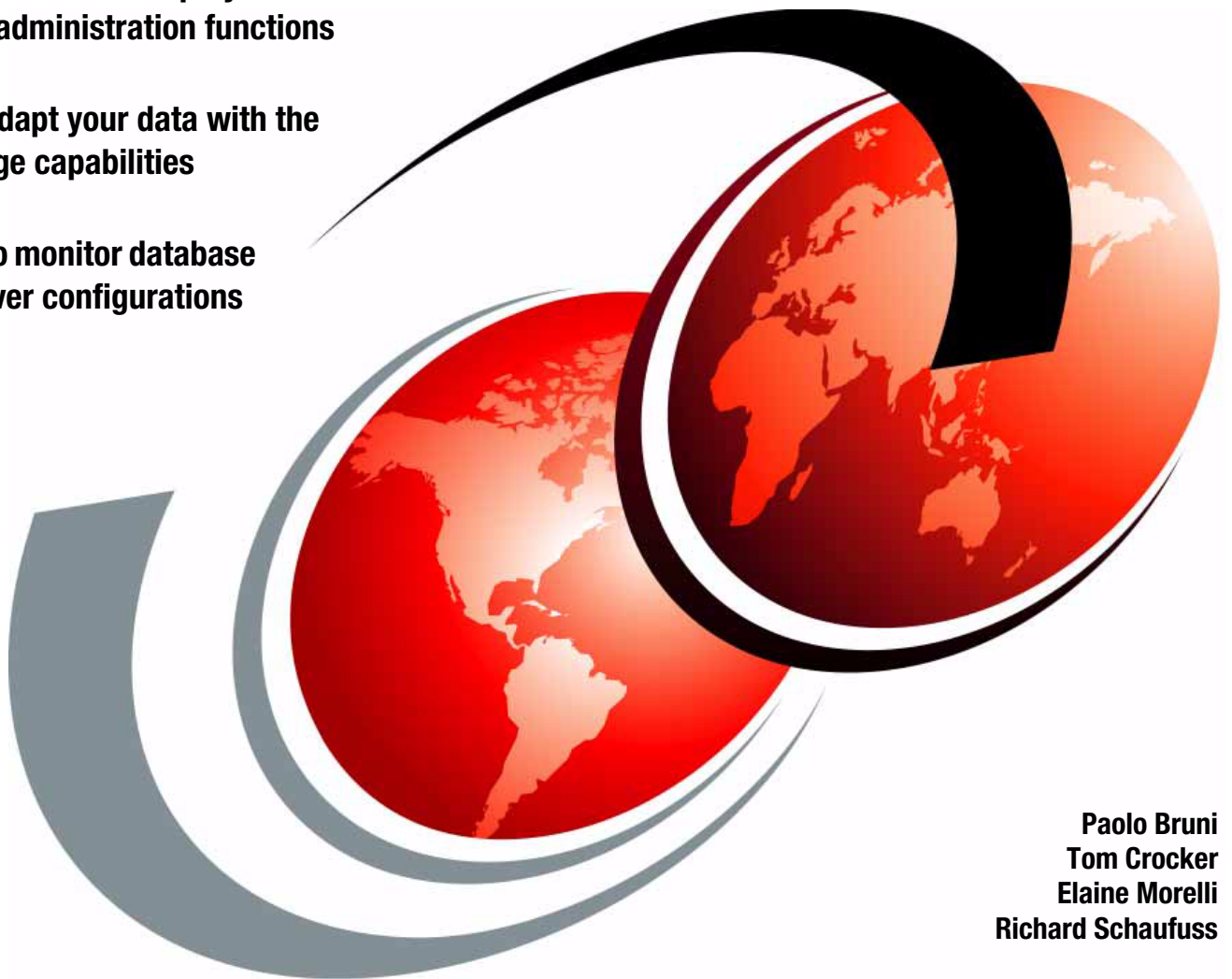# DB2 Administration Solution Pack for z/OS

Streamlining DB2 for z/OS Database Administration

Understand how to simplify the database administration functions

Learn to adapt your data with the new change capabilities

See how to monitor database client/server configurations

Paolo Bruni
Tom Crocker
Elaine Morelli
Richard Schaufuss

Redbooks

International Technical Support Organization

DB2 Administration Solution Pack for z/OS: Streamlining DB2 for z/OS Database Administration

August 2013

Note: Before using this information and the product it supports, read the information in "Notices" on page xvii.

First Edition (August 2013)

This edition applies to Version 1.1 of IBM DB2 Administration Solution Pack for z/OS (program number 5697-DAM).

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Preface

IBM® DB2® tools for z/OS® support and exploit the most current versions of DB2 for z/OS. These tools are integral for the administration of the DB2 for z/OS environment and optimization of data performance.

DB2 Administration Solution Pack for z/OS V1.1 (5697-DAM) offers features, functions, and processes that database administrators (DBAs) can use to more effectively and efficiently manage DB2 environments.

DB2 Administration Solution Pack for z/OS is composed of the following tools:

► IBM DB2 Administration Tool for z/OS
► IBM DB2 Object Comparison Tool for z/OS
► IBM InfoSphere® Optim™ Configuration Manager for DB2 for z/OS
► IBM DB2 Table Editor for z/OS

This IBM Redbooks® publication shows how the delivered capabilities can help DBAs to more easily complete tasks associated with object management, change management, application management, and configuration management.

Authors

This book was produced by a team of specialists from around the world working at the International Technical Support Organization, San Jose Center.

Paolo Bruni is a DB2 Information Management Project Leader at the International Technical Support Organization, based at the Silicon Valley Lab. He has authored several IBM Redbooks publications about DB2 for z/OS and related tools and has conducted workshops and seminars worldwide. During Paolo's many years with IBM, in development and in the field, his work has been mostly related to database systems.

Tom Crocker is a Senior IT Specialist working in the United Kingdom as a Client Technical Advisor specializing in DB2 Tools and DB2 Engine. Tom has over 20 years experience in data management and has worked for IBM for the last 10 years, first as a DB2 DBA supporting SAP on IBM OS/390® and for the last eight years in Technical Pre-Sales. Before joining IBM, he worked as an independent consultant and has experience in the insurance, banking, and retail industries. He is also an author of another IBM Redbooks publication about DB2 utilities.

Elaine Morelli is an Executive IT Specialist with the North America IBM System z® Database Tools Team. Elaine's expertise is in the DB2 database tools arena with a specialization in DB2 administration. Elaine has over 25 years in IT experience, 11 of which have been at IBM in a Technical Sales Specialist role. In the past, she has been an Application Developer, a DOS/VSE Systems Programmer, a DBA for DB2, IDMS, IBM Informix®, and Oracle. Elaine has presented at various local user groups and technical conferences across the United States. She is the IBM sponsor for the Tampa Bay Relational User Group.

Richard Schaufuss is a Software Engineer working as a Developer on the DB2 Administration Tool for z/OS. Rich joined IBM 11 years ago and, after four years of working on DB2 for z/OS development, has moved to DB2 Tools for z/OS, first supporting customers in the field and recently as developer. He has recently participated in designing and writing the certification exams for DB2 10 for z/OS.

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Part 1

DB2 Tools Solution Packs

This part introduces the DB2 Tools Solution Packs and contains the following chapters:

1

The DB2 Tools Solution Packs

In IT environments today, data growth remains the biggest challenge, followed by scalability and performance, and cost containment. Data management must drive competitive advantage, and business continuity and availability drive strategic plans. Critical to success is the ability to maintain or improve user service levels and satisfaction while growth of or new data centers is driving the need for consistent technology and architectural decisions to maximize purchase decisions.

For DB2 environments, DB2 tools and tools solution packs have the following main objectives:

► Reducing costs
► Increasing responsiveness
► Maximizing IT staff productivity

Tools are getting functional improvements, more integration, and incorporating autonomic solutions and best practices.

Solution packs address the areas of common activities that the database administrators (DBAs) deal with regularly:

► Managing the database
► Managing the data
► Managing the performance

Solution packs offer a complete solution for all needs in the area rather than you having to purchase multiple products with simplified installation and maintenance. They have built-in intelligence regarding when and how actions are performed, optimizing the performance and resource utilization that is associated with DBA activities.

This chapter contains the following topics:

► DB2 Tools Solution Packs
► Overview of the IBM Tools Customizer

3

1.1 DB2 Tools Solution Packs

Solution packs combine several products into a single consolidated solution providing everything necessary to ensure the execution of a set of database administration functions. The objectives are to reduce the operational complexity and reduce cost.

IBM currently offers the following four DB2 Tools Solution Packs (the program number in each pack is a product that combines several IBM components into a consolidated solution to help you manage your DB2 for z/OS environment):

► IBM DB2 Administration Solution Pack (program number: 5697-DAM); see Figure 1-1.
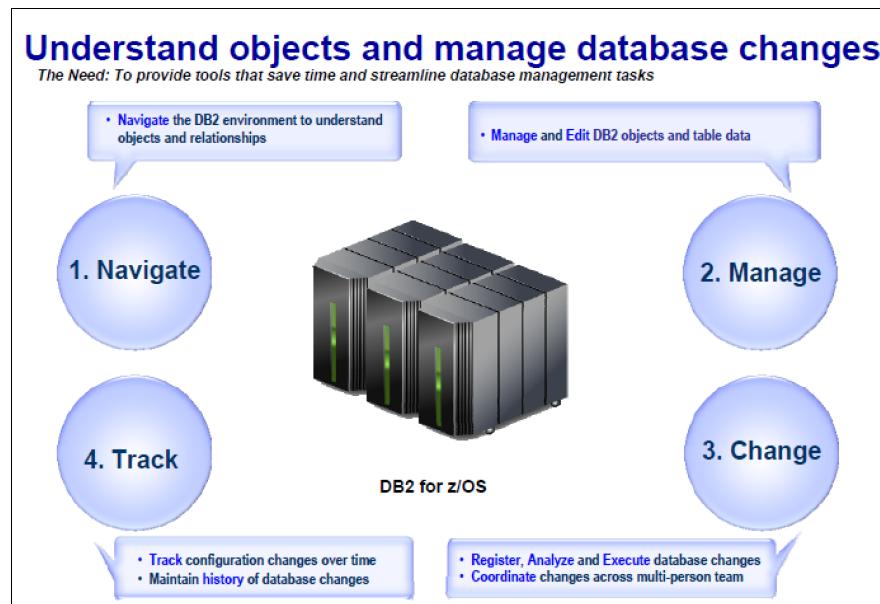
Figure 1-1   DB2 Administration Solution Pack

IBM DB2 Administration Solution Pack for z/OS includes the following components:

– DB2 Administration Tool for z/OS Version 10.2
– DB2 Object Comparison Tool for z/OS Version 10.2
– DB2 Table Editor for z/OS Version 4.4
– InfoSphere Optim Configuration Manager for DB2 for z/OS Version 2.2

The focus of this publication is on the use of the DB2 Administration Solution Pack. The book explores scenarios for the execution of DB2 database administration functions.

► IBM DB2 Utilities Solution Pack (program number 5697-DUM) Version 1.1; see Figure 1-2.
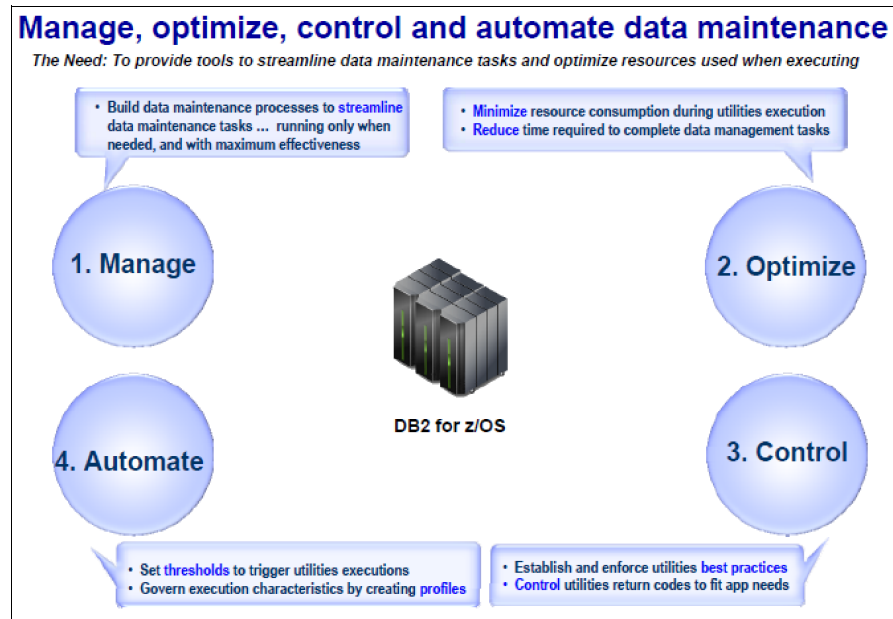
Figure 1-2   DB2 Utilities Solution Pack

IBM DB2 Utilities Solution Pack for z/OS is a product that combines several IBM components into a consolidated solution that enables enterprises to efficiently and intelligently run utilities, while optimizing the performance of daily utilities management activities. It combines the following components into a single offering:

– IBM DB2 Automation Tool for z/OS Version 4.1
– IBM DB2 High Performance Unload for z/OS Version 4.2
– IBM DB2 Sort for z/OS Version 1.3
– IBM DB2 Utilities Enhancement Tool for z/OS Version 2.2

► IBM DB2 Fast Copy Solution Pack (program number: 5697-DFM) extends the DB2 Utilities Solution Pack by integrating the technology available with IBM DS8000® FlashCopy®.

Typically FlashCopy disk-storage-related tools do not address needs of the database administrator. IBM DB2 Fast Copy Solution Pack for z/OS, Version 1 Release 1 combines several IBM components into a consolidated solution that uses fast replication technology to optimize availability, performance, and resource utilization when you back up, recover, and clone DB2 subsystems or DB2 objects. It contains the following components:

– IBM DB2 Cloning Tool for z/OS Version 3.1
– IBM DB2 Recovery Expert for z/OS Version 3.1

► IBM DB2 Performance Solution Pack (program number: 5655-E74); see Figure 1-3.
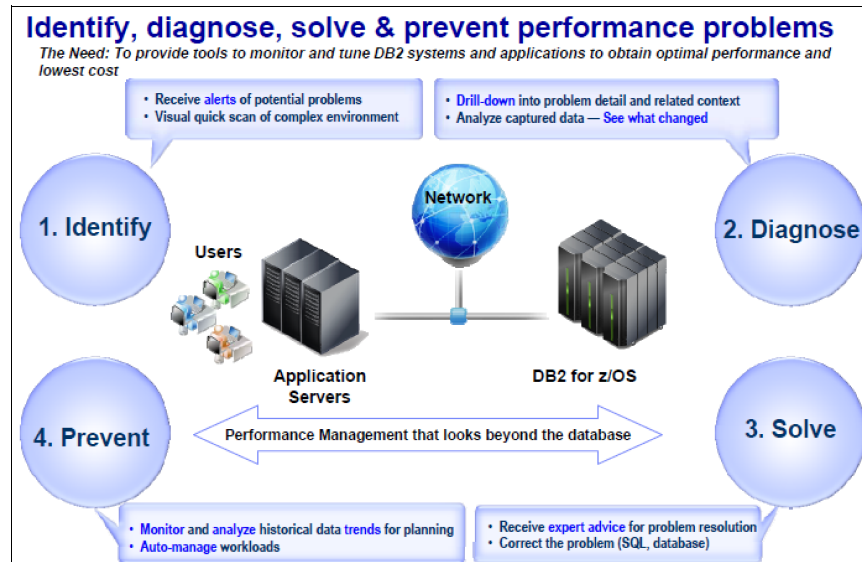
Figure 1-3 DB2 Performance Solution Pack

IBM DB2 Performance Solution Pack for z/OS, V1.1 delivers integrated performance management capabilities for DB2 for z/OS by combining the functionality from the following components:

– IBM Tivoli® OMEGAMON® XE for IBM DB2 Performance Expert on z/OS, V5.1.1
– IBM DB2 Query Monitor for z/OS, V3.1
– IBM DB2 SQL Performance Analyzer for z/OS, V4.1
– IBM InfoSphere Optim Query Workload Tuner for DB2 for z/OS, V3.2

The DB2 Tools documentation is available at the following address:

http://www.ibm.com/support/docview.wss?uid=swg27020910

1.2 Overview of the IBM Tools Customizer

IBM Tools Customizer provides a standard solution for installing and customizing the DB2 Tool products.

The IBM Tools Customizer (TCz in Figure 1-4 on page 7) helps with post-SMP/E customization of z/OS tool products. The goal is to provide a more consistent, usable, and simple solution for the customization of multiple z/OS products. See Figure 1-4 on page 7.

The Tools Customizer is a common customization utility for all DB2 and IBM IMS™ Tool products and provides the following benefits:

► Fast consumability: faster time to tools usage

Because of automatic discovery of previous release customization parameters, less manual entry is necessary. Product templates are customized by Tools Customizer. It provides job execution sequence.

► Easy customization of multiple tools

In a step-by-step fashion, with help text and ISPF panel-driven dialogs that have a similar "look and feel" to each other, you can specify customization of multiple products.

► Faster propagation of customization across multiple logical partitions (LPARs)

Resulting product customized jobs can be saved on shared DASD, or the user can transmit to other systems for usage on other LPARs.

► Easier upgrades

Parameters from previous customization are saved for future new product releases and DB2 or IMS upgrades.
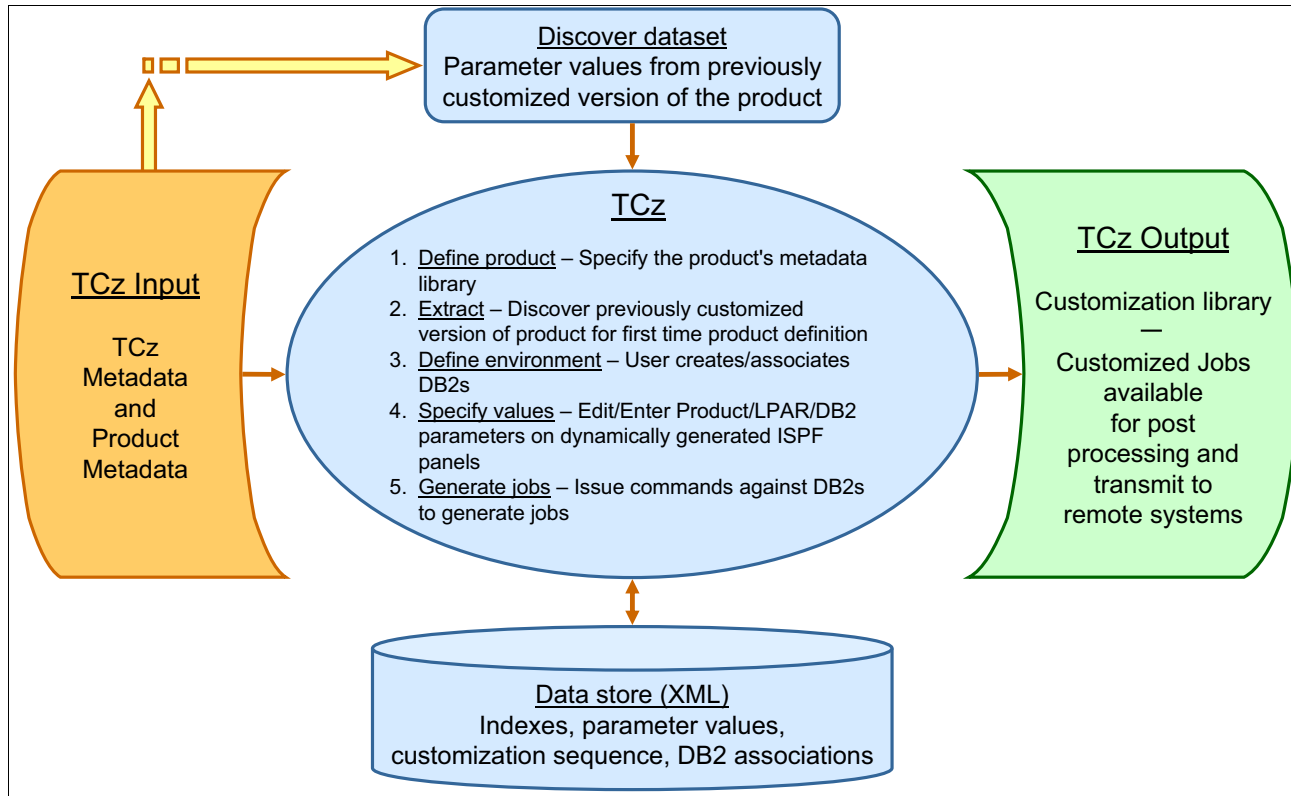
Figure 1-4   Tools Customizer framework

The main features are as follows:

► A new standard for post SMP/E customization of DB2 Tools and IMS Tools products

► A more consistent, usable, and simple solution for the customization of multiple products

► An ISPF user interface that guides you through the customization process, assisting you in the following main tasks:

  – Initial customization and recustomization of products

  – Discovering previous customization of a product

  – Guidance through the steps of customization with dynamically generated ISPF product panels

  – Entry of parameter values that are required by the products that are being customized

  – Reuse and sharing of configuration settings across products through a common XML repository

  – Customization of product templates

  – Display of the job execution sequence

Prior to the solution pack, the tools came as individual products, and they can still be ordered individually. The Tools Customizer installation requires that each solution pack or product provides a metadata file, which confirms to Tools Customizer requirements, and instructions for how to perform the installation, what parameters are required, what jobs must be generated to complete the installation. The approach to installing any product using with Tools Customizer is to acquire the metadata file (the file that has a LLQ starting SxxxDENU, where xxx is the product code) from the initial SMP/E installation, and then load it into Tools Customizer. Tools Customizer then adds that product or components to the Tools Customizer installation list. See Figure 1-5.

```
TCUSTMZR                  Select the Components to Customize      Row 1 to 4 of 4
Command ===>                                                      Scroll ===> PAGE


Select one or more components to customize. Press Enter to continue
or End to cancel.


Pack metadata library . : DBTLSP.SBBVDENU
Pack to customize . . . : DB2 Administration Solution P  > Version . : 1.1.0


Line commands: / - Select
  Cmd Name                                    Version Customization Status
   -  ------------------------------------->  ------- ---------------------
      DB2 Administration Tool for z/OS        10.2.0  Customized
      DB2 Object Comparison Tool for z/OS     10.2.0  Customized
      DB2 Table Editor for z/OS               4.4.0   Customized
      InfoSphere Optim Configuration Manager  2.2.0   Not Applicable
---------------------------- End of components ----------------------------
```

Figure 1-5   Components of the Administration Solution Pack after loading the metadata file

Next, the installation process is the same for each component or product. It adheres to the order in the following list of tasks:

1. Select the component to customize.
2. Associate DB2 entries to the component.
3. Customize the component parameters.
4. Customize the LPAR parameters.
5. Customize the DB2 entry parameters.
6. Generate the job streams.
7. Submit the jobs.

After completion of these tasks, the components are ready for the optional tasks and then ready to use. If you make an error, you can always change a parameter and regenerate the job stream. Some jobs are foolproof in that they can be rerun without change; others might require you to delete a file, database, and so on, before rerunning. In some cases, one or more of the steps are not necessary to do, depending on the component that is being customized. For example, DB2 Object Comparison Tool requires DB2 entries to be associated but there are no DB2 parameters needed for any of these entries.

An approach to running the job streams is to review all the jobs first before running the first one. Understand what each job does and determine any dependencies on previous jobs, or associations with other products (that is, does it refer to DB2 Automation for example, or does it use other services such as DB2 Administration Scheduler). Begin your installation only when you are sure that you thoroughly understand the implications of running the job stream.

The components of the DB2 Administration Solution Pack are listed in Table 1-1.

Table 1-1   5697-DAM Administration Solution Pack

FMID[a]	Component	HLQ[a]	Notes
HDAM110	Solution Pack	DBTLSP	Default HLQ BBV
H0IHA20	DB2 Administration Tool 10.2	DBTLSP	Product MLQ ADB
H25GA20	DB2 Object Comparison Tool 10.2	DBTLSP	Product MLQ GOC
H25K140	DB2 Table Editor 4.4	DBTLSP	Product MLQ ETI
HAI6220	InfoSphere Optim Configuration Manager 2.2	DBTLSP	N/A

a. function modification identifier (FMID); high-level qualifier (HLQ)

The components of DB2 Utilities Solution Pack are listed in Table 1-2.

Table 1-2   5697-DUM DB2 Utilities Solution Pack

FMID	Component	HLQ	Notes
HBBY110	Solution Pack	DBTLSP	Default HLQ BBY
H25HKN0/H25H410	Automation 4.1	DBTLSP	Product MLQ HAA
HCNK130	DB2 Sort 1.3	DBTLSP	Product MLQ CNK
HINZ420	High Performance Unload	DBTLSP	Product MLQ INZ
H2AM220	Utilities Enhancement Tool 2.2	DBTLSP	Product MLQ ABP

The components of DB2 Fast Copy Utilities Solution Pack are listed in Table 1-3.

Table 1-3   5697-DFM DB2 Fast Copy Utilities Solution Pack

FMID	Components	HLQ	Notes
HBBX110	FC Solution Pack	DBTLSP	Default HLQ BBX
H30RKN0/H30R310	Recovery Expert	DBTLSP	Product MLQ ARY
HCKZ310	Cloning Tool	DBTLSP	Product MLQ CKZ

The components of DB2 Performance Solution Pack are listed in Table 1-4.

Table 1-4   5655-E74 Performance Solution Pack

FMID	Component	HLQ	Notes
HBPF110	Solution Pack	DBTLSP	Default HLQ BPF
H238310/H238KN0/H25F132	DB2 Query Monitor 3.1	DBTLSP	Product MLQ CQM
H1D0410	DB2 SQL Performance Analyzer 4.1	DBTLSP	Product MLQ ANL
HKDB511/HKDB51T/JKDB51W/HKOB700/HPM7511	Tivoli OMEGAMON XE for IBM DB2 Performance Expert 5.1.1	DBTLSP	Product MLQ FPE
H2AQ320	InfoSphere Optim Query Workload Tuner 3.2	DBTLSP	Product MLQ AOC

To install solution packs, you also need the IBM Tools Customizer product 5655-V93, which consists of the components listed in Table 1-5.

Table 1-5   5655-V93 IBM Tools Customizer product

FMID	Component	HLQ	Notes
HAHN130	IBM Tool Base for z/OS	DBTLSP	Default HLQ GLX
HTCZ110	IBM Tool Customizer	DBTLSP	Default HLQ CCQ

1.2.1 Installing the base for solution packs

All solution packs are installed through the IBM Tool Customizer product. A local CLIST was used to open the Tools Customizer primary options panel. At our installation, we created a CLIST named DB2TOOLS (Figure 1-6) and invoked it from the following TSO command line:

```
TSO DB2TOOLS CLIST
```

```
/* REXX */
ADDRESS ISPEXEC "SELECT PANEL(DB2TOOLS)";
EXIT
```

Figure 1-6   DB2TOOLS initial CLIST

This CLIST invokes the panel member of Figure 1-7 which displays our local DB2TOOLS panel. From here, you can invoke the Tools Customizer startup CLIST from the installed CCQ[1].

```
-------------------- DB2 Tools Primary Options Menu -------------------
 OPTION ===>
                                                        USERID - ADMR2
 Select an option from below.                           DATE   -13/01/31
                                                        TIME   - 09:22

      A Admin.       - Administration Tool
      T Automation   - Automation Tool
      C Cloning      - Cloning Tool
      I HPU          - High Performance Unload
      R RE           - Recovery Expert
      U UET          - Utilities Enhancement Tool

      L LP           - DB2 Launchpad
      Z TCZ          - Toolkit Customization

      X EXIT         - Exit
```

Figure 1-7   DB2 Tools initial panel

The Tools Customizer option calls the default Tools Customizer initial CLIST (CCQTCZ) from the CCQ.SCCQEXEC library. This displays the Tools Customizer primary menu. See Figure 1-8. We then set up our default options according to the instructions in *IBM DB2 Administration Solution Pack for z/OS Version 1 Release 1 Overview and Customization*, SC19-3785.

```
TCUSTMZR                  IBM Tools Customizer for z/OS              09:29:48
Option ===>


Select an option.



0. User settings for Tools Customizer
1. Customize a product

X. Exit
```

Figure 1-8   Tools Customizer Initial CLIST

---

[1] CCQ is the three-character identifier of the TCz product (all module names start with CCQ).

Selecting Option 0, we set up our user settings as shown in Figure 1-9.

```
TCUSTMZR                    Tools Customizer Settings                   09:34:23
Command ===>


Enter the settings for customizing a product or press End to save and exit.


Commands: SAVE - Save user settings

 Product Customization Settings

   Customization library qualifier . . DB2TOOLS.JCL
   Use DB2 group attach  . . . . . . . NO  (YES/NO)

 Tools Customizer Library Settings

   Metadata library . . . . . DBTLSP.SCCQDENU
   Discover output data set . DB2TOOLS.DISCOVER
   Data store data set  . . . DB2TOOLS.DATASTOR

 User Job Card Settings for Customization Jobs

 ===> //          JOB (999,POK),'RE',
 ===> //          REGION=0M,NOTIFY=&SYSUID,
 ===> //          MSGCLASS=X,CLASS=T
 ===> //PROCLIB JCLLIB ORDER=DBOAM.PROCLIB
 ===> /*JOBPARM SYSAFF=SC63
```

Figure 1-9   Tools Customizer user settings

Several field settings are explained in Table 1-6.

Table 1-6   User settings for Tools Customizer

Setting	Description	Sample value
Customization Library Qualifier	A high level prefix that is used for the customization data set for each component.	Example: DB2TOOLS.JCL.£ssid£.ADB102[a]
Metadata library	Tools Customizer metadata library for DB2 and LPAR parameters	We use the IBM supplied library: DBTLSP.SCCQDENU
Discovery output data set	Used by the DISCOVER EXEC for the discovery of information from previous installations.	We are not using the DISCOVER EXEC (although required, this does not apply to our installation).
Data store data set	Tools Customizer stores information and LPAR, DB2 and parameter values	We specified this value: DB2TOOLS.DATASTOR

a. The example shows GBP pound sign and ssid. They are the national currency symbol (country-dependent) and the LPAR name. For example, users in the USA will see $lpar$, as C717086.ADBA2MPE.CUST.$SY4A$.ADB1020.

After saving these options, you can continue with the installation of the solution packs.

2

The Tools Customizer

This chapter describes the basic aspects of the DB2 Tools Customizer (TCz) component that is now a standard installation procedure for most DB2 Tools for z/OS. The chapter introduces the various steps that are used in the TCz component. Regarding the DB2 Administration Solution Pack, a more specific example is in Chapter 3, "Installing the DB2 Administration Solution Pack" on page 27.

The steps that are used in the TCz component are as follows:

► Component selection
► Installation discovery
► DB2 entries and association
► Component customization
► Generation of customization jobs

2.1 Component selection

Every component that is installed through Tools Customizer requires a metadata library. This is normally included in a $DENU$ type library[1]. For this solution pack, the DENU library is named DBTLSP.SBBVDENU. To begin the installation process, specify option 1 on the Tools Customizer primary menu and enter the name of the metadata library. The next panel (Figure 2-1) shows which components must be customized to install this solutions pack.

```
TCUSTMZR                Select the Components to Customize      Row 1 to 4 of 4
Command ===>                                                   Scroll ===> PAGE


Select one or more components to customize. Press Enter to continue
or End to cancel.

Pack metadata library . : DBTLSP.SBBVDENU
Pack to customize . . . : DB2 Administration Solution P  > Version . : 1.1.0


Line commands: / - Select
  Cmd Name                                    Version Customization Status
   -  ------------------------------------->  ------- ----------------------
      DB2 Administration Tool for z/OS        10.2.0  Not Found
      DB2 Object Comparison Tool for z/OS     10.2.0  Not Found
      DB2 Table Editor for z/OS               4.4.0   Not Found
      InfoSphere Optim Configuration Manager  2.2.0   Not Applicable
--------------------------- End of components ----------------------------
```

Figure 2-1   Tools Customizer Customization screen for Administration Solution Pack

You can select one or multiple tools to customize. If selecting multiple, the tools are customized in the order of the selection list.

---

[1] After a product or a pack is SMP/E installed, the default name of the metadata library is `hlq.SxxxDENU`, where `hlq` is the high-level qualifier for the product or the pack, and `xxx` is the three-character prefix for the product or the pack.

2.2 Installation discovery

After selecting a product to install, the screen in Figure 2-2 is displayed. It provides information about DISCOVER EXEC, which can be invoked to "discover" customized detail from a previous installation of the administration tools component, assuming it was installed with Tools Customizer, either singly or as a solution pack, and the metadata written to the previous STORDATA and DISCOVER files. The DB2 Administration Tool for z/OS can discover from a previously installed Version 10 product. See Figure 2-2.

```
TCUSTMZR                      Customizer Workplace
Command ===>                                            Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.


Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU        > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0


EssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
e TCUSTMZR                       Run Discover EXEC                          e
e                                                                           e
e If DB2 Administration Tool for z/OS                                       e
e has been customized before, you can run the Discover EXEC to retrieve     e
e information from that customized version. Otherwise, if you are either     e
e customizing this component for the first time or you have not customized  e
e the component yet, continue the customization process because information e
e to be discovered does not exist.                                          e
e                                                                           e
e To go to the Discover Customized Component Information panel and run the  e
e Discover EXEC, press Enter. To return to the Customizer Workplace panel   e
e without running the Discover EXEC, press End.                             e
e                                                                           e
e                                                                           e
e                                                                           e
DssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
```

Figure 2-2   Initial customization panel with the DISCOVER EXEC option

2.3 DB2 entries and association

One of the elements of the installation of a product is associating the DB2 subsystem to the components within the packs. You can create the necessary DB2 entries through the **ASSOCIATE** command on the Customizer Workplace panel. See Figure 2-3.

```
TCUSTMZR                    Customizer Workplace
Command ===>                                           Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.


Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Incomplete
    LPAR parameters . . .: Incomplete

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date         Status
    ------------------------- End of DB2 entries ----------------------------
```

Figure 2-3   Create the DB2 entries using the ASSOCIATE command

After you enter the **ASSOCIATE** command, the DB2 entry association panel is displayed (Figure 2-4). In this sample, there are no DB2 entries that are yet associated with the product. To create a new DB2 entry, issue the **CREATE** command on this panel.

```
TCUSTMZR              Associate DB2 Entry for Component       Row 1 to 3 of 3
Command ===>                                           Scroll ===> PAGE


Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
subsystems, data sharing members, and group attach names on which to
customize the component.


Commands:  CREATE - Create a new DB2 entry


Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0

Line commands: A - Associate  C - Copy

Cmd SSID GrpAttch
----------------------------- End of DB2 entries -----------------------------
```

Figure 2-4   Creating new DB2 entries

In the panel that opens, create a new DB2 entry, as shown in Figure 2-5.

```
TCUSTMZR              Associate DB2 Entry for Component       Row 1 to 3 of 3
Command ===> create                                     Scroll ===> PAGE


Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
s EssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
c e TCUSTMZR                    Create a DB2 Entry                        e
  e Command ===>                                                         e
C e                                                                      e
  e Specify a DB2 subsystem ID, a DB2 group attach name, or both for the e
  e new DB2 entry. Press Enter to continue or End to cancel.            e
P e                                                                      e
  e  New DB2 Entry Information                                           e
  e    DB2 subsystem ID . . . . . DBOA                                   e
  e    DB2 group attach name  . .                                        e
L e                                                                      e
  e                                                                      e
C e                                                                      e
  e                                                                      e
  DssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
------------------------------ End of DB2 entries -----------------------------
```

Figure 2-5   Creating a new DB2 entry

Next, enter the subsystem (or member name, if data sharing) and the group attach name, if
data sharing, and then press Enter to save the entry. Keep in mind that the DB2 entry must be
created only once for each product (if installing products individually) or once per solution
pack. Each DB2 entry must be associated for each product, however. After you press Enter,
you are returned to the DB2 entry association panel. You can see that three entries are
already created using the **CREATE** command as presented in the example in Figure 2-6 on
page 18. These are the DB2 subsystems in our environment.

You can now associate the entries for DB0A and DB0C to solution pack components by selecting those entries with the **Associate** line command.

```
TCUSTMZR              Associate DB2 Entry for Component        Row 1 to 3 of 3
Command ===>                                            Scroll ===> PAGE


Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
subsystems, data sharing members, and group attach names on which to
customize the component.


Commands:  CREATE - Create a new DB2 entry



Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU         > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0


Line commands: A - Associate  C - Copy


Cmd SSID GrpAttch
 A  DB0A   --
 A  DB0C   --
    DB0D   --
----------------------------- End of DB2 entries -----------------------------
```

Figure 2-6   Creating and associating DB2 entries to a solution pack

2.4 Component customization

After one or more DB2 entries are associated with a component, customization of a component can begin. The parameter status field provides information about two areas of customization: component and LPAR. These parameters must be provided (incomplete) or checked and edited before continuing with the component customization. See Figure 2-7.

```
TCUSTMZR                   Customizer Workplace              Row 1 to 2 of 2
Command ===>                                                 Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU        > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Incomplete
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
      DB0A  --       101 NFM  ADMR8    2013/04/17    Ready to Customize
      DB0C  --       101 NFM  ADMR8    2013/04/17    Ready to Customize
    ------------------------- End of DB2 entries ----------------------------
```

Figure 2-7   Component and LPAR status

Complete the component customization by entering the **E** (for Edit) line command for the component parameters option. A panel with the related component parameters is displayed. The parameters must be customized for your installation. For details about the parameters, consult the related component installation and customization guide, which is available at the the following link:

http://www.ibm.com/support/docview.wss?uid=swg27020910

As an example, Figure 2-8 shows the first page from the DB2 Administration Tool component parameter panel.

```
TCUSTMZR                    Component Parameters                      16:35:20
Command ===>                                                Scroll ===> PAGE


Complete the following tasks to customize the components. The required tasks
and steps are preselected. Ensure that all parameters are specified for each
selected step within a task. Press End to save and exit.


Commands: SAVE - Save parameter values
Line Commands: / - Select

 Pack to Customize .: DB2 Administration Solution Pac >  Version . : 1.1.0
   Component metadata library : DBTLSP.SADBDENU        >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Administration Too >  Version . : 10.2.0

Component customization library: DBTLSP.CUST.$SC63$.ADB1020
                                                             More:     +


IMPORTANT:
 (1) Values specified here apply to every DB2 SSID unless you specify
   values for parameters with the same names on the DB2 Parameters panel. In
   this case, the values on the DB2 Parameters panel override the values on
   the Product Parameters panel. (2) To enable the "Change Management" task,
   first edit the product parameters for the DB2 subsystem and specify a
   value for the "Change Management database objects owner" parameter. Then,
   return to this panel to select the "Change Management" task.


 Required parameters
 DB2 Admin product load library . . . . . . DBTLSP.SADBLLIB    >    Add...
 DB2 Admin product REXX library . . . . . . DBTLSP.SADBEXEC    >    Add...
 Customized parameters table library  . . . DBTLSP.SADBTLIB          >
 DB2 Admin tool high-level qualifier  . . . DBTLSP                   >
 (Global) System identification method  . . JESID
 (Global) Type of DB2 security exit . . . . STD                     List...
 (Global) JOB class for DB2 utilities . . . A
 (Global) Installation name . . . . . . . .                         >
 (Global) JES node name . . . . . . . . . .
 (Global) Utility data set prefix . . . . .
 (Global) SYSAFF for DB2 utilities  . . . .
 DB2 Admin APF library  . . . . . . . . . . DBTLSP.SADBLINK         >
 JES3 system  . . . . . . . . . . . . . . . NO  (NO, YES)
 (Global) Remote DB2 subsystem name . . . .
 (Global) Remote location name  . . . . . .
 (Global) Authorization switching . . . . . NO  (NO, YES)
```

Figure 2-8   Example of DB2 Administration Tool component parameters

After the component and LPAR parameters are updated and saved, the component is ready to have the individual DB2 entries customized. Select an **E** for each DB2 entry on the customizer workplace panel. The DB2 parameter panel for that DB2 entry is displayed. Make sure that you add SDSNLOAD to the RUN execution libraries if this library is not in your LINKLIST. This parameter entry is in the DB2 Parameters panel. See Figure 2-9.

```
TCUSTMZR                       DB2 Parameters                      11:47:13
Command ===>                                            Scroll ===> PAGE


Enter values for all of the DB2 parameters. Press End to save and exit.


Commands: SAVE - Save parameter values


 Pack to Customize .: DB2 Administration Solution Pac >   Version . : 1.1.0
   Component metadata library : DBTLSP.SADBDENU       >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Administration Too > Version . : 10.2.0


                                                          More:     +


 DB2 subsystem ID . . . . . . . . . . . . : DB0A
 Group attach name . . . . . . . . . . . . :
 Type of DB2 security exit . . . . . . . . . STD                     List...
 Started task name for MSTR services . . . . DB0AMSTR
 Number of job steps in DSNUPROC procedure



 General DB2 Information
  Mode . . . . . . . . . . . . . . . . . . . NFM (CM, CM8, CM9, NFM)
  Level Number . . . . . . . . . . . . . . . 101 (810, 910, 101)


 DB2 Libraries
  Load Library . . . . . . . . . . . . . . . DB0AT.SDSNLOAD      >    Add...
  Run Library  . . . . . . . . . . . . . . . DB0AM.RUNLIB.LOAD   >    Add...
  Exit Library . . . . . . . . . . . . . . . DB0AT.SDSNEXIT      >    Add...
  Message Library  . . . . . . . . . . . . . DB0AT.SDSNSPFM      >    Add...
  Panel Library  . . . . . . . . . . . . . . DB0AT.SDSNSPFP      >    Add...
  Skeleton Library . . . . . . . . . . . . . DB0AT.SDSNSPFS      >    Add...
  Table Library  . . . . . . . . . . . . . . DB0AT.SDSNSPFT      >    Add...
  REXX EXEC library  . . . . . . . . . . . .                     >    Add...
  CLIST library  . . . . . . . . . . . . . . DB0AT.SDSNCLST      >    Add...


 DB2 Utilities
  JOB class name for DB2 utilities . . . . .
  SYSAFF for DB2 utilities . . . . . . . . . SC63
  Plan name for the DSNTEP2 utility  . . . . DSNTEP10


 DB2 Admin Subsystem Parameters
  DB2 subsystem description  . . . . . . . .                            >
```

Figure 2-9   DB2 Parameters for individual DB2 Entries

When you look at the component parameters and the parameters that are associated with a specific DB2 entry, you might see an overlap of parameters. This is to allow users to tailor some of these items by subsystem.

2.5 Generation of customization jobs

After all of the individual DB2 entries associated with a component are customized, the **GENERATEALL** command can be issued to generate the JCL to customize the product. If you want to generate customization jobs for specific DB2 entries, specify the **G** line command for the DB2 entry. See Figure 2-10. If any steps are not complete or any information is missing, you are prevented from generating jobs (either singly or with **GENERATEALL**).

```
TCUSTMZR                 Finish Component Customization        Row 1 to 26 of 30
Command ===>                                                   Scroll ===> PAGE

Submit the members in the order in which they apply to all DB2 entries. To
submit the job, browse the member and issue the TSO SUBMIT command, or browse
the customized library and submit the jobs from there.

Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU           > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool   > Version . : 10.2.0

Line Commands: E - Edit  B - Browse

    Component customization library: DBTLSP.CUST.$SC63$.ADB1020

 Cmd Member   SSID GrpAttch Template Date        Description
 -   -------- ---- ----     -------- ---------- ------------------------------>
     A0CUSTAA DB0A --       ADBCUST  2013/04/17 General customization
     A0CUSTAB DB0C --       ADBCUST  2013/04/17 General customization
     A1OPTSAA DB0A --       ADBOPTS  2013/04/17 Main menu options
     A1OPTSAB DB0C --       ADBOPTS  2013/04/17 Main menu options
     A2FB2VAA DB0A --       ADBFB2VB 2013/04/17 Copy FB to VB libraries
     A2FB2VAB DB0C --       ADBFB2VB 2013/04/17 Copy FB to VB libraries
     A3CHKPAA DB0A --       ADBCHKPT 2013/04/17 Create DB2 checkpoint objects
     A3CHKPAB DB0C --       ADBCHKPT 2013/04/17 Create DB2 checkpoint objects
     A7BINDAA DB0A --       ADBBIND  2013/04/17 Binds
     A7BINDAB DB0C --       ADBBIND  2013/04/17 Binds
     A8CATVAA DB0A --       ADBCATVT 2013/04/17 DB2 catalog copy
     A8CATVAB DB0C --       ADBCATVT 2013/04/17 DB2 catalog copy
     A9PRHIAA DB0A --       ADBPRHIS 2013/04/17 AUTOSTATS
     A9PRHIAB DB0C --       ADBPRHIS 2013/04/17 AUTOSTATS
     B0RUNSAA DB0A --       ADBRUNSV 2013/04/17 Create views
     B0RUNSAB DB0C --       ADBRUNSV 2013/04/17 Create views
     B1RESTAA DB0A --       ADBREST  2013/04/17 Reverse Engineering
     B1RESTAB DB0C --       ADBREST  2013/04/17 Reverse Engineering
     B3CX10AA DB0A --       ADBCX10  2013/04/17 Create V10 indexes
     B3CX10AB DB0C --       ADBCX10  2013/04/17 Create V10 indexes
     B42RCPAA DB0A --       ADB2RCPC 2013/04/17 Stored procedure for running re
     B42RCPAB DB0C --       ADB2RCPC 2013/04/17 Stored procedure for running re
     B5TEP2AA DB0A --       ADBTEP2R 2013/04/17 ADBTEP2
     B5TEP2AB DB0C --       ADBTEP2R 2013/04/17 ADBTEP2
     B6CFGBAA DB0A --       ADBCFGBD 2013/04/17 Bind DB2 Admin package on OCM r
     B6CFGBAB DB0C --       ADBCFGBD 2013/04/17 Bind DB2 Admin package on OCM r
     B7CFGPAA DB0A --       ADBCFGPM 2013/04/17 Deploy settings for OCM integra
     B7CFGPAB DB0C --       ADBCFGPM 2013/04/17 Deploy settings for OCM integra
     B8LIMAA  DB0A --       ADBLIM   2013/04/17 Sample job to run the ADBLIM pr
     B8LIMAB  DB0C --       ADBLIM   2013/04/17 Sample job to run the ADBLIM pr
------------------------- End of customized jobs --------------------------
```

Figure 2-10   Output from the GENERATEALL command

Note that the jobs generated vary based on the number of options selected and the number of DB2 entries associated with the chosen component. The jobs can now be submitted to customize the component. To run a generated job, enter the `E` (edit) line command for the generated job you want, and submit the job.

Check each job carefully before submitting it. *If you must change the JCL, do not change it.* Instead, first go back to the component, LPAR, or DB2 entry parameters and try to locate the parameter that relates to the change you want to make. Correct that parameter and GENERATE the jobs again. This way saves you from having to abort the installation later when you find that subsequent jobs fail because of a related parameter you modified manually in the generated JCL.

Part 2

Solution pack components

This part provides some details about the functions of the components of the DB2 Administration Solution Pack and contains the following chapters:

3

Installing the DB2 Administration Solution Pack

This chapter provides an example of how we installed and customized the DB2 Administration Solution Pack components. To explore all functions of the solution pack, we chose to do a full installation.

This chapter contains the following topics:

► The DB2 Administration Solution Pack
► DB2 Administration for z/OS component customization
► DB2 Object Comparison for z/OS component customization
► DB2 Table Editor for z/OS component customization
► InfoSphere Optim Configuration Manager for DB2 for z/OS customization

3.1 The DB2 Administration Solution Pack

The DB2 Administration Solution Pack combines powerful DB2 tools that, when used together, can simplify DB2 database administration tasks. They include the following functionally compatible products:

- ► DB2 Administration Tool for z/OS

  This DB2 administration product can greatly increase the productivity of the entire DB2 staff (database administrators, system administrators, and application developers).

- ► DB2 Object Comparison Tool for z/OS

  This product compares two sets of DB2 objects (*source* and *target* objects), generates various reports showing the differences between the objects, and can generate the jobs that are required to apply changes to the target. The DB2 Object Comparison Tool for z/OS runs as an extension to the DB2 Administration Tool for z/OS.

- ► DB2 Table Editor for z/OS

  With this product, you can more easily view and modify your DB2 table data through various user interfaces choices.

- ► InfoSphere Optim Configuration Manager

  With this product, not only you can record and analyze activity in your data systems but also control your client applications.

By using the DB2 Administration Solution Pack, you can simplify the management of your DB2 database environments.

3.2 DB2 Administration for z/OS component customization

The following information provides a detailed example of how we installed and customized the DB2 Administration component. Because we wanted to test all the functions of the solution pack, we did a full installation. The following series of figures is tailored to this specific example and is similar to the introductory information already presented.

This example begins at the TCz main menu. See Figure 1-8 on page 11 to review this example. Every component installed through Tools Customizer requires a metadata library. The metadata library for the solution pack that we want to review is in the DBTLSP.SBBVDENU library.

To begin the installation process, specify option 1 on the Tools Customizer primary menu. The Specify the Metadata Library panel opens (Figure 3-1). Enter the name of the metadata library and press Enter.

```
TCUSTMZR                    Specify the Metadata Library                  14:31:59
Command ===>                                                  Scroll ===> PAGE


Type the name of the metadata library for the pack or the product in the
Metadata library field, or select the library name in the list of previous
libraries and press Enter to populate the field. Press Enter to continue.

The default name of the metadata library after the pack or the product has been
SMP/E installed is <hlq>.SxxxDENU, where <hlq> is the high-level qualifier for
the pack or the product, and xxx is the three-character prefix for the pack or
the product.

Metadata library . 'DBTLSP.SBBVDENU'


Previously Used Metadata Library:

=>
=>
=>
=>
=>
=>
=>

```

Figure 3-1   Specifying the metadata library for the DB2 Administration Solution Pack

The next panel (Figure 3-2) shows which components can be installed as part of the DB2 Administration Solution Pack. This example first customizes the DB2 Administration Tool component of the solution pack. Select the DB2 Administration Tool by indicating that product with a forward slash (/) and then press Enter.

```
TCUSTMZR              Select the Components to Customize      Row 1 to 4 of 4
Command ===>                                                Scroll ===> PAGE

Select one or more components to customize. Press Enter to continue
or End to cancel.

Pack metadata library . : DBTLSP.SBBVDENU
Pack to customize . . . : DB2 Administration Solution P  > Version . : 1.1.0

Line commands: / - Select
  Cmd Name                                    Version Customization Status
  -   ------------------------------------> ------- ----------------------
  /   DB2 Administration Tool for z/OS        10.2.0  Not Found
      DB2 Object Comparison Tool for z/OS     10.2.0  Not Found
      DB2 Table Editor for z/OS               4.4.0   Not Found
      InfoSphere Optim Configuration Manager  2.2.0   Not Applicable
--------------------------- End of components ---------------------------
```

Figure 3-2   Selecting the DB2 Administration Tool for customization

Because this is the first time customizing this product in your environment, a message indicates you can run DISCOVER EXEC to work with a prior installation (Figure 3-3).

```
TCUSTMZR                        Customizer Workplace
Command ===>                                          Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.


Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0


EsssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
e TCUSTMZR                        Run Discover EXEC                           e
e                                                                            e
e If DB2 Administration Tool for z/OS                                        e
e has been customized before, you can run the Discover EXEC to retrieve      e
e information from that customized version. Otherwise, if you are either      e
e customizing this component for the first time or you have not customized    e
e the component yet, continue the customization process because information   e
e to be discovered does not exist.                                          e
e                                                                            e
e To go to the Discover Customized Component Information panel and run the    e
e Discover EXEC, press Enter. To return to the Customizer Workplace panel     e
e without running the Discover EXEC, press End.                              e
e                                                                            e
e                                                                            e
e                                                                            e
DsssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
```

Figure 3-3   DISCOVER EXEC prompt for first install of DB2 Administration Tool

In general, the DB2 Administration Tool customization settings from a previous installation, using the previous non-TCz customization process, can be discovered and used to initialize the DB2 Administration Tool customization in TCz. The options are listed in Table 3-1.

Table 3-1   Discover and reuse options

DB2 Administration Tool installed before?	TCz used to customize?	TCz to discover or reuse previous DB2 Administration Tool customization settings?
No	N/A	N/A
Yes	No	Yes
Yes	Yes	Yes

Because you are not working with a prior installation of DB2 Administration Tool, press the PF key that is associated with End, which in this example is PF3. If you have a different PF key that is assigned to End, use that PF key instead.

The Customizer Workplace panel is displayed (Figure 3-4).

```
TCUSTMZR                    Customizer Workplace
Command ===>                                           Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.


Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool   > Version . : 10.2.0


Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Incomplete
    LPAR parameters . . .: Incomplete


Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
    ------------------------- End of DB2 entries -----------------------------
```

Figure 3-4   Customizer workplace panel

Again, because this is a new installation, the parameter configurations indicate `Incomplete`
and the DB2 entries list no DB2 subsystems or members. Although starting to customize the
component parameters first is possible, for this example you add your DB2 entries first and
therefore use the `ASSOCIATE` command by typing it on the Command line and pressing Enter.
An alternative way is to move the cursor to the `ASSOCIATE` command and press Enter. The
Associate DB2 Entry for Component panel is displayed (Figure 3-5).

```
TCUSTMZR              Associate DB2 Entry for Component      Row 1 to 3 of 3
Command ===>                                           Scroll ===> PAGE


Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
subsystems, data sharing members, and group attach names on which to
customize the component.


Commands:  CREATE - Create a new DB2 entry



Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool   > Version . : 10.2.0


Line commands: A - Associate  C - Copy


Cmd SSID GrpAttch
------------------------------ End of DB2 entries -----------------------------
```

Figure 3-5   Creating new DB2 entries

To associate a particular DB2 subsystem or member to a product, first create a DB2 entry if one does not exist. A DB2 entry must be created only once (that is, you do not have to create a DB2 entry again if you install more products such as DB2 Object Comparison Tool for z/OS, for example). However, you must associate a DB2 entry to each product. This example guides you through creating one DB2 entry through explicit samples. When you are in the Associate DB2 Entry for Component panel, either enter the CREATE command on the command line or move the cursor to the **CREATE** command and press Enter.

The Create a DB2 Entry panel is displayed (Figure 3-6).

```
TCUSTMZR              Associate DB2 Entry for Component       Row 1 to 3 of 3
Command ===> create                                          Scroll ===> PAGE

Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
s EsssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
c e TCUSTMZR                       Create a DB2 Entry                          e
  e Command ===>                                                              e
C e                                                                           e
  e Specify a DB2 subsystem ID, a DB2 group attach name, or both for the     e
  e new DB2 entry. Press Enter to continue or End to cancel.                 e
P e                                                                           e
  e  New DB2 Entry Information                                               e
  e    DB2 subsystem ID . . . . . DB0A                                       e
  e    DB2 group attach name  . .                                           e
L e                                                                           e
  e                                                                           e
C e                                                                           e
  e                                                                           e
  DsssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
---------------------------- End of DB2 entries ----------------------------
```

Figure 3-6   Create a DB2 entry

On this panel, you enter the DB2 SSID, or member name for data sharing, and a group attach ID for data sharing only (that is, for non-data-sharing environments. keep the group attach field blank). These DB2 entries do not have to actually exist on the local LPAR. After you enter the information, press Enter. This new entry is now available for association to a product. To continue this example, create DB2 entries for subsystems DB0A, DB0C and DB0D (only the DB0A example is shown in the figures). All are stand-alone subsystems with no data sharing. For a data sharing environment, create DB2 entries for each member and use the appropriate group attach name.

As each DB2 entry is created, the Associate DB2 Entry for Component panel shows DB2
entries at the bottom. After adding subsystems DB0A, DB0C and DB0D, the panel is similar
to Figure 3-7.

```
TCUSTMZR              Associate DB2 Entry for Component        Row 1 to 3 of 3
Command ===>                                                  Scroll ===> PAGE

Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
subsystems, data sharing members, and group attach names on which to
customize the component.


Commands:  CREATE - Create a new DB2 entry


Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0

Line commands: A - Associate  C - Copy

Cmd SSID GrpAttch
 A  DB0A   --
 A  DB0C   --
    DB0D   --
----------------------------- End of DB2 entries -----------------------------
```

Figure 3-7   Example with DB2 entries added

Now you are ready to associate two of these subsystems to your customization of DB2
Administration Tool. Select which DB2 entries to associate by entering an **A** in the `Cmd` column
of one or more DB2 entries that are being associated with the product. Press Enter.

The next panel is displayed (Figure 3-8). Notice that the available DB2 entries (all of the DB2 entries associated with the product) now show DB0A and DB0C.

```
TCUSTMZR                    Customizer Workplace              Row 1 to 2 of 2
Command ===>                                                  Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
  E Component parameters.: Incomplete
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
      DB0A  --       101 NFM  ADMR8    2013/04/17    Ready to Customize
      DB0C  --       101 NFM  ADMR8    2013/04/17    Ready to Customize
    ------------------------ End of DB2 entries ----------------------------
```

Figure 3-8   Editing the component parameters

The next step in the example customization is to edit the general component parameters. Any parameters that we edit apply to the entire product, independent of DB2 subsystem or group. We choose this for the example but there is nothing to prevent you from customizing these items in any order you want (that is, component parameters, LPAR parameters, and parameters that are associated with the DB2 entries). However, until these items are complete. you are not able to generate the jobs to perform the customization. If you try to generate the jobs too early in the process, you are likely directed to enter missing parameters. To edit the general component parameters, enter an E before the Component parameters field on the panel and press Enter.

The Component Parameters panel for the product you are customizing is displayed
(Figure 3-9). Note that each product has a different set of component parameters; if you are
customizing a product other than DB2 Administration Tool, your panel will look different from
the example shown.

For detailed information about each parameter, see "Chapter 25, Customization reference:
DB2 Administration Tool" in the *DB2 Administration Tool User's Guide and Reference,*
SC19-3774.

```
TCUSTMZR                  Component Parameters                        13:36:10
Command ===>                                              Scroll ===> PAGE


Complete the following tasks to customize the components. The required tasks
and steps are preselected. Ensure that all parameters are specified for each
selected step within a task. Press End to save and exit.


Commands: SAVE - Save parameter values
Line Commands: / - Select

 Pack to Customize .: DB2 Administration Solution Pac >   Version . : 1.1.0
   Component metadata library : SYSADM.ADP110.SADBDENU >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Administration Too >  Version . : 10.2.0

Component customization library: SYSADM.ADP110.CUST.$SC63$.ADB1020
                                                             More:     +


IMPORTANT:
 (1) Values specified here apply to every DB2 SSID unless you specify
   values for parameters with the same names on the DB2 Parameters panel. In
   this case, the values on the DB2 Parameters panel override the values on
   the Product Parameters panel. (2) To enable the "Change Management" task,
   first edit the product parameters for the DB2 subsystem and specify a
   value for the "Change Management database objects owner" parameter. Then,
   return to this panel to select the "Change Management" task.

 Required parameters
  DB2 Admin product load library . . . . . . DBTLSP.SADBLLIB     >     Add...
  DB2 Admin product REXX library . . . . . . DBTLSP.SADBEXEC     >     Add...
  Customized parameters table library  . . . DBTLSP.SADBTLIB           >
  DB2 Admin tool high-level qualifier  . . . DBTLSP                    >
  (Global) System identification method  . . JESID
  (Global) Type of DB2 security exit . . . . STD                     List...
  (Global) JOB class for DB2 utilities . . . A
  (Global) Installation name . . . . . . . .                           >
  (Global) JES node name . . . . . . . . . .
  (Global) Utility data set prefix . . . . .
  (Global) SYSAFF for DB2 utilities  . . . .
  DB2 Admin APF library  . . . . . . . . . . DBTLSP.SADBLINK          >
  JES3 system  . . . . . . . . . . . . . . . NO   (NO, YES)
  (Global) Remote DB2 subsystem name . . . .
  (Global) Remote location name  . . . . . .
  (Global) Authorization switching . . . . . NO   (NO, YES)
```

Figure 3-9   First panel of the DB2 Administration Tool component parameters

After you specify the general component parameters, save them by typing SAVE and pressing Enter or by pressing the PF key associated with End (in our case, PF3). After returning to the Customizer Workplace panel, edit the LPAR parameters by entering an E next to the LPAR parameters value, as shown in Figure 3-10, and press Enter.

```
TCUSTMZR                   Customizer Workplace              Row 1 to 2 of 2
Command ===>                                                 Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
  E LPAR parameters . . .: Incomplete

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date         Status
      DB0A  --      101 NFM  ADMR8    2013/04/17    Ready to Customize
      DB0C  --      101 NFM  ADMR8    2013/04/17    Ready to Customize
    ------------------------- End of DB2 entries -----------------------------
```

Figure 3-10   Editing the LPAR parameters

The LPAR parameters panel for the product is displayed (Figure 3-11). Again, the LPAR parameters for the DB2 Administration Tool do not look the same for other products.

```
TCUSTMZR                        LPAR Parameters                         14:09:57
Command ===>                                                   Scroll ===> PAGE


Enter values for all of the LPAR parameters. Press End to save and exit.


Commands: SAVE - Save parameter values

 Pack to Customize .: DB2 Administration Solution Pac >   Version . : 1.1.0
   Component metadata library : DBTLSP.SADBDENU        >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Administration Too >  Version . : 10.2.0




 ISPF Libraries
  Message library  . . . . . . . . . . . . . ISP.SISPMLIB        >     Add...
  Panel library  . . . . . . . . . . . . . . ISP.SISPPLIB        >     Add...
  Skeleton library . . . . . . . . . . . . . ISP.SISPSLIB        >     Add...
  ISPF table input library . . . . . . . . . ISP.SISPTLIB        >     Add...
  Link list library  . . . . . . . . . . . .                     >     Add...
  ISPF Llib1 . . . . . . . . . . . . . . . . ISP.SISPLOAD              >
  ISPF Llib2 . . . . . . . . . . . . . . . .                              >

 Other Parameters
  Unit name for TSO work data sets . . . . . SYSDA
  Unit name for batch work data sets . . . . SYSDA
  Unicode translation technique  . . . . . . UTF-8
```

Figure 3-11 LPAR Parameters panel

These parameters are also of a general nature and apply once to the entire product. In the case of DB2 Administration Tool, they consist of the general ISPF libraries, work data set designations, and Unicode translation technique. In general, they are parameters that indicate specific details about the environment that the tool needs to "know."

After you enter these parameters, save them and press the PF key that is associated with End.

You are then returned to the Customizer Workplace panel (Figure 3-12).

```
TCUSTMZR                     Customizer Workplace              Row 1 to 2 of 2
Command ===>                                              Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU           > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool   > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
   E  DB0A  --      101 NFM  ADMR8    2013/04/17    Incomplete
      DB0C  --      101 NFM  ADMR8    2013/04/17    Incomplete
    ------------------------ End of DB2 entries ----------------------------
```

Figure 3-12   Editing the DB2 parameters

Now you are ready to enter the DB2 parameters for each subsystem that is associated with
the product. To do this, enter E next to a DB2 SSID and press Enter.

The DB2 Parameters panel is displayed (Figure 3-13).

```
TCUSTMZR                         DB2 Parameters                      14:18:25
Command ===>                                              Scroll ===> PAGE


Enter values for all of the DB2 parameters. Press End to save and exit.


Commands: SAVE - Save parameter values

 Pack to Customize .: DB2 Administration Solution Pac >  Version . : 1.1.0
   Component metadata library : DBTLSP.SADBDENU        >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Administration Too >  Version . : 10.2.0


                                                           More:     +


DB2 subsystem ID  . . . . . . . . . . . . : DBOA
Group attach name . . . . . . . . . . . . :
Type of DB2 security exit . . . . . . . . . STD                    List...
Started task name for MSTR services . . . . DBOAMSTR
Number of job steps in DSNUPROC procedure
                                            1


General DB2 Information
 Mode . . . . . . . . . . . . . . . . . . . NFM (CM, CM8, CM9, NFM)
 Level Number . . . . . . . . . . . . . . . 101 (810, 910, 101)


DB2 Libraries
 Load Library . . . . . . . . . . . . . . . DBOAT.SDSNLOAD      >     Add...
 Run Library  . . . . . . . . . . . . . . . DBOAM.RUNLIB.LOAD   >     Add...
 Exit Library . . . . . . . . . . . . . . . DBOAT.SDSNEXIT      >     Add...
 Message Library  . . . . . . . . . . . . . DBOAT.SDSNSPFM      >     Add...
 Panel Library  . . . . . . . . . . . . . . DBOAT.SDSNSPFP      >     Add...
 Skeleton Library . . . . . . . . . . . . . DBOAT.SDSNSPFS      >     Add...
 Table Library  . . . . . . . . . . . . . . DBOAT.SDSNSPFT      >     Add...
 REXX EXEC library  . . . . . . . . . . . .                     >     Add...
 CLIST library  . . . . . . . . . . . . . . DBOAT.SDSNCLST      >     Add...


DB2 Utilities
 JOB class name for DB2 utilities . . . . . A
 SYSAFF for DB2 utilities . . . . . . . . . SC63
 Plan name for the DSNTEP2 utility  . . . . DSNTEP10
 Plan name for the DSNTIAD utility  . . . . DSNTIAD


DB2 Admin Subsystem Parameters
 DB2 subsystem description  . . . . . . . .                              >
```

Figure 3-13   First panel of the DB2 Parameters

For the DB2 Administration Tool, many parameters exist. As stated previously, overlap exists between the DB2 parameters for a certain SSID and the general parameters. This overlapping allows the installer to tailor certain items by subsystem, providing greater control.

After you enter these parameters, save them and press the PF key associated with End. You
are then returned to the Customizer Workplace panel (Figure 3-14).

```
TCUSTMZR                      Customizer Workplace              Row 1 to 2 of 2
Command ===> generateall                                       Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date         Status
      DBOA  --      101 NFM  ADMR8    2013/04/17   Ready to Customize
      DBOC  --      101 NFM  ADMR8    2013/04/17   Ready to Customize
     ------------------------ End of DB2 entries ----------------------------
```

Figure 3-14   Generating all jobs

Now you can generate the jobs to install the product. Use the GENERATEALL command to
generate the jobs.

Now, if information is missing, you are informed and the issue is corrected (by defaults in the tools), otherwise the jobs are generated and the Finish Component Customization panel is displayed (Figure 3-15).

```
TCUSTMZR              Finish Component Customization        Row 1 to 26 of 30
Command ===>                                               Scroll ===> PAGE


Submit the members in the order in which they apply to all DB2 entries. To
submit the job, browse the member and issue the TSO SUBMIT command, or browse
the customized library and submit the jobs from there.


Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SADBDENU         > LPAR  . . : SC63
  Component name . . . . . . : DB2 Administration Tool  > Version . : 10.2.0


Line Commands: E - Edit  B - Browse


    Component customization library: DBTLSP.CUST.$SC63$.ADB1020


 Cmd Member   SSID GrpAttch Template Date       Description
 -  -------- ---- ----     -------- ---------- ------------------------------>
    A0CUSTAA DB0A --       ADBCUST  2013/04/17 General customization
    A0CUSTAB DB0C --       ADBCUST  2013/04/17 General customization
    A1OPTSAA DB0A --       ADBOPTS  2013/04/17 Main menu options
    A1OPTSAB DB0C --       ADBOPTS  2013/04/17 Main menu options
    A2FB2VAA DB0A --       ADBFB2VB 2013/04/17 Copy FB to VB libraries
    A2FB2VAB DB0C --       ADBFB2VB 2013/04/17 Copy FB to VB libraries
    A3CHKPAA DB0A --       ADBCHKPT 2013/04/17 Create DB2 checkpoint objects
    A3CHKPAB DB0C --       ADBCHKPT 2013/04/17 Create DB2 checkpoint objects
    A7BINDAA DB0A --       ADBBIND  2013/04/17 Binds
    A7BINDAB DB0C --       ADBBIND  2013/04/17 Binds
    A8CATVAA DB0A --       ADBCATVT 2013/04/17 DB2 catalog copy
    A8CATVAB DB0C --       ADBCATVT 2013/04/17 DB2 catalog copy
    A9PRHIAA DB0A --       ADBPRHIS 2013/04/17 AUTOSTATS
    A9PRHIAB DB0C --       ADBPRHIS 2013/04/17 AUTOSTATS
    B0RUNSAA DB0A --       ADBRUNSV 2013/04/17 Create views
    B0RUNSAB DB0C --       ADBRUNSV 2013/04/17 Create views
    B1RESTAA DB0A --       ADBREST  2013/04/17 Reverse Engineering
    B1RESTAB DB0C --       ADBREST  2013/04/17 Reverse Engineering
    B3CX10AA DB0A --       ADBCX10  2013/04/17 Create V10 indexes
    B3CX10AB DB0C --       ADBCX10  2013/04/17 Create V10 indexes
    B42RCPAA DB0A --       ADB2RCPC 2013/04/17 Stored procedure for running re
    B42RCPAB DB0C --       ADB2RCPC 2013/04/17 Stored procedure for running re
    B5TEP2AA DB0A --       ADBTEP2R 2013/04/17 ADBTEP2
    B5TEP2AB DB0C --       ADBTEP2R 2013/04/17 ADBTEP2
    B6CFGBAA DB0A --       ADBCFGBD 2013/04/17 Bind DB2 Admin package on OCM r
    B6CFGBAB DB0C --       ADBCFGBD 2013/04/17 Bind DB2 Admin package on OCM r
    B7CFGPAA DB0A --       ADBCFGPM 2013/04/17 Deploy settings for OCM integra
    B7CFGPAB DB0C --       ADBCFGPM 2013/04/17 Deploy settings for OCM integra
    B8LIMAA  DB0A --       ADBLIM   2013/04/17 Sample job to run the ADBLIM pr
    B8LIMAB  DB0C --       ADBLIM   2013/04/17 Sample job to run the ADBLIM pr
-------------------------- End of customized jobs ----------------------------
```

Figure 3-15   Job list from DB2 Administration Tool GENERATEALL

The number of jobs generated depends on the number of DB2 subsystems and the customization options chosen. The job names have the following format (where xx is a two-byte identifier used to identify the sequence in which the job should be run, and yy is an optional extra identifier to separate equivalent jobs on multiple subsystems):

```
xx<descriptor>yy
```

All of the possible generated jobs are listed in Table 3-2.

Table 3-2   Table of generated job names for DB2 Administration Tool for z/OS

Job name	Job description
xxCUSTyy	General product customization.
xxFB2Vyy	Copy FB to VB libraries.
xxGCyy	Grant SELECT authority on DB2 V9 catalog.
xxGC10yy	Grant SELECT authority on DB2 V10 catalog.
xxCHKPyy	Create DB2 checkpoint table objects.
xxCHANyy	Create change management database.
xxCMBAT	Create CM batch JCL procedure.
xxCMBSyy	Create CM batch items.
xxBINDyy	Bind general-use DB2 Administration Tool plans and packages.
xxCATVyy	Create the DB2 catalog copy version control database.
xxPRHIyy	Create the DB2 Administration Tool profiles history database.
xxRUNSyy	Create views to allow users to manually modify RUNSTATS information.
xxRESTyy	Create the objects needed to run Reverse Engineering as a stored procedure.
xxCXyy	Create additional indexes to facilitate performance on a DB2 V9 or earlier catalog.
xxCX10yy	Create additional indexes to facilitate performance on a DB2 V10 catalog.
xx2RCPyy	Create stored procedure for running remote commands.
xxTEP2yy	Sample JCL to run the ADBTEP2 program.
xxCFGByy	Bind DB2 Administration Tool package on Optim Configuration Manager repository database.
xxCFGPyy	Deploy settings for Optim Configuration Manager integration.
xxLIMyy	Sample job to run ADBLIM program.
xxCMBIyy	Verify CM batch JCL procedure.

After running all generated jobs, installation of DB2 Administration Tool is completed.

3.3 DB2 Object Comparison for z/OS component customization

In continuing with the DB2 Object Comparison component of the solution pack, the process is almost the same as for DB2 Administration Tool. Associate the DB2 subsystems to the component. Ensure that the component parameters are correct, and then generate, verify, and submit the jobs. There are no LPAR-specific parameters for this tool as there are for DB2 Administration Tool.

Press Enter in the Finish Component Customization panel (shown in Figure 3-15 on page 42). The Select the Components to Customize panel is displayed (Figure 3-16). It shows the components that can be installed as part of the DB2 Administration Solution Pack.

To continue our example, we select the DB2 Object Comparison Tool by indicating that product with a forward slash (/) and pressing Enter.

```
TCUSTMZR                Select the Components to Customize      Row 1 to 4 of 4
Command ===>                                                 Scroll ===> PAGE

Select one or more components to customize. Press Enter to continue
or End to cancel.

Pack metadata library . : DBTLSP.SBBVDENU
Pack to customize . . . : DB2 Administration Solution P  > Version . : 1.1.0

Line commands: / - Select
  Cmd Name                                      Version Customization Status
   -  ------------------------------------->  ------- ---------------------
      DB2 Administration Tool for z/OS          10.2.0  Customized
   /  DB2 Object Comparison Tool for z/OS       10.2.0  Not Found
      DB2 Table Editor for z/OS                 4.4.0   Not Found
      InfoSphere Optim Configuration Manager    2.2.0   Not Applicable
---------------------------- End of components ----------------------------
```

Figure 3-16   Selecting the DB2 Object Comparison Tool for customization

For more information about specifying values for parameters, see the *IBM DB2 Object Comparison Tool for z/OS Version 10 Release 2 User's Guide,* SC19-3778.

Because this is the first time customizing this product in your environment, a message indicates that you can run the DISCOVER EXEC to work with a prior installation (Figure 3-17).

```
TCUSTMZR                      Customizer Workplace
Command ===>                                        Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SGOCDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Object Comparison To  > Version . : 10.2.0

EssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
e TCUSTMZR                        Run Discover EXEC                           e
e                                                                            e
e If DB2 Object Comparison Tool for z/OS                                     e
e has been customized before, you can run the Discover EXEC to retrieve      e
e information from that customized version. Otherwise, if you are either      e
e customizing this component for the first time or you have not customized    e
e the component yet, continue the customization process because information   e
e to be discovered does not exist.                                           e
e                                                                            e
e To go to the Discover Customized Component Information panel and run the    e
e Discover EXEC, press Enter. To return to the Customizer Workplace panel    e
e without running the Discover EXEC, press End.                              e
e                                                                            e
e                                                                            e
e                                                                            e
DssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
```

Figure 3-17   DISCOVER EXEC prompt for first install of DB2 Object Comparison Tool

Because you are not working with a prior installation of DB2 Object Comparison Tool, press the PF key associated with End, which in this example is PF3.

The Customizer Workplace panel is displayed (Figure 3-18).

```
TCUSTMZR                      Customizer Workplace
Command ===>                                              Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SGOCDENU           >  LPAR  . . : SC63
  Component name . . . . . . : DB2 Object Comparison To  >  Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Incomplete
    LPAR parameters . . .: Not Required

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
    ------------------------- End of DB2 entries -----------------------------
```

Figure 3-18   Customizer workplace panel

Again, because this is a new installation, the component parameters indicate `Incomplete` and the DB2 entries do not list DB2 subsystems or members. Although customizing the component parameters first is possible, this example adds DB2 entries first. To do this, use the **ASSOCIATE** command (either by typing it on the Command line and pressing Enter, or by moving the cursor to the **ASSOCIATE** command and pressing Enter).

The Associate DB2 Entry for Component panel is displayed (Figure 3-19). Notice that creating DB2 entries again is unnecessary. You associate only the existing DB2 entries with each product.

```
TCUSTMZR                 Associate DB2 Entry for Component          Row 1 to 3 of 3
Command ===>                                                    Scroll ===> PAGE

Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
subsystems, data sharing members, and group attach names on which to
customize the component.

Commands:  CREATE - Create a new DB2 entry


Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SGOCDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Object Comparison To  > Version . : 10.2.0

Line commands: A - Associate  C - Copy

Cmd SSID GrpAttch
 A  DB0A   --
 A  DB0C   --
    DB0D   --
----------------------------- End of DB2 entries -----------------------------
```

Figure 3-19   Associating DB2 subsystems with DB2 Object Comparison Tool

Now, you can associate two of these subsystems to your customization of DB2 Object Comparison Tool. Select the DB2 entries you want to associate by typing the letter A in the Cmd column of the DB2 entry or entries being associated with the product. This process is similar to that of the DB2 Administration Tool installation. Press Enter.

The next panel is displayed (Figure 3-20). Notice that the available DB2 entries (all of the DB2 entries associated with the product) now show DB0A and DB0C.

```
TCUSTMZR                     Customizer Workplace
Command ===>                                          Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SGOCDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Object Comparison To  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
  E Component parameters.: Ready to Customize
    LPAR parameters . . .: Not Required

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
      DB0A  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
      DB0C  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
    ------------------------ End of DB2 entries ----------------------------
```

Figure 3-20   Editing the component parameters

The Component Parameters panel for the product you are customizing is displayed (Figure 3-21). As stated previously, each product has a different set of component parameters; if you are customizing a product other than DB2 Object Comparison Tool, your panel looks different from the example shown.

```
TCUSTMZR                      Component Parameters                         16:22:09
Command ===>                                                     Scroll ===> PAGE

Complete the following tasks to customize the components. The required tasks
and steps are preselected. Ensure that all parameters are specified for each
selected step within a task. Press End to save and exit.

Commands: SAVE - Save parameter values
Line Commands: / - Select

 Pack to Customize .: DB2 Administration Solution Pac >   Version . : 1.1.0
   Component metadata library : DBTLSP.SGOCDENU        >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Object Comparison  >  Version . : 10.2.0

Component customization library: DBTLSP.CUST.$SC63$.GOC1020


/ Create the VB CLIST and EXEC libraries.

  / Create the VB libraries.
    DB2 Object Comparison high-level qualifier
                                          DBTLSP                          >
    Fixed to variable blocked VOLSER . . . .
    Fixed to variable blocked UNIT . . . . .
    DB2 Admin customization high-level qualifier
                                          DBTLSP                          >

/ Sample JCL step for CM Batch

  / Create the CM Batch interface job step.
    DB2 Object Comparison high-level qualifier
                                          DBTLSP                          >
```

Figure 3-21   DB2 Object Comparison Tool component parameters

After you specify the general component parameter, save them by typing SAVE and pressing Enter, or by pressing the PF key associated with `End` (in this case, PF3).

You are returned to the Customizer Workplace panel (Figure 3-22).

```
TCUSTMZR                      Customizer Workplace            Row 1 to 2 of 2
Command ===>                                                 Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SGOCDENU           > LPAR  . . : SC63
  Component name . . . . . . : DB2 Object Comparison To  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
    LPAR parameters . . .: Not Required

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date         Status
  E   DBOA  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
      DBOC  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
    ------------------------- End of DB2 entries -----------------------------
```

Figure 3-22   Editing the DB2 parameters

Because no LPAR parameters are applicable to the DB2 Object Comparison Tool installation,
edit the DB2 entry parameters by entering the letter E next to a DB2 SSID and then pressing
Enter.

The DB2 Parameters panel for the SSID is displayed (Figure 3-23).

```
TCUSTMZR                        DB2 Parameters                      16:25:46
Command ===>                                                 Scroll ===> PAGE


Enter values for all of the DB2 parameters. Press End to save and exit.


Commands: SAVE - Save parameter values

 Pack to Customize .: DB2 Administration Solution Pac >  Version . : 1.1.0
   Component metadata library : DBTLSP.SGOCDENU        >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Object Comparison  >  Version . : 10.2.0



 DB2 subsystem ID  . . . . . . . . . . . . : DBOA
 DB2 subsystem ID description  . . . . . . .                               >
 Group attach name . . . . . . . . . . . . :

 General DB2 Information
  Mode . . . . . . . . . . . . . . . . . . . NFM (CM, CM8, CM9, NFM)
  Level Number . . . . . . . . . . . . . . . 101 (810, 910, 101)
```

Figure 3-23   DB2 Parameters for DB2 Object Comparison Tool

For DB2 Object Comparison Tool, there are not as many parameters as there are for the DB2 Administration Tool.

After you enter these parameters, save them and press the PF key that is associated with End. The Customizer Workplace panel is displayed (Figure 3-24).

```
TCUSTMZR                    Customizer Workplace
Command ===> generateall                               Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SGOCDENU         > LPAR  . . : SC63
  Component name . . . . . . : DB2 Object Comparison To  > Version . : 10.2.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
    LPAR parameters . . .: Not Required

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date         Status
      DBOA  --       101 NFM  SYSADM   2013/04/19    Ready to Customize
      DBOC  --       101 NFM  SYSADM   2013/04/19    Ready to Customize
    ------------------------- End of DB2 entries ----------------------------
```

Figure 3-24   Generating all jobs

After entering all the necessary parameters, you can generate the jobs to install the product. Use the **GENERATEALL** command to generate the jobs. If any information is missing, you are informed and the issue is corrected automatically.

Otherwise, the jobs are generated and the Finish Component Customization panel is displayed (Figure 3-25).

```
TCUSTMZR                   Finish Component Customization          Row 1 to 2 of 2
Command ===>                                                    Scroll ===> PAGE

Submit the members in the order in which they apply to all DB2 entries. To
submit the job, browse the member and issue the TSO SUBMIT command, or browse
the customized library and submit the jobs from there.

Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SGOCDENU           > LPAR  . . : SC63
  Component name . . . . . . : DB2 Object Comparison To  > Version . : 10.2.0

Line Commands: E - Edit  B - Browse

    Component customization library: DBTLSP.CUST.$SC63$.GOC1020

 Cmd Member    SSID GrpAttch Template Date         Description
 -  -------- ---- ----      -------- ---------- ------------------------------->
    AOFB2VB   --   --        GOCFB2VB 2013/04/17 Copy the FB libraries to the VB
    A1CM2     --   --        GOCCM2   2013/04/17 GOCCM2
-------------------------- End of customized jobs ----------------------------
```

Figure 3-25   Job list from DB2 Object Comparison Tool GENERATEALL

The number of jobs generated depends on the customization options you selected. The job names have the following format (xx is a two-byte identifier used to identify the sequence in which the job should be run; yy is an option additional identifier to separate equivalent jobs on multiple subsystems):

xx<descriptor>yy

All of the possible generated jobs are listed in Table 3-3.

Table 3-3   Table of generated job names for DB2 Object Comparison Tool for z/OS

Job name	Job description
xxFB2VB	Copy FB to VB libraries.
xxCM2	Create a sample job to invoke the CM batch interface.

After running all of the generated jobs, the installation of DB2 Object Comparison Tool is complete.

3.4 DB2 Table Editor for z/OS component customization

Next is the DB2 Table Editor component of the solution pack. The process is the same as for DB2 Administration Tool and DB2 Object Comparison Tool. You associate the DB2 subsystems to the component, ensure that the component and LPAR parameters are correct, and then generate, verify, and submit the jobs.

Press Enter in the Finish Component Customization panel (shown in Figure 3-25 on page 52).

The next panel is displayed (Figure 3-26). It shows which components can be installed as part of the DB2 Administration Solution Pack.

Select DB2 Table Editor by indicating that product with a forward slash (/) and pressing Enter.

As with the other components, customize the DB2 Table Editor product by following the same procedure. First, allocate the DB2 entries, then customize the component parameters. Again, there are no LPAR parameters for this product. After the customization is completed, use the **GENERATEALL** command to generate all the jobs. The job list for the DB2 Table Editor implementation is shown in Figure 3-37 on page 63.

```
TCUSTMZR              Select the Components to Customize     Row 1 to 4 of 4
Command ===>                                                Scroll ===> PAGE


Select one or more components to customize. Press Enter to continue
or End to cancel.

Pack metadata library . : DBTLSP.SBBVDENU
Pack to customize . . . : DB2 Administration Solution P  > Version . : 1.1.0


Line commands: / - Select
  Cmd Name                                      Version Customization Status
  -   -------------------------------------> ------- ---------------------
      DB2 Administration Tool for z/OS         10.2.0  Customized
      DB2 Object Comparison Tool for z/OS      10.2.0  Customized
  /   DB2 Table Editor for z/OS                4.4.0   Not Found
      InfoSphere Optim Configuration Manager   2.2.0   Not Applicable
---------------------------- End of components ----------------------------
```

Figure 3-26   Selecting DB2 Table Editor for customization

Because this is the first time for customizing this product in your environment, a message indicates you can run the DISCOVER EXEC to work with a prior installation (Figure 3-27).

```
TCUSTMZR                     Customizer Workplace
Command ===>                                           Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands: ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 10.2.0


EsssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
e TCUSTMZR                        Run Discover EXEC                            e
e                                                                             e
e If DB2 Table Editor for z/OS                                                e
e has been customized before, you can run the Discover EXEC to retrieve       e
e information from that customized version. Otherwise, if you are either       e
e customizing this component for the first time or you have not customized     e
e the component yet, continue the customization process because information    e
e to be discovered does not exist.                                            e
e                                                                             e
e To go to the Discover Customized Component Information panel and run the     e
e Discover EXEC, press Enter. To return to the Customizer Workplace panel      e
e without running the Discover EXEC, press End.                                e
e                                                                             e
e                                                                             e
e                                                                             e
DsssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
```

Figure 3-27   DISCOVER EXEC prompt for first installation of DB2 Table Editor

Because you are not working with a prior installation of DB2 Table Editor, press the PF key associated with End, which in this example is PF3.

The Customizer Workplace panel is displayed (Figure 3-28).

```
TCUSTMZR                      Customizer Workplace
Command ===>                                          Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU           > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 4.4.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Incomplete
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
    ------------------------- End of DB2 entries -----------------------------
```

Figure 3-28   Customizer workplace panel

Again, because this is a new installation, the parameter configurations indicate `Incomplete`
and the DB2 entries list no DB2 subsystems or members. Although you may start customizing
the `Component Parameters` first, for this example you add DB2 entries first, so you use the
ASSOCIATE command. Either type the `ASSOCATE` command on the Command line and press
Enter, or move the cursor to the **ASSOCIATE** command and press Enter.

The Associate DB2 Entry for Component panel is displayed (Figure 3-29). Notice that you do not have to create DB2 entries again. You only have to associate the existing DB2 entries with each product.

```
TCUSTMZR             Associate DB2 Entry for Component        Row 1 to 3 of 3
Command ===>                                            Scroll ===> PAGE

Select any of the following DB2 entries to add them to the Customizer
Workplace panel. You use the Customizer Workplace panel to choose the DB2
subsystems, data sharing members, and group attach names on which to
customize the component.

Commands:  CREATE - Create a new DB2 entry


Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 10.2.0

Line commands: A - Associate  C - Copy

Cmd SSID GrpAttch
 A  DB0A   --
 A  DB0C   --
    DB0D   --
----------------------------- End of DB2 entries -----------------------------
```

Figure 3-29   Associating DB2 subsystems with DB2 Table Editor

You are ready to associate two of these subsystems to your customization of DB2 Table Editor. Select the DB2 entries you want to associate by entering the letter A in the Cmd column of the DB2 entry or entries being associated with the product. Notice that this process flow is similar to that of the DB2 Administration Tool installation. Press Enter.

The Customizer Workplace panel is displayed (Figure 3-30). Notice that the available DB2 entries (all of the DB2 entries associated with the product) now show DB0A and DB0C.

```
TCUSTMZR                       Customizer Workplace                  Row 1 to 2 of 2
Command ===>                                                    Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 4.4.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
  E Component parameters.: Ready to Customize
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
      DB0A  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
      DB0C  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
    ------------------------ End of DB2 entries ----------------------------
```

Figure 3-30   Editing the component parameters

The Component Parameters panel for the product you are customizing is displayed (Figure 3-31). As stated previously, each product has a different set of component parameters; if you are customizing a product other than DB2 Table Editor, your panel differs from the example shown.

```
TCUSTMZR                    Component Parameters                      16:40:58
Command ===>                                                 Scroll ===> PAGE

Complete the following tasks to customize the components. The required tasks
and steps are preselected. Ensure that all parameters are specified for each
selected step within a task. Press End to save and exit.

Commands: SAVE - Save parameter values
Line Commands: / - Select

 Pack to Customize .: DB2 Administration Solution Pac >  Version . : 1.1.0
   Component metadata library : DBTLSP.SETIDENU        >  LPAR  . . : SC63
   Component name . . . . . . : DB2 Table Editor for z >  Version . : 4.4.0

Component customization library: DBTLSP.CUST.$SC63$.ETI440
                                                             More:     +


 Required parameters
  Startup CLIST library  . . . . . . . . . DBTLSP.SETISAMP             >
  DB2 Table Editor V4.4 HLQ  . . . . . . . DBTLSP                      >
  DB2 Table Editor V4.4 control file . . . ETI.DB2.CONTROL             >

/ Configure EXECs

  / Configure startup CLISTs
    DB2 Table Editor startup CLIST 1 . . . ETIV44
    Warn when excluding columns  . . . . . NO
    Warn when exclusively locking  . . . . NO
    Warn when entering setup . . . . . . . NO
    Lock in browse mode  . . . . . . . . . YES
    Show locking options . . . . . . . . . NO
    DB2 Table Editor startup CLIST 2 . . . ETIV44B
    High-level qualifier of the SQL data set DB2USER                   >

/ Bind plans and packages

  / Bind plans and packages
    DB2 Table Editor V4.4  DBRM library  . . DBTLSP.SETIDBRM           >
    DB2 Table Editor V4.4 package owner  . . ETIUSER                   >

/ Create control file

  / Create control file
```

Figure 3-31   First panel of the DB2 Table Editor component parameters

After you enter the general component parameters, save them either by typing SAVE and pressing Enter, or by pressing the PF key associated with End (in this case, PF3).

The Customizer Workplace panel is displayed (Figure 3-32). Edit the LPAR parameters by entering the letter E next to the LPAR parameters value as shown. Press Enter.

```
TCUSTMZR                     Customizer Workplace              Row 1 to 2 of 2
Command ===>                                                   Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.


Commands: ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU         > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 4.4.0


Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
  E LPAR parameters . . .: Ready to Customize


Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
      DBOA  --       101 NFM  SYSADM   2013/04/19    Ready to Customize
      DBOC  --       101 NFM  SYSADM   2013/04/19    Ready to Customize
    ------------------------ End of DB2 entries ----------------------------
```

Figure 3-32   Editing the LPAR parameters

The LPAR parameters panel for the product is displayed (Figure 3-33). Again, the LPAR parameters for the DB2 Table Editor product do not look the same for other products.

```
TCUSTMZR                      LPAR Parameters                        16:46:30
Command ===>                                                   Scroll ===> PAGE


Enter values for all of the LPAR parameters. Press End to save and exit.


Commands: SAVE - Save parameter values


 Pack to Customize .: DB2 Administration Solution Pac >  Version . : 1.1.0
   Component metadata library : DBTLSP.SETIDENU       > LPAR  . . : SC63
   Component name . . . . . . : DB2 Table Editor for z >  Version . : 4.4.0




 ETI LPAR Parameters
  ISPF message library . . . . . . . . . . . ISP.SISPMENU      >     Add...
  ISPF table input library . . . . . . . . . ISP.SISPTENU      >     Add...
  ISPF skeleton library  . . . . . . . . . . ISP.SISPSENU      >     Add...
```

Figure 3-33   LPAR parameters for DB2 Table Editor

These parameters are also of a general nature and apply once to the entire product. In the case of DB2 Table Editor, they consist of the general ISPF libraries. In general, they are parameters that indicate specifics about the environment that the tool needs to "know."

After you enter these parameters, save them and press the PF key associated with End. The Customizer Workplace panel is displayed again (Figure 3-34).

```
TCUSTMZR                    Customizer Workplace              Row 1 to 2 of 2
Command ===>                                                 Scroll ===> PAGE

Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 4.4.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
   E   DBOA  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
       DBOC  --      101 NFM  SYSADM   2013/04/19    Ready to Customize
     ------------------------- End of DB2 entries ----------------------------
```

Figure 3-34   Editing the DB2 parameters for a subsystem

Now you must enter the DB2 parameters for each subsystem associated with the product. To do this, type the letter E next to a DB2 SSID and press Enter.

The DB2 Parameters panel is displayed (Figure 3-35).

```
TCUSTMZR                        DB2 Parameters                        16:49:12
Command ===>                                              Scroll ===> PAGE

Enter values for all of the DB2 parameters. Press End to save and exit.

Commands: SAVE - Save parameter values

 Pack to Customize .: DB2 Administration Solution Pac >   Version . : 1.1.0
    Component metadata library : DBTLSP.SETIDENU       >   LPAR  . . : SC63
    Component name . . . . . . : DB2 Table Editor for z >  Version . : 4.4.0



 DB2 subsystem ID  . . . . . . . . . . . . : DB0A
 Group attach name . . . . . . . . . . . . :

 General DB2 Information
  Mode . . . . . . . . . . . . . . . . . . . NFM (CM, CM8, CM9, NFM)
  Level Number . . . . . . . . . . . . . . . 101 (810, 910, 101)

 DB2 Libraries
  Load Library . . . . . . . . . . . . . . . DB0AT.SDSNLOAD      >     Add...

 ETI DB2 Parameters
  DB2 Table Editor plan name . . . . . . . . ETI044P1

 ETI Shared Profile Packages
  DB2 Table Editor package name  . . . . . . ETIV44PK

 ETI Shared Profile Devices
  Work file device type  . . . . . . . . . . SYSALLDA
```

Figure 3-35   DB2 parameters for DB2 Table Editor

For DB2 Table Editor, there are not as many parameters as there are for DB2 Administration Tool. Parameters vary by product.

After specifying these parameters, save them and press the PF key associated with End.

You are returned to the Customizer Workplace panel (Figure 3-36).

```
TCUSTMZR                     Customizer Workplace                  Row 1 to 2 of 2
Command ===> generateall                                      Scroll ===> PAGE


Use the Generate jobs line command to select the DB2 entries on which to
customize the component, and press Enter to generate the customization jobs.

Commands:  ASSOCIATE  DISCOVER  GENERATEALL  JOBLIST
Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 4.4.0

Component and LPAR Parameter Status
  Line commands: E - Edit  B - Browse
    Component parameters.: Ready to Customize
    LPAR parameters . . .: Ready to Customize

Associated DB2 Entries and Parameter Status
  Line commands: G - Generate jobs  E - Edit  B - Browse  C - Copy  R - Remove
  Cmd SSID GrpAttch Lvl Mode User ID  Date          Status
      DB0A  --      101 NFM  SYSADM   2013/04/19     Ready to Customize
      DB0C  --      101 NFM  SYSADM   2013/04/19     Ready to Customize
     ------------------------- End of DB2 entries ----------------------------
```

Figure 3-36   Generating all jobs for DB2 Table Editor

After you enter all the necessary parameters, you are now ready to generate the jobs to install the product. Use the **GENERATEALL** command to generate the jobs. So now if anything is missing, you are informed and the issue corrected automatically.

Otherwise, the jobs are generated and the Finish Component Customization panel is displayed (Figure 3-37).

```
TCUSTMZR                 Finish Component Customization        Row 1 to 9 of 9
Command ===>                                                  Scroll ===> PAGE


Submit the members in the order in which they apply to all DB2 entries. To
submit the job, browse the member and issue the TSO SUBMIT command, or browse
the customized library and submit the jobs from there.


Pack to Customize .: DB2 Administration Solution Pack f >  Version . : 1.1.0
  Component metadata library : DBTLSP.SETIDENU          > LPAR  . . : SC63
  Component name . . . . . . : DB2 Table Editor for z/O  > Version . : 4.4.0


Line Commands: E - Edit  B - Browse

    Component customization library: DBTLSP.CUST.$SC63$.ETI440


 Cmd Member    SSID GrpAttch Template Date       Description
 -  -------- ---- ----      -------- ---------- ------------------------------->
     A0V44     --   --       ETIV44   2013/04/17 Configure startup CLIST 1
     A1V44B    --   --       ETIV44B  2013/04/17 Configure startup CLIST 2
     A2#BINAA DBOA  --       ETI#BIND 2013/04/17 DB2 bind jobs
     A2#BINAB DBOC  --       ETI#BIND 2013/04/17 DB2 bind jobs
     A3CNTFL   --   --       ETICNTFL 2013/04/17 Create Control File
     A5ADBI    --   --       ETIADBI  2013/04/17 Add to DB2 Admin Launchpad: Cre
     A6ADBI2   --   --       ETIADBI2 2013/04/17 Add to DB2 Admin Tool Launchpad
------------------------- End of customized jobs ----------------------------
```

Figure 3-37   Job list from DB2 Table Editor GENERATEALL

The number of jobs generated depends on the customization options chosen. The job names have the following format (xx is a two-byte identifier used to identify the sequence in which the job should be run; yy is an option additional identifier to separate equivalent jobs on multiple subsystems):

xx<descriptor>yy

All of the possible generated jobs are listed in Table 3-4.

Table 3-4   Table of generated job names for DB2 Table Editor for z/OS

Job name	Job description
xxV44	Configure startup CLIST 1.
xxV44B	Configure startup CLIST 2.
xx#BINyy	BIND of packages.
xxCNTFL	Create the ETI control file.
xxCF2Uyy	Update the ETI control file.
xxADBI	Generate EXEC to add DB2 Table Editor to the DB2 Administration Tool launchpad.
xxADBI2	Run EXEC to add DB2 Table Editor to the DB2 Administration Tool launchpad.

After running all of the generated jobs, installation of DB2 Table Editor is complete.

3.5 InfoSphere Optim Configuration Manager for DB2 for z/OS customization

The Optim Configuration Manager product is included with the DB2 Administration Solution Pack. It is unique in the fact that it is not customized through the TCz interface. If you look at the component customization panel for the DB2 Administration Solution Pack, notice that Optim Configuration Manager is listed on the menu of components, but the status indicates `Not Applicable` (Figure 3-38).

```
TCUSTMZR                Select the Components to Customize      Row 1 to 4 of 4
Command ===>                                              Scroll ===> PAGE

Select one or more components to customize. Press Enter to continue
or End to cancel.

Pack metadata library . : DBTLSP.SBBVDENU
Pack to customize . . . : DB2 Administration Solution P  > Version . : 1.1.0

Line commands: / - Select
  Cmd Name                                    Version Customization Status
  -   ------------------------------------->  ------- ---------------------
      DB2 Administration Tool for z/OS        10.2.0  Customized
      DB2 Object Comparison Tool for z/OS     10.2.0  Customized
      DB2 Table Editor for z/OS               4.4.0   Customized
      InfoSphere Optim Configuration Manager  2.2.0   Not Applicable
--------------------------- End of components ----------------------------
```

Figure 3-38   Optim Configuration Manager is not installed through TCz

The installation of Optim Configuration Manager primarily consists of two parts in sequence:

1. Installing the Optim Configuration Manager server, and if you want, custom object names

2. Creating the Optim Configuration Manager repository

For this continuing example, the Optim Configuration Manager server is installed on a Linux server, and the Optim Configuration Manager repository is built on a DB2 for z/OS subsystem (DB0A).

The first step after you extract the installer file is to run the executable file on the Linux console (Figure 3-39).

```
[redbook@oc3083137088 OCM31Apr10]$ ./IOCM.v3.1.0.install-on-linux-x86_64.bin -i
console
Preparing to install...
Extracting the JRE from the installer archive...
Unpacking the JRE...
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...

Launching installer...


===============================================================================
Choose Locale...
----------------

    1- Deutsch
  ->2- English
    3- Español
    4- Français
    5- Italiano
    6- Português  (Brasil)

CHOOSE LOCALE BY NUMBER: 2
===============================================================================
```

Figure 3-39   Running the installer on the Linux console

Use the following command (the installation is self-guided, as shown in the figures):

`./IOCM.v3.1.0.install-on-linux-x86_64.bin -i console`

This command runs the 64-bit server on a Linux x86 type server (consult the installation guide for the file you need to run for your installation); this process is running in interactive console mode.

The first item of installation information to be requested is the language of the installation or the locale. In this example, it is English, so select **2** and press Enter.

As the installation proceeds, the console shows the progress for the next several steps (Figure 3-40).

The console describes how to navigate the installation process by describing how to proceed to the next step, how to go back to make changes, and how to quit. It also has a URL address to the IBM Information Center for further documentation. Press Enter when you finish reading this console information.

```
--------------------------------------------------------------------------------

Preparing CONSOLE Mode Installation...




===============================================================================
Welcome
-------


This program installs or upgrades IBM InfoSphere Optim Configuration Manager.
Close all applications before you continue.

Respond to each prompt to proceed to the next step in the installation. If you
want to change something on a previous step, type "back".
You can cancel this installation at any time by typing "quit".

Optional:  http://publib.boulder.ibm.com/infocenter/cfgmgr/v3r1/topic/com.ibm.d
atatools.configmgr.install.doc/cparentinstallfg.html
PRESS <ENTER> TO CONTINUE:

===============================================================================
```

Figure 3-40   Preparatory information to continue the install

The next portion of the Optim Configuration Manager server installation is displayed (Figure 3-41). Specify the directory where your license file or files are located and then press Enter. The available licenses are listed. Press Enter again.

```
IBM InfoSphere Optim Configuration Manager         (created with InstallAnywhere)
License Activation
------------------------------
Specify the directory where the product license files reside that are used to
activate IBM InfoSphere Optim Configuration Manager.
License directory: /home/redbook/OCM31Apr10/profiles
Available licenses
are:/home/redbook/OCM31Apr10/profiles/OCM_Z_License.zip;OCM_LUW_License.zip


===============================================================================
```

Figure 3-41   Optim Configuration Manager License information

The license agreement is displayed (Figure 3-42).

```
  International License Agreement for Early Release of Programs

     Part 1 - General Terms

     BY DOWNLOADING, INSTALLING, COPYING, ACCESSING, CLICKING ON AN
     "ACCEPT" BUTTON, OR OTHERWISE USING THE PROGRAM, LICENSEE AGREES TO
     THE TERMS OF THIS AGREEMENT. IF YOU ARE ACCEPTING THESE TERMS ON
     BEHALF OF LICENSEE, YOU REPRESENT AND WARRANT THAT YOU HAVE FULL
     AUTHORITY TO BIND LICENSEE TO THESE TERMS. IF YOU DO NOT AGREE TO
     THESE TERMS,

     * DO NOT DOWNLOAD, INSTALL, COPY, ACCESS, CLICK ON AN "ACCEPT" BUTTON,
     OR USE THE PROGRAM; AND

     * PROMPTLY RETURN THE UNUSED MEDIA AND DOCUMENTATION TO IBM. IF THE
     PROGRAM WAS DOWNLOADED, DESTROY ALL COPIES OF THE PROGRAM.

     1. Definitions


Press Enter to continue viewing the license agreement, or enter "1" to
   accept the agreement, "2" to decline it, "3" to print it, or "99" to go back
   to the previous screen.: 1

=========================================
```

Figure 3-42   Optim Configuration Manager license agreement

The first panel of the license agreement is shown in this example. Be sure to read the agreement, and if you agree, enter 1 and then press Enter.

Indicate the directory where you want to install the Optim Configuration Manager server (Figure 3-43).

```
Installation Directory
------------------------------

Specify the directory in which IBM InfoSphere Optim Configuration Manager will
be installed, or upgrade an existing copy. Only one copy is permitted.

  ->1- Install a new product.

Choose an option by entering a number, or press Enter to accept the default.
    : 1
Installation directory: (DEFAULT: /home/redbook/IOCM):

You choose to:
    1- Install a new product.

IS THIS CORRECT? (Y/N): y

================================================================================
```

Figure 3-43   Installation Directory

Because this is a new installation of Optim Configuration Manager enter the number 1 and press Enter. Accept the default installation directory (or specify a target installation directory) and then press Enter. If the information you specified is correct, enter the letter Y (for yes).

The Repository Database Panel is displayed (Figure 3-44).

```
===========================================
Repository Database Panel
------------------------------

Specify the database to host the repository for IBM InfoSphere Optim
Configuration Manager. The connection to the database that you specify will be
tested, but the necessary tables and data will not be created in the database
until you run the product.
  ->1- Use an existing database to host the repository. The local or remote
database that you select must meet the requirements that are stated in the IBM
InfoSphere Optim Configuration Manager system requirements. The user account
you provided must have DBADM authority for the specified database.

Select an option for specifying the repository database.: 1
    1- DB2 for Linux, UNIX, and Windows
  ->2- DB2 for z/OS

Database type: 2
Host (DEFAULT: localhost): wtsc63.itso.ibm.com
Port number (DEFAULT: 50000): 38360
Location: DB0A
User name (DEFAULT: db2inst1): admr8
Password:
===========================================
```

Figure 3-44   Optim Configuration Manager Repository Database panel

Specify the type and location of the repository database. Because this example creates a
new repository on DB2 for z/OS, indicate 2 for the database type and provide the relevant
information that allows the Optim Configuration Manager server to reach that DB2
environment, including a user ID that has DBADM authority on the target database and DB2
environment. Press Enter.

The web installation section is displayed (Figure 3-45). Specify values for port definition.

```
-----------------------------
The following ports enable web console users and managed clients to communicate
with the configuration manager server.
These ports must be opened in the firewall.


HTTP port: (DEFAULT: 12206): 38361


Enable the HTTPS port: (Y/N): y
HTTPS port: (DEFAULT: 12207): 38362


Specify the control port for the web console. This port is used only locally
and does not require firewall configuration.
Web server administration port number: (DEFAULT: 12208):

================================================================================
```

Figure 3-45   Web information section

Review the Preinstallation Summary (Figure 3-46). Press Enter

```
Preinstallation Summary
-----------------------

Review the following information before you continue:

Product Name:
    IBM InfoSphere Optim Configuration Manager

Install Folder:
    /home/redbook/IOCM

Disk Space Information (for Installation Target):
    Required:  462,099,120 Bytes
    Available: 423,652,806,656 Bytes

PRESS <ENTER> TO CONTINUE:


================================================================================
```

Figure 3-46   Pre-installation Summary panel

The confirmation (Ready To Install) panel is displayed (Figure 3-47). Press Enter to install the InfoSphere Optim Configuration Manager.

```
Ready To Install
----------------


InstallAnywhere is ready to install IBM InfoSphere Optim Configuration Manager
onto your system at the following location:

    /home/redbook/IOCM

PRESS <ENTER> TO INSTALL:



===============================================================================
```

Figure 3-47   Install Anywhere confirmation panel

The Customize Repository panel is displayed (Figure 3-48).

```
Customize Repository
--------------------


When the server is started for the first time the necessary tables and objects
will be created in the repository. Review the script below. If you determine
that additional customization is needed, choose No below.

Tip: For reference, the original script is located at
/home/redbook/IOCM/samples/repository/db2z/create.sql
Do you want to review the repository script? (Y/N): y
Start server and create database tables and objects?
  ->1- Yes. Start the server and use the default script to create database
tables
and objects.
    2- No. Do not start the server. To customize table and object creation,
follow
these steps:
1. Complete the installation.
2. Edit the database tables and objects creation script and run it manually.
   3. Start the server manually using the following command:
/home/redbook/IOCM/bin/start.sh

Choose starting option by number: 2



===============================================================================
```

Figure 3-48   Customization options

Choose option 2 (do not start the server) so that you can do further customization to the object names. This is described more later. Note the name and location of the repository DDL that is shown because you will need it later. (In practice, if you were satisfied with the provided object names, you could have selected option 1 and pressed Enter.)

The next panel (Figure 3-49) indicates the directory where the installation log file is located, the server host name, and the port number., This information is needed to start the server manually.

```
Open Web Console
-----------------------------

You chose not to start IBM InfoSphere Optim Configuration Manager. You will
need to start the product manually before you can start the web console.


The installation log file is in the following directory:
/home/redbook/IOCM/logs


You can open the web console for IBM InfoSphere Optim Configuration Manager
from any workstation by entering the following web address in a web browser.
You can add it as a bookmark for future use or forward it to other users of the
web console.

Please note OCM server hostname localhost and port 38361 for future reference
as you will need this information for client-side install.

    http://localhost:38361/datatools
    https://localhost:38362/datatools

PRESS <ENTER> TO CONTINUE:
[redbook@oc3083137088 OCM31Apr10]$
```

Figure 3-49   Information to Web Console

Because you chose *not* to start the Optim Configuration Manager server, some final information regarding how to launch the web console is given.

The next step is to modify the repository SQL, which, in this example, is in the following location:

/home/redbook/IOCM/samples/repository/db2z/create.sql

After modifying this, run it on the z/OS subsystem by using IBM Data Studio rather than SPUFI[1], because this file is formatted with long-line format (over 80 characters per line) and does not translate well into a flat file or PDS member.

After the DDL is run to conclusion, you can start the Optim Configuration Manager server by using the following command:

/home/redbook/IOCM/bin/start.sh

When the Optim Configuration Manager server is ready, you can access the web console from any web browser.

---

[1] SQL Processor Using File Input

4

DB2 Administration Tool for z/OS

This chapter provides an overview of the features of IBM DB2 Administration Tool for z/OS, and a list of the newest features of the product.

This chapter contains the following topics:

► Overview of DB2 Administration Tool for z/OS
► New features in DB2 Administration Tool for z/OS

4.1 Overview of DB2 Administration Tool for z/OS

The functions provided by DB2 Administration Tool for z/OS help you handle requirements in the following areas:

- ▶ Object management
- ▶ Security management
- ▶ Performance management
- ▶ Change management
- ▶ System management
- ▶ Application management

4.1.1 Object management

Object management provides, among its functions, in-depth DB2 catalog navigation, which can minimize the time that is required to review the catalog. Objects in the catalog are displayed and interpreted, and relevant catalog information is presented logically. You can issue any DB2 command, including **BIND**, **REBIND**, and **FREE**, against selected plans and packages. As shown in Figure 4-1, DB2 Administration Tool displays the DB2 catalog logically:

- ▶ Displays any object in the catalog
- ▶ Displays related DB2 objects through the use of special line commands
- ▶ Interprets catalog information
- ▶ Displays the authorization for objects
- ▶ Displays the static SQL statements from application plans and packages
- ▶ Displays the DDL for existing views
- ▶ Runs on one of multiple copies of the DB2 system catalog

```
DB2 Admin -------------------- DBOA System Catalog -------------------- 07:29
Option ===>


                                                           More:     +
Object options:                                    DB2 System: DBOA
  AO - Authorization options                       DB2 SQL ID: ADMR8
   G - Storage groups               P - Plans
   D - Databases                    L - Collections
   S - Table spaces                 K - Packages
   T - Tables, views, and aliases
   V - Views                        H - Schemas
   A - Aliases                      E - User defined data types
   Y - Synonyms                     F - Functions
   X - Indexes                      O - Stored procedures
   C - Columns                      J - Triggers
   N - Constraints                  Q - Sequences
  DS - Database structures        DSP - DS with plans and packages
 PDC - DB2 pending definition changes


Enter standard selection criteria (Using a LIKE operator, criteria saved):
Name     ===>                      > Grantor  ===>           >
Owner    ===>           >          Grantee  ===>           >
In D/L/H ===>                      > Switch Catalog Copy  ===> N   (N/S/C)
And/or other selection criteria (option xC shows you columns for option x)
```

Figure 4-1   Main DB2 Administration catalog navigation panel

DB2 Administration Tool for z/OS integrates with DB2 utilities to simplify the creation of DB2 utility jobs. JCL can be generated for DB2 utilities and can be executed. The use of LISTDEFs and TEMPLATEs is also supported. See Figure 4-2.

```
DB2 Admin ------------------ DBOA Table Space Utilities ----------------- 07:57
Option ===>

 Execute utility on                                       DB2 System: DBOA
   table space RLS1.RTS1                                  DB2 SQL ID: ADMR
                                                                More:     +
   C - Copy full             CI - Copy incremental    C2 - Copytocopy
  CC - Copy concurrent
   E - Mergecopy             EN - Mergecopy newcopy
   K - Check index           KD - Check data          KL - Check LOB
  LC - Load with Cross loader
   M - Modify                NW - Repair Auxwarn       NX - Repair Auxcheckpend
   N - Repair nocopypend     NA - Repair nocheckpend   NB - Repair norcvrpend
  NL - Repair Levelid        NR - Repair noreorgpend
   O - Reorg                 OU - Reorg unload only    OO - Online reorg
  OC - Reorg with Inline Copy
   P - Report recovery        Q - Quiesce
   R - Runstats              RT - Runstats table all   RR - Runstats report
  RX - Runstats (to invalidate dynamic cache)
   V - Recover               VC - Recover tocopy       VG - Recover to last GDG
  VI - Rebuild index         VR - Recover torba        VL - Recover logonly
  DG - Define GDG for copy data sets                   VP - Recover tologpoint
   U - Unload


  SM - Standard Maintenance  C O R
  BP - Change batch job parameters
  TU - Specify Template Usage

Utility control options
  Review/change options  . . . . . YES  (Yes/No)
  Generate work statement list . .      (Yes/No)
  Generate template statements . . NO   (Yes/No)
  Generate modify after copy . . . NO   (Yes/No)
```

Figure 4-2   Example of utility options for a table space

DB2 Administration Tool for z/OS does tasks such as alter, create, rename, drop, and migrate DB2 objects. See Figure 4-3.

```
DB2 Admin ------------------ DBOA Table Spaces --------------- Row 1 to 2 of 2
Command ===> mig                                           Scroll ===> PAGE

Commands: GRANT  MIG  DIS  STA  STO  ALL  CT
Line commands:
 T - Tables  D - Database  A - Auth  G - Storage group  ICS - Image copy status
 DIS - Display table space  STA - Start table space  STO - Stop table space
 ? - Show all line commands

Select Name     DB Name   Parts Bpool  L E S I C Tables  Act. pages  Segsz T L
       *        *            * *        * * * * *    *             *      * * *
------ -------- -------- ------ ------ - - - - - ------ ----------- ------ - -
       RTS1     RLS1          0 BP0    A N A N Y      1          -1      4   Y
       RTS2     RLS1          0 BP0    A N A N Y      1          -1      4   Y
****************************** END OF DB2 DATA ******************************
```

Figure 4-3   Example of migrating two table spaces

DB2 Administration Tool for z/OS allows reverse engineering of DB2 objects. Reverse engineering can be done by object, by using the DDL line command, or can be done for a hierarchical series of objects, using the **GEN** command as a primary command (for multiple objects) or a line command (for a single object). See Figure 4-4.

```
DB2 Admin -------------- DBOA Generate SQL from DB2 catalog ------------- 08:22
Option ===>

 Generate SQL statements for database RLS1               DB2 System: DBOA
                                                         DB2 SQL ID: ADMR8
                                                                    More:     +
 SQL statement types to be generated from the DB2 catalog:
   CREATE DATABASE  . . . . Y (Y,N)   GRANT access ON DATABASE . . Y (Y,N,A,R)
   CREATE TABLESPACE  . . . Y (Y,N)   GRANT access ON TABLESPACE . Y (Y,N,A,R)
   CREATE TABLE . . . . . . Y (Y,N)   GRANT access ON TABLE  . . . Y (Y,N,A,R)
   CREATE VIEW  . . . . . . Y (Y,N,D) GRANT access ON VIEW . . . . Y (Y,N,A,R)
   CREATE INDEX . . . . . . Y (Y,N)   ALTER TABLE ADD FOREIGN KEY. Y (Y,N,D)
   CREATE SYNONYM . . . . . Y (Y,N)   LABEL ON . . . . . . . . . . Y (Y,N)
   CREATE ALIAS . . . . . . Y (Y,N)   COMMENT ON . . . . . . . . . Y (Y,N)
   CREATE TRIGGER . . . . . Y (Y,N,D) REBIND PLAN/PACKAGE  . . . . Y (Y,N,D)
   CREATE MASK  . . . . . . Y (Y,N)   ALTER TABLE ACTIVATE CONTROL Y (Y,N)
   CREATE PERMISSION  . . . Y (Y,N)
   CREATE STORAGE GROUP . . N (Y,N)   GRANT use OF STORAGE GROUP . N (Y,N,A,R)

 New names/values for generated SQL: (leave blank to use current values)
   Object schema  . . . . . MFSMFX3   > Run SQLID  . . . . . . . . ADMR8
   Object grantor . . . . .           >
   Alloc TS size as . . . . DEFINED    (DEFINED, USED, or ALLOC)
   Database name  . . . . . MFMFXAB3
   Storage group for TS . .           > Storage group for IX . . .          >
   Target DB2 version . . .            (Current DB2 version: 1015)
   Use Masking  . . . . . . NO         (Yes/No)
   Use Exclude Spec . . . . NO         (Yes/No)
   Generate catalog stats . NO         (Yes/No/Only)
     Target cat qualifier .           > (Default is SYSIBM)
     Statistics tables  . . ALL        (All or Select. Default is All)
   Include DB2 pending chgs NO         (Yes/No/Alter/Only)

 SQL output data set and execution mode:
   Add to a WSL . . . . . . NO         (Yes/No)
   Data set name  . . . . . MFMFXAB3
     Data set disposition . SHR        (OLD, SHR, or MOD)
   Execution mode . . . . . TSO        (BATCH or TSO)
   Commit statements per  .            (Db, tS, Tb, All, None. Default is All)
   DB2 defaults handling  .            (Keep, or Remove. Default is Keep)
   Prompt to run SQL  . . . NO         (Yes/No. For TSO mode and no WSL)
   Include SQL comments . . NO         (Yes/No. For BATCH mode and no WSL)

 DB2 Command output data set:
   Data set name  . . . . .
     Data set disposition . OLD        (OLD, SHR, or MOD)

 BP - Change batch job parameters
  G - Change additional parameters
```

Figure 4-4   Generating SQL from catalog definitions using a GEN command

DB2 Administration Tool for z/OS supports DB2 predictive governing. DB2 Administration allows displaying and updating the DB2 resource limit tables. See Figure 4-5.

```
DB2 Admin ------ DBOA Display/Update Resource Limit Tables --- Row 1 to 2 of 2
Command ===>                                                 Scroll ===> PAGE

                                                    DB2 System: DBOA
Commands:
 DIS - Display RLIMIT  STO - Stop RLIMIT

Line commands:
 S - Display/update  STA - Start RLIMIT with ID   I - Insert row

Select ID Owner     Name              Columns
       *  *         *                      *

------ -- -------- ----------------- -------
       01 SYSIBM   DSNRLMT01                9
       01 SYSIBM   DSNRLST01               11
***************************** END OF DB2 DATA ******************************
```

Figure 4-5   Example of ability to display/update the resource limit tables

DB2 Administration Tool for z/OS enables you to alter the definition of a DB2 table. Table alterations can either be simple where you do something that can be handled by DB2 ALTER statements through the **AL** line command or can accomplish more invasive alterations, including those requiring a DROP AND CREATE. See Figure 4-6. In addition to supporting changes to objects that can be done only by a DROP AND CREATE, the **ALT** function can also be used to alter other objects during the same change.

```
DB2 Admin ------------------ DBOA ALTER Table --------------- Row 1 to 3 of 3
Command ===>                                                 Scroll ===> PAGE

New schema . . ADMR8      >               Old schema: ADMR8
New name . . . TEST_TAB1         >        Old name  : TEST_TAB1
Partitions . : 0                          New DB  . . RLSDBZ
Rows per page: 145                        New TS  . . RLSTS1

Commands:  CONTINUE   PRIMKEY   TBLOPTS          HASH
Line commands:
 I - Insert  U - Update  D - Delete  R - Repeat  LAB - Label  COM - Comment
 M - Move    A - After   B - Before  X - Index   RES - Reset update
 UM - Update XML modifiers
                                                        Old Operation
Sel Column Name        Col No Col Type    Length  Scale N D Col No Type
    *                       * *                *       * * *      * *

--- -----------------> ------ -------- ----------- ------ - - ------ ---------

    COL10                1 SMALLINT        2      0 N Y      1
    COL20                2 INTEGER         4      0 N Y      2
    COL30                3 CHAR           10      0 N Y      3
***************************** END OF DB2 DATA ******************************
```

Figure 4-6   ALTER Table panel through the ALT line command

DB2 Administration Tool for z/OS enables you to request the Prompt function, which prompts you before a statement is executed. Prompting can be turned on or off for different statements types and can be done dynamically through the **PROMPT** primary command. See Figure 4-7.

```
DB2 Admin ---------------------- Prompt Options ---------------------- 08:18
Option ===>

Change one or more options below. Prompt before executing:

  Definition SQL (CREATE, DROP, ALTER, RENAME,..)  ===> NO  (Yes/No)

  Authorization SQL (GRANT and REVOKE)             ===> NO  (Yes/No)

  Update SQL (INSERT, UPDATE, DELETE)              ===> NO  (Yes/No)

  DSN commands (BIND, REBIND and FREE)             ===> NO  (Yes/No)

  DB2 commands (START, STOP, ALTER, SET)           ===> NO  (Yes/No)
```

Figure 4-7   Prompt Options panel

4.1.2 Security management

DB2 Administration Tool for z/OS displays authorizations that have been granted on any type of DB2 object, and enables you to revoke these authorizations or grant new ones. See Figure 4-8.

```
DB2 Admin ---------------- DBOA Table Authorizations --------- Row 1 to 1 of 1
Command ===>                                               Scroll ===> PAGE

Commands: REVOKE  GRANT
Line commands:
 R - Revoke  GR - Grant  T - Table  I - Interpretation     U   D   I S U   R
 CA - Column authorizations  RE - Grantee role             P A E I N E P R E
 RR - Grantor role                                         D L L N S L D E F T
                                                           C T E D E E A F C R
                       G                      H Date       O E T E R C T E O I
S  Grantor  Grantee  T Schema   Name          G Grant      L R E X T T E R L G
   *        *        * *        *             * *          * * * * * * * * * *

-- -------- -------- - -------- ---------------- - ------ - - - - - - - - - -
   ADMR8    ADMR8      ADMR8    TEST_TAB1          130102   G G G G G G G   G
****************************** END OF DB2 DATA ******************************
```

Figure 4-8   Example of authorizations on a DB2 table

The Copy Privileges function is also available. One way to access this function is by using the **CP** line command next to an object. This will open the Copy Privileges panel.

DB2 Administration Tool for z/OS provides a revoke impact analysis to prevent inadvertent data loss when you revoke authorities. See Figure 4-9.

```
DB2 Admin -------------- DBOA Revoke Impact Report ----------- Row 1 to 1 of 1
Command ===>                                                   Scroll ===>



Line commands:  I - Interpretation
                                Owner/
S   Grantee  G Resource N/  O Schema/  Grantor/ G H Privileges/
  Lv           T Collection   T P/K Name Binder   T G Effect
- -- -------- - ------------ - -------- -------- - - -------------------------
  O  TESTUSER   TEST_TAB1     T ADMR8    ADMR8          Y
****************************** END OF DB2 DATA ******************************
```

Figure 4-9   Example of a revoke impact report

DB2 Administration Tool for z/OS displays the list of secondary authorization IDs and manages SQL IDs. See Figure 4-10. DB2 Administration Tool does not introduce any new security layer into your environment. All authorities already in place are used. For example, if a user cannot browse the DB2 catalog, the user is not able to do so within the product.

```
DB2 Admin ---------------- DB2 Change Current SQL ID --------- Row 1 to 1 of 1
Command ===>                                                  Scroll ===> PAGE

Enter:                                              Current:
 New DB2 SQL ID ===>                                DB2 SQL ID: ADMR8

Or select one from the following list of secondary SQL IDs:

  Secondary
S SQL ID
  *

- --------
  ADMR8
  TESTUSER
  XXUSE1
****************************** END OF DB2 DATA ******************************
```

Figure 4-10   Example of available secondary authorization IDs for a user

4.1.3 Performance management

DB2 Administration Tool for z/OS allows complex performance and space queries. There are several queries that can be selected and, in some cases, the parameters of queries can be changed from the DB2 Performance Query panel. See Figure 4-11.

```
DB2 Admin ------------------- DB2 Performance Queries ------------------- 08:45
Option ===>

                                                                  More:     +
WHERE database LIKE  . . .                          DB2 System: DBOA
AND obj has more than  . . 32       pages           DB2 SQL ID: ADMR


   1  - Table spaces without RUNSTATS within 0    days
   1X - Indexes without RUNSTATS within 0    days
RUNSTATS information is required for options 2 through 9
   2  - Table spaces with more than 10 percent relocated rows
   3  - Indexes with clustering level problems
   4  - Table spaces with more than 5  percent dropped space
   5  - Table spaces with locking size = 'S' (table space locking)
   6  - Index with 2  or more levels
   7  - Indexes with 150  or more leaf page distance
   8  - Indexes on tables with fewer than 6    pages
   9  - Indexes not used by any plan or package
   10  - Table spaces containing more than one table
   11  - Table spaces without SPACE information
   11X - Indexes without SPACE information
SPACE information is required for options 12 through 13
   12  - Table spaces exceeding allocated primary quantity
   12X - Indexes exceeding allocated primary quantity
   13  - Allocated and used space for table spaces
RTS Real-Time Statistics tables are required for options 14 and 14X
   14  - Table Space maintenance recommendations
   14X - Index Space maintenance recommendations
   15  - Indexes not used within 40     days


                                  Switch Catalog Copy  . . . . N (N/S/C)
```

Figure 4-11   DB2 Performance Query panel

DB2 Administration Tool for z/OS contains a built-in explain function so you can explain a query. It provides an interpretation of the PLAN_TABLE output in an easy-to-understand format. You can also interpret an already existing explain function from a PLAN_TABLE. See Figure 4-12.

```
DB2 Admin ------------------------- Explain -------------------------- 08:48
Option ===>

  E - Explain an SQL statement                          DB2 System: DBOA
  L - List PLAN_TABLE   Q - List SYSQUERY explain info  DB2 SQL ID: ADMR8
        Schema . . . . . . . . .           >            (default is ADMR8)
        Plan name  . . . . . . .           >            (optional)
        DBRM/package name  . . .           >            (optional)
        Collection ID  . . . . .               > (optional)

  CT - Create a table used by EXPLAIN
  CX - Create an index for the table
  UT - Upgrade a table to current DB2 version
  CA - Create an alias for the table

  For the above create and upgrade options:
  Schema  . . . . . . . . . . . ADMR8      >            (default is ADMR8)
  Table . . . . . . . . . . . .       1. PLAN_TABLE
                                      2. DSN_STATEMNT_TABLE
                                      3. DSN_FUNCTION_TABLE
                                      4. DSN_STATEMENT_CACHE_TABLE
```

Figure 4-12   EXPLAIN panel

DB2 Administration Tool for z/OS includes a set of performance health check catalog queries. After these queries are run, you can then act on the objects that fail the health check. See Figure 4-13.

```
DB2 Admin ------- DBOA Table Spaces with Relocated Rows > 10 P Row 1 to 1 of 1
Command ===>                                              Scroll ===> PAGE

The following table spaces have more than 10 percent relocated rows,
that is, rows not located in their original page. Consider reorganizing the
table spaces or redesigning the programs that update the rows.


Commands:       O - Reorg   UT - Utilities
Line commands:  S - Select   O - Reorg

  DB        TS                Near      Far       Percent
S Name      Name      Part  Org Page  Org Page  Relocated        Rows
  *         *           *      *         *          *              *
- -------- -------- ------ ----------- ----------- ----------- -----------
  ADBDCHG  ADBSCVER    0      205         42          48            513
****************************** END OF DB2 DATA ******************************
```

Figure 4-13   Example of health check: Table spaces with greater than 10% relocated rows

DB2 Administration Tool for z/OS enables you to perform space-related functions, such as resizing page sets, lets you move page sets to and from STOGROUP- and VCAT-defined space, and helps you estimate space allocations for new table spaces and indexes. This is done by using the DB2 Administration Tool space management facility. You can also estimate future sizes by entering dynamic, simulated changes to the objects, such as row length and number of rows. See Figure 4-14.

```
DB2 Admin --------------------- DB2 Space Manager --------------------- 08:55
Option ===>

   1 - Display page set space by database           DB2 System: DB0A
   2 - Table space estimator                        DB2 SQL ID: ADMR8
   3 - Index space estimator

For option 2 (optional):

Table space name  . . . .                   (? to look up)
In database . . . . . . . %                 (? to look up. Default DSNDB04)

For option 3 (optional):

Index name  . . . . . . .            >  (? to look up)
Schema  . . . . . . . . .             >  (Default ADMR8)



Switch catalog copy . . . N (N/S/C)

```

Figure 4-14   Space Manager panel

DB2 Administration Tool for z/OS enables you to create and manage work statement lists (WSLs) and run them in batch. WSLs are a series of commands that can contain DDL, utility syntax, DB2 commands, and more. WSLs are fully restartable. Some functions within the product force the use of WSLs such as change management operations. See Figure 4-15.

```
DB2 Admin ----------------- Work Statement List Library ------ Row 1 to 2 of 2
Command ===>                                             Scroll ===> PAGE

Commands: OPTIONS
Line commands:
 S - Show  R - Run (batch)   D - Delete  C - Copy  A - Append  Q - Clone
 I - Interpret  V - Validate  E - Edit  B - Checkpoint

Work Statement List: 'ADMR8.PDS.WSL'

Sel Name     Created    Changed          ID       Restart
    *        *          *                *        *
--- -------- ---------- ---------------- -------- --------
    TEST1    2011/06/08 2012/04/11 07:25 ADMR8
    TEST2    2012/04/11 2012/04/11 08:25 ADMR8
******************************* END OF DB2 DATA *******************************
```

Figure 4-15   Example of the contents of a work statement list PDS

DB2 Administration Tool for z/OS enables you to dynamically manage system parameters. In addition, you can also assemble system parameters from this facility. Note that the system parameters can be browsed by category or individually. The description of the parameters are provided with their DB2 abbreviation so that finding system parameters that you are looking for by their function, can be simpler to do. See Figure 4-16.

```
DB2 Admin --------- DB0A System Parameters - System Parameters ---------- 08:58
Command ===>


                                                    DB2 System: DB0A
   (*) Online changeable parameter                 DB2 SQL ID: ADMR8
                                                              More:     +

   Storage sizes and connections
   Operator and DDF functions
   Tracing and data installation
   Locking (IRLM)
   Active log
   Archive log
   Protection and data definition
   Stored procedures
   Data sharing parameters
   Application programming defaults
   Other parameters
   Restart parameters
   Utility parameters
Allow explain during autobind . . . . . . . . . . . . . YES (ABEXP        ) *
Allow autobind operations . . . . . . . . . . . . .     YES (ABIND        ) *
Start accellerators . . . . . . . . . . . . . . . .      NO (ACCEL        ) *
Accumulate DB2 accounting data. . . . . . . . . . .      10 (ACCUMACC     ) *
Rollup accting aggregation fields   . . . . . . . . .     0 (ACCUMUID     ) *
```

Figure 4-16   Example of the display of DB2 system parameters

4.1.4 Change management

DB2 Administration Tool for z/OS allows you to manage and track changes to DB2 objects through the change management facility. The DB2 Object Comparison Tool is required to enable the use of the change management function. From here you can browse, update, analyze, run, recover changes, and more. See Figure 4-17.

```
DB2 Admin ------------------ CM - Changes ------------------ Row 1 to 13 of 35
Command ===>                                                Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel      ID Owner    Name                           Type    Status    Comment
         *  *        *                              *       *         *
--- -------- -------- ------------------------------ ------- -------- -------->
          1 ADMR8    D24583A                        CHANGE  COMPLETE
        227 ADMR8    D24945A                        CHANGE  CANCELED
        228 ADMR8    D24945AR                       RECOVER CANCELED RECOVER C
        236 ADMR8    D24920A                        CHANGE  CANCELED
        264 ADMR8    D25072A                        CHANGE  CANCELED
        266 ADMR8    D25074A                        CHANGE  CANCELED
        288 ADMR8    D25030A                        CHANGE  COMPLETE
        289 ADMR8    D25030B                        CHANGE  COMPLETE
        356 ADMR8    D25261                         CHANGE  CANCELED
        357 ADMR8    D25261AR                       RECOVER CANCELED RECOVER C
        373 ADMR8    OCA2AA91-CHG1                  CHANGE  CANCELED
        374 ADMR8    D25374A                        CHANGE  DEFINED
        379 ADMR8    D25454A                        CHANGE  COMPLETE
```

Figure 4-17   The primary change management panel

DB2 Administration Tool for z/OS provides a convenient audit trail that can be used to determine the status of objects that are being changed and where those changes have been deployed. See Figure 4-18.

```
DB2 Admin ------------- CM - Interpretation of a Change ----------------- 06:43
Command ===>

Details for change : ADMR8.D25030B
                                                            More:     +
Change ID  . . . : 289            Status . . . : COMPLETE
Created by . . . : ADMR8          Created  . . : 2012-06-11-12.11.04.868701
Last altered by  : ADMR8          Last altered : 2012-06-11-12.13.06.096633
Change type  . . : CHANGE
WSL DSN  . . . . : 'ADMR8.D25030.WSL(C0000289)'
Run job DSN  . . : 'ADMR8.D25030.JCL(E0000289)'
Analyze job DSN  : 'ADMR8.D25030.JCL(C0000289)'
First run by . . : ADMR8
Authorization Switch ID (Run)  . :
SECADM Authorization ID (Run)  . :
Authorization Switch ID (Recover):
SECADM Authorization ID (Recover):
Comment  . . . . :



                      Owner         Name
Change  . . . . . . . . . : ADMR8      : D25030B
Mask  . . . . . . . . . : ?           : ?
Ignore  . . . . . . . . : ?           : ?
Version scope . . . . . . : ?          : ?
Base version before run . : ?          : ?
Base version after run  . : ?          : ?
Source version  . . . . . : ?          : ?
Target version  . . . . . : ?          : ?
Delta version . . . . . . : ADMR8      : D25030B
```

Figure 4-18   Detailed interpretation of a change

DB2 Administration Tool for z/OS allows you to recover changes that have been made, and restore database objects to their previous state. The recover job is generated and available for review before the change is completed. See Figure 4-19.

```
DB2 Admin -------------- Edit Generated JCL -------------- Columns 00001 00072
Command ===>                                                  Scroll ===> PAGE

****** ************************** Top of Data ****************************
000001 //ADMR7FA JOB ,'ADMIN',
000002 //*         RESTART=STEPNAME, <== FOR RESTART REMOVE * AND ENTER STEP NAME
000003 //          CLASS=A,TIME=500,REGION=0M,NOTIFY=&SYSUID,
000004 //          MSGCLASS=H
000005 /*JOBPARM S=TSTA
000006 //*
000007 //*
000008 //*********************************************************************
000009 //* DB2 ADMINISTRATION TOOL GENERATED JOB
000010 //*
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
 The recover job can be submitted now.  The recover strategy has determined    e
 that there are no completed changes that have to be recovered first, and      e
 there are no pending changes that will be set to DEFINED status.              e
 Note: At runtime the recover strategy will be checked again.  The change      e
 will not be recovered if the recover strategy at runtime determines that the e
 change cannot be recovered at that time.                                      e
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
000019 //*   THE PENDING CHANGES ACTION PARAMETER (PCACT) IS BY DEFAULT SET TO
```

Figure 4-19   Sample change recovery job

The change management function also has a batch interface for the main processes of change management.

4.1.5 System management

DB2 Administration Tool for z/OS allows you to perform various system administrative tasks including, but not limited to, the following tasks; see Figure 4-20 on page 88:

► Display and cancel threads

► Display and alter buffer pools

► Display, start, and stop DB2 traces

► Set and display the logs

► Update RLIMITs and manage DDF tables

► Administer RLF and DDF tables

► Manage stored procedure operations, such as creating, displaying or altering stored procedures, issuing the DB2 **START** and **STOP STORED PROCEDURE** commands, and showing statistics for stored procedures that are accessed by DB2 applications

► Display current dynamic DSNZPARMs change parameters, generate new DSNZPARM modules with changes, and activate those changes in DB2

```
DB2 Admin ---------------- DBOA System Administration ----------------- 13:46
Option ===>

                                                 DB2 System: DBOA
                                                 DB2 SQL ID: ADMR8
                                                              More:     +
 DB2 activity related functions:
   2D - Display threads                   2U - Display/terminate utilities
   2T - Display/manage traces             2R - Display/update resource limits
   2S - Stop DB2                          2G - Display group
   2B - Display/manage batch checkpoint   2Z - Manage system parameters
 Buffer pool functions:
   BD - Display buffer pools              BA - Alter buffer pools
   BH - Display buffer pool hit ratios
 DB2 log functions:
   LD - Display archive log parameters    LS - Set archive log parameters
   LA - Archive current log               LI - Display log information
   LZ - Set log checkpoint frequency
 DDF functions:
   DU - Display/update CDB
   DC - Display/cancel distributed thds   DL - Display active locations
   DT - Start DDF                         DS - Stop DDF
 Stored procedures and functions options:
   PM - Manage stored procedures          FM - Manage functions
 System Backup and Recovery:
   SB - Backup System                     SR - Recover System
   PT - Set Point in Time
 Security and Audit:
   AP - Manage audit policies
 DB2 autonomic functions:
   RP - Manage RUNSTATS profiles          TW - Manage time windows
   AA - Display alerts                    AH - Display autostats run history




 Note: Before running a command on this panel, make sure you have sufficient
       privilege to execute the related DB2 command.
```

Figure 4-20   DB2 Administration Tool system administration menu

4.1.6 Application management

DB2 Administration Tool for z/OS builds and executes dynamic SQL statements without requiring you to know the exact SQL syntax. This is accomplished with the DB2 SQL prototyping facility as shown in Figure 4-21.

```
DB2 Admin --------- DBOA Build SQL SELECT Prototype ---------- Row 1 to 5 of 5
Command ===>                                               Scroll ===> PAGE

SELECT ?
  FROM ADMR8.TEST_TAB4
  FOR ?
  WHERE ?
ORDER BY ?
GROUP BY ?
Commands: EDIT  RESET  *  QUOTE  INS  UPD  DEL  COUNT  COUNT_BIG
Line commands:  S - Show  SA - Show ASC  SD - Show DESC
 AVG, COUNT, COUNT_BIG, MAX, MIN, STDDEV, SUM, VARIANCE - Aggregate functions
 <oper><expr>, OR <pred>, IN list, BETWEEN <expr>,<expr> - WHERE predicates
 ? - Show all line commands
Select                                Column Name        Col Type     Length
                                      *                  *                 *
-------------------------------->  ------------------ -------- -----------
                                      TRANS_DATE         DATE             10
                                      CUSTNO             DECIMAL           7
                                      COL10              SMALLINT          2
                                      COL20              SMALLINT          2
                                      REMARKS            VARCHAR         254
****************************** END OF DB2 DATA ******************************
```

Figure 4-21   SQL prototyping facility

DB2 Administration Tool for z/OS allows you to work with a copy of the DB2 catalog to avoid contention and other performance problems on the actual catalog. Multiple copies can be used as shown in Figure 4-22.

```
DB2 Admin -------------- DBOA Select Copy of DB2 Catalog ----- Row 1 to 5 of 5
Command ===>                                               Scroll ===> PAGE

DB2 Catalog Copy Version Selection:                     DB2 System: DBOA
                                                        DB2 SQL ID: ADMR8
 S - Select an entry
                                  Copy     Planname
Select Timestamp                  Owner    Suffix   Type Location
       *                          *        *        *    *
------ ------------------------- -------- -------- ---- ----------------
       ?                          TESTINZ  T4       C
       ?                          TEMPCAT  TC       C
       ?                          CAT7086  C3       C
       ?                          TESTUSR  U2       C
       ?                          CAT7087  C4       C
****************************** END OF DB2 DATA ******************************
```

Figure 4-22   DB2 Catalog Copy selection panel

DB2 Administration Tool for z/OS accesses a remote DB2 catalog where a DDF connection exists between systems. See Figure 4-23.

```
DB2 Admin ----------------- Distributed DB2 Systems -------- Row 1 to 13 of 31
Command ===>                                                   Scroll ===> PAGE

Select the location you wish to use:                     DB2 System: DB0A
                                                         DB2 SQL ID: ADMR8
Line commands:
    S - Use DDF to access remote catalog  CO - Connect to remote subsystem
  DIS - Display threads for remote system
Select Location
      *
------ ----------------
      DB2P
      DB9Q
      DBAB
      DSN9
      DBAD
      DBAC
****************************** END OF DB2 DATA ******************************
```

Figure 4-23   Distributed DB2 System selection panel

4.2 New features in DB2 Administration Tool for z/OS

This section highlights some of the newer features of DB2 Administration Tool 10.2 that were introduced since the previous publication, *Managing IBM DB2 10 for z/OS Using the IBM DB2 Administration Tool for z/OS Version 10,* SG24-7916. The list changes as new features are constantly added to the product.

4.2.1 ALL primary command

Currently, navigating upward and downward in the DB2 catalog can be easy by using line command. For example, using the **X** line command to list all indexes for a table space or table, which you could not do for multiple objects previously, can now be done by using the **ALL** primary command followed by a character denoting the object type you want to retrieve.

For example, to retrieve a list of table spaces for an existing list of tables, use the **ALL S** primary command, as shown in Figure 4-24.

```
DB2 Admin --------------- DBOA Tables, Views, and Aliases -- Row 1 to 12 of 35
Command ===> all s                                          Scroll ===> PAGE

Commands: GRANT  MIG  ALL  CT
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands


Sel    Name              Schema   T DB Name  TS Name    Cols       Rows Chks C
       *                 *        * *        *          *           *    * *
----- -----------------> -------- - -------- -------- ------ ----------- ---- -
       ALTERTEST_IX1     ADMR8    T RLSDBZ   RLSTS5      3          -1   0
       CHILD1            ADMR8    T RLS1     RTS2        2          -1   0
       DSN_FUNCTION_TABLE ADMR8   T DSN03841 DSNRFUNC   19          -1   0
       DSN_STATEMENT_CACH ADMR8   T DSN03842 DSNRSTAT   67          -1   0
       DSN_STATEMNT_TABLE ADMR8   T DSN03840 DSNRSTAT   15          -1   0
       DSTTEST_TB1       ADMR8    T RLSDBZ   RLSTS6      2          -1   0
       HIST_POLICY_INFO  ADMR8    T DSN03502 HISTRPOL    5          -1   0
       MAP1              ADMR8    T RLSMAP1  RLSTSMAP    4          -1   0
       PARENT1           ADMR8    T RLS1     RTS1        3          -1   0
       PLAN_TABLE        ADMR8    T DSN03839 PLANRTAB   64          -1   0
       POLICY_INFO       ADMR8    T DSN03501 POLICYRI    2          -1   0
       RLSPT_TB1         ADMR8    T RLSDBZ   RLSTSPT     2          -1   0
```

Figure 4-24   Example of the ALL primary command

4.2.2 Catalog navigation shortcut

A new DB2 catalog navigation shortcut is now available as a primary command. The syntax of the command is a question mark (**?**) immediately followed by the symbol for the object type you want to search, followed by the search string for the object name. For example, the command to initiate a search of databases starting with RLS is **?D RLS*** as shown in Figure 4-25. If you enter a question mark (?) with no other qualifiers, you are sent to the main catalog navigation panel.

```
DB2 Admin --------------- DBOA Tables, Views, and Aliases -- Row 1 to 12 of 35
Command ===> ?d rls*                                        Scroll ===> PAGE

Commands: GRANT  MIG  ALL  CT
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands

Sel   Name                 Schema   T DB Name  TS Name    Cols       Rows Chks C
      *                    *        * *        *          *             *    * *
----- ------------------> -------- - -------- -------- ------ ----------- ---- -
      ALTERTEST_IX1        ADMR8    T RLSDBZ    RLSTS5      3          -1  0
      CHILD1               ADMR8    T RLS1      RTS2        2          -1  0
      DSN_FUNCTION_TABLE   ADMR8    T DSN03841  DSNRFUNC   19          -1  0
      DSN_STATEMENT_CACH   ADMR8    T DSN03842  DSNRSTAT   67          -1  0
      DSN_STATEMNT_TABLE   ADMR8    T DSN03840  DSNRSTAT   15          -1  0
      DSTTEST_TB1          ADMR8    T RLSDBZ    RLSTS6      2          -1  0
      HIST_POLICY_INFO     ADMR8    T DSN03502  HISTRPOL    5          -1  0
      MAP1                 ADMR8    T RLSMAP1   RLSTSMAP    4          -1  0
      PARENT1              ADMR8    T RLS1      RTS1        3          -1  0
      PLAN_TABLE           ADMR8    T DSN03839  PLANRTAB   64          -1  0
      POLICY_INFO          ADMR8    T DSN03501  POLICYRI    2          -1  0
      RLSPT_TB1            ADMR8    T RLSDBZ    RLSTSPT     2          -1  0
```

Figure 4-25   Example of a DB2 catalog navigation shortcut

4.2.3 DET line command

The **DET** (abbreviation for details) command is now available for select object types. Use this command to get a meaningful summary of various information pertaining to that object. For example, when using **DET** on a table, you see information about the table, its columns, its indexes, and more. all on one panel (Figure 4-26 on page 93). You can then save this information to a location of your choosing. The **ZOOM** command allows the toggling of the collapse of this information.

```
DB2 Admin ----------------- DBOA Details for object(s) ---------------- 13:09
Command ===>                                                  Scroll ===> PAGE

Commands: SAVE  ZOOM

  Details for table (label) : ADMR8.RLSSEG_TB1

   Table information
     Table schema . . . : ADMR8        Table name . . . . : RLSSEG_TB1
     Created by . . . . : ADMR8        Created  . : 2013-03-26-13.28.44.233635
     Table space name . : RLSTSSG      Database name  . . : RLSDBZ
     Object ID for table: 46           DB ID for database : 339
     Maximum row length : 14           Primary key OBID . : N/A
     Number of columns  : 2            Primary key columns: N/A
     Validate procedure : N/A          EDIT procedure name: N/A
     Parent relations . : 0            Child relations  . : 0
     Auditing . . . . . : AUDIT NONE   Status . . : No primary key
     Data capture . . . : NO           Altered  . : 2013-03-26-13.28.44.233635
     Restrict on DROP . : NO           Check constraints  : None
     Encoding scheme  . : E – EBCDIC   Col. in part. key  : 0
     Check flag . . . : No             VOLATILE table . . : No
     Created in DB2 Ver : 0 – DB2 V10  Dependent MQTS . . : 0
     Data version . . . : 0
     Table owner  . . . : ADMR8
     Owner type . . . . : Auth ID      Append specified . : No
     Clone table schema :              Clone table name . :
     Access control . . : ' ' – Not enforced
     Number of hash cols: 0
     Versioning Schema. :              Versioning Table . :

     Statistical data . : No valid data available

     Associated remarks :

   Column information for table : ADMR8.RLSSEG_TB1

     Column Name        Col No Col Type Length  Scale Null Def FP    Col card
     ------------------ ------ -------- ------ ------ ---- --- -- -----------
     COL10                   1 SMALLINT      2      0 N    Y   N           -1
     COL20                   2 INTEGER       4      0 N    Y   N           -1

   Index information for table : ADMR8.RLSSEG_TB1

                      Index           C C C C
     Index Name       Schema   U  Cols G D L M  First Key    Full Key
     ------------------ -------- - ------ - - - - ----------- -----------
     RLSSEG_IX1       ADMR8    D      1 N N Y N          -1          -1

                      Column Name       Order Period
                      ------------------ ----- ------
                      COL10                 A
  _____

******************************* Bottom of data *********************************
```

Figure 4-26   Example of DET command on a table

4.2.4 CP line command: Copy Privileges

An often requested feature is to be able to copy only authorizations for an object to one or more other objects. In DB2 Administration Tool 10.2, this is now available by using the **CP** line command, which opens the Copy Privileges panel (Figure 4-27).

```
DB2 Admin -------------------- DBOA Copy Privileges -------------------- 13:29
Option ===>

                                                            More:     +
 1  One-to-one   - Copy from one object to another
 2  One-to-many  - Copy from one object to many others
 3  Many-to-many - Copy from many objects to many objects

From one object specification:
  Schema/Qual  . . . . ADMR8      >           (? to look up)
  Name . . . . . . . . RLSSEG_TB1          > (? to look up)
  Type . . . . . . . . TB                    (SG,DB,TS,TB,VW,AL,DT,FU,SC,SP,SQ)

To one object specification:
  Schema/Qual  . . . .            >           (? to look up)
  Name . . . . . . . .                      > (? to look up)

Many objects specification:                (A version scope or as a quick scope)
  Schema/Owner . . . .            >           (? to look up)
  Name . . . . . . . .                      > (? to look up)
  Quick scope type . .                       (SG,DB,TS,TB,VW,AL,DT,FU,SC,SP,SQ)

Options:
  Run SQLID  . . . . . . . .
```

Figure 4-27   Copy Privileges panel

4.2.5 Enhancements to UTIL

Standard maintenance is now available with a new command on the utility panel. With this command, you to chain together several utilities for an object or objects. See Figure 4-28. You specify utilities you want on the panel and when the **SM** primary command is used, a series of utilities are generated for the objects. If the series of utilities are standard, they are saved until you change them.

```
DB2 Admin ------------------ DBOA Table Space Utilities ----------------- 13:34
Option ===>

 Execute utility on                                      DB2 System: DBOA
    all the selected table spaces                        DB2 SQL ID: ADMR8
                                                                 More:   -
   R - Runstats              RT - Runstats table all   RR - Runstats report
  RX - Runstats (to invalidate dynamic cache)
   V - Recover                                          VG - Recover to last GDG
  VI - Rebuild index         VR - Recover torba         VL - Recover logonly
  DG - Define GDG for copy data sets                    VP - Recover tologpoint
   U - Unload


  SM - Standard Maintenance  C O R
  BP - Change batch job parameters
  TU - Specify Template Usage

Utility control options
  Review/change options  . . . . . YES  (Yes/No)
  Generate work statement list . . NO   (Yes/No)
  Generate template statements . . NO   (Yes/No)
  Generate modify after copy . . . NO   (Yes/No)
```

Figure 4-28   New standard maintenance option on the utility panel

5

DB2 Object Comparison Tool for z/OS

This chapter provides an overview of the features of IBM DB2 Object Comparison Tool for z/OS, and a list of the newest features of the product.

This chapter contains the following topics:

► Overview of DB2 Object Comparison Tool for z/OS
► Integration of DB2 Object Comparison Tool with DB2 Administration Tool for z/OS

5.1 Overview of DB2 Object Comparison Tool for z/OS

With the IBM DB2 Object Comparison Tool for z/OS, you can identify the structural differences that exist between two or more DB2 catalogs, DDL, or version files. Identifying these differences is key for effective change management. DB2 Object Comparison Tool also generates the jobs that are required to apply the changes to align the catalogs.

You can also use DB2 Object Comparison Tool for the following tasks:

► Build a compare operation by using the walk-through option, which provides an end-to-end framework for specifying job options.

► Generate target changes to a work statement list (WSL) for propagation to remote sites.

► Report differences by using a variety of reports.

► Account for intentional differences and naming discrepancies between two sets of objects.

5.1.1 DB2 Object Comparison Tool general concepts

The purpose of DB2 Object Comparison Tool is straightforward: It compares objects in your source with objects in your target and, if you want, generates jobs to propagate those changes from your source to your target.

Source

The source is the object or objects you want to use as a model to apply to your target environments. For example, perhaps you have a change in a development DB2 subsystem that you want to move to a production DB2 subsystem. The development DB2 subsystem will be the source. The source information can be DDL, the DB2 catalog, or a version file (Figure 5-1).

```
Compare ------------------- Specify Compare Source -------------------- 15:05
Option ===>


   1  - Source is from a DDL file
   2  - Source is from the DB2 catalog
   3  - Source is from a compare version file



   VS - Source is from the DB2 catalog and the objects are selected from
        a version scope

Exclude Specifications:
  Owner . . . . . . . .            > (Optional, default is ADMR8, ? to lookup)
  Name  . . . . . . . .                          > (Required, ? to lookup)
  Edit Objects  . . . . NO     (Yes/No)
```

Figure 5-1   Compare source specification panel

Target

The target is the destination of any propagated changes. To extrapolate the example, the production DB2 subsystem is the target. The target information can be DDL, the DB2 catalog, or a version file (see Figure 5-2).

```
Compare -------------------- Specify Compare Target --------------------- 15:08
Option ===>


   1  - Target is from a DDL file
   2  - Target is from the DB2 catalog
   3  - Target is from a compare version file
   4  - Target is from the DB2 catalog and the objects are automatically
         selected based on the selected source objects
   VS - Target is from the DB2 catalog and the objects are selected from
         a version scope

Exclude Specifications:
  Owner . . . . . . . .           > (Optional, default is ADMR8, ? to lookup)
  Name  . . . . . . . .                            > (Required, ? to lookup)
  Edit Objects  . . . . NO     (Yes/No)
```

Figure 5-2   Compare target specification panel

Version File

The version file is the repository of the source or target information. It is a proprietary format file that can be put into a flat file, a PDS or into the DB2 Administration Tool database. The compare process works only with version files, which means that if DDL or objects in a DB2 catalog are specified for the source, target, or source and target, they must be converted or extracted to a version file. This is done normally as part of the DB2 Object Comparison Tool process flow. See 5.1.2, "DB2 Object Comparison Tool process flow" on page 101.

Mask

The mask is optional and basically functions for two purposes. One is to establish object equality when object qualifiers are different. For example, comparing a table named SCHEMA1.TABLE1 to SCHEMA2.TABLE2 requires a mask to indicate that SCHEMA1 is congruous with SCHEMA2. This allows the compare process to "know" these two objects are equivalent. If no equivalent object is found on the target, the mask is used to appropriately name objects.

To continue the example, the next purpose is if you compare SCHEMA1.TABLE2 with SCHEMA2.TABLE2 and there is no SCHEMA2.TABLE2, the compare job creates DDL to create the object SCHEMA2.TABLE2 on the target. Mask can be provided through flat files, partitioned data sets, or through the DB2 Administration Tool databases. See Figure 5-3.

```
Compare -------------------- Specify Compare Masks --------------------------
Option ===>


Mask Table Entry:
  Owner . .            >            (? to look up)
  Name  . .                       > (? to look up)
Data Set:
  Mask DSN  . .  TEST1.MASK
Options:
  Edit Mask . .  YES (Yes/No)
```

Figure 5-3   Compare mask specification panel

Ignore

An ignore designation (also optional) indicates to the compare process that an inequality in a DB2 catalog value is expected so do not generate a change for the said value An example of this might be space parameters when comparing a development environment to a production environment where the space values likely differ. Ignore files can be provided through flat files, partitioned data sets, or the DB2 Administration Tool databases. See Figure 5-4.

```
Compare -------------------- Specify Compare Ignores -------------------------
Option ===>


                                                              More:     +


Ignore Fields Specification:
  Owner . .                                  > (? to look up)
  Name  . .                                  > (? to look up)
  Data Set:
    Data Set Name . .
  Options:
    Edit Ignore Fields Specification . . . NO  (Yes/No)



Ignore Changes Specification:
  Owner . . . .                              > (? to look up)
  Name  . . . .                              > (? to look up)
  Edit Ignore Changes Specification  . . . NO  (Yes/No)
  Display using a saved compare result . . NO  (Yes/No)
    Saved Compare Results:
      Owner . . . .                          > (? to look up)
      Name  . . . .                          > (? to look up)
```

Figure 5-4   Compare ignore specification panel

5.1.2 DB2 Object Comparison Tool process flow

The general flow of the compare process is relatively simple. After the user specifies all of the information to do the comparison, the steps are as follows:

1. If the source is DDL or objects from the DB2 catalog, the source is extracted to a version file.

2. If the target is DDL or objects from the DB2 catalog, the source is extracted to another version file.

3. The comparison is run using the source version, the target version, the designated mask (if any). and the designated ignore (if any). A report and a changes file are produced.

4. If jobs to propagate changes are requested (called *apply jobs*), the changes file is used as input and the apply jobs are generated.

Reviewing the result of the compare report to see that everything looks correct is important. New users to DB2 Object Comparison Tool might forget items such as masks. If you must change the masks, do so and rerun the process. No changes are made to the target environment until you manually submit the generated apply jobs or run the generated work statement list.

5.2 Integration of DB2 Object Comparison Tool with DB2 Administration Tool for z/OS

DB2 Object Comparison Tool for z/OS is unique in that it is the only tool in the IBM DB2 Tools for z/OS portfolio that requires another tool, which is DB2 Administration Tool. The installation examples illustrate how to add DB2 Object Comparison Tool (Object Compare) to the main menu of the DB2 Administration Tool. Another key item to mention is that the DB2 Administration Tool change management process uses DB2 Object Comparison Tool to do the work required to make changes.

You can customize the DB2 Administration Tool (DB2 Admin) product to add DB2 Object Compare to the main menu, as shown in Figure 5-5. This is done as part of the install process for DB2 Administration Tool and can be done after the fact.

```
DB2 Admin -------------- DB2 Administration Menu 10.2.1 ----------------- 14:07
Option ===>

   1 - DB2 system catalog                              DB2 System: DB0A
   2 - Execute SQL statements                          DB2 SQL ID: ADMR8
   3 - DB2 performance queries                         Userid    : ADMR8
   4 - Change current SQL ID                           DB2 Schema: ADMR8
   5 - Utility generation using LISTDEFs and TEMPLATEs DB2 Rel   : 1015
   P - Change DB2 Admin parameters
  DD - Distributed DB2 systems
   E - Explain
   Z - DB2 system administration
  SM - Space management functions
   W - Manage work statement lists
   X - Exit DB2 Admin
  CC - DB2 catalog copy version maintenance
  CM - Change management

Interface to other DB2 products and offerings:
   C  Object Compare
```

Figure 5-5   Example of main menu with option to launch DB2 Object Comparison Tool

6

DB2 Table Editor for z/OS

This chapter provides an overview of the features of IBM DB2 Table Editor for z/OS and a list of the newest features of the product.

This chapter contains the following topics:

► Overview of DB2 Table Editor for z/OS
► Integration of DB2 Table Editor for z/OS with DB2 Administration Tool for z/OS

6.1 Overview of DB2 Table Editor for z/OS

The general features of Table Editor are as follows:

► Quick and easy manipulation of data

   With DB2 Table Editor, the following task can be done more quickly and easily: navigating IBM DB2 databases, tables, and views; finding related data; and updating, deleting, or creating data with full support for your existing DB2 security and logon IDs. It provides drag-and-drop functionality and wizards to rapidly create versatile, task-specific Java or Windows based table editing forms that contain built-in data validation and business rules.

► Multiple Interfaces

   You can choose from a variety of user entry points to navigate, browse, and edit DB2 tables: Java-enabled web browsers, Java-based interfaces on Microsoft Windows, or an ISPF interface. This variety of user interfaces allows users of all skill levels to interact with your database.

► Easy access to data

   Administrators can browse database tables and views (even with no prior understanding of the database structure), or search-and-replace, filter data, and open tables that are related to selected data. Users at the front lines of your business, such as customer service personnel, can access your database through forms that contain business rules and command buttons to more easily call up data and quickly perform specific, important tasks with virtually no training. DB2 Table Editor offers all your users an environment that meets their needs. Users who do not know SQL can perform inserts, updates and deletes, thus freeing up your SQL experts for more demanding tasks.

► Control of data integrity

   In today's competitive environment, data integrity is more important than ever. Whether your concern is as basic as accurate customer records or as complex as running applications that depend on hundreds of interdependent tables, DB2 Table Editor helps to more easily accomplish preserving data integrity, no matter what level of experience your employees have. With DB2 Table Editor, all of your knowledge workers, both novice and expert, can use this single, powerful tool, to manipulate your data while maintaining tight control over data editing privileges.

6.1.1 DB2 Table Editor elements

Elements and terminology for the overview discussion and the disparate items used by the DB2 Table Editor product are as follows:

► Server definition file (SDF)

   Server definition files are used to define connectivity to one or more database servers. These are not used in the ISPF interface.

► Form

   Forms are a platform-independent vehicle through which data can be viewed or changed. Forms are created and managed through the DB2 Table Editor component and are applicable only through the Windows and Java interfaces to DB2 Table Editor.

► Attributes and controls

   Attributes and controls are applicable only to forms and, as such, are used only when accessing forms through the Windows and Java interfaces of DB2 Table Editor. Attributes are used to define the data that is linked to a form and its controls, when and how the data is presented, and the function of each control in the form. A control in DB2 Table Editor

Developer is an individual component of a form. Controls allow users to view and edit data. Examples of controls include edit boxes, list boxes, and buttons.

6.1.2 DB2 Table Editor components

Many components are associated with DB2 Table Editor and only some might be required, depending on what use you expect from the product. For example, if you want to use only the ISPF interface to DB2 Table Editor, you install and configure only the ISPF component.

This section has a general discussion of each DB2 Table Editor component, the purpose it serves, and the benefits garnered by using it.

Console

The DB2 Table Editor Console is used to set up and manage server definition files (SDFs). SDFs contain the technical information that DB2 Table Editor requires to connect users to database servers. There are four basic tasks that you perform with DB2 Table Editor Console:

► Define and configure the database servers that are accessed by DB2 Table Editor Java player and DB2 Table Editor User components.

► Create database tables, bind database packages, and grant authority on user packages.

► Set up governing.

► Create sample database tables.

The console component runs on Windows.

Developer

DB2 Table Editor Developer is a development environment in which you can build table editing applications. Using theDB2 Table Editor Developer drag-and-drop interface, you can build forms that provide a simple, graphical interface to IBM DB2 database, without programming. The forms you design with DB2 Table Editor Developer allow your users to access, search and edit data. Before working with DB2 Table Editor Developer, you must define and configure the database servers to which you want to connect using DB2 Table Editor Console.

User and Java Player

Use the DB2 Table Editor User component, a Windows based interface, and the Java player component to work with DB2 Table Editor forms that were created in the DB2 Table Editor Developer component, or to create forms as you go. Before you work with the DB2 Table Editor User component, you must specify the server definition file (SDF) that you want to use.

ISPF

Three client versions of DB2 Table Editor for z/OS are available to access z/OS or OS/390 servers: a Windows version, a Java version, and an ISPF version. The ISPF client is intended for database administrators and developers who want to use DB2 Table Editor to edit tables and modify data in an ISPF environment. DB2 Table Editor for ISPF allows you to work with DB2 tables in an ISPF environment using a quick and easy interface. You can access, edit, and search data that is stored on databases that are linked to DB2 Table Editor. You can also perform insert, update, and delete operations without writing SQL.

6.2 Integration of DB2 Table Editor for z/OS with DB2 Administration Tool for z/OS

The two primary points of integration between DB2 Administration Tool for z/OS and DB2 Table Editor are as follows:

► DB2 Launchpad
► DB2 Tables, Views, and Aliases panel

DB2 Launchpad

DB2 Launchpad is a facility, provided with DB2 Administration Tool, to help you create a single panel where you can launch tools across the portfolio. The DB2 Table Editor installation process includes jobs, if you choose to generate them, that add an entry for DB2 Table Editor to the DB2 Launchpad. The DB2 Launchpad is invoked through the following TSO command:

EX '<DB2 Admin Library High Level>.SADBCLST(ADBL)' 'DMT'

If you omit the 'DMT' parameter, the DB2 Administration Tool main menu is displayed; otherwise, the DB2 Launchpad is displayed. See Figure 6-1

```
 ----------------------- DB2 Tools Launchpad ------------------ Row 1 from 9
Command ===>                                              Scroll ===> PAGE


Specify DB2 SSID (opt) ===>  DBOA  (Enter '?' for a list of active SSIDs)

Select the DB2 tool you wish to launch or enter its code in the command line.

Sel Code  Tool Name                                      Rel  Prog No.
    ---   ------------ ADMINISTRATION TOOLS ------------- ---  --------
    ADM   DB2 Administration Tool                         102  5655-W34
    ETI   DB2 Table Editor                                440  5697-G65
    ---   --------- APPLICATION MANAGEMENT TOOLS -------- ---  --------
          No table entries in this category
    ---   --------- PERFORMANCE MANAGEMENT TOOLS -------- ---  --------
          No table entries in this category
    ---   -- RECOVERY AND REPLICATION MANAGEMENT TOOLS -- ---  --------
          No table entries in this category
****************************** Bottom of data ******************************
```

Figure 6-1   DB2 Launchpad with DB2 Table Editor added

DB2 Tables, Views, and Aliases panel

You can also invoke DB2 Table Editor directly from the DB2 Administration Tool Tables, Views and Aliases panel (ADB21T) as a line command (EDIT). DB2 Table Editor must be enabled in the DB2 Administration Tool installation for this command to work.

> **Note:** APAR PM93870 adds edit-line-command support for DB2 File Manager in addition to DB2 Table Editor.

In the Tables, Views and Aliases panel, you can use the **EDIT** line command, as shown in Figure 6-2.

```
DB2 Admin --------------- DBOA Tables, Views, and Aliases ---- Row 1 to 2 of 2
Command ===>                                              Scroll ===> PAGE

Commands: GRANT  MIG  ALL  CT
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands

Sel   Name                Schema   T DB Name  TS Name   Cols      Rows Chks C
      *                   *        * *        *         *          *    * *
----- ------------------- -------- - -------- -------- ------ ----------- ---- -
edit  POLICY_INFO         ADMR8    T DSN00372 POLICYRI    2          -1   0
      HIST_POLICY_INFO    ADMR8    T DSN00373 HISTRPOL    5          -1   0
***************************** END OF DB2 DATA *****************************
```

Figure 6-2   Example of the EDIT line command

If you press Enter, the column selection panel in DB2 Table Editor is displayed (Figure 6-3). Notice how the table information is already completed.

```
ETI$DPSC  V4R4   ------------ Select Columns ------------ 2013/07/11  12:00:21
Option  ===>                                              Scroll ===> PAGE
----------------------------------------------------------------   >
Saved Table Profile exists  Y  (Y or N)    Location ==> DBOA
And/Or on Where Clause      A              Creator  ==> ADMR8            >
Long or Short Data Types    L  (L or S)    Table    ==> POLICY_INFO      >
-----------------------------------------------------------------------------


Select Ord Srt Frz Type          Column Name
    1      A   N  CHAR(10)        POLICY_ID
    2      A   N  INTEGER         COVERAGE
*************************** Bottom of Data *********************************



Valid Commands: Edit, Browse, SQL, Count, CANcel, SAve, Load, END/PF3
```

Figure 6-3   DB2 Table Editor column selection panel

From here you can do all of the functions available through the ISPF interface such as edit and browse.

7

InfoSphere Optim Configuration Manager

This chapter provides an overview of the features and functions of IBM InfoSphere Configuration Manager for DB2 for z/OS.

The chapter, which has the following topics, examines the capabilities to identify and track changes to both the server and client environments, to implement best practices, and to manage application performance:

► Optim Configuration Manager overview
► Optim Configuration Manager architecture
► Features and functions of Optim Configuration Manager

See the IBM InfoSphere Optim Configuration Manager for DB2 for z/OS website:

http://www.ibm.com/software/products/us/en/infosphere-optim-configuration-manager-z/

7.1 Optim Configuration Manager overview

With Optim Configuration Manager, you can centrally manage DB2 subsystem and client configurations effectively and efficiently. You can quickly identify changes that might be the root causes of sudden changes to application performance or even an outage of the application.

With Optim Configuration Manager, you can gain control of clients that are accessing your data in a way that you have never been able to until now. For example, you can control driver and data source properties, the number of connections for an application and set special registers, among other properties, without changing the applications. This allows you to set a central policy and enforce it at the server rather than at the desktop, giving you greater control of how clients access DB2 data and the information to present upon connection.

Figure 7-1 shows a high-level representation of the features of Optim Configuration Manager that can be used in a z/OS environment.
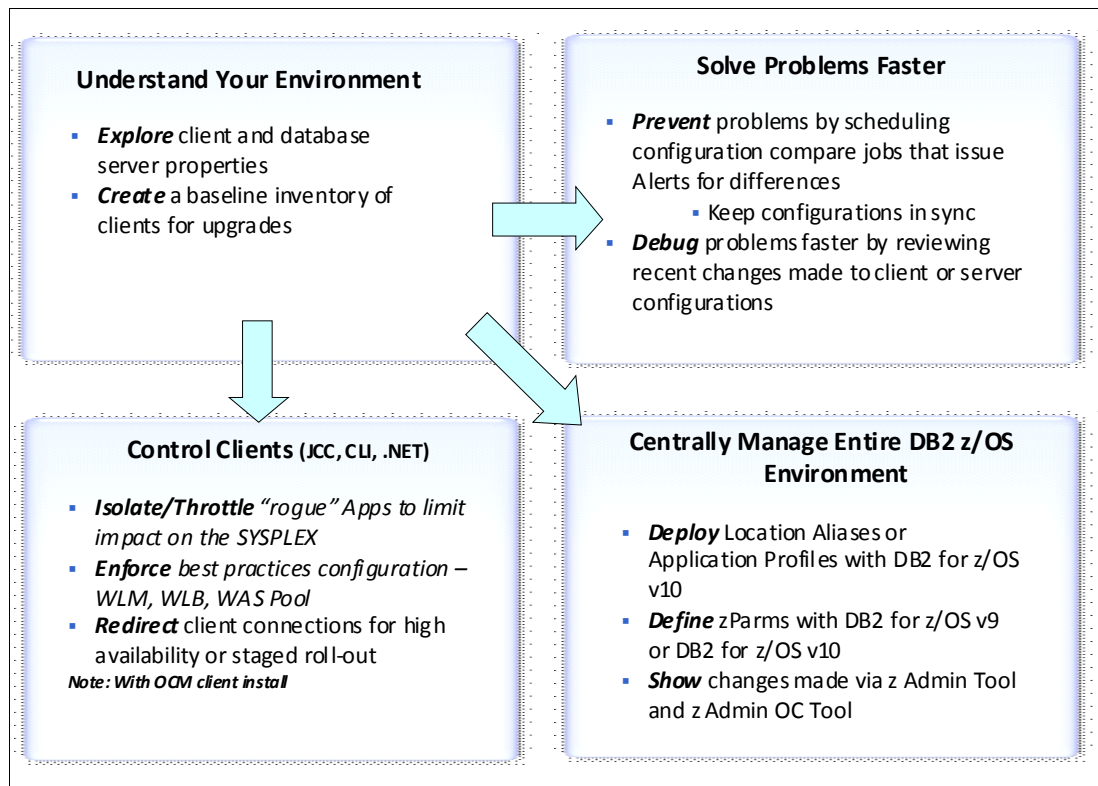
Figure 7-1   Optim Configuration Manager overview of features

Some of the more detailed questions that can be easily answered by Optim Configuration Manager are shown in Figure 7-2. These features are discussed in detail later in this chapter
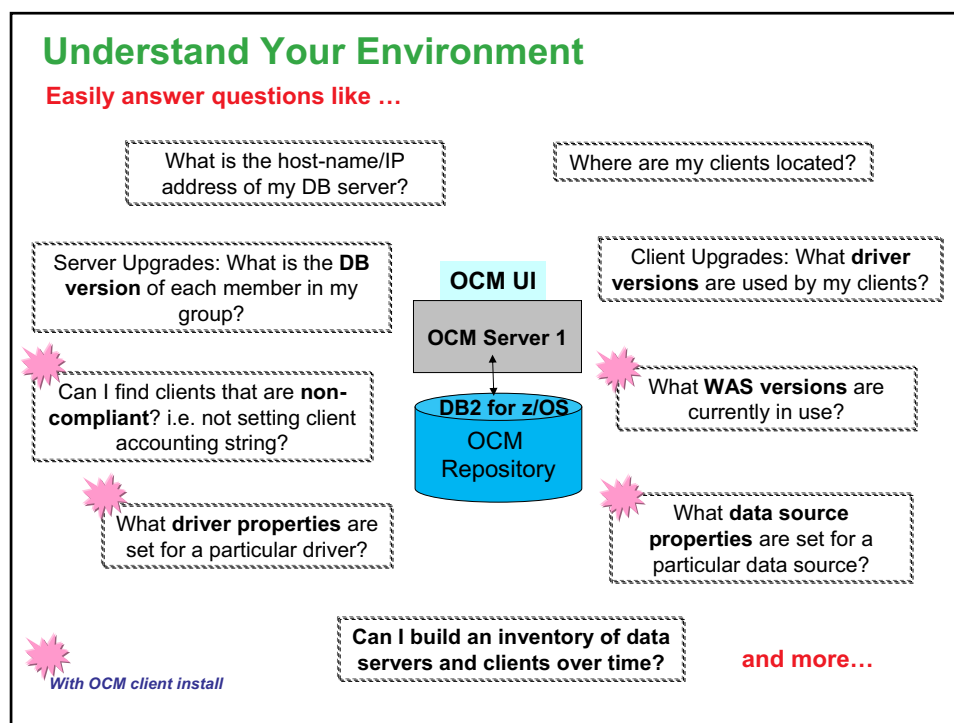
Figure 7-2   Understanding your environment

Optim Configuration Manager can be used to control a DB2 for Linux, UNIX, and Windows environment also, although not all of the features mentioned in this book are available on the DB2 for Linux, UNIX, and Windows platform. Additional features are available only for the Linux, UNIX, and Windows platform. These additional features and the licensing necessary to run Optim Configuration Manager are not discussed in this book.

7.2 Optim Configuration Manager architecture

Optim Configuration Manager has a central server that runs on a Linux, UNIX, or Windows server, it can also be deployed on a Linux on System z partition. In addition, it has its own central repository where it stores all the configuration data that it collects and details about jobs and processes that have been configured. Put this repository onto DB2 for z/OS when monitoring the z/OS environment.

As shown in Figure 7-3 on page 112, several components constitute Optim Configuration Manager:

► Optim Configuration Manager server
► Optim Configuration Manager web interface
► Optim Configuration Manager clients
► Optim Configuration Managed Servers
► Optim Configuration Manager DB2 repository

These components are described in this section.
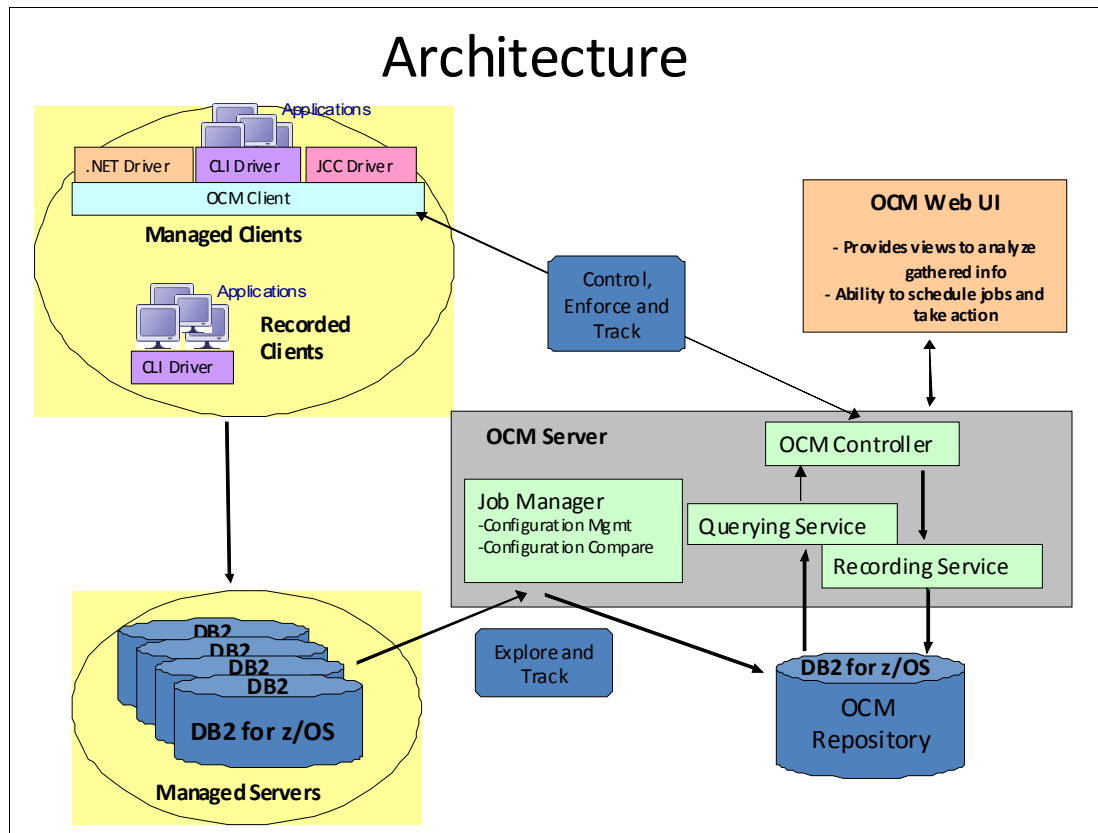
Figure 7-3   Optim Configuration Manager architecture

7.2.1 Optim Configuration Manager server

Optim Configuration Manager server records information in a DB2 repository, and runs on a distributed platform such as Linux on System z, Linux, UNIX, IBM AIX® and so on. It requires access to the Optim Configuration Manager repository schema, which should be stored in DB2 for z/OS database in this situation.

The Optim Configuration Manager server consists of four components:

► Job Manager

Allows users to schedule Optim Configuration Manager jobs, which can track changes to managed servers (DB2 subsystem) and gather snapshots of Recorded Clients (see "Recorded Clients" on page 116), accessing those managed servers. See Figure 7-4 on page 113 for details of how to set up Optim Configuration Manager jobs.

► Optim Configuration Manager Controller

Communicates with the Optim Configuration Manager clients to periodically return information about user-defined Optim Configuration Manager rules and record client statistics in the repository.

► Querying Service

Retrieves user-defined Optim Configuration Manager rules from the DB2 repository.

► Recording Service

Records database client statistics in the DB2 repository.

The Optim Configuration Manager server provides the mechanism for configuring, capturing, and executing the Optim Configuration Manager jobs. These jobs, which are not to be confused with z/OS jobs, provide the ability to run comparisons, and manage the configurations. To set up an Optim Configuration Manager job, first select **ADD Job** from the Job Manager window; you are next prompted to select the details you want to collect, as shown in Figure 7-4.
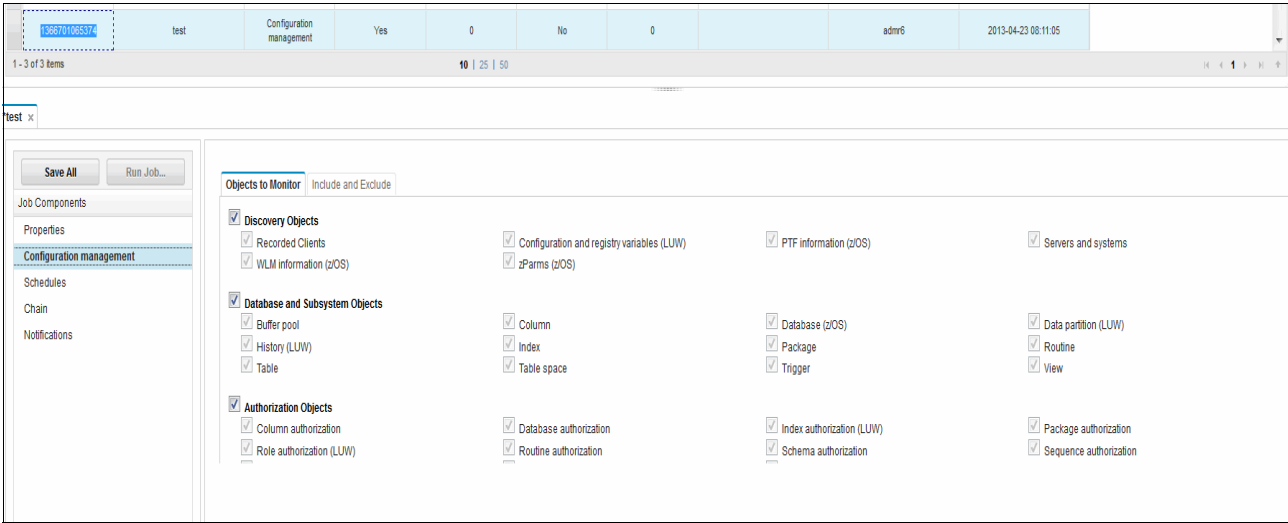
Figure 7-4   Defining Optim Configuration Manager jobs: Collection Definition

In addition, you can decide to include or exclude objects in this panel (Figure 7-5).
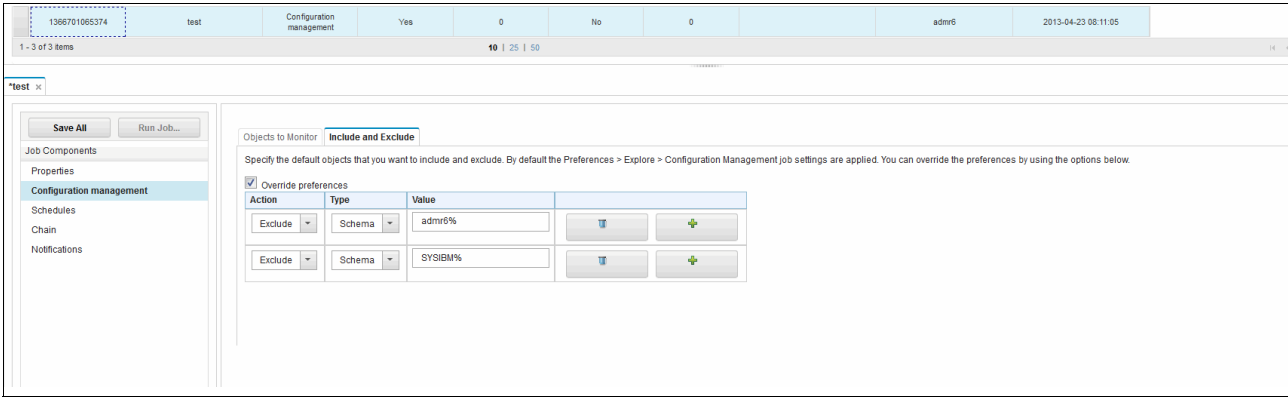
Figure 7-5   Defining Optim Configuration Manager jobs: Including and Excluding Objects

After defining the collection criteria, define the schedule of when you want the job to automatically run (Figure 7-6). This step is optional if you want to manually execute the jobs.

Figure 7-6   Defining Optim Configuration Manager jobs: Schedule definition

After the schedule is set, you may set what actions to take after successful completion or on failure of the jobs; this is called *chaining*. See Figure 7-7. These jobs must be defined within the Optim Configuration Manager Job Manager. To indicate which databases to run this job against, click the **Databases** tab from the Schedules view.

Figure 7-7   Defining Optim Configuration Manager jobs: Chaining

Define notifications that can be sent out when the job completes (Figure 7-8). You can configure the email service from the setup view.

Figure 7-8   Defining Optim Configuration Manager jobs: Job Notification

By using the notification criteria, you can be notified of only successes, only failures, or both.

The Optim Configuration Manager server is the interface for the Managed Clients to the repository and is the engine that provides the ability to change properties of clients. It provides the mechanism for recording and querying the Optim Configuration Manager repository through the Optim Configuration Manager user interface. For Recorded Clients, the server collects the information from the managed server (in this case theDB2 subsystem) and records it in the repository.

You can maintain business continuity by deploying the Optim Configuration Manager server in a highly available and load balanced environment and configuring a back-up server for failover. The configuration management tool supports Active/Active architecture, so that an application client can switch to another server by using a redundant communications network and ensuring the application remains available.

The configuration management server uses existing technology to manage the data in its repository, and each server in an active/active deployment should have access to its repository data. This can be achieved by using one of the following methods:

► Maintaining a single shared repository with disk mirroring for redundancy

► Maintaining two copies of the repository that are kept in step using replication technology

After you create rules to set application properties, the rules remain enforced and survive and outages to the server.

7.2.2 Optim Configuration Manager web interface

Optim Configuration Manager user interface is supported only through the supplied Optim Configuration Manager web interface. It provides full access to information in the DB2 repository and allows users to take action by defining jobs and rules.

7.2.3 Optim Configuration Manager clients

Optim Configuration Manager client is code that works in conjunction with the JDBC driver, CLI and .NET, to enable key features of Optim Configuration Manager that control and track distributed clients. The Optim Configuration Manager client is a JAR file that resides with the JCC driver and periodically sniffs and sends database client information to the Optim Configuration Manager server.

Two types of clients, from an Optim Configuration Manager perspective, must be understood:

► Managed Clients
► Recorded Client

Managed Clients

Managed Clients are clients that have had the Optim Configuration Manager client deployed onto it. Deploying the Optim Configuration Manager client allows Optim Configuration Manager to do the following tasks:

► Isolate or throttle poorly behaving applications with a DB2 for z/OS data sharing group.

► Redirect application clients between DB2 for z/OS systems for high availability or in a migration scenario.

► Enforce application client and driver properties.

► Enforce Workload Manager (WLM) policies.

► Identify a greater range of changes to client properties.

> **Note:** Controlling application clients requires JCC driver level 3.63.81, 4.13.86 or later.

Recorded Clients

Recorded Clients are clients that have not had the Optim Configuration Manager client deployed. Information for these clients is captured using the `-DISPLAY THREAD` command and therefore less information is collected and stored about these clients. As with the `DISPLAY THREAD` command, if the client connection is terminated, the client information no longer shows in "Recorded Clients."

7.2.4 Optim Configuration Managed Servers

A managed server is any DB2 that is being monitored by Optim Configuration Manager. It can either be a DB2 subsystem, data sharing group, or a DB2 for Linux, UNIX, and Windows instance.

7.2.5 Optim Configuration Manager DB2 repository

At the heart of Optim Configuration Manager is the DB2 repository. This repository is created at installation, and the DDL can be tailored to specific site standards. See Chapter 3, "Installing the DB2 Administration Solution Pack" on page 27 for details.

The repository is populated by the Recording service of the Optim Configuration Manager service and by the DB2 Administration Tool Change Management process, both batch and online. These changes are recorded in the repository at commit time as the change is being executed, and show the DDL being run.

7.3 Features and functions of Optim Configuration Manager

As shown previously (Figure 7-1 on page 110), Optim Configuration Manager can be used in four main areas: understand, solve, control, and manage environments and clients. To track the client changes and to override client property changes you must be running Managed Clients (see "Managed Clients" on page 116).

7.3.1 Client and server properties

Optim Configuration Manager allows you to track changes to both client and server properties. It identifies all the changes that have been made to the DB2 objects and the subsystem parameters, and in conjunction with DB2 Administration Tool and DB2 Object Comparison Tool it shows how the changes were made.

Optim Configuration Manager allows you to override client configurations without having to push changes down to the individual client hardware. This function can potentially reduce the cost of making changes to the client software and enables the enforcement of best practices. One example is ensuring that client information is correct in the client properties. Examples of Optim Configuration Manager overriding parameters are shown in 7.3.3, "Application controls" on page 125.

Tracking server changes

Server information is initially collected when the database connection is added to Optim Configuration Manager and can be controlled by settings within the preferences menu. You must supply a user ID and password with sufficient authority to call DB2 stored procedures such as GET_SYSTEM_INFO. Deltas to this baseline are subsequently collected by scheduling jobs through the Optim Configuration Manager Job Manager interface. These can be scheduled to run at set times, for example within maintenance windows, or can be run immediately.

The following server information is collected:

► Systems: Host name, IP address, clients, instances, databases, subsystems, OS name, and more

► Instances, databases: DB2 version and fix pack, clients (Linux, UNIX, and Windows)

► Subsystems: Hosting system, port, DB2 versions

► Location aliases on DB2 for z/OS

The source and target of the comparison can be the same subsystems, subsystems within the same data sharing group (for ZPARMS comparison), or completely separate subsystems (such as a test subsystem and production).

You can compare either of both of the following items:

► DSNZPARMs

A comparison of the source and target is displayed; the differences can be highlighted. From this information, you can see any changes that have not been propagated through the lifecycle or not made of all members of data sharing group members.

Figure 7-9 shows the initial summary report, indicating the number of changes that have been found between the two versions.

Figure 7-9   DSNZPARMs comparison report summary

Figure 7-10 shows the details after you drill down from the report summary.

Figure 7-10   DSNZPARMs comparison detail report

► Database, tables, views, packages and other objects

The comparison report shows a high-level compare of the DB2 objects captured at the time the information was gathered. This report highlights any difference in the number of objects and in the definitions of DB2 objects. By drilling down from the initial report you can identify objects that have been created, dropped, or have other differences, such as column definition errors. Figure 7-11 show a report with differences between two tables.

Figure 7-11   DB2 Object Columns change reports

The following server configuration changes can be tracked:

► Subsystem
► Data sharing group
► DSNZPARMs
► Database objects such as tables. columns, indexes etc
► Authorizations
► WLM service classes
► Buffer pools
► PTF levels

Optim Configuration Manager can compare one source to multiple targets.

By using the information collected about changes to servers, you can quickly identify changes that might have contributed to application performance degradation or even a application outages. Changes might be the dropping of indexes or incorrect column definitions.

Another potential use of the server comparison is to ensure that, after migrating to a new version of DB2, the ZPARMS are the values that you expected and that all your changes have been made to all members of a data sharing group.

DB2 object and authorization changes that are made using DB2 Administration Tool and DB2 Object Comparison Tool can be tracked within Optim Configuration Manager. Change Management writes details of the changes directly in real time into the Optim Configuration Manager DB2 Repository from which Optim Configuration Manager can display the changes.

Optim Configuration Manager can correlate snapshot data with richer and more current data, enabling faster problem determination and checking that changes have been made across environments. See Figure 7-12.
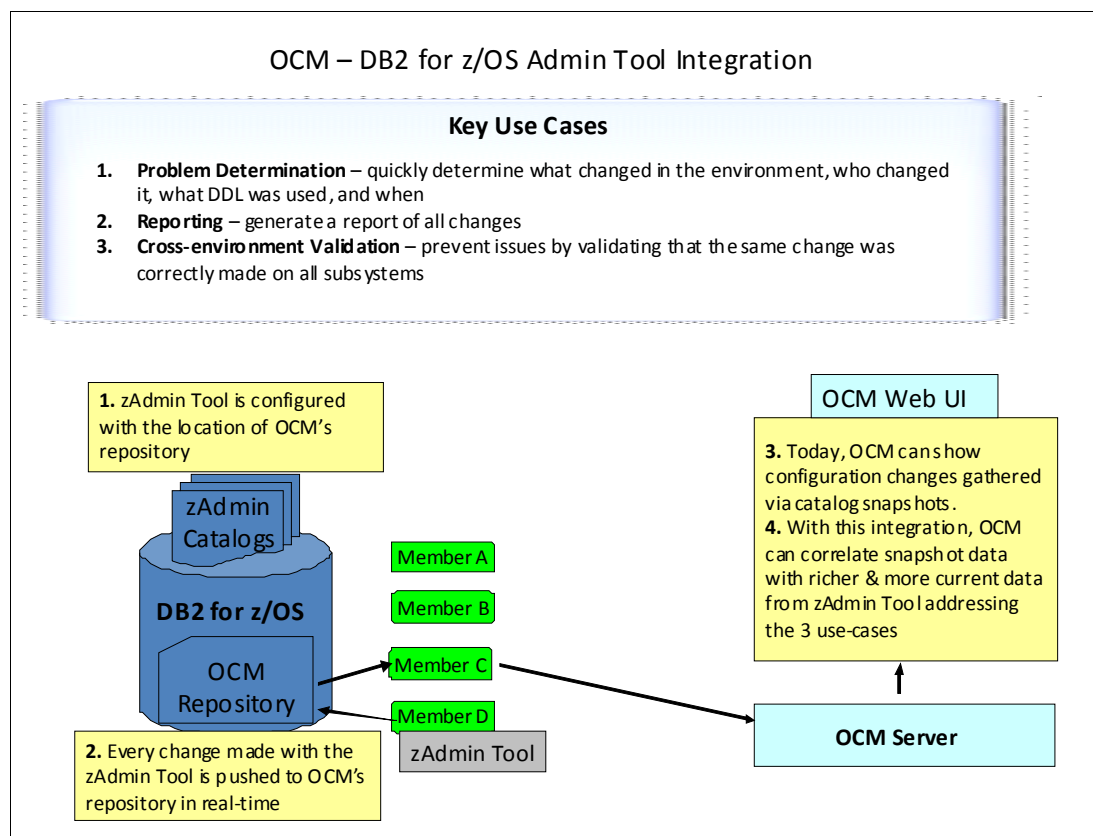
Figure 7-12   Optim Configuration Manager integration with DB2 tools

Tracking client changes

You can also track and compare changes that are made to DB2 clients. These clients can be either managed or Recorded Clients, although the information tracked differs for each client type and how the information is collected.

Data for Recorded Clients is collected at the same time as the server information is collected; the client information is collected through the `-DISPLAY THREAD(*)` command.

The Managed Client information is initially collected at the next statistics interval for each client after the client is upgraded to the required driver and Optim Configuration Manager levels. The delta is automatically gathered when the client reports to Optim Configuration Manager at configurable statistics collection intervals as set in the Control section of the Optim Configuration Manager Preferences; the default is 15 minutes.

> **Tip:** Consider reducing the polling default for clients from 15 minutes to allow the more frequent collection of client statistics, and earlier identification of changes.

The following client information is captured:

- ► Managed Client
  - IP address, UUID, client information fields
  - JDBC/JNDI information, IBM WebSphere® Application Server information, client driver information
  - Target IP, port, DB name
- ► Recorded Client
  - Authentication ID, where hosted
  - Subsystem name, client

> **Note:** UUID is a globally unique identifier that is created when you install a Data Tools Runtime Client. The client automatically sends this identifying information to the Optim Configuration Manager server.

After the capture, you can compare the captured data to identify any changes that were made. Figure 7-13 shows output of a comparison of different captures from the same client.

Show only differences	Source: Clear source	Target version: Fri Jan 04 2013 22:43:32 GMT-0800 (Pacific Standard Time)
► Data Source Descriptors (1 difference)		
► Driver Properties		
▼ Properties		
CMX_BUILD_CERT	releaseBuild	releaseBuild
CMX_BUILD_QUALIFIER	34320051	34320051
CMX_COMPONENT_NAME	CMX	CMX
CMX_FULL_VERSION	CMX 8.0.0.34320051 Spec Version 34	CMX 8.0.0.34320051 Spec Version 34
CMX_MAJOR_VERSION	8	8
CMX_MINOR_VERSION	0	0
CMX_SPEC_VERSION	34	34
DB_NAME	EOSDB205	EOSDB205
DDID	1	1
DRIVER_BUILD_CERT	releaseBuild	releaseBuild
DRIVER_BUILD_QUALIFIER	0	0
DRIVER_CMPNT_NAME	IBM DB2 JDBC Universal Driver Architecture	IBM DB2 JDBC Universal Driver Architecture
DRIVER_FULL_VERSION	IBM DB2 JDBC Universal Driver Architecture 3.64.107.0	IBM DB2 JDBC Universal Driver Architecture 3.64.107.0
DRIVER_MAJOR_VERSION	3	3
DRIVER_MINOR_VERSION	107	107
DSDID	1	1
IPADDR_SET	[192.168.41.134]	[192.168.41.134]
JDBC_DATASOURCE_NAME	RedirectExampleDataSource	RedirectExampleDataSource
PORT	5446	5446
SERVER_NAME	zserveros.demos.ibm.com	zserveros.demos.ibm.com
UUID	fa8adaca-c884-451f-8f7a-4105d9dbeb82	fa8adaca-c884-451f-8f7a-4105d9dbeb82
WAS_POOL_SIZE	0	0

Figure 7-13   Optim Configuration Manager client comparison: Same client

Figure 7-14 shows a comparison between two clients with the differences highlighted. This window can be further enhanced by clicking **Show only differences**.

Figure 7-14   Optim Configuration Manager client comparison: Different clients

The client changes that can be compared (for Managed Clients) are properties pertaining to the following items:

► Drivers
► Data sources

Central control of properties

With Optim Configuration Manager being able to collect client properties, you now have the ability to provide a central point of control to override client properties for Managed Clients.

Comparing multiple configurations

After collecting the server and client configurations, you can identify one of the configurations as a "master" configuration and use that for comparison against other configurations. This allows for implementation, and maintenance, of best practices and for migration across multiple subsystems.

After identifying the source, you can select a category to use for comparison:

► Connection name
► Connection set name
► Data server type
► Data server version
► Host name
► User ID

The category identifies the targets for the comparison. If any new servers are added to your environment, they are automatically added to the configuration if they meet the selection criteria specified for the target name.

You have now defined the source and target environments and you can now refine the comparison between the source and targets to allow for expected changes between the configurations. See Figure 7-15.

For example you might want to refine based on the following criteria:

► Differences in schema names
► Differences in table names, columns names etc
► Exclude schemas

Figure 7-15   Comparing source to target

These mappings can be saved and reused in other comparison reports.

The comparison reports can be automated and run on a regular basis. Any differences that are found can be notified immediately through email showing a summary of the changes, which can be investigated further by detailed reports viewed from within the repository.

7.3.2 Assist migrations

Optim Configuration Manager can assist with migrations by building an inventory of your DB2 assets and by allowing you to have a staged migration plan.

Client inventory
One key concern when migrating DB2 versions is the level of client that is connecting to DB2. At each release of DB2, there is a minimum and a recommended level of client software to either tolerate the new features or to exploit the new features.

In larger environments, fully understanding the range of client levels being deployed and run is often a challenge. Many desktop clients are not updated after they are deployed unless absolutely necessary. Therefore, fully understanding your landscape is important so you can meet the prerequisites before migration, and more important, plan the time into any upgrade schedule (before you start the migration).

With Optim Configuration Manager, you can build an inventory of client locations, what versions of drivers are available, and what properties are set for those drivers (Figure 7-16).
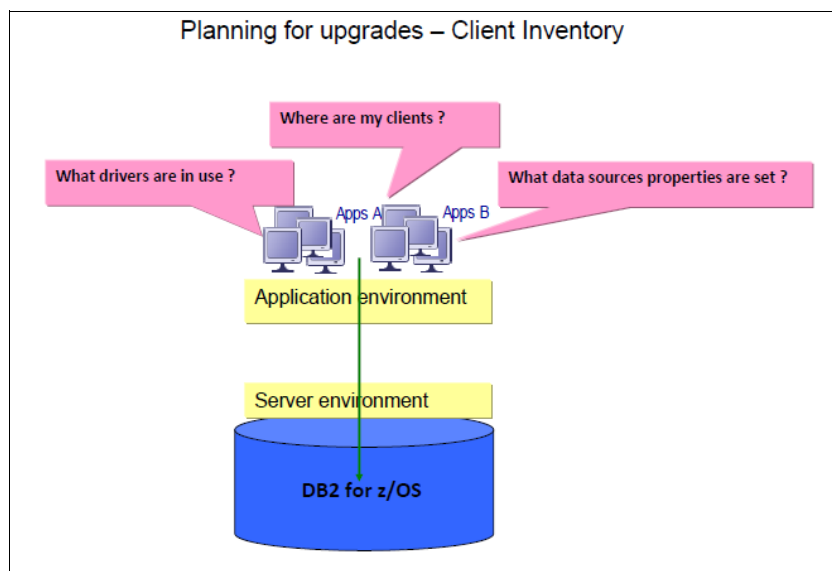
Figure 7-16   Building Client Inventory

Having this inventory can help you understand the amount of effort that is required to upgrade the drivers, and you can identify any properties that might need addressing before any planned upgrade. In addition, you can track changes throughout the project to ensure that the landscape is not changing.

Controlled migrations and high availability

You can use Optim Configuration Manager to assist with both planned migrations and with high availability scenarios.

When migrating DB2 you can use Optim Configuration Manager to redirect clients from the current version to the new version of DB2 in a controlled manner. This allows you to stage the migration in an orderly manner and ensure that everything is working correctly before completing the migration. See Figure 7-17 on page 125. If the performance, for example, was not acceptable, then you are able to switch the application back to the original version without incurring an outage or any changes to the application.
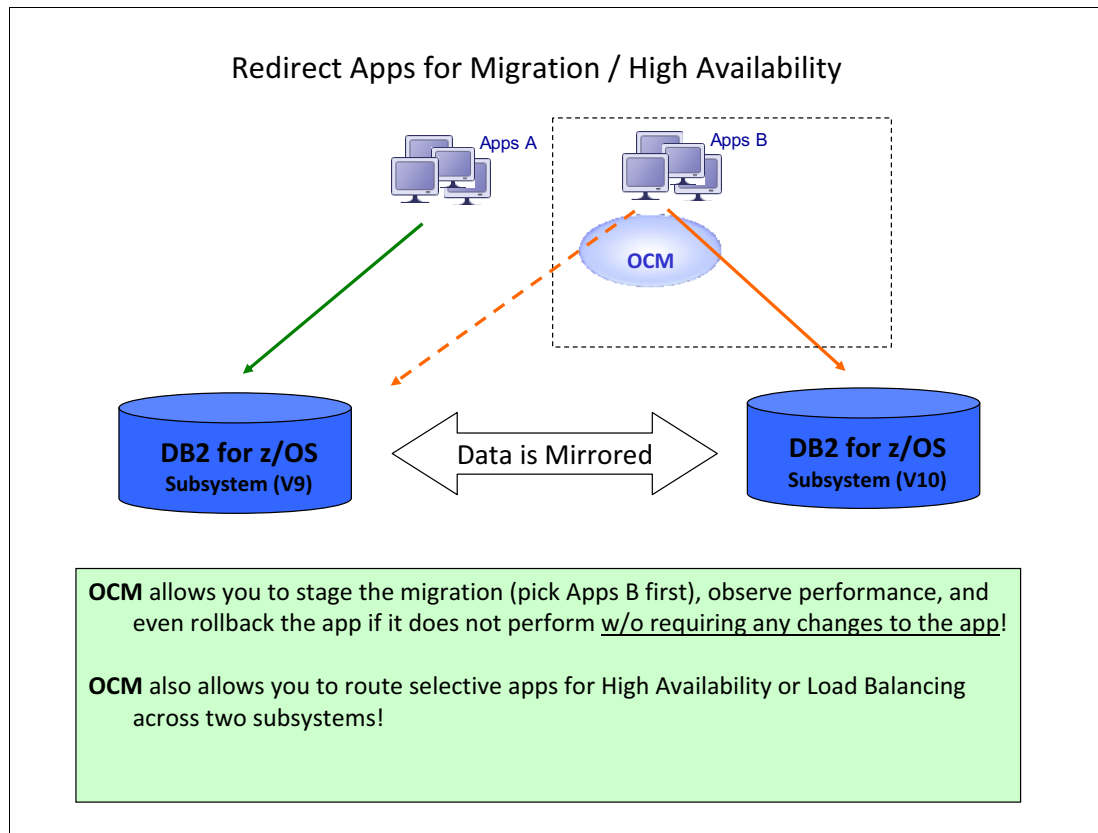
Figure 7-17   Redirecting applications

To set this up, configure and enable a task to redirect database connections. The application is then redirected to the new DB2 environment upon a recycle. One exception is for WebSphere Application Server (APARs 7.0.0.31, 8.0.0.7 and 8.5.5.1), which has a new feature that redirects connections without requiring a recycle operation. WebSphere Application Server waits for its connection pool to reach zero before redirecting the connections.

You can use the same methodology to configure tasks to route selective applications to a different DB2 for high availability or for load-balancing reasons. This again is without application changes.

There are no changes required on the DB2 environment to implement assuming all DB2 environments are already set up.

7.3.3 Application controls

This section highlights the features of Optim Configuration Manager that can be used to manage application behavior:

- ► Penalty boxing
- ► Controlling errant applications
- ► Setting WLM service class
- ► Setting special registers
- ► Throttling connections
- ► Enabling DB2 application profiles

Penalty boxing

DB2 10 provides the ability to add, remove, and modify distributed data facility (DDF) location alias names without stopping either DB2 or DDF, so that DB2 remote traffic is not disrupted. This allows applications to connect to only a subset of DB2 members, in much the same way as you can connect to a subset of DB2 members through DDF using location alias names.

Optim Configuration Manager can be used to manage the DB2 10 location alias feature, you can view and report status of each alias, and also start, stop, edit or cancel a location alias. Additionally a history of changes is kept for audit purposes showing the changes to location aliases.

With this feature, you can define location aliases with the Optim Configuration Manager tool to implement application controls, described in "Controlling errant applications" on page 126, ensuring that the control can be implemented efficiently without leaving the Optim Configuration Manager tool, allowing timely intervention.

Controlling errant applications

Within a DB2 for z/OS data sharing environment, Optim Configuration Manager can be used to isolate poorly behaving applications.

This is achieved by defining a location alias (known as penalty box) for a member or members within the data sharing group. When the defined rule is breached, the application is moved into the location alias at the next transaction boundary.

See Figure 7-18 on page 127. Application B starts consuming excessive resources, which are picked up by OMPE. While this is being investigated, the "Isolate application transaction" rule is breached so the next time that application transaction is established, it is routed to the penalty box, in this case M3.

Member M3 normally has restricted resources, which allows Application A to get the resources that it requires. This protects service-level agreements (SLAs) of any other application in this data sharing group and allows time for a solution to be found for Application B.

After the problem is solved, Application B can be routed back to the other members and allowed to run on M1 and M2.
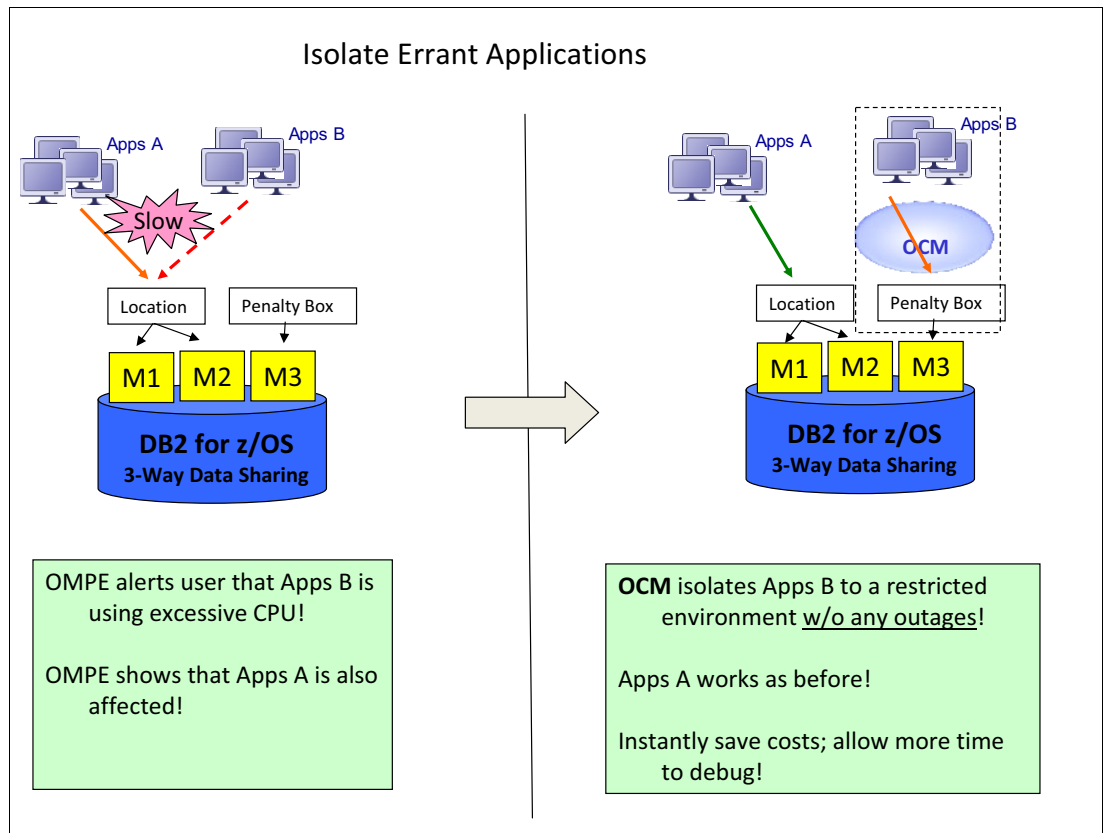
Figure 7-18   Isolating errant applications

The benefit of this feature is that you can quickly and automatically identify and move any transactions that are exceeding their defined resource consumption before they can affect other transactions and their SLAs, giving support personnel time to rectify the problems.

An outage is not required for this change, or for the rerouting of the application to M3 and back again, because changes are made at transaction boundaries.

You must have a Penalty Box data sharing member that is set up and a location alias that you created that points to this member or members.

Setting WLM service class

Optim Configuration Manager can automatically enforce client information fields, ensuring that an application conforms to the appropriate WLM service class. This way ensures that resources are made available to applications depending on their importance and SLAs, regardless of what was set on the client.

See Figure 7-19. This is all done without any application outages.
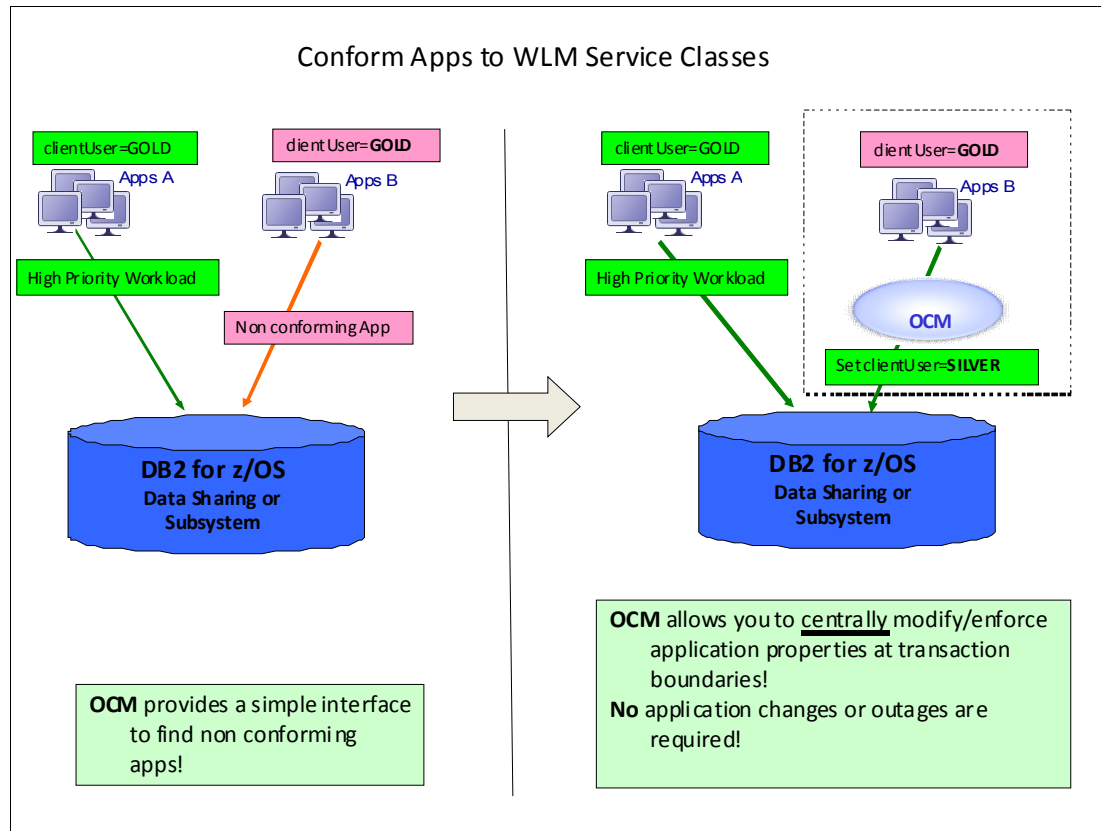
Figure 7-19   Enforcing WLM service class

In this example, Application A is a high priority application, Application B has had the same clientUser coded but should be running as a lower priority. This has not been coded at the client so the application is running as a high-priority application.

Using the "Map workload management service classes" rule, you can set the rule to identify Application B and automatically set the WLM service class to a more appropriate class (in this case SILVER). This takes effect when the rule is enabled.

You must have set up the WLM service classes in advance and the change of WLM class does not require an outage.

Setting special registers

To take advantage of some features of DB2 it is advantageous to set special registers within the application rather than to set it at a ZPARMS level. This allows you to control the granularity of the feature or to test the feature before making it available to all applications.

By using Optim Configuration Manager you can set special registers without needing to make any application change. For example, Figure 7-20 shows how you can confirm whether an individual application can benefit from using the IBM DB2 Analytics Accelerator appliance, using Optim Configuration Manager to set the special register QUERY_ACCELERATION dynamically without amending the programs. This change does not affect any other application executing and the programs use the DB2 tables and not the appliance.
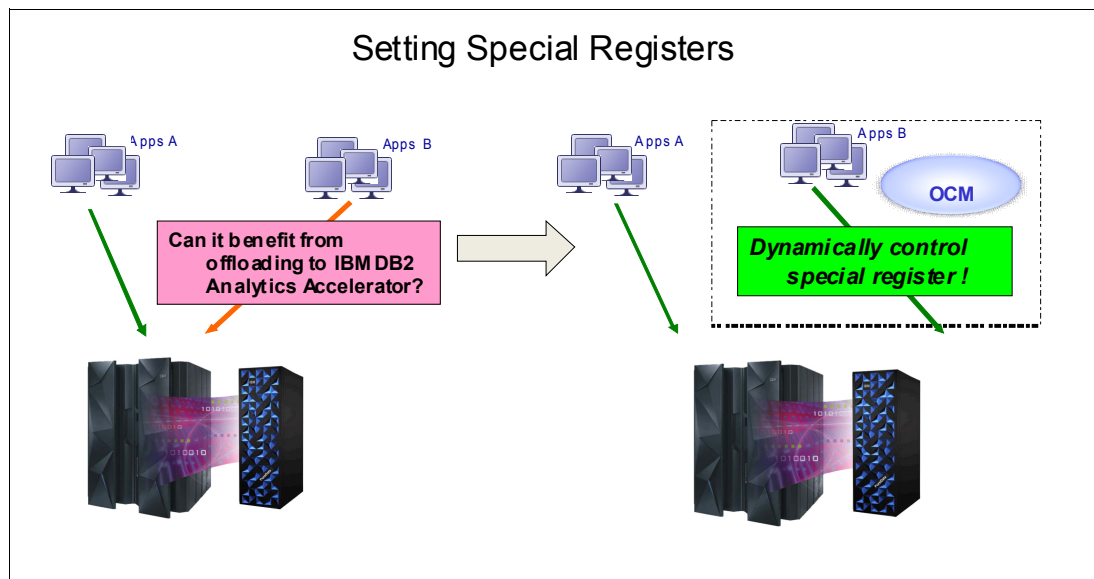
Figure 7-20   Setting special registers

Throttling connections

With Optim Configuration Manager, you can update JCC driver properties that control the number of connections that an application can make. This allows you to optimally share resources in a data sharing environment.

Figure 7-21 shows how you can use Optim Configuration Manager to reign in applications that are making too many connections and affecting performance of other applications by taking the lion share of the resources available on the system.
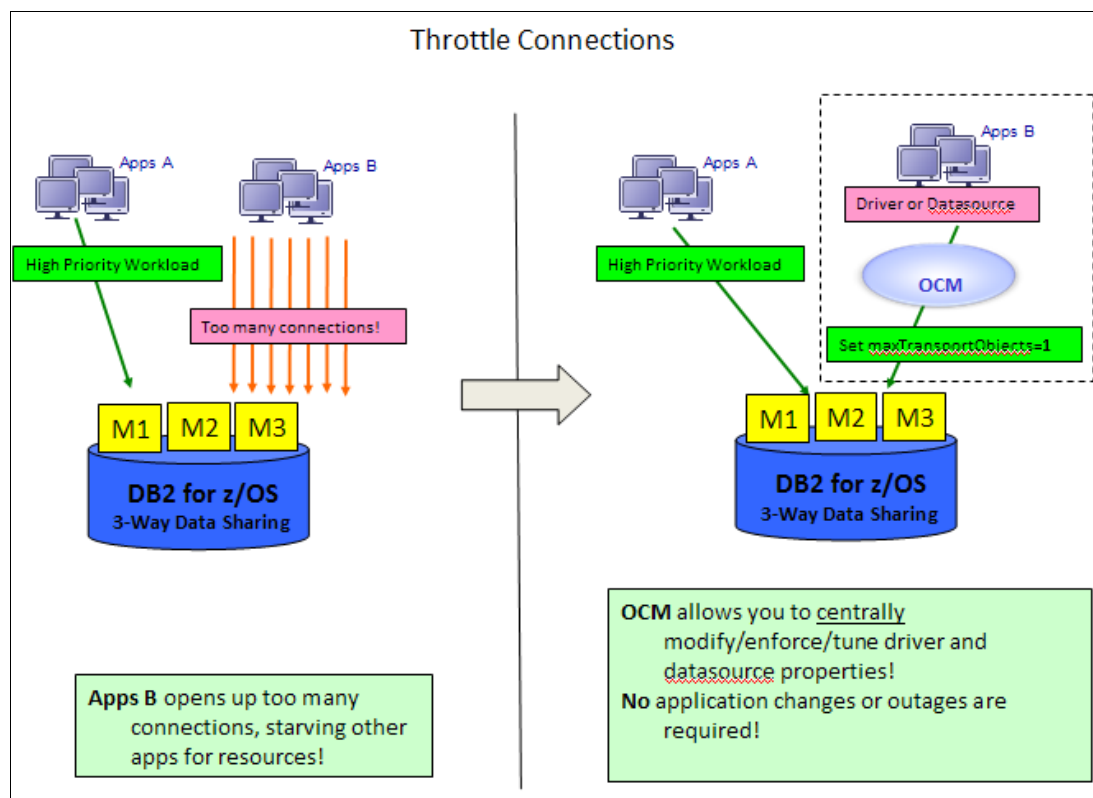
Figure 7-21   Throttling connections

This example shows that Application B opens too many connections to the DB2 data sharing group, which in turn affects the high priority workload being driven through Application A. By using Optim Configuration Manager, you can change the data source and driver properties, in this case maxTransportObjects, to scale back the number of connections allowed by Application B.

To achieve this, you must define and enable a "Throttle database connections" rule. The new properties take effect immediately. No application outages or changes are required.

You can tune the following attributes:

- ► maxTransportObjects
- ► minTransportObjects
- ► maxTransportObjectIdleTime
- ► maxTransportObjectWaitTime
- ► maxRefreshInterval

Enabling DB2 application profiles

Starting with DB2 10 for z/OS, you can monitor an application using application profiles. A profile is a set of criteria that identifies a particular context on a DB2 subsystem, such as threads, connections, or SQL statements that have particular attributes. You can create profiles to define filtering scopes for processes within DB2 and specify actions for DB2 to take when a process, such as a SQL statement, thread, or connection, meets the criteria of the profile.

You can specify the following actions:

► Monitor threads and connections.
► Set or disable certain subsystem parameters for particular SQL statements.
► Specify policies for managing query access plans.

How you define a profile depends on the context that you want to define and the actions that you want DB2 to perform. A valid row in SYSIBM.DSN_PROFILE_TABLE always contains null values in some columns. Which of the following columns that you define depends on the purpose of the profile:

► AUTHID
► COLLID
► LOCATION
► PKGNAME
► PLANNAME
► PRDID
► ROLE
► CLIENT_APPLNAME
► CLIENT_USERID
► CLIENT_WRKSTNNAME

For more information about DB2 Application Profiles see Chapter 44 ("Planning for performance monitoring") in *DB2 10 for z/OS Managing Performance,* SC19-2978.

Optim Configuration Manager can assist you in setting up and enabling the application profile rules.

8

Solution pack product integration

The products included in the DB2 Administration Solution Pack were chosen based on the value of their integration points. Each product provides a unique set of capabilities, but the integration of the products is what provides the intrinsic value of the pack for the user. This chapter describes the integration points:

► Integration between DB2 Administration Tool and DB2 Object Comparison Tool

► Integration between DB2 Administration Tool and DB2 Table Editor

► Integration between DB2 Administration Tool, DB2 Object Comparison Tool, and Optim Configuration Manager

8.1 Integration between DB2 Administration Tool and DB2 Object Comparison Tool

With the DB2 Administration Tool, among the other tasks, you can do the following tasks:

► Navigate the DB2 catalog without having to write an SQL statement.
► Migrate objects from one environment to another.
► Create, drop, and alter one or more DB2 objects (non-managed changes).
► View zPARMS.
► Manage authorizations: grant or revoke.

With the DB2 Object Comparison Tool, you can compare a source environment to a target environment in order to identify the differences between the two. You can also optionally generate APPLY jobs, which when submitted, cause the target to look like the source. The tool requires the DB2 Administration Tool to be installed and customized.

Together the DB2 Administration Tool and the DB2 Object Comparison Tool provide the ability to manage changes. A managed change is one where the change is registered in the Change Management Repository through the change management processes of import or register. The repository consists of a set of DB2 tables that are created by the Tools Customizer (TCz) when customizing the DB2 Administration Tool. The change management process has three possible settings:

► NONE: This is the default. Even if the Change Management Repository tables have been created, the changes are not stored in the repository.

► OPTIONAL: The user has a choice of using or not using the change management process (import or register) to store the change definition in the Change Management Repository.

► REQUIRED: All changes are either imported or registered in the Change Management Repository.

To use the change management process you must first update the Change Management ID table (ADBCID) and change the default level setting for the system from NONE to OPTIONAL or REQUIRED, or insert individual user IDs and set the levels for each ID to OPTIONAL, REQUIRED, or NONE.

For example, in Figure 8-1 all of the users are set to OPTIONAL, but DBA104 is REQUIRED to use the change management process.

Issue the **CMM** command on the top line of the DB2 Administration Tool panels and select option 5 to display the contents of the CM Management ID table.

```
ADB2C5 in -------------- CM - Manage ID Table ---------------- Row 1 to 1 of 1
Command ===>                                                   Scroll ===> CSR

Commands: CANCEL
Line commands:  I - Insert  D - Delete

Change management default level setting : OPTIONAL


Sel SQL ID    Level    Oper
    *         *        *
--- -------- -------- ------
    DBA104    REQUIRED
****************************** END OF DB2 DATA ******************************
```

Figure 8-1   CM - Manage ID Table

The method for defining a change is the same whether the change is managed or non-managed. However, additional benefits are associated with using managed changes:

► Virtual change: User is notified if another change has been defined for the same object. The user can elect to either apply the change, which means that the new change is merged with the previously defined change, or supersede (bypass) the previously defined change. This capability minimizes the amount of confusion and duplicated efforts on the part of the database administrator (DBA).

► Audit capabilities: Provides a set of reports on completed changes or uncompleted changes for the local subsystem.

8.2 Integration between DB2 Administration Tool and DB2 Table Editor

The DB2 Administration Tool can be used by DBAs, and also application developers, to navigate the DB2 catalog to display lists of objects and their attributes without having to write SQL statements. Both roles might also have the need to edit the data values stored in a table. The DB2 Table Editor provides this capability and can be called as a stand-alone product from the DB2 Tools Launchpad or from a line command issued next to the name of a table on the DB2 Administration Tool's Tables, Views, and Aliases panel (ADB21T). The name of the line command to be used to call DB2 Table Editor is specified at customization time.

In Figure 8-2, the command name is `EDIT`.

```
ADB21T in --------------- DBOA Tables, Views, and Aliases ---- Row 1 to 6 of 6
Command ===>                                              Scroll ===> PAGE


Commands: GRANT  MIG  ALL  CT
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands


Sel   Name                Schema   T DB Name  TS Name   Cols      Rows Chks C
      *                   *        * *        *         *            *    * *
----- ------------------> -------- - -------- -------- ------ ----------- ---- -
EDIT  BC_EMPLOYEE         BCD076DA T BCD076DA BCTSEMP    21          -1   0
      BC_EMP_PROJ_ACT     BCD076DA T BCD076DA BCTSEPA    10          -1   0
      BC_PROJECT_ACTIVIT  BCD076DA T BCD076DA BCTSPJA    10          -1   0
      BC_PROJ             BCD076DA T BCD076DA BCTSPROJ   14          -1   0
      BC_DEPARTMENT       BCD076DA T BCD076DA BCTSDEPT   10          -1   0
      BC_ACTIVITY         BCD076DA T BCD076DA BCTSACT     3          -1   0
****************************** END OF DB2 DATA ******************************
```

Figure 8-2   EDIT line command: Editing DB2 tables from DB2 Administration Tool

After editing the data values, press F3 to return to the DB2 Administration Tool Tables, Views, and Aliases panel (ADB21T). This is the time that the edited data values are committed. The benefit of this integration is that the user does not have to leave the DB2 Administration Tool to edit or browse data values.

Note: The DB2 Administration Tool has a `BR` (browse) line command. The DB2 Table Editor also has a BROWSE option, which is more robust than the browse option of the DB2 Administration Tool. The DB2 Table Editor panels can be customized to "freeze" specified columns so that when you scroll right and left, the key information can remain in view.

8.3 Integration between DB2 Administration Tool, DB2 Object Comparison Tool, and Optim Configuration Manager

With Optim Configuration Manager, you can audit or capture committed changes for all subsystems in one central location. Its integration point in the DB2 Administration Solution Pack is at the reporting level.

As indicated previously, the DB2 Administration Tool Change Management Process can report on completed and non-completed changes. Optim Configuration Manager can also report on completed changes. Although you might think that both products are providing the same information, they are not. Table 8-1 contains a synopsis of the differences between the two products.

Table 8-1   DB2 Administration Tool reporting versus Optim Configuration Manager reporting

DB2 Administration Tool Change Management	Optim Configuration Manager with *no* integration with Admin Tool	Optim Configuration Manager with integration with Admin Tool
Reports on intended changes; if someone goes outside the products change management realm (for example they use SPUFI) and makes a change to an object, that change is not reported by the DB2 Administration Tool change management reports.	The report of actual changes is limited to showing before and after values of a DB2 catalog table row.	Reports on the actual change regardless of the origin of the change. The intended changes shown by DB2 Administration Tool are the intended SQL statements.
Does not report on the SQL statements actually executed, but rather reports on the statements that were intended to be executed. [a]		Captures and reports on the actual DDL and DCL executed for each change. This data originates from DB2 Administration Tool.
Reports on the changes in the local system.[b]	Reports on changes for the entire enterprise.	
Reports on all registered changes regardless of status (DEFINED, ANALYZED, RUNNING, COMPLETE, CANCELED, and others).	Reports only on the completed changes	

a. If a job aborts and the user modifies the job stream and resubmits, the DDL in the Change Management Repository does not reflect the change made to the job stream.
b. Export of a change is not recorded in the source Change Management Repository, but an IMPORT is registered in the target repository because an IMPORT registers a change.

The best integration between the two products is when managed changes are used. An example of the Optim Configuration Manager DB2 Administration Tool Explorer reporting on a specific managed change is shown in Figure 8-3.

Figure 8-3   Optim Configuration Manager DB2 Administration Tool Explorer

> **Important:** Because the Optim Configuration Manager reports on the actual changes, this information can be used to help quickly identify the source for problems.

Part 3

Use cases

This part provides examples of practical use cases where the adoption of the DB2 Administration Solution Pack for z/OS can improve productivity.

This part includes the following chapters:

- ► Chapter 9, "Change management" on page 141
- ► Chapter 10, "The environment for the change management scenario" on page 161
- ► Chapter 11, "Using DB2 Administration Tool and DB2 Object Comparison Tool" on page 169
- ► Chapter 12, "Using Optim Configuration Manager" on page 239

Change management

DBAs are often challenged when in regard to managing changes to DB2 objects in a DB2 environment, because changes can be complex. Typically, changes are initiated in one specified environment and are then pushed, or propagated, to other target environments, often within a limited amount of time.

The IBM DB2 Administration Tool Pack's DB2 Administration Tool and DB2 Object Comparison Tool can provide assistance for accomplishing the necessary tasks needed to import, define, analyze, run, and propagate changes. Optim Configuration Manager can be used to monitor or view all changes that have been completed through the use of its Configuration Changes and Administration Tool Explorer options. See Chapter 7, "InfoSphere Optim Configuration Manager" on page 109.

This chapter provides background information for change management actions using the functions of the DB2 Administration Tool Pack's DB2 Administration Tool and DB2 Object Comparison Tool.

This chapter contains the following topics:

► IBM change management vocabulary
► Options for defining a change
► Options for propagating a change

9.1 IBM change management vocabulary

The following terms are important to understanding the IBM change management solution:

► AL

The **AL** line command is used to define changes that can be accomplished through an ALTER SQL statement. This command can be issued against databases, table spaces, tables, aliases, materialized query tables, indexes, functions, stored procedures, sequences, XML DOCID, stogroups, and triggers. It is also available for masks and permissions. The command works on only one object at a time.

► ALT

The **ALT** command performs simple to complex changes for the following object types:
  – DB: Database
  – TS: Table space
  – TB: Table
  – VW: View
  – AL: Alias
  – SY: Synonym
  – IX: Index
  – FK: Foreign key constraint
  – TR: Trigger
  – SP: Stored procedure
  – FU: Function
  – SQ: Sequence

  ALT consists of two steps: analyze and apply. **ALT** can be used to define changes to one or more objects during a change session.

► Apply

There are two contexts for the term *apply* in the IBM DB2 change management realm:

  – Apply is used in the change management process when a user wants to append a new change specification to a previously defined or registered change specification. The alternative is to supersede the previous change.

  – Apply is used to refer to the generated JCL that when submitted causes the target to look like the source. It is the job that applies the changes to the target. This reference of the term is used by the DB2 Object Comparison Tool and by the **ALT** line command in the DB2 Administration Tool.

► ANALYZE

This command does an impact analysis and generates the statements (for example SQL and utilities) necessary to implement the changes on the current subsystem. The change statements are stored in a member of the work statement list library. To analyze a change, issue the **ISPF 'AN'** line command next to a registered change in the Change Management Repository that is either in DEFINED or ANALYZED status. To analyze a change in batch, use the **action_analyze_change** action control statement.

► Base version

This is a snapshot of definitions for a set of DB2 objects at a point in time.

► Change management process

Change management consists of five processes: import, register, analyze, run, and recover. It is also referred to, in this document, as a *managed change*. The implementation of the change management process requires that the Change Management ID table must be set to optional or required either at the system level or by user.

The process is supported by ISPF and batch interfaces. Using the change management process offers several benefits:

– The recording and tracking of changes

– A virtual change capability, whereby the user is notified when other changes against the same object have been previously defined but not completed

– Ability to propagate changes utilizing a delta change file

– Attain the best usage of the Optim Configuration Manager capabilities

► Change Management Batch (CM Batch)

This is the batch interface for making changes to DB2 objects. Provides access to the main processes of change management (import, register, analyze, run, and recover) in batch without having to launch the DB2 Administration Tool product and navigate through the panels. It allows the user to create, customize, and reuse batch jobs when managing and propagating their changes using DB2 Administration Tool change management process.

► EXCLUDE SPECIFICATIONS

This allows the user to exclude objects and authorizations from a compare process.

► Fast change (immediate)

This is a type of change that is immediately executed through an `ALTER` command and is registered in the Change Management repository with a status of COMPLETE. If the change management process is activated and the `AL` line command is issued, you are prompted to either run the change as an immediate change or register the change as a normal change (which means that the ANALYZE and RUN steps must be issued before the change is completed).

► IGNORE CHANGES SPECIFICATION

This allows the user to specify changes that are not to be considered as part of the compare. Currently, only table changes are supported. The scope of allowable changes will be extended in the future.

► RECOVER Change

This is a named change that can be generated at the time of analyzing when using the change management process. The change is registered in the Change Management Repository with an ANALYZED status and is ready to run if a change must be backed out.

► RUN

The RUN job is the job that makes the physical change. To run a change, issue the ISPF `RN` line command next to the name of a change that is in ANALYZED status. To build a run job, the `RN` line command can be used or you can use CM Batch with the `action_build_run_job` parameter. If the change was analyzed using CM Batch, the run job is built by default.

Submit the run job to run a change. Using the DB2 Administration Tool panels, the run job can be accessed by issuing the `ER` line command next to a change, regardless if the change was analyzed using CM Batch or using DB2 Administration Tool panels. If the change was analyzed using CM Batch, the location of the run job is displayed in the job output of the analyze job.

► SUPERSEDE

This is an alternative to the APPLY option when a pending change to the same object exists in the Change Management Repository. If SUPERSEDE is selected, the status of the other changes reverts to DEFINED and has to be reanalyzed. The reason for this

behavior is that previously defined changes must incorporate any changes made by the newly defined change, as the newly defined change will be completed first.

► VERSION SCOPE

This named entity in the Change Management Repository is used to store a list of objects to be included in a version.

► Work statement list library

This is a PDS or PDSE where a set of operations (DDL statements, utility control cards, and others) can be created or stored and run either online or in batch.

9.2 Options for defining a change

There are several ways to initiate a change using the IBM DB2 database tools; the following list is a sample sequence:

1. Enter the changes using the ISPF interface of the DB2 Administration Tool.

2. Compare a file of DDL (source) to a target definition in the DB2 catalog using the DB2 Object Comparison Tool.

3. Generate APPLY jobs to cause the target to look like the source.

4. Use the Change Management Batch component to import a DDL file or a delta change file as a registered change.

In DB2 many object changes can be accomplished by executing a DDL statement such as ALTER and DROP. The list of changes that can be made in this fashion grows with each new release of DB2 through a facility known as online schema evolution. There are times when these types of changes will place an object in advisory pending status and require a REORG to fully materialize the change. This type of change is considered to be non-intrusive because it does not impact the availability of the application at the time the change is specified. The DB2 tools support online schema evolution, where applicable, and provide the option to automate the REORG utility to remove the advisory pending status if you want.

Other changes might be intrusive because additional actions are required to complete the change, thereby impacting the availability of the application. For example, if a column is added to the middle of a table, it is necessary to unload the data, drop the object, re-create the object, and reload the data to complete the change.

Two ISPF line commands for defining an alter process in the DB2 Administration Tool are **AL** and **ALT**:

► AL line command: See 11.2, "Change scenario 1: Alter BC_PROJ Table" on page 170 for an example of a fast change. Consider the following information:

   – Can be used only for making non-intrusive changes.

   – Works against one object at a time.

   – When used in the Change Management Process, the **AL** line command can execute or run a change immediately (fast change) or be registered as a normal change requiring an analyze and run process or function of the tool to complete the change.

   – Can be issued against databases, table spaces, tables, aliases, materialized query tables, indexes, functions, stored procedures, sequences, XML DOCID, stogroups, triggers, masks, and permissions.

- ALT line command: See 11.3, "Change scenario 2: ALT Tables and change propagation delta change" on page 179 for an example of a normal change. Consider the following information:
  - Can be used for both non-intrusive and intrusive types of changes.

    For example, if a change can be completed using just an ALTER DDL statement, the DB2 Administration Tool **ALT** option generates just an ALTER process. If the change requires additional functions, **ALT** generates all of the necessary steps needed to complete the change.
  - Can make changes to one or more objects within one change session by using ADD objects to the change.
  - When used in the Change Management Process, **ALT** requires changes to go through the ANALYZE and RUN processes to complete the change.
  - Can be issued against databases, tables spaces, indexes, views, and other objects such as procedures.

The Alter Objects panel (ADB27CA) in Figure 9-1 lists seven objects included in the change specification defined by the **ALT** line command.

```
ADB27CA n ---------------------- DBOA Alter Objects ---------- Row 1 to 7 of 7
 Command ===> add                                        Scroll ===> PAGE


 Commands: ALTER - Generate jobs  ADD - Add objects
  OPTIONS - Change alter options
 Line commands:
  A - Alter object  D - Delete  S - Select object  REL - Alter related
  FK - Add FK-affected tables  RI - Add RI-related tables  E - Edit view DDL
  RS - Reset RI-FK flags  CX - Create index  CFK - Create foreign key


     Object  Object                                      RI RI  FK
 Sel Qual    Name             Ty Info 1   Info 2     Rels Add Add Operation
     *       *                *  *         *           *  *   *   *
 --- ------> ----------------> -- -------> -------> ------ --- --- ----------
     BCD076DA BC_VSTAFAC2      VW BCD076DA BCTSEPA        NA  NA  MODIFY
     BCD076DA BC_VPROJRE1      VW BCD076DA BCTSPROJ       NA  NA  MODIFY
     BCD076DA BC_VPHONE        VW BCD076DA BCTSEMP        NA  NA  MODIFY
     BCD076DA BC_VEMPDPT1      VW BCD076DA BCTSDEPT       NA  NA  MODIFY
     BCD076DA BC_VEMP          VW BCD076DA BCTSEMP        NA  NA  MODIFY
     BCD076DA BC_VDEPMG1       VW BCD076DA BCTSDEPT       NA  NA  MODIFY
 *EL BCD076DA BC_EMPLOYEE      TB BCD076DA BCTSEMP     O  NA  NA  MODIFY
 ****************************** END OF DB2 DATA ******************************
```

Figure 9-1   Alter Objects Panel (ADB27CA): Accumulation of changes

Related objects

The DB2 Administration Tool has several restrictions when adding or renaming columns in a table, as in the following examples:

- New columns are not automatically included in views or indexes.
- If a column has been renamed, the new name is not automatically reflected in the view, if the view accesses more than one table.

In these instances, it is necessary to include related objects in the change specification using the DB2 Administration Tool **REL** line command. **REL** is available only when using the **ALT** line command.

Additional objects

More objects can be added to a change by using the **ADD** primary command on the command line of the Alter Objects panel (ADB27CA). **ADD** is available only when you use the **ALT** line command.

An example of using the **REL** and **ADD** commands is in 11.3, "Change scenario 2: ALT Tables and change propagation delta change" on page 179.

ALTER: Complete change specification

After all changes are entered, the next step is to click the **ALTER** keyword or specify ALTER on the Command line of the Alter Objects panel (ADB27CA), as shown in Figure 9-1 on page 145. The resulting panel depends on whether changes are non-managed or managed.

► Non-managed changes

A non-managed change is one where the change management process is not being used. The ALTER results in the display of the Build Analyze and Apply Job panel (ADBPALT) as shown in Figure 9-2.

```
ADBPALT ------------------- ALTER - Build Analyze and Apply Job ---------------
Option ===>

 Specify the following:

 Worklist information:
   Worklist name . . . . . . .           (also used as middle qualifier in DSNs)
   Prefix for data sets  . . .

 Data set information:
   PDS final qualifiers  . . .
     Member name . . . . . . . ADBALTER
     Delete member name  . . . ADBDELET (Optional job to delete work data sets)

 Options:
   Generate online . . . . . . NO       (Yes/No)
   Generate one job  . . . . . YES      (Yes/No)
     Member name or prefix . . APPLY
   As work statement list  . . YES      (Yes/No)
   Content of apply job(s) . . ALL      (All, DDL)
   Unload method . . . . . . . U        (Unload, Parallel unload, HPU)



   Optional processes:
     Run CHECK DATA  . . . . . NO       (Yes/No)
     Run COPY  . . . . . . . . N        (after: Reload/Alter/Both/None)
     Run REORG/REBUILD . . . . N        (Mandatory, All relevant, None)
     Run RUNSTATS  . . . . . . N        (after: Reload/Alter/Both/None)
     Run REBIND  . . . . . . . NO       (Yes/No)

   Utility control options:
     Use templates . . . . . . NO       (Yes/No)
     Use utility options . . . NO       (Yes/No)

 BP - Change batch job parameters
 TU - Specify TEMPLATE usage
 UO - Customize utility options
```

Figure 9-2   Build Analyze and Apply Job panel (ADBPALT): Non-managed changes

After this panel is completed, either a native JCL Analyze and Apply job is stored in a PDS or the change control cards are stored as a work statement list member in a work statement list library. A work statement list member may be run online or in batch to complete the change. Automatic restarting is supported.

► Managed changes

This is referred to in the documentation as the Change Management Process and provides a higher degree of control over the management of changes. Several requirements must be met to use this process:

– Both DB2 Administration Tool and DB2 Object Comparison Tool must be licensed. Given that both tools are included in the DB2 Administration Solution Pack, this feature is available for all licensees of the pack.

– The Tools Customizer (TCz) parameter (Enable Change Management) must be set to `Yes`.

– The Change Management (CM) ID table must be updated to reflect one of the following three levels.

   • NONE: The Change Management Process is not used (default setting).
   • OPTIONAL: The user can elect to use the Change Management Process or not.
   • REQUIRED: All changes are using the Change Management Process.

If set to OPTIONAL, the user must choose whether to use Change Management for the change. An example of this panel is in Figure 9-3.

```
DB2 Admin ------------------------ DBOA Alter ----------------------------
C EssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
  e DB2 Admin ----------- DBOA Change Management Prompt ----------- 18:39 e
  e                                                                        e
  e Change Management is optional for SQLID:  ADMR7                        e
  e                                                                        e
  e Do you wish to use Change Management for this function:     (Yes/No)  e
  e                                                                        e
  e                                                                        e
  e                                                                        e
  DsssssssImpossssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
```

Figure 9-3   Change Management Prompt

Managing changes by using the Change Management Process offers several benefits:

– An audit capability whereby completed and incomplete changes can be reported

– Batch interface for propagating changes

– Enablement of change propagation to multiple target environments using a delta change file

– Conflict resolution to notify regarding pending changes - option to APPLY the change to an existing change or to supersede or bypass the existing change

– Integration with InfoSphere Optim Configuration Manager to track changes at the enterprise level

The Change Management Process has a set of required processes, and a set of optional processes:

► Required processes:
  – REGISTER or IMPORT: Create a named change entry in the Change Management Repository.
    • Register is used to describe a change that is defined by using the ISPF panels (for example, AL or ALT) on the local system intended for use on the local system.
    • Import is used to describe a change that is defined by importing a delta change file, or a file containing DDL, that could have been defined on the local or a remote system.
  – ANALYZE: Does an impact analysis and generates the statements needed to implement the change on the local system and stores them into a work statement list member.
  – RUN: Completes the change.

    Using the online function (`ALT`), you would register a change, analyze the change by using the `AN` line command, and run the change using the `RN` line command.

    Using CM Batch, you import a delta change or DDL file, analyze the change, and run the change, by specifying the appropriate action parameters.

► Optional processes:
  – PROMOTE: Compare two base versions to generate a delta change file; used to propagate or import changes to target systems
  – RECOVER: Register a recover change in the Change Management Repository, which can be used to back out a change; a recover change is created during the analyze process with an analyzed status

Each change has a status that reflects the current state of the change:

  – INITIAL: Registration of a change failed; you must retry registering the change.
  – DEFINED: Registered named change.
  – ANALYZED: Change has gone through validation; a work statement list member is built; indicates the change is ready to be run.
  – RUNNING: Change is running; this status remains if the change aborts.
  – COMPLETE: Change is completed.
  – CANCELED: Change is canceled.
  – FAILED: FAST change aborted.

When deleting a change, only those changes having a status of CANCELED, FAILED, or COMPARE can be deleted. They can only be deleted if the Enable Allow Change Delete option in the Tools Customizer (TCz) is set to `Yes` at the time the DB2 Administration Tool is customized.

Note: Optim Configuration Manager users see the most benefit with the implementation of the change management process or managed changes.

Change Management Batch

The Change Management Process also has a batch interface referred to as CM Batch. This interface is customized using TCz and it is created in a JCL procedure library as specified by the person who customizes DB2 Administration Tool using TCz. The GOCCM2 member remains in the SAMP member. The GOCCM2 member is a sample job used to invoke the CM Batch JCL procedure (GOCCM). GOCCM2 includes a list of all of the CM Batch parameters and can be used as a template by specifying only those parameter values that are needed. There are default values for every parameter, except for SSID.

> **Note:** The CM Batch facility supports all of the required Change Management Processes plus many of the optional items. This facility continues to be enhanced. Watch this space.

Figure 9-4 displays some available actions when using the CM Batch interface. The values for each of the actions can be set to Y or N, and must be enclosed in single quotation marks, except for the following items:

► action_generate_base_version = (AUTO, USER, NO)

► action_genearete_ddl_from_base_version = (BEFORE_RUN, AFTER_RUN, SOURCE, TARGET, USER, or NO)

```
//LSCLIBS JCLLIB ORDER=GOCA10.SGOCSAMP
//*
//GOCCM    EXEC GOCCM,SSID=DSNA,PLAN=ADB
//GOCCM.PARMS DD *
action_analyze_change = ''
action_build_run_job = ''
action_generate_base_version = ''
action_generate_ddl_from_base_version = ''
action_import_change = ''
action_import_ignore = ''
action_import_mask = ''
action_recover_change = ''
action_run_change = ''
action_compare = ''
```

Figure 9-4   CM Batch GOCCM2 Parameters: Actions

Table 9-1 shows the complementary actions for CM Batch and the ISPF interface.

Table 9-1   CM Batch actions that are mapped to the equivalent ISPF interface commands

Action	CM Batch action	ISPF interface command
Analyze a change	action_analyze_change	`AN` line command next to a DEFINED change on CM Changes panel (ADB2C11). See Figure 11-26 on page 190.
Build JCL to run a change	action_build_run_job	Used by the `AN` line command: Build JCL to Run WSL = Yes on the Generate Analyze Job panel (ADB2C11A) and the RN line command. See Figure 11-27 on page 193.
Generate a base version	action_generate_base_version	`GV` line command next to an existing base version on the Version Scope panel (ADB2C42).
Extract DDL from a base version	action_generate_ddl_from_base_version	`DDL` line command next to an existing base version on the CM Versions panel (ADB2C41).
Import a change	action_import_change	Option 4: Import Changes from the CM Manage Changes panel (ADB2C11). See Figure 11-26 on page 190.
Import a mask	action_import_mask	
Import ignore	action_import_ignore	
Recover a change	action_recover_change	Used by `AN` command; it controls whether or not a recover change is created for the change. The CM Batch equivalent option is the `generate_recover_change` parameter. Generate a `recover change = Y` on the Generate Analyze Job panel (ADB2C11A). See Figure 11-27 on page 193. To recover a change, either issue the `RC` line command against a change in ISPF, or use CM Batch with the `action_recover_change` parameter.
Run a change	action_run_change	`RN` line command next to a change with an ANALYZED status on the CM Changes panel (ADB2C11) builds the run job. You can submit it then, or later. To run a change, submit the run job. See Figure 11-26 on page 190.
Compare to generate a delta change file	action_compare	DB2 Object Comparison Tool compare, use "Changes file data set name" on the Generate Compare Job panel (GOC5). See Figure 11-54 on page 214.

Figure 9-5 is a list of CM Batch parameters available in GOCCM2 for the management of the batch restart program ADBTEP2.

```
ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
EDIT       DBTLSP.SGOCSAMP(GOCCMJ) - 01.02                 Columns 00001 00072
Command ===>                                                 Scroll ===> CSR
000082 adbtep2_ac = ''
000083 adbtep2_advisoryautorebuild = ''
000084 adbtep2_advisoryautoreorg = ''
000085 adbtep2_autorebuild = ''
000086 adbtep2_autoreorg = ''
000087 adbtep2_binderror = ''
000088 adbtep2_pendingchangescheck = ''
000089 adbtep2_restart = ''
```

Figure 9-5   CM Batch GOCCM2 ADBTEP2 parameters

In the ISPF interface, the ADBTEP2 parameters are on the Batch Job Utility Parameters panel (ADB2UPA), as shown in Figure 9-6.

```
ADB2UPA n -------------- DSNB Batch Job Utility Parameters -------------- 23:01
Command ===>

                                                                More:   - +

ADBTEP2:
  Restart  . . . . . . . YES      (Yes/No)
  Maxerrors  . . . . . . 0        (-1 to 99)
  BindError  . . . . . . MAXE     (MAXE, Save or Ignore)
  Log DIAG . . . . . . . NO       (Yes/No)
  AutoCheck  . . . . . . NO       (Yes/No)
  LOAD Summary Report  . YES      (Yes/No)
  Auto Rebuild . . . . . YES      (Yes/No)
  Auto Reorg . . . . . . YES      (Yes/No)
  Advisory Auto Rebuild. YES      (Yes/No)
  Advisory Auto Reorg  . YES      (Yes/No)
  LOB/XML IC Unload  . . U        (Error, Use base data)
  Missing IC Unload  . . U        (Error, Use base data)
  DB2 Pending Changes options:
    Check at DROP  . . . YES      (Yes/No)
```

Figure 9-6   ADBTEP2 parameters on the Batch Job Utility Parameters panel (ADB2UPA)

Figure 9-7 is a display of the CM Batch parameters in GOCCM2 for base version support. It shows options for specifying names and owners before and after the run. Some options pertain to version scopes.

```
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
EDIT       DBTLSP.SGOCSAMP(GOCCMJ) - 01.02              Columns 00001 00072
Command ===>                                            Scroll ===> CSR
000094 base_version_name = ''
000095 base_version_name_after_run = ''
000096 base_version_name_before_run = ''
000097 base_version_owner = ''
000098 base_version_owner_after_run = ''
000099 base_version_owner_before_run = ''
000100 base_version_scope_name = ''
000101 base_version_scope_name_after_run = ''
000102 base_version_scope_name_before_run = ''
000103 base_version_scope_owner = ''
000104 base_version_scope_owner_after_run = ''
000105 base_version_scope_owner_before_run = ''
```

Figure 9-7   CM Batch Base GOCCM2 Base Version options

Additional CM Batch parameters are shown in Figure 9-8; change_name and change_owner are two of the more interesting parameters in this display. Use of these two parameters is in 11.3, "Change scenario 2: ALT Tables and change propagation delta change" on page 179.

```
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
EDIT       DBTLSP.SGOCSAMP(GOCCMJ) - 01.02              Columns 00001 00072
Command ===>                                            Scroll ===> CSR
000106 change_comment = ''
000107 change_name = ''
000108 change_owner = ''
000109 content_of_apply_jobs = ''
000110 data_to_recover = ''
000111 default_space_priqty = ''
000112 default_space_secqty = ''
000113 existing_base_version_action = ''
000114 generate_base_version_after_run = ''
000115 generate_base_version_before_run = ''
000116 generate_job_class = ''
000117 generate_recover_change = ''
000118 generate_templates = ''
000119 identity_start_value = ''
```

Figure 9-8   CM Batch GOCCM2: Additional parameter options

The next group of CM Batch parameters in GOCCM2 pertain to the ignore parameters, the job card, and masking. See Figure 9-9.

```
EDIT       DBTLSP.SGOCSAMP(GOCCMJ) - 01.02              Columns 00001 00072
Command ===>                                               Scroll ===> CSR
000120 ignore_comment = ''
000121 ignore_name = ''
000122 ignore_owner = ''
000123 import_pending_change_action = ''
000124 job_card_line_1 = ''
000125 job_card_line_2 = ''
000126 job_card_line_3 = ''
000127 job_card_line_4 = ''
000128 job_card_line_5 = ''
000129 job_class = ''
000130 job_jcllib_line_1 = ''
000131 job_jcllib_line_2 = ''
000132 job_jcllib_line_3 = ''
000133 job_jcllib_line_4 = ''
000134 job_parm_line_1 = ''
000135 job_parm_line_2 = ''
000136 job_parm_line_3 = ''
000137 job_parm_line_4 = ''
000138 mask_comment = ''
000139 mask_name = ''
000140 mask_owner = ''
000141 max_allocation_to_dasd = ''
000142 max_priqty_in_kb = ''
```

Figure 9-9   CM Batch GOCCM2 - Ignore, Job Card, and Masking options

The CM Batch parameters listed in Figure 9-10 are options for providing new names and owners for different change components. This list also includes the option to specify the PDS name to be used for run JCL and the work statement list library (WSL), and the prefix to be used for any allocated data sets. At the bottom are options for recover change options.

```
EDIT        DBTLSP.SGOCSAMP(GOCCMJ) - 01.02              Columns 00001 00072
Command ===>                                              Scroll ===> CSR
000143 new_base_version_name = ''
000144 new_base_version_owner = ''
000145 new_change_name = ''
000146 new_change_owner = ''
000147 new_ignore_name = ''
000148 new_ignore_owner = ''
000149 new_mask_name = ''
000150 new_mask_owner = ''
000151 pds_for_run_jcl = ''
000152 pds_for_run_job_input = ''
000153 pds_for_wsl = ''
000154 percent_increase_for_converted_data_sets = ''
000155 plan = ''
000156 prefix_for_data_sets = ''
000157 recover_change_comment = ''
000158 recover_change_name = ''
000159 recover_change_owner = ''
000160 recover_pending_change_action = ''
```

Figure 9-10   CM Batch GOCCM2: New names, PDS for JCL / WSL, Recover Change

Figure 9-11 includes a variety of report options, followed by options for sequence numbers and identity columns. The `run` options for utilities match those found on the bottom of the Analyze parameter panel, where post-change utilities can be specified (as Figure 11-27 on page 193 shows).

```
ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
EDIT      DBTLSP.SGOCSAMP(GOCCMJ) - 01.02              Columns 00001 00072
Command ===>                                           Scroll ===> CSR
000161 report_expected_conversion_problems = ''
000162 report_object_count = ''
000163 report_only_changed_objects = ''
000164 report_summary = ''
000165 report_system_generated_ignore_fields = ''
000166 report_translation_masks = ''
000167 report_user_specified_ignore_fields = ''
000168 retain_generated_always_for_row_change_ts = ''
000169 retain_generated_always_for_rowid = ''
000170 run_check_data = ''
000171 run_rebind = ''
000172 run_reorg_rebuild = ''
000173 run_runstats = ''
000174 run_sqlid = ''
000175 save_source_base_version = ''
000176 save_target_base_version = ''
000177 space_tape_unit = ''
000178 space_unit = ''
000179 space_unit_name = ''
000180 ssid = ''
000181 stop_on_conversion_error = ''
```

Figure 9-11   CM Batch GOCCM2: Report options, Run utility options...

Many utility options are available for CM Batch as Figure 9-12 shows.

```
ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
EDIT       DBTLSP.SGOCSAMP(GOCCMJ) - 01.02              Columns 00001 00072
Command ===>                                            Scroll ===> CSR
000182 take_an_image_copy = ''
000183 unload_method = ''
000184 use_defer_yes = ''
000185 use_ignore_for_import_change = ''
000186 use_mask_for_import_change = ''
000187 use_permanent_data_set_for_run_job_input = ''
000188 use_utility_options = ''
000189 util_check_auxerror = ''
000190 util_check_drain_wait = ''
000191 util_check_exceptions = ''
000192 util_check_include_xml_tablespaces = ''
000193 util_check_retry = ''
000194 util_check_retry_delay = ''
000195 util_check_scope = ''
000196 util_check_sortdevt = ''
000197 util_check_sortnum = ''
000198 util_check_xmlschema = ''
000199 util_clone_template_copyddn1_name = ''
000200 util_clone_template_copyddn1_use = ''
000201 util_clone_template_copyddn2_name = ''
000202 util_clone_template_copyddn2_use = ''
000203 util_clone_template_discarddn_name = ''
000204 util_clone_template_discarddn_use = ''
000205 util_clone_template_errddn_name = ''
000206 util_clone_template_errddn_use = ''
000207 util_clone_template_fccopyddn_name = ''
000208 util_clone_template_fccopyddn_use = ''
000209 util_clone_template_filterddn_name = ''
000210 util_clone_template_filterddn_use = ''
000211 util_clone_template_lobcol_name = ''
000212 util_clone_template_lobcol_use = ''
000213 util_clone_template_recoveryddn1_name = ''
000214 util_clone_template_recoveryddn1_use = ''
000215 util_clone_template_recoveryddn2_name = ''
000216 util_clone_template_recoveryddn2_use = ''
000217 util_clone_template_workddn1_name = ''
000218 util_clone_template_workddn1_use = ''
000219 util_clone_template_workddn2_name = ''
```

Figure 9-12   CM Batch GOCCM2: Utility Options

CM Batch can be used to run DB2 Object Comparison Tool to create a managed change or only to get the compare report and delta change file without registering the change. More documentation is in the recent Chapter 8, "Creating a Change Management batch job to run compare" of the *DB2 Object Comparison Tool for z/OS Version 10 Release 2 User's Guide,* SC19-3778-04.

Several CM Batch parameters for running DB2 Object Comparison Tool are as follows:

```
action_compare = ''
source_type = ''
target_type = ''
compare_mask_owner = ''
compare_mask_name = ''
compare_mask_dsn = ''
compare_ignore_fields_owner = ''
compare_ignore_fields_name = ''
compare_ignore_fields_dsn = ''
suppress_drop_of_objects = ''
suppress_drop_of_columns = ''
suppress_adding_columns = ''
```

The CM Batch parameters listed so far is not a complete list. However, the complete list is in the following resources:

► The *DB2 Administration Tool for z/OS, V10.2 User's Guide*, SC19-3744 contains a complete list of the CM Batch parameters and indicates which actions can be paired with which parameter.

► The GOCCM2 JCL member in the highlvl.SGOCCOMP library has a list.

> **Note:** Not everything that is available in the ISPF interface is in the CM Batch facility at this time, but CM Batch continues to be enhanced. Watch this space.

John Dembinski, an Advisory Software Engineer at IBM, wrote an article about CM Batch: *DB2 Tools Corner: Introducing the IBM supported batch interface for change management in DB2 Administration Tool and DB2 Object Comparison Tool*. It is at the following location:

http://www.ibm.com/developerworks/data/library/techarticle/dm-1205toolscorner/

9.3 Options for propagating a change

Changes often must be propagated to one or more environments. There are many variables to consider when electing the change propagation method to be used. Some key considerations include the number of environments involved, the frequency of changes being made, the volume of changes being made, the number of resources responsible for the changes, and the time frame in which the changes have to be made available. Many organizations want to standardize their change management processes and follow the same set of directions regardless of the circumstance. Others leave it up to the individual who is responsible for making the changes as to which methods they want to use.

Table 9-2 on page 158 lists potential options for propagating changes to one or more target environments using the IBM DB2 database tools.

Table 9-2   Change propagation options

Option	Action	Description	Advantages	Disadvantages
1	Reissue commands.	Reissue the change commands in every environment (**AL**, **ALT**, and so on).	► Simple ► Available for non-managed and managed changes	► Might be prone to error, you might forget one or more changes or enter a change incorrectly. ► Might not be feasible for large environments having many targets or time constraints.
2	Compare source to target and generate an APPLY job. [a] Execute the APPLY job.	Use DB2 Object Comparison Tool to compare environments.	► If the goal is to synchronize the environments this is the preferred method for ensuring that each environment looks exactly alike. ► Full control of compare options (for example, exclude specifications, include specifications). ► Available for non-managed and managed changes.	► Might not be feasible for large environments having many targets or time constraints.
3	Generate and import a delta change file (two-step process): [b]	Generate the delta change file; three methods:		
	Step 1: Generate a delta change file.	Method 1: Use the PROMOTE function of the change management process: compare two base versions to generate the delta change file.[c]	► Control over the scope; can compare small groups of changes.	► Must have two base versions to do the comparison. ► Must accept all differences; no ignore or exclude options are available.
		Method 2: Use DB2 Object Comparison Tool to compare a source to a target to generate the delta change file.	► Full control of compare options (for example, exclude specifications, include specifications) ► Can use DDL as the source. ► Supported in ISPF. All compare options in the panels have equivalent CM Batch parameters that the user can control. Each CM Batch parameter for compare does have a product default value.	► Use with the ISPF interface requires the specification of compare options to produce the change file .

Option	Action	Description	Advantages	Disadvantages
		Method 3: Export a change by issuing the ISPF **EX** line command next to an existing change	► Can be issued before the change has been analyzed (the change does not have to be completed in any environment). ► Eliminates the need to run a compare. ► Multiple changes can be exported as one change.[d] ► Good option when handling a large number of environments.	► Export is available only in the ISPF interface.
	STEP 2: Import the delta change file	Import one or multiple delta change files using either the ISPF or batch interface.		

a. DB2 Object Comparison Tool has a multi-compare feature whereby compare dialogs can be saved and run at a later time. Users may select dialogs to include or exclude from job submissions

b. Using this option requires the implementation of the Change Management Process. It can be accomplished online or through the CM Batch interface

c. Base versions can be generated on-demand when needed using the ISPF panels or CM Batch. They can also be generated just before a change first starts to run, and just after a change completes.

d. When multiple changes are to be exported, drop / create of the same table, exporting and deploying these changes to other target environments as one change reduces the time and resources needed to implement the change. For example, the combined change would require one unload, one drop / create and one load of the table.

10

The environment for the change management scenario

This chapter describes the environment that was set up during this project for the definition of our use cases.

Although the following environment description is an oversimplification of what DBAs actually manage in the real world, it is sufficient to illustrate the capabilities of the IBM DB2 database tools in the DB2 Administration Solution Pack.

10.1 Database environment

Figure 10-1 is a schematic of the environment used for the change scenarios that were developed for this book. There are six databases that are divided as follows:

► The first database or schema is BCD076DA (*development*). All changes are initiated in this database using the ISPF interface.

► The next level consists of three databases or schemas: BCD076TA, BCD076TB, and BCD076TC. They represent the *test* environment.

► Next is the *user assurance* level and the database name or schema is BCD076UA.

► The last database or schema BCD076ZA represents the *production* environment.
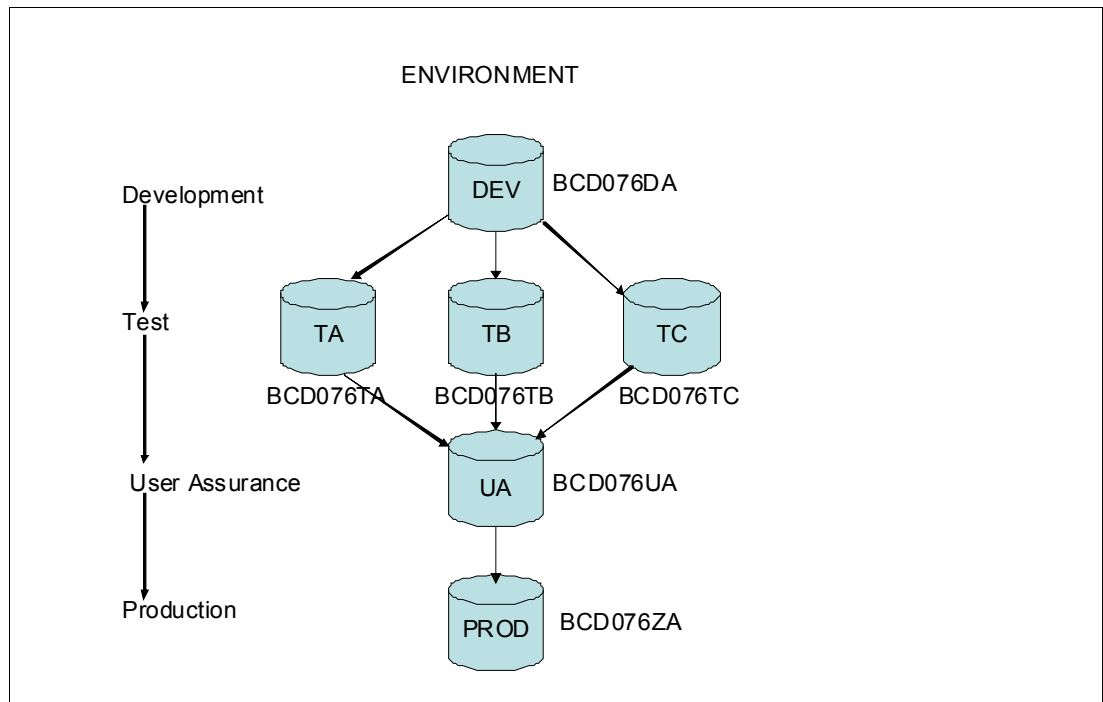

Figure 10-1   Environment schematic for change management scenario

DB2 Administration Tool assists with the navigation of the DB2 catalog. We used the tool to display the list of databases in our scenario as shown in Figure 10-2.

```
ADB21D in ------------------- DBOA Databases ----------------- Row 1 to 6 of 6
Command ===>                                                    Scroll ===> PAGE

Commands: GRANT  MIG  DIS  STA  STO  UTIL  CT
Line commands:
 T - Tables  S - Table spaces  X - Indexes  G - Storage group  ICS - IC status
 DIS - Display database  STA - Start database  STO - Stop database  A - Auth
 ? - Show all line commands
                           Storage  Buffer           Created      Index
Select Name      Owner     Group    Pool      DBID By        T E BPool     I
       *         *         *        *           * *         * * *         *

------ -------- -------- -------- -------- ------ -------- - - -------- -
       BCD076DA ADMR7     SYSDEFLT BP0         399 ADMR7       E BP0       N
       BCD076TA ADMR7     SYSDEFLT BP0         400 ADMR7       E BP0       N
       BCD076TB ADMR7     SYSDEFLT BP0         401 ADMR7       E BP0       N
       BCD076TC ADMR7     SYSDEFLT BP0         402 ADMR7       E BP0       N
       BCD076UA ADMR7     SYSDEFLT BP0         403 ADMR7       E BP0       N
       BCD076ZA ADMR7     SYSDEFLT BP0         404 ADMR7       E BP0       N
****************************** END OF DB2 DATA ******************************
```

Figure 10-2   Databases panel (ADB210) list of DB2 databases used for change management scenario

Figure 10-3 and Figure 10-4 on page 165 are the result set from the issuance of the DB2 Administration Tool **DS** (Database Structure) line command next to the name of the BCD076DA database. When you select the **DS** option, the Database Structures panel displays a structured list of objects in the database that you have selected but does not display plans and packages. This command enables the DBA to easily see all of the objects and how they are related.

```
ADB21DS n --------------- DB0A Database Structures --------- Row 1 to 35 of 51
Command ===>                                                 Scroll ===> PAGE

Line commands:  S - Show object  DSN - Data sets
                                                   PSID/
Sel Type    Object Name            Qualifier  DBID ISOBID   OBID Note
    *       *                      *            *    *        * *
--- ------- ----------------------> -------- ------ ------ ------ ------------
    D------ BCD076DA--------------- ADMR7     399      0      0
     S       BCTSACT                ADMR7     399      2      1 Segmented
      T       BC_ACTIVITY           BCD076DA  399      0      3
       UC       GLWPACT                         0      0      0 Primary key
       X        BC_IXACT1            BCD076DA  399      5      4 Cluster
       V        BC_VACT              BCD076DA    0      0      0
       V        BC_VSTAFAC1          BCD076DA    0      0      0
       V        BC_VSTAFAC2          BCD076DA    0      0      0
     S       BCTSDEPT               ADMR7     399      7      6 Segmented
      T       BC_DEPARTMENT         BCD076DA  399      0      8
       UC       GLWPDPT                         0      0      0 Primary key
       X        BC_IXDEPT1           BCD076DA  399     10      9 Cluster
       X        BC_IXDEPT2           BCD076DA  399     12     11
       V        BC_VDEPMG1           BCD076DA    0      0      0
       V        BC_VDEPT             BCD076DA    0      0      0
       V        BC_VEMPDPT1          BCD076DA    0      0      0
       V        BC_VHDEPT            BCD076DA    0      0      0
       V        BC_VPHONE            BCD076DA    0      0      0
     S       BCTSEMP                ADMR7     399     31     30 UTS - PBR
      T       BC_EMPLOYEE           BCD076DA  399      0     32
       UC       GLWPEMP                         0      0      0 Primary key
       X        BC_IXEMP1            BCD076DA  399     34     33 Part Cluster
       X        BC_IXEMP2            BCD076DA  399     36     35
       X        BC_IXEMP3            BCD076DA  399     38     37
       V        BC_VDEPMG1           BCD076DA    0      0      0
       V        BC_VEMP              BCD076DA    0      0      0
       V        BC_VEMPDPT1          BCD076DA    0      0      0
       V        BC_VEMPLP            BCD076DA    0      0      0
       V        BC_VPHONE            BCD076DA    0      0      0
       V        BC_VPROJRE1          BCD076DA    0      0      0
       V        BC_VSTAFAC2          BCD076DA    0      0      0
     S       BCTSEPA                ADMR7     399     14     13 Segmented
      T       BC_EMP_PROJ_ACT       BCD076DA  399      0     15
       UC       GLWPEPA                         0      0      0 Primary key
       X        BC_IXEPA1            BCD076DA  399     17     16 Cluster
```

Figure 10-3   Database structures panel (ADB21DS) output: DS Display Structure line command (Part 1 of 2)

```
ADB21DS n --------------- DBOA Database Structures -------- Row 36 to 51 of 51
Command ===>                                                Scroll ===> PAGE

Line commands:  S - Show object   DSN - Data sets
                                                  PSID/
Sel Type     Object Name             Qualifier  DBID ISOBID  OBID Note
    *        *                       *            *     *      * *
--- ------- ------------------------> --------- ------ ------ ------ ------------
     X            BC_IXEPA2          BCD076DA    399    19     18
     V            BC_VEMPPROJACT     BCD076DA      0     0      0
     V            BC_VSTAFAC2        BCD076DA      0     0      0
    S        BCTSLOC                 ADMR7       399    40     39 Segmented
    S        BCTSPJA                 ADMR7       399    21     20 Segmented
     T           BC_PROJECT_ACTIVITY BCD076DA    399     0     22
    UC           GLWPPJA                           0     0      0 Primary key
     X           BC_IXPJA1           BCD076DA    399    24     23 Cluster
     V           BC_VPROJACT         BCD076DA      0     0      0
     V           BC_VSTAFAC1         BCD076DA      0     0      0
    S        BCTSPROJ                ADMR7       399    26     25 Segmented
     T       BC_PROJ                 BCD076DA    399     0     27
    UC           GLWPPRJ                           0     0      0 Primary key
     X           BC_IXPRJ1           BCD076DA    399    29     28 Cluster
     V           BC_VPROJ            BCD076DA      0     0      0
     V           BC_VPROJRE1         BCD076DA      0     0      0
****************************** END OF DB2 DATA ******************************
```

Figure 10-4   Database structures panel (ADB21DS) output: DS Display Structure line command (Part 2 of 2)

To return to the list of databases, press F3. To get a list of the tables in the database, enter the letter T next to the name of the database, which in this case is BCD076D, and press Enter. Figure 10-5 shows the output.

```
ADB21T in --------------- DBOA Tables, Views, and Aliases ---- Row 1 to 6 of 6
Command ===>                                                Scroll ===> PAGE

Commands: GRANT  MIG  ALL  CT
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands

Sel   Name               Schema    T DB Name  TS Name   Cols         Rows Chks C
      *                  *         * *        *           *            *    * *
----- ------------------> -------- - -------- -------- ------ ----------- ---- -
      BC_ACTIVITY        BCD076DA T BCD076DA BCTSACT      3          -1    0
      BC_DEPARTMENT      BCD076DA T BCD076DA BCTSDEPT    10          -1    0
      BC_EMP_PROJ_ACT    BCD076DA T BCD076DA BCTSEPA     10          -1    0
      BC_PROJECT_ACTIVIT BCD076DA T BCD076DA BCTSPJA     10          -1    0
      BC_PROJ            BCD076DA T BCD076DA BCTSPROJ    14          -1    0
      BC_EMPLOYEE        BCD076DA T BCD076DA BCTSEMP     21          -1    0
****************************** END OF DB2 DATA ******************************
```

Figure 10-5   Tables, Views, and Aliases panel (ADB31T): Tables list in BCD076DA database

The DB2 Administration Tool has a new **DET** (Detail) command. **DET** can be used as a line command next to the name of a table or a package, or as a primary command against a list of tables or a list of packages. The types of tables supported by **DET** include Clone, Global Temporary, History, Implicit tables for XML columns, and Auxiliary tables. When issued against a table, the **DET** command displays detail information about the table (or tables) and its related objects, including table details, column information, index information, partitioning information, key information, and alias information. When issued against a package, **DET** displays detailed information about the package and the SQL statements included in the package.

Figure 10-6 shows the **DET** command being used as a primary command on the Tables, Views, and Aliases panel (ADB21T).

```
ADB21T in --------------- DBOA Tables, Views, and Aliases ---- Row 1 to 6 of 6
Command ===> DET                                              Scroll ===> PAGE

Commands: GRANT  MIG  ALL  CT
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands

Sel    Name                Schema   T DB Name  TS Name   Cols       Rows Chks C
       *                   *        * *        *         *             *    * *
----- ----------------> -------- - -------- -------- ------ ----------- ---- -
       BC_ACTIVITY         BCD076DA T BCD076DA BCTSACT     3          -1   0
       BC_DEPARTMENT       BCD076DA T BCD076DA BCTSDEPT   10          -1   0
       BC_EMP_PROJ_ACT     BCD076DA T BCD076DA BCTSEPA    10          -1   0
       BC_PROJECT_ACTIVIT  BCD076DA T BCD076DA BCTSPJA    10          -1   0
       BC_PROJ             BCD076DA T BCD076DA BCTSPROJ   13          -1   0
       BC_EMPLOYEE         BCD076DA T BCD076DA BCTSEMP    19          -1   0
***************************** END OF DB2 DATA *******************************
```

Figure 10-6   Tables, Views, and Aliases panel (ADB21T): Tables list in BCD076DA

The results of the **DET** command are shown in Figure 10-7.

```
ADBPD min ----------------- DBOA Details for object(s) ---------------- 18:42
Command ===>                                           Scroll ===> PAGE

Commands: SAVE  ZOOM

_ Details for table (label) : BCD076DA.BC_ACTIVITY

_ Table information
      Table schema . . . : BCD076DA      Table name . . . . : BC_ACTIVITY
      Created by . . . . : ADMR7         Created  . : 2013-04-12-14.39.46.848339
      Table space name . : BCTSACT       Database name  . . : BCD076DA
      Object ID for table: 3             DB ID for database : 399
      Maximum row length : 40            Primary key OBID . : 4
      Number of columns  : 3             Primary key columns: 1
      Validate procedure : N/A           EDIT procedure name: N/A
      Parent relations . : 0             Child relations  . : 0
      Auditing . . . . . : AUDIT NONE    Status . . : X - Unique constraint
      Data capture . . . : NO            Altered  . : 2013-04-12-14.39.46.848339
      Restrict on DROP . : NO            Check constraints  : None
      Encoding scheme  . : E - EBCDIC    Col. in part. key  : 0
      Check flag . . . : No             VOLATILE table . . : No
      Created in DB2 Ver : 0 - DB2 V10   Dependent MQTS . . : 0
      Data version . . . : 0
      Table owner  . . . : ADMR7
      Owner type . . . . : Auth ID       Append specified . : No
      Clone table schema :               Clone table name . :
      Access control . . : ' ' - Not enforced
      Number of hash cols: 0
      Versioning Schema. :               Versioning Table . :

      Statistical data . : No valid data available

      Associated remarks :

 _ Column information for table : BCD076DA.BC_ACTIVITY

      Column Name        Col No Col Type Length  Scale Null Def FP    Col card
      ------------------ ------ -------- ------ ------ ---- --- -- -----------
      ACT_NO                  1 INTEGER       4      0 N    J   N             -1
      ACTKWD                  2 CHAR          6      0 N    N   N             -1
      ACTDESC                 3 VARCHAR      20      0 N    N   N             -1

 _ Index information for table : BCD076DA.BC_ACTIVITY
```

Figure 10-7   Details for objects panel (ADBPD): Output of the DET command

F7 and F8 can be used to scroll backward and forward to review the information.

A single section may be collapsed by entering a hyphen (-) over the underscore (_) located next to the keyword of the section. Figure 10-8 on page 168 illustrates the display with the table information collapsed. To expand a previously collapsed section click the plus sign (+) over the underscore (_) next to the section name.

```
ADBPD min ---------------- DBOA Details for object(s) ---------------- 18:47
Command ===>                                               Scroll ===> PAGE

Commands: SAVE  ZOOM

  Details for table (label) : BCD076DA.BC_ACTIVITY

_ Table information
_ Column information for table : BCD076DA.BC_ACTIVITY

    Column Name       Col No Col Type Length  Scale Null Def FP   Col card
    ------------------ ------ -------- ------ ------ ---- --- -- -----------
    ACT_NO                 1 INTEGER       4      0 N    J   N          -1
    ACTKWD                 2 CHAR          6      0 N    N   N          -1
    ACTDESC               3 VARCHAR       20      0 N    N   N          -1

 _ Index information for table : BCD076DA.BC_ACTIVITY

                       Index           C C C C
    Index Name         Schema  U  Cols G D L M  First Key   Full Key
    ------------------ -------- - ------ - - - - ----------- -----------
    BC_IXACT1          BCD076DA P      1 Y Y Y N          -1          -1

                       Column Name       Order Period
                       ------------------ ----- ------
                       ACT_NO                 A
_____

  Details for table (label) : BCD076DA.BC_DEPARTMENT

  Table information
    Table schema . . . : BCD076DA      Table name . . . . : BC_DEPARTMENT
    Created by . . . . : ADMR7         Created  . : 2013-04-12-14.39.47.178455
    Table space name . : BCTSDEPT      Database name  . . : BCD076DA
    Object ID for table: 8            DB ID for database : 399
    Maximum row length : 109          Primary key OBID . : 9
    Number of columns  : 10           Primary key columns: 1
    Validate procedure : N/A          EDIT procedure name: N/A
    Parent relations . : 0            Child relations  . : 0
    Auditing . . . . . : AUDIT NONE    Status . . : X - Unique constraint
    Data capture . . . : NO           Altered  . : 2013-04-17-02.21.56.148240
    Restrict on DROP . : NO           Check constraints  : None
    Encoding scheme  . : E - EBCDIC    Col. in part. key  : 0
```

Figure 10-8   Details for objects panel (ADBPD): Collapsed output of the DET command

To expand or collapse all of the sections, click the **ZOOM** keyword or enter ZOOM on the Command line. DB2 Administration Tool also provides a **SAVE** primary command that can be used to store the detail information that is displayed by the **DET** command in a data set. The information is stored in the same way that it is displayed on the panel at the time the **SAVE** command is issued. So, if a section is collapsed, it is not expanded at the time of saving.

11

Using DB2 Administration Tool and DB2 Object Comparison Tool

Making schema and authorization changes is a key function for a DB2 DBA. This chapter addresses how to define, complete, and propagate managed changes to one or more environments using the DB2 Tools included in the IBM DB2 Administration Tool Solution pack.

This chapter begins with a sample change request followed by three sample scenarios:

► Change Scenario 1: Use the **AL** command to add a column to the end of the table.

  – Generate FAST change.

  – Review change propagation options.

► Change Scenario 2: Use the **ALT** command to specify changes.

  – Register the change.

  – Propagate the change using a Delta Change File approach.

► Change Scenario 3: Recover a change

11.1 Sample change request

The change request in Table 11-1 is used as the basis for the change scenarios in this chapter. The scenarios use managed changes (Change Management Process), with the Change Management ID table set to REQUIRED.

All changes are initially defined in the development database BCD076DA and then propagated to BCD076TA.

Table 11-1   Change request

Action	Object	Description	Comments
ALT	BC_PROJ	Add a new column PROJ_MANAGER integer.	
ALT	BC_EMPLOYEE	1. Change column name FIRSTNME to FIRSTNAME. 2. Add new column CELLPHONE char 10 after PHONE. 3. Add new column TERMDATE after HIREDATE.	Be sure to check views and indexes to see if they need to be updated.
ALT	BC_DEPARTMENT	Change the length of DEPT_NAME from 22 to 30.	

Note: A good approach is to issue the `PANELID` command on the Command line to follow the flow of the following scenarios.

11.2 Change scenario 1: Alter BC_PROJ Table

This scenario consists of two parts:

► Add a new column, PROJ_MANAGER, to the end of the BC_PROJ table using the `AL` line command in the development environment (BCD076DA). Generate as a FAST change.

► Review some change propagation options.

11.2.1 Alter (AL or ALT) the BC_PROJ table

FAST change means that the change will be registered in the Change Management repository and the ALTER statement will execute immediately. Specifying `AN` (analyze) and `RN` (run) commands is not necessary.

To begin, use the DB2 Administration Tool to display a list of existing tables in the BCD076DA
database by entering the letter T next to the name of the database (Figure 11-1).

```
 ADB21D in ------------------- DBOA Databases ----------------- Row 1 to 6 of 6
 Command ===>                                              Scroll ===> PAGE


 Commands: GRANT  MIG  DIS  STA  STO  UTIL  CT
 Line commands:
  T - Tables  S - Table spaces  X - Indexes  G - Storage group  ICS - IC status
  DIS - Display database  STA - Start database  STO - Stop database  A - Auth
  ? - Show all line commands
                          Storage  Buffer           Created      Index
 Select Name      Owner   Group    Pool     DBID By       T E BPool    I
        *         *       *        *          * *       * * *        *

 ------ -------- -------- -------- -------- ------ -------- - - -------- -
 T      BCD076DA ADMR7    SYSDEFLT BP0        399 ADMR7      E BP0      N
        BCD076TA ADMR7    SYSDEFLT BP0        400 ADMR7      E BP0      N
        BCD076TB ADMR7    SYSDEFLT BP0        401 ADMR7      E BP0      N
        BCD076TC ADMR7    SYSDEFLT BP0        402 ADMR7      E BP0      N
        BCD076UA ADMR7    SYSDEFLT BP0        403 ADMR7      E BP0      N
        BCD076ZA ADMR7    SYSDEFLT BP0        404 ADMR7      E BP0      N
 ***************************** END OF DB2 DATA *****************************
```

Figure 11-1   Databases panel (ADB21D): List of databases for sample scenario environment

As a result, the list of tables included in the database is displayed on the Tables, Views, and
Alias panel (ADB21T), as is shown in Figure 11-2.

```
 ADB21T in --------------- DBOA Tables, Views, and Aliases ---- Row 1 to 6 of 6
 Command ===>                                              Scroll ===> PAGE


 Commands: GRANT  MIG  ALL  CT
 Line commands:
  C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
  V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
  ? - Show all line commands


 Sel    Name             Schema   T DB Name  TS Name   Cols       Rows Chks C
        *                *        * *        *          *            *    * *
 ----- ----------------> -------- - -------- -------- ------ ----------- ---- -
        BC_ACTIVITY      BCD076DA T BCD076DA BCTSACT     3          -1  0
        BC_DEPARTMENT    BCD076DA T BCD076DA BCTSDEPT   10          -1  0
        BC_EMP_PROJ_ACT  BCD076DA T BCD076DA BCTSEPA    10          -1  0
        BC_PROJECT_ACTIVIT BCD076DA T BCD076DA BCTSPJA  10          -1  0
        BC_PROJ          BCD076DA T BCD076DA BCTSPROJ   13          -1  0
        BC_EMPLOYEE      BCD076DA T BCD076DA BCTSEMP    19          -1  0
 ***************************** END OF DB2 DATA *****************************
```

Figure 11-2   Tables, Views, and Aliases panel (ADB21T): List of tables for sample scenario

Adding a column to the end of a table can be accomplished through a DB2 ALTER SQL statement. Regardless of which DB2 Administration Tool line command is used, **AL** or **ALT**, an ALTER SQL statement is generated when defining the change to the table. This scenario uses the **AL** command (Figure 11-3).

```
ADB21T in --------------- DBOA Tables, Views, and Aliases ---- Row 1 to 6 of 6
Command ===>                                                Scroll ===> PAGE

Commands: GRANT  MIG  ALL  CT
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands

Sel    Name                Schema   T DB Name  TS Name    Cols       Rows Chks C
       *                   *        * *        *          *          *      * *
----- -----------------> -------- - -------- -------- ------ ----------- ---- -
       BC_ACTIVITY         BCD076DA T BCD076DA BCTSACT     3          -1   0
       BC_DEPARTMENT       BCD076DA T BCD076DA BCTSDEPT   10          -1   0
       BC_EMP_PROJ_ACT     BCD076DA T BCD076DA BCTSEPA    10          -1   0
       BC_PROJECT_ACTIVIT BCD076DA T BCD076DA BCTSPJA    10          -1   0
al     BC_PROJ             BCD076DA T BCD076DA BCTSPROJ   13          -1   0
       BC_EMPLOYEE         BCD076DA T BCD076DA BCTSEMP    19          -1   0
****************************** END OF DB2 DATA ******************************
```

Figure 11-3   Tables, Views, and Aliases panel (ADB21T) with AL line command

The Alter Table panel (ADB21TA) is displayed (Figure 11-4). To add a column, enter the
letter S next to the ADD column keyword.

```
ADB21TA n ---------------------- DBOA Alter Table ---------------------- 13:50
Command ===>


 Table schema . . : BCD076DA >
 Table name . . . : BC_PROJ            >

   AUDIT  . . . . . . . NONE      (None, Changes, or All)
   DATA CAPTURE . . . . NONE      (None/Changes)
   VALIDPROC  . . . . . NULL      (NULL/Program name)
   RESTRICT ON DROP . . NO        (Yes/No)
   VOLATILE . . . . . . NO        (Yes/No)
   APPEND . . . . . . . NO        (Yes/No)

 ALTER TABLE with any of the above changes OR select one of the options below

 s ADD column                             ADD MATERIALIZED QUERY
   ADD PRIMARY KEY                        DROP MATERIALIZED QUERY
   DROP PRIMARY KEY                       REFRESH MATERIALIZED TABLE
   ADD FOREIGN KEY                        ADD PARTITIONING KEY
   DROP FOREIGN KEY                       ADD/ALTER PARTITION
   ADD CHECK constraint                   ADD CLONE
   DROP CHECK constraint                  DROP CLONE
   ADD UNIQUE constraint                  ADD VERSIONING
   DROP UNIQUE constraint                 DROP VERSIONING
   ADD ORGANIZE BY HASH                   ADD PERIOD
   ALTER ORGANIZATION                     ACTIVATE ROW ACCESS CONTROL
   DROP ORGANIZATION                      DEACTIVATE ROW ACCESS CONTROL
   ACTIVATE COLUMN ACCESS CONTROL         ADD ROW PERMISSION
   DEACTIVATE COLUMN ACCESS CONTROL       DROP ROW PERMISSION
   ADD COLUMN MASK
   DROP COLUMN MASK
```

Figure 11-4   Alter Table panel (ADB21TA): Specify an S to select column

Enter the column name and its attributes on the Alter Table panel (ADB21TA), as shown in Figure 11-5.

```
ADB21TAB  ---------------------- DBOA Alter Table --------------------- 13:54
Command ===>


 ALTER TABLE
 Table schema . . BCD076DA >
 Table name . . . BC_PROJ            >

 ADD
 Column name  . . PROJ_MANAGER       > (? to look up)
 Column type  . . integer               (Built-in only)
 Data length  . .                       (Built-in only)
 Inline length  .                       (0-32680 BLOB or CLOB, 0-16340 DBCLOB)
 Precision  . . .                       (used only w/FLOAT and DECIMAL)
 Scale  . . . . .                       (used only w/DECIMAL and TIMESTAMP)
 Type schema  . .            >          (User-defined only)
 Type name  . . .                    >  (User-defined only)
 WITH TIME ZONE .                       (Yes/No - for TIMESTAMP only)

 Allow nulls  . .      (Yes or blank-nullable, No-NOT NULL)
 FOR ? DATA . . .      (B-Bit, S-SBCS, M-Mixed, blank-N/A)
 WITH DEFAULT . .      (Yes, No, L (SECLABEL) or enter value below)
 Default value  .                                             >
 GENERATED  . . .      (A-ALWAYS,                 D-DEFAULT,
                        I-ALWAYS AS IDENTITY,      J-DEFAULT AS IDENTITY,
                        E-ALWAYS AS UPD TIMESTAMP, F-DEFAULT AS UPD TIMESTAMP,
                        Q-ALWAYS AS ROW BEGIN,     R-ALWAYS AS ROW END,
                        X-ALWAYS AS TRANSACTION START ID)
 FIELDPROC
 Program name . .          (optional)
 Program parm . .                                             >

 Hidden . . . . .      (Yes/No)
```

Figure 11-5   Alter Table panel (ADB21TAB)

After you enter all attributes, press Enter to display the generated SQL (Figure 11-6). The generated ALTER SQL statement is displayed at the bottom of the panel.

```
ADB2CMRG  ----------------- DBOA CM - Register Change ----------------- 14:02
Option ===>

 C - Cancel
 I - Register and run as an immediate change
 N - Register as a normal change




For option I enter the following information for the change:
 Owner  . . . . .          >  (Optional, default is ADMR7)
 Name . . . . . .                                      >
 Comment  . . . .                                                        >

Statement that is about to be executed (first 28 lines)
ALTER TABLE "BCD076DA"."BC_PROJ"
ADD "PROJ_MANAGER" INTEGER
```

Figure 11-6   CM Register Change panel (ADB2CMRG)

Choose one of three options at the top of the CM - Register Change panel (ADB2CMRG), as shown in Figure 11-7:

► C - Cancel the change

► I - Register and run as an immediate change (FAST change)

► N - Register as a normal change

To do a FAST change you would use the I (Immediate) option. In the middle of the CM Register change panel there is a place to provide the name of the change, which is a required field, and optionally a comment. In this instance the change name is BCCHG01-DA BC_PROJ as seen in Figure 11-7.

I

```
ADB2CMRG  ----------------- DBOA CM - Register Change ----------------- 14:02
Option ===> i

 C - Cancel
 I - Register and run as an immediate change
 N - Register as a normal change




For option I enter the following information for the change:
 Owner  . . . . . ADMR7    >  (Optional, default is ADMR7)
 Name . . . . . . BCCHG01-DA BC_PROJ             >
 Comment  . . . . ADD COLUMN TO THE END OF THE TABLE                     >

Statement that is about to be executed (first 28 lines)
ALTER TABLE "BCD076DA"."BC_PROJ"
ADD "PROJ_MANAGER" INTEGER
```

Figure 11-7   Register Change panel (ADB2CMRG): Change BCCHG01-DA BC_PROJ

Press Enter to complete the change and register it in the Change Management Repository. The ALTER stmt executed message is displayed under the Command line on the Alter Table panel (ADB21TAB), as shown in Figure 11-8. The new column is added to the BC_PROJ table.

```
ADB21TAB  ---------------------- DBOA Alter Table ---------------------- 14:21
Command ===>
ALTER stmt executed

 ALTER TABLE
 Table schema . . BCD076DA >
 Table name . . . BC_PROJ           >

 ADD
 Column name  . . PROJ_MANAGER      >  (? to look up)
 Column type  . . INTEGER           (Built-in only)
 Data length  . .                   (Built-in only)
 Inline length  .                   (0-32680 BLOB or CLOB, 0-16340 DBCLOB)
 Precision  . . .                   (used only w/FLOAT and DECIMAL)
 Scale  . . . . .                   (used only w/DECIMAL and TIMESTAMP)
 Type schema  . .           >       (User-defined only)
 Type name  . . .                 > (User-defined only)
 WITH TIME ZONE .                   (Yes/No - for TIMESTAMP only)

 Allow nulls  . .      (Yes or blank-nullable, No-NOT NULL)
 FOR ? DATA . . .      (B-Bit, S-SBCS, M-Mixed, blank-N/A)
 WITH DEFAULT . .      (Yes, No, L (SECLABEL) or enter value below)
 Default value  .                                              >
 GENERATED  . . .      (A-ALWAYS,                   D-DEFAULT,
                        I-ALWAYS AS IDENTITY,      J-DEFAULT AS IDENTITY,
                        E-ALWAYS AS UPD TIMESTAMP, F-DEFAULT AS UPD TIMESTAMP,
                        Q-ALWAYS AS ROW BEGIN,      R-ALWAYS AS ROW END,
                        X-ALWAYS AS TRANSACTION START ID)
 FIELDPROC
 Program name . .          (optional)
 Program parm . .                                               >

 Hidden . . . . .      (Yes/No)
```

Figure 11-8   Completed Change: Alter Table panel (ADB21TAB)

To view a registered change, navigate to the Change Management menu (ADB2C) by entering **CMM** on the Command line of any DB2 Administration Tool panel (Figure 11-9).

```
ADB21TAB  ---------------------- DB0A Alter Table ---------------------- 14:29
Command ===> cmm


 ALTER TABLE
 Table schema . . BCD076DA >
 Table name . . . BC_PROJ          >

 ADD
```

Figure 11-9   Alter Table panel (ADB21TAB): CMM command

As a result, the Change Management panel (ADB2C) is displayed (Figure 11-10).

```
ADB2C min -------------------- Change Management (CM) ------------------- 14:30
Option ===>


   1 - Manage changes                           DB2 System: DB0A
   2 - Manage masks                             DB2 SQL ID: ADMR7
   3 - Manage ignores                           CM Owner  : DB2AUTH
   4 - Manage versions
   5 - Manage ID table
   6 - Report changes
   7 - Manage exclude specifications
   8 - Manage ignore changes specifications
```

Figure 11-10   Change Management panel (ADB2C)

Continue to drill down by entering the number 1 on the Option line of the Change Management panel (ADB2C), and press Enter.

The CM - Manage Changes panel (ADB2C1) is displayed (Figure 11-11).

```
ADB2C1 in -------------------- CM - Manage Changes -------------------- 14:34
Option ===>


  1 - Display changes                               DB2 System: DBOA
  2 - Create a change                               DB2 SQL ID: ADMR7
  3 - Create delta for target
  4 - Import changes
  5 - Export changes




Enter display selection criteria (Using a LIKE operator, criteria not saved):
Name . . . . .                            > Created by . .          >
Owner  . . . .          >                   Altered by . .          >
Type . . . . .                              Status . . . .
Created within                              Change ID  . .
Altered within
```

Figure 11-11   CM Manage Changes panel (ADB2C1)

A filtering area is at the bottom of the CM - Manage Changes panel (ADB2C1) in
Figure 11-11. This is the area where you specify which changes are to be displayed. If
nothing is specified in the filter area, all registered changes in the repository will be displayed.
Enter the number 1 on the Option line of the CM - Manage Changes panel (ADB2C1) to
display a list of the registered changes.

As shown in Figure 11-12, the BCCHG01-DA BC_PROJ change has the word FAST in the
Type column, and a status of COMPLETE.

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 1 of 1
Command ===>                                                 Scroll ===> PAGE


Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands


Sel      ID Owner    Name                              Type    Status   Comment
         * *         *                                 *       *        *
--- -------- -------- ------------------------------ ------- -------- -------->
        29 ADMR7    BCCHG01-DA BC_PROJ               FAST    COMPLETE ADD COLUM
****************************** END OF DB2 DATA ******************************
```

Figure 11-12   Registered Changes panel (ADB2C11): FAST change

11.2.2 Propagate the change

A FAST or immediate change can be propagated to the other environments in several ways:

► Repeat the same process in each environment. Issue the **AL** or **ALT** line command to define the change, register (name) the change, and run as an immediate or FAST change.

► Use DB2 Object Comparison Tool to compare the source to the target generating the APPLY jobs to cause the target to look like the source. For example, specify BCD076DA as the source and BCD076TA as the target.

► Generate a delta change file and import it to one or more targets using either the CM ISPF interface or batch interface:

   a. Generate a change file by using one of the following options:

      • Use DB2 Object Comparison Tool to generate a delta change file.

      • Use the Change Management **EX** command to export the existing change to a delta change file.

   b. Import one or more delta change files using the ISPF or CM Batch interface.

> **Note:** PROMOTE is not an option for this particular change because the necessary base versions were not generated. To use PROMOTE when doing a FAST (or immediate) change, the base version must be generated before and after the change by using the ISPF panels or by using CM Batch (action_generate_base_version).

11.3 Change scenario 2: ALT Tables and change propagation delta change

This scenario consists of two parts:

► Complete the changes in the sample change request (Table 11-1 on page 170) using the DB2 Administration Tool **ALT** command.

► Propagate all of the changes, including the change made in scenario 1 if possible, to the BCD076TA environment.

11.3.1 Alter (ALT) the BC_EMPLOYEE and BC_DEPARTMENT tables

Issue the **ALT** line command next to the BC_EMPLOYEE table and specify the following changes:

► Rename FIRSTNME to FIRSTNAME.

► Insert a new CELLPHONE column after the PHONENO column as data type CHAR, size 10 bytes.

► Insert a new TERMDATE column after the HIREDATE column.

Figure 11-13 reflects all changes made on the Alter Table panel (ADB27C).

```
ADB27C in ------------------- DBOA ALTER Table ------------- Row 1 to 21 of 21
Command ===>                                             Scroll ===> PAGE

New schema . . BCD076DA  >                   Old schema: BCD076DA
New name . . . BC_EMPLOYEE          >        Old name  : BC_EMPLOYEE
Partitions . : 5                             New DB  . . BCD076DA
Rows per page: 25                            New TS  . . BCTSEMP

Commands:  CONTINUE  PRIMKEY  TBLOPTS  ALTPART  HASH
Line commands:
 I - Insert  U - Update  D - Delete  R - Repeat  LAB - Label  COM - Comment
 M - Move     A - After   B - Before  X - Index   RES - Reset update
 UM - Update XML modifiers
                                                           Old Operation
Sel Column Name        Col No Col Type    Length  Scale N D Col No Type
     *                    *  *               *        * * *     * *
--- ------------------> ------ -------- ----------- ------ - - ------ ---------

    EMP_NO                 1 INTEGER          4      0 N N    1
    FIRSTNAME              2 VARCHAR         12      0 N N    2 UPDATE
    MIDINIT                3 CHAR            1       0 N N    3
    LASTNAME               4 VARCHAR         20      0 N N    4
    WORKDEPT               5 INTEGER          4      0 Y Y    5
*   PHONENO                6 CHAR            4       0 N N    6
    CELLPHONE              7 CHAR           10       0 N N    0 INSERT
*   HIREDATE               8 DATE            4       0 N Y    7
    TERMDATE               9 DATE            4       0 N Y    0 INSERT
    JOB                   10 CHAR           12       0 Y Y    8
    MANAGER               11 CHAR            1       0 N N    9
    EDLEVEL               12 SMALLINT        2       0 N N   10
    SEX                   13 CHAR            1       0 Y Y   11
    BIRTHDATE             14 DATE            4       0 N Y   12
    SALARY                15 DECIMAL         9       2 Y Y   13
    BONUS                 16 DECIMAL         9       2 Y Y   14
    COMM                  17 DECIMAL         9       2 Y Y   15
    CREATED_TS            18 TIMESTMP       10       6 N Y   16
    CREATED_BY            19 CHAR            8       0 N Y   17
    UPDATED_TS            20 TIMESTMP       10       6 N Y   18
    UPDATED_BY            21 CHAR            8       0 N Y   19
****************************** END OF DB2 DATA ******************************
```

Figure 11-13   ALTER Table panel (ADB27C): Changes to BC_EMPLOYEE

After all changes are specified, enter **CONTINUE** on the Command line, to display the Alter Objects panel (ADB27CA) as shown in Figure 11-14. Note that the BC_EMPLOYEE table is flagged as being modified.

```
ADB27CA n --------------------- DBOA Alter Objects ---------- Row 1 to 1 of 1
Command ===>                                              Scroll ===> PAGE

Commands: ALTER - Generate jobs  ADD - Add objects
 OPTIONS - Change alter options
Line commands:
 A - Alter object  D - Delete  S - Select object  REL - Alter related
 FK - Add FK-affected tables  RI - Add RI-related tables  E - Edit view DDL
 RS - Reset RI-FK flags  CX - Create index  CFK - Create foreign key

    Object   Object                                    RI RI  FK
Sel Qual     Name              Ty Info 1  Info 2    Rels Add Add Operation
    *        *                 * *        *            * *   *   *
--- -------> ------------------> -- -------> -------> ------ --- --- -----------
    BCD076DA BC_EMPLOYEE       TB BCD076DA BCTSEMP      O NA  NA  MODIFY
****************************** END OF DB2 DATA ******************************
```

Figure 11-14   Alter Objects panel (ADB27CA)

Consider the following information when renaming a column with the DB2 Administration Tool:

► The name change is automatically reflected in any index where the column is used.

► The name change does not automatically update the column name in a view *if* the view accesses more than one table.

Because the FIRSTNME column was changed to FIRSTNAME in the BC_EMPLOYEE table and the table has views accessing multiple tables, you must alter the views with the new column name.

At the top of the Alter Objects panel (ADB27CA) is the **OPTIONS** keyword. You can either click this keyword or enter **OPTIONS** command on the Command line.

This displays the ALTER Choose Related Objects panel (Figure 11-15).

```
ADBP7OBJ  -------------- DBOA ALTER Choose Related Objects -------------- 19:20
Option ===>


Commands:  CONTINUE



 Choose the related object types for table:        BCD076DA.BC_EMPLOYEE

   Database . . . . . YES      (Yes/No)
   Table space  . . . YES      (Yes/No)
   Table  . . . . . . YES      (Yes/No)
   View . . . . . . . YES      (Yes/No)
   Alias  . . . . . . YES      (Yes/No)
   Synonym  . . . . . YES      (Yes/No)
   Index  . . . . . . YES      (Yes/No)
   Foreign key  . . . YES      (Yes/No)
   Trigger  . . . . . YES      (Yes/No)

Show this panel prior to each use . . . NO        (Yes/No)
```

Figure 11-15   ALTER Choose Related Objects panel (ADBP7OBJ)

At the bottom of this panel, choose whether to show this panel prior to each use. If this option is set to NO, the user can always click the `OPTIONS` command or enter `OPTIONS` on the Command line of the Alter Objects panel (ADB27CA) as shown in Figure 11-16. The purpose of the ALTER Choose Related Objects panel is to select which object types to include in the result set when issuing the `REL` (Alter related) line command next to a change listed on the Alter Objects panel (ADB27CA).

In this scenario the BC_EMPLOYEE table has views and indexes associated with it, but only the views are affected when a column name is changed. To bring in the related objects, specify `REL` next to the name of the change on the Alter Objects panel (ADB27CA), as shown in Figure 11-16.

```
ADB27CA n ---------------------- DBOA Alter Objects ---------- Row 1 to 1 of 1
Command ===>                                                Scroll ===> PAGE


Commands: ALTER - Generate jobs  ADD - Add objects
 OPTIONS - Change alter options
Line commands:
 A - Alter object  D - Delete  S - Select object  REL - Alter related
 FK - Add FK-affected tables  RI - Add RI-related tables  E - Edit view DDL
 RS - Reset RI-FK flags  CX - Create index  CFK - Create foreign key


    Object    Object                                  RI RI  FK
Sel Qual      Name                 Ty Info 1  Info 2   Rels Add Add Operation
    *         *                    * *        *        * *   *   *
--- -------> ------------------> -- -------> -------> ------ --- --- -----------
rel BCD076DA BC_EMPLOYEE           TB BCD076DA BCTSEMP      O NA  NA  MODIFY
****************************** END OF DB2 DATA ******************************
```

Figure 11-16   Alter Objects panel (ADB27CA): Issue the REL command

Enter the letter **A** next to each related object to be added to the list of objects to be altered. See Figure 11-17.

Note: Be sure to press Enter before leaving the Related Objects panel ADBP7REL. If you forget, the selected objects will not be included.

```
ADBP7REL  -------------- DB0A ALT - Related Objects -------- Row 1 to 13 of 13
Command ===>                                                    Scroll ===> PAGE

Line commands:  S - Show object  A - Add object

Related objects for table:       BCD076DA.BC_EMPLOYEE

Sel Type    Object Name             Qualifier Info 1   Info 2   Note
    *       *                       *         *         *        *
--- ------- ----------------------> --------- -------> -------> ---------------
    D------ BCD076DA---------------- ADMR7
     S         BCTSEMP              ADMR7                       UTS - PBR
      T          BC_EMPLOYEE        BCD076DA  BCD076DA BCTSEMP
       X           BC_IXEMP1        BCD076DA  BCD076DA BC_EMPLO Part Cluster
       X           BC_IXEMP2        BCD076DA  BCD076DA BC_EMPLO
       X           BC_IXEMP3        BCD076DA  BCD076DA BC_EMPLO Primary
a     V           BC_VDEPMG1        BCD076DA  BCD076DA BC_EMPLO
a     V           BC_VEMP           BCD076DA  BCD076DA BC_EMPLO
a     V           BC_VEMPDPT1       BCD076DA  BCD076DA BC_EMPLO
      V           BC_VEMPLP         BCD076DA  BCD076DA BC_EMPLO
a     V           BC_VPHONE         BCD076DA  BCD076DA BC_EMPLO
a     V           BC_VPROJRE1       BCD076DA  BCD076DA BC_EMPLO
a     V           BC_VSTAFAC2       BCD076DA  BCD076DA BC_EMPLO
****************************** END OF DB2 DATA ******************************
```

Figure 11-17   ALT Related Objects Panel (ADBP7REL)

The `Objects Added` message is displayed below the Command line on the ALT - Related Objects panel (ADBP7REL), as shown in Figure 11-18. As a reminder, this message is displayed only if you press Enter.

```
ADBP7REL  -------------- DBOA ALT - Related Objects -------- Row 1 to 13 of 13
Command ===>                                              Scroll ===> PAGE
Object(s) added
Line commands:  S - Show object  A - Add object

Related objects for table:      BCD076DA.BC_EMPLOYEE

Sel Type    Object Name             Qualifier Info 1   Info 2   Note
    *       *                       *         *        *        *
--- ------- ----------------------> --------- -------> -------> --------------
    D------ BCD076DA---------------- ADMR7
    S         BCTSEMP               ADMR7                       UTS - PBR
      T         BC_EMPLOYEE         BCD076DA  BCD076DA BCTSEMP
        X         BC_IXEMP1         BCD076DA  BCD076DA BC_EMPLO Part Cluster
        X         BC_IXEMP2         BCD076DA  BCD076DA BC_EMPLO
        X         BC_IXEMP3         BCD076DA  BCD076DA BC_EMPLO Primary
*       V         BC_VDEPMG1        BCD076DA  BCD076DA BC_EMPLO
*       V         BC_VEMP           BCD076DA  BCD076DA BC_EMPLO
*       V         BC_VEMPDPT1       BCD076DA  BCD076DA BC_EMPLO
        V         BC_VEMPLP         BCD076DA  BCD076DA BC_EMPLO
*       V         BC_VPHONE         BCD076DA  BCD076DA BC_EMPLO
*       V         BC_VPROJRE1       BCD076DA  BCD076DA BC_EMPLO
*       V         BC_VSTAFAC2       BCD076DA  BCD076DA BC_EMPLO
****************************** END OF DB2 DATA ******************************
```

Figure 11-18   ALT Related Objects panel (ADBP7REL) with objects added message

Press F3 to return to the Alter Objects panel (ADB27CA).

Figure 11-19 shows that all newly added objects are tagged with the words NONE, indicating that no modifications have been made at this time. To modify the related objects enter the letter A next to each object name.

```
ADB27CA n --------------------- DBOA Alter Objects ---------- Row 1 to 7 of 7
Command ===>                                                  Scroll ===> PAGE

Commands: ALTER - Generate jobs  ADD - Add objects
 OPTIONS - Change alter options
Line commands:
 A - Alter object  D - Delete  S - Select object  REL - Alter related
 FK - Add FK-affected tables  RI - Add RI-related tables  E - Edit view DDL
 RS - Reset RI-FK flags  CX - Create index  CFK - Create foreign key

    Object  Object                                     RI RI  FK
Sel Qual    Name               Ty Info 1  Info 2   Rels Add Add Operation
    *       *                  *  *        *         *  *   *   *
--- -------> ----------------->  -- ------->  ------->  ------ --- --- -----------
    BCD076DA BC_VSTAFAC2        VW BCD076DA BCTSEPA      NA  NA  NONE
    BCD076DA BC_VPROJRE1        VW BCD076DA BCTSPROJ     NA  NA  NONE
    BCD076DA BC_VPHONE          VW BCD076DA BCTSEMP      NA  NA  NONE
    BCD076DA BC_VEMPDPT1        VW BCD076DA BCTSDEPT     NA  NA  NONE
    BCD076DA BC_VEMP            VW BCD076DA BCTSEMP      NA  NA  NONE
    BCD076DA BC_VDEPMG1         VW BCD076DA BCTSDEPT     NA  NA  NONE
*EL BCD076DA BC_EMPLOYEE        TB BCD076DA BCTSEMP    O  NA  NA  MODIFY
****************************** END OF DB2 DATA ******************************
```

Figure 11-19   Alter Objects panel (ADB27CA)

When the text of the view is displayed, you can use the TSO command **C FIRSTNME FIRSTNAME ALL** to change all occurrences of the column name in the view. As the changes are specified, the operation field of the Alter Objects panel (ADB27CA) is updated to reflect the MODIFY status (Figure 11-20 on page 186).

The next change specification in the sample change request (Table 11-1 on page 170) is to increase the length of the DEPT_NAME column in the BC_DEPARTMENT table to 30 bytes.

To add the BC_DEPARTMENT table to the active change list issue the **ADD** command on the Command line of the Alter Objects panel (ADB27CA). See Figure 11-20.

```
ADB27CA n --------------------- DBOA Alter Objects ---------- Row 1 to 7 of 7
Command ===> add                                          Scroll ===> PAGE

Commands: ALTER - Generate jobs  ADD - Add objects
 OPTIONS - Change alter options
Line commands:
 A - Alter object  D - Delete  S - Select object  REL - Alter related
 FK - Add FK-affected tables  RI - Add RI-related tables  E - Edit view DDL
 RS - Reset RI-FK flags  CX - Create index  CFK - Create foreign key


    Object   Object                                     RI RI  FK
Sel Qual     Name                Ty Info 1   Info 2    Rels Add Add Operation
    *        *                   *  *        *           *  *   *   *
--- -------> -----------------> -- -------> -------> ------ --- --- ----------
    BCD076DA BC_VSTAFAC2         VW BCD076DA BCTSEPA      NA  NA  NA  MODIFY
    BCD076DA BC_VPROJRE1         VW BCD076DA BCTSPROJ     NA  NA  NA  MODIFY
    BCD076DA BC_VPHONE           VW BCD076DA BCTSEMP      NA  NA  NA  MODIFY
    BCD076DA BC_VEMPDPT1         VW BCD076DA BCTSDEPT     NA  NA  NA  MODIFY
    BCD076DA BC_VEMP             VW BCD076DA BCTSEMP      NA  NA  NA  MODIFY
    BCD076DA BC_VDEPMG1          VW BCD076DA BCTSDEPT     NA  NA  NA  MODIFY
*EL BCD076DA BC_EMPLOYEE         TB BCD076DA BCTSEMP       O  NA  NA  MODIFY
****************************** END OF DB2 DATA ******************************
```

Figure 11-20   Alter Objects panel (ADB27CA): Using the ADD Command

There are three options on the ALTER Add Options panel (ADBP7AD). Adding a table requires the following actions:

▶ Enter TB next to the Type keyword.

▶ Enter the qualifier, in this case BCD076DA.

▶ Enter the name of the object or use the DB2 Administration Tool look-up feature by entering a prefix concatenated with a question mark (?) to display a list of objects from which to choose. For example, enter the following text (in this case the full table name BC_DEPARTMENT was specified):

BC_D?

▶ Enter the number 3 on the Option line to add the object to the list.

See Figure 11-21 on page 187.

```
ADBP7AD n -------------------- DBOA ALTER Add Options ------------------- 01:00
Option ===> 3


 1  Add tables with an RI relationship to a table in the list (ADDRI)
 2  Add tables with a foreign-key relationship to altered columns (ADDFK)
 3  Add an object to the list using the following fields

    Object specification:
      Type  . . . . . tb            (DB,TS,TB,VW,AL,SY,IX,FK,TR,SP,FU,SQ)
      Qualifier . . . bcd076da >
      Name  . . . . . bc_department      >  (? to look up)
```

Figure 11-21   ALTER Add Options panel (ADBP7AD)

After one or more objects are selected and are added to the Alter Objects panel (ADB27CA),
use the **A** (alter) command to alter the newly added objects. There is no limit to the number of
objects that can be added to the change.

The instructions in the scenario's change request is to change the length of the DEPT_NAME
field to 30 bytes. See Figure 11-22.

```
ADB27C in -------------------- DBOA ALTER Table ------------- Row 1 to 10 of 10
Command ===>                                             Scroll ===> PAGE

New schema . . BCD076DA  >                  Old schema: BCD076DA
New name . . . BC_DEPARTMENT        >       Old name  : BC_DEPARTMENT
Partitions . : 0                            New DB  . . BCD076DA
Rows per page: 39                           New TS  . . BCTSDEPT


Commands:  CONTINUE  PRIMKEY  TBLOPTS          HASH
Line commands:
 I - Insert  U - Update  D - Delete  R - Repeat  LAB - Label  COM - Comment
 M - Move     A - After   B - Before  X - Index   RES - Reset update
 UM - Update XML modifiers
                                                            Old Operation
Sel Column Name        Col No Col Type     Length  Scale N D Col No Type
    *                       *  *               *       * * *       * *
--- ----------------->  ------ --------  -----------  ------ - - ------ ---------

    DEPT_NO                1 INTEGER          4       0 N Y     1
    DEPT_NAME              2 CHAR            30       0 N Y     2
    MGR_NO                 3 INTEGER          4       0 Y Y     3
    ADMR_DEPT             4 INTEGER          4       0 N Y     4
    LOCATION              5 CHAR            20       0 N Y     5
    EMPLOYEE_CNT          6 SMALLINT         2       0 N Y     6
    CREATED_TS           7 TIMESTMP        10       6 N Y     7
    CREATED_BY           8 CHAR             8       0 N Y     8
    UPDATED_TS           9 TIMESTMP        10       6 N Y     9
    UPDATED_BY          10 CHAR             8       0 N Y    10
***************************** END OF DB2 DATA *****************************
```

Figure 11-22   ALTER Table panel ADB27C: DEPT_NAME from 22 bytes to 30 bytes

When all changes have been specified, and in this case there is only one, click the ALTER keyword or enter the **ALTER** command on the Command line. The Alter Objects panel (ADB27CA) is displayed (Figure 11-23), showing that the BC_DEPARTMENT table was added and modified.

```
ADB27CA n --------------------- DBOA Alter Objects ---------- Row 1 to 8 of 8
Command ===>                                              Scroll ===> PAGE

Commands: ALTER - Generate jobs  ADD - Add objects
 OPTIONS - Change alter options
Line commands:
 A - Alter object  D - Delete  S - Select object  REL - Alter related
 FK - Add FK-affected tables  RI - Add RI-related tables  E - Edit view DDL
 RS - Reset RI-FK flags  CX - Create index  CFK - Create foreign key

     Object   Object                                      RI RI  FK
 Sel Qual     Name              Ty Info 1   Info 2    Rels Add Add Operation
     *        *                 *  *        *             *  *   *  *
 --- -------> ----------------> -- -------> -------> ------ --- --- -----------
 *   BCD076DA BC_DEPARTMENT     TB BCD076DA BCTSDEPT      O NA  NA  MODIFY
     BCD076DA BC_VSTAFAC2       VW BCD076DA BCTSEPA         NA  NA  MODIFY
     BCD076DA BC_VPROJRE1       VW BCD076DA BCTSPROJ        NA  NA  MODIFY
     BCD076DA BC_VPHONE         VW BCD076DA BCTSEMP         NA  NA  MODIFY
     BCD076DA BC_VEMPDPT1       VW BCD076DA BCTSDEPT        NA  NA  MODIFY
     BCD076DA BC_VEMP           VW BCD076DA BCTSEMP         NA  NA  MODIFY
     BCD076DA BC_VDEPMG1        VW BCD076DA BCTSDEPT        NA  NA  MODIFY
 *EL BCD076DA BC_EMPLOYEE       TB BCD076DA BCTSEMP       O NA  NA  MODIFY
 ****************************** END OF DB2 DATA ******************************
```

Figure 11-23   Alter Objects panel (ADB27CA)

At this point, all changes in the sample change request are entered. The next step is to click the **ALTER** keyword or enter **ALTER** on the Command line of the Alter Objects panel (ADB27CA) to register the change. The changes can be registered under a new name or appended to an existing change.

To append a change to an existing change, simply provide the name and owner of the existing change to which it is to be appended. See Figure 11-24.

Note: The owner and the name of the change, which are required, cause the entry into the Change Management Repository to be unique. The Comment field is optional.

```
ADB2CRO n -------------------- CM - Register Options -------------------- 01:17
Option ===>


Commands: CONTINUE                                      DB2 System: DBOA
                                                        DB2 SQL ID: ADMR7
Specify the following values to register a change:


Owner . . . . . . . . ADMR7    >  (Optional, default is ADMR7)
Name  . . . . . . . . BCCHGO2-DA BC_EMPLOYEE BC_DEPARTMENT              >
Comment . . . . . . . SAMPLE CHANGE REQUEST                           >
Change Type . . . . : CHANGE    (Promote, Change, Compare, Recover, Fast)


Specify the owner and name values to use for this change (? to lookup):
                      Owner         Name
Ignore  . . . . . . .         >                                    >
Mask  . . . . . . . .         >                                    >
Delta Version . . . .         >                                    >
```

Figure 11-24   CM Register Options panel (ADB2CR0): BCCHG02-DA Register Change

After the name of the change IS specified, enter **CONTINUE** on the Command line to complete the registration. The Register Successful message is displayed below the Command line on the Tables, Views, and Aliases panel (ADB21T), as Figure 11-25 shows.

```
ADB21T in --------------- DBOA Tables, Views, and Aliases ---- Row 1 to 6 of 6
Command ===>                                             Scroll ===> PAGE
Register Successful
Commands: GRANT      ALL
Line commands:
 C - Columns  A - Auth  L - List  X - Indexes  S - Table space  D - Database
 V - Views  T - Tables  P - Plans  Y - Synonyms  SEL - Select prototyping
 ? - Show all line commands


Sel   Name                Schema   T DB Name  TS Name    Cols      Rows Chks C
      *                   *        * *        *          *           *    * *
----- ------------------> -------- - -------- -------- ------ ----------- ---- -
      BC_ACTIVITY         BCD076DA T BCD076DA BCTSACT       3          -1    0
      BC_DEPARTMENT       BCD076DA T BCD076DA BCTSDEPT     10          -1    0
      BC_EMP_PROJ_ACT     BCD076DA T BCD076DA BCTSEPA      10          -1    0
      BC_PROJECT_ACTIVIT  BCD076DA T BCD076DA BCTSPJA      10          -1    0
      BC_PROJ             BCD076DA T BCD076DA BCTSPROJ     14          -1    0
*LT   BC_EMPLOYEE         BCD076DA T BCD076DA BCTSEMP      19          -1    0
****************************** END OF DB2 DATA ******************************
```

Figure 11-25   Tables, Views, and Aliases panel (ADB21T): Register Successful

The change is stored in the Change Management Repository and has a status of DEFINED.

> **Note:** At this point, a change file can be generated by issuing the **EX** (export) line command next to the name of the registered change. A change does not have to be completed to be propagated.

The next step in the Change Management Process is to analyze (**AN**) the registered change. The change can be analyzed using the ISPF interface or the change management batch interface. This scenario illustrates the using the ISPF interface:

► Navigate to the Change Management panels by entering **CMM** on the Command line of any DB2 Administration Tool panel.

► Drill down to get a list of the registered changes. A quick entry of CMM;1;1 displays the Change Management (CM) panel (ADB2C).

To analyze a change, enter **AN** command next to the change name as shown in Figure 11-26.

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 2 of 2
Command ===>                                                Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands


Sel       ID Owner    Name                                Type    Status    Comment
          * *         *                                   *       *         *
--- -------- -------- ------------------------------> ------- -------- -------->
         29 ADMR7     BCCHG01-DA BC_PROJ                   FAST    COMPLETE ADD COLUM
AN       31 ADMR7     BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE  DEFINED  SAMPLE CH
****************************** END OF DB2 DATA ******************************
```

Figure 11-26   CM - Changes panel (ADB2C11): AN - Analyze a registered change

The Generate Analyze Job panel (ADB2C11A) is displayed (Figure 11-27 on page 193). This panel has a list of several parameters that determine the job options to be used by the analyze step. The parameters found on the Generate Analyze Job panel are listed in Table 11-2.

Table 11-2   Analyze Options from the Generate Analyze Job panel (ADB2C11A)

Parameter	Description	Values	Comments
Set Base Version method	How to create the target base version.	A = Auto: Build the target base version from the list of objects in the change. This is the preferred option in most cases. U = User defined: Requires a predefined version scope. E = Use an existing base version, which must already exist.	A base version is a snapshot of the object definition at a point in time.
Change Report Options	Several reports are available from which to choose.	Yes or No	Set all options to Yes except for the System Ignore option, which you can set to No.
Required data set information	Two data sets exist: ► PDS for the work statement list (created by the analyze process) ► PDS for the analyze JCL generated by the product		The data set name begins with value specified in the Prefix of data sets option, unless it is specified in quotation marks.
Run SQLID	This is the ID that will be used in any generated SET CURRENT SQLID statements.		
Validate work statement list	Validates DDL syntax.[a]	Yes or No	Suggest setting to Yes.
Use utility options	Utilities JCL is generated based on a skeleton; can override the skeleton parameter cards for the utility.	Yes of No	
Generate templates	Templates are used to customize data set names to match naming standards to be used for utilities.	Yes or No	

Parameter	Description	Values	Comments
Build JCL to run the WSL	► If set to No, the JCL can be built at run time when the **RN** command is issued. ► If set to Yes, the JCL will be built for the changes	Yes or No	If set to Yes, the user can submit the run job. The run job can be accessed through the DB2 Administration Tool panels by issuing the **ER** (edit run job) line command.
Stop on conversion error	Stop if there is a data conversion error (Yes = RC 28).	Yes of No	Suggest setting this to Yes.
Content of APPLY jobs	Determines what happens to the data.	ALL or DDL	See footnote[a]
Unload method	IBM Unload or DB2 High Performance Unload (HPU)	IBM Unload or DB2 HPU	Must be licensed to use HPU.
Use DEFER Yes	Applicable to CREATE INDEX statements.	Yes or No	
Allow rotate parts	Generate the rotate partition statement or an alter partition statement if the condition for a rotate is met.	Yes or No	
Retain GENERATED ALWAYS	For ROWID	Yes or No	
	For ROW CHANGE TIMESTAMP	Yes or No	
Identity Start Value		Original or computed	
Sequence Start Value		Original or computed	
Optional jobs to be run after the Reload of Alter	CHECK, IMAGE COPY, REORG, RUNSTATS, REBIND	Optional	

a. If the **DROP** SQL command is generated, DB2 Administration Tool unloads the table before doing the drop, even if the content of the APPLY job is set to DDL.

After all parameters are filled in, or modified, a JCL job is generated in the specified JCL library, which when submitted analyzes the change. Figure 11-27 shows the panel used to specify the analyze job parameters.

```
ADB2C11A  ----------------- Generate Analyze Job  ---------------------- 02:06
Command ===>

 Specify the following for Analyze:
                                                            More:    +
 Base version method . . . . . A        (Auto, User, or Existing)


 Change reporting options  . . YES      (Yes/No)


 Required data set information:
   PDS for WSL . . . . . . . . DBOA.ANALYZE.WSL
   PDS for jobs  . . . . . . . DBOA.ANALYZE.JCL
   Prefix for data sets  . . . ADMR7

 Options:
   Run SQLID . . . . . . . . .            (Blank, a SQLID, or <NONE>)
   Validate WSL  . . . . . . . YES      (Yes/No)
   Use utility options . . . . NO       (Yes/No)
   Generate templates  . . . . NO       (Yes/No)
   Build JCL to run WSL  . . . NO       (Yes/No)
   Generate a recover change . NO       (Yes/No)
     Data to recover . . . . .          (Original or Existing)


   Stop on conversion error. . YES      (Yes/No)
   Content of apply job(s) . . ALL      (All, DDL)
   Unload method . . . . . . . U        (Unload, HPU)
   Use DEFER YES . . . . . . . NO       (Yes/No)
   Allow rotate parts  . . . . YES      (Yes/No)
   Retain GENERATED ALWAYS:
     For ROWID . . . . . . . . NO       (Yes/No)
     For ROW CHANGE TIMESTAMP. NO       (Yes/No)
   IDENTITY START value  . . . ORIGINAL (Original, Computed)
   SEQUENCE RESTART value  . . ORIGINAL (Original, Computed)

   Optional jobs after Reload or Alter:
     Run CHECK DATA  . . . . . NO       (Yes/No)
     Take an image copy  . . . N        (after: Reload/Alter/Both/None)
     Run REORG/REBUILD . . . . N        (Mandatory, All relevant, None)
     Run RUNSTATS  . . . . . . N        (after: Reload/Alter/Both/None)
     Run REBIND  . . . . . . . NO       (Yes/No)

 BP - Change batch job parameters
```

Figure 11-27   Generate Analyze Job: Parameters

When the analyze step completes, the change will be in ANALYZED status (Figure 11-28). In addition, the analyze step generates a work statement list (WSL) member and places it in a PDS or in the PDSE specified for the WSL file on the Generate Analyze Job panel (ADB2C11A).

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 2 of 2
Command ===>                                                  Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel      ID Owner    Name                                Type    Status   Comment
         * *         *                                   *       *        *
--- -------- -------- ------------------------------> ------- -------- -------->
         29 ADMR7    BCCHG01-DA BC_PROJ                 FAST    COMPLETE ADD COLUM
         31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE    ANALYZED SAMPLE CH
****************************** END OF DB2 DATA ******************************
```

Figure 11-28   CM Changes panel (ADB2C11): Status = ANALYZED

As previously mentioned, the analyze step can also be run in batch. Table 11-3 helps clarify the relationship between the two interfaces, ISPF and CM Batch. This table maps the parameters found on the Generate Analyze Job panel (ADB2C11A), Figure 11-28, and the parameters available for CM Batch. See the *DB2 Administration Tool for z/OS, V10.2 User's Guide*, SC19-3744 for a list of the definitions for all CM batch parameters.

Table 11-3   ISPF parameters mapped to comparable CM Batch parameters

ISPF parameter	CM Batch parameter	Default value
Base version method	existing_base_version_action	A = Auto
Change reporting options		
Only changed objects	report_only_changed_objects	No
Ignore fields: User specified	report_user_specified_ignored_fields	No
Ignore fields: System generated	report_system_generated_ignore_fields	No
Translation masks	report_translation_masks	No
Summary report	report_summary	No
Object count report	report_object_count	No
Conversion report	report_expected_conversion_problems	No
Required data set information		
PDS for WSL	pds_for_wsl	blank
PDS for jobs	pds_for_run_jclt	blank
Prefix for data sets	prefix_for_data_sets	blank

ISPF parameter	CM Batch parameter	Default value
Options		
Run SQLID	run_sqlid	blank
Validate WSL	validate_wsl	No
Use utility options	use_utility_options	No
Generate templates	generate_templates	No
Build JCL to run WSL	action_build_run_job	
Generate a recover change	generate_recover_change	No
Data to recover	data_to_recover	
Stop on conversion error	stop_on_conversion_error	No
Content of apply jobs	content_of_apply_jobs	
Unload method	unload_method	Unload
Use DEFER yes	use_defer_yes	No
Allow rotate parts	allow_rotate_parts	
Retain GENERATED ALWAYS for ROWID	retain_generated_always_for_rowid	
Retain GENERATED ALWAYS for ROW CHANGE TIMESTAMP	retain_generated_always_for_row_change_ts	
IDENTITY START value	identity_start_value	
SEQUENCE RESTART value	sequence_restart_value	
Optional jobs after Reload or Alter		
Run CHECK DATA	run_check_data	No
Take an image copy	take_an_image_copy	None
Run REORG / REBUILD	run_reorg_rebuild	None
Run RUNSTATS	run_runstats	No
Run REBIND	run_rebind	No

The next step in the Change Management Process is to run the change. Only those changes that have an ANALYZED status can be run.

To generate the JCL to run the change, enter **RN** (run) next to the name of the ANALYZED change as shown in Figure 11-29. If the JCL was previously built during the analyze step, use the **ER** line command to open the existing RUN job JCL and submit the job from there.

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 2 of 2
Command ===>                                                 Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel      ID Owner   Name                            Type    Status   Comment
         *  *       *                               *       *        *
--- -------- -------- ------------------------------> ------- -------- -------->
         29 ADMR7    BCCHG01-DA BC_PROJ              FAST    COMPLETE ADD COLUM
rn       31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE  ANALYZED SAMPLE CH
****************************** END OF DB2 DATA ******************************
```

Figure 11-29   CM Changes panel (ADB2C11): Running a change

When running a change, the CM - Run a Change panel (ADB2CEX1) offers an option to generate a base version before or after the change. With this option, using the PROMOTE method for change propagation can be easier to manage. To demonstrate PROMOTE as a propagation method, both fields are set to AUTO. (AUTO means the scope of the base version is automatically determined by DB2 Administration Tool.) You can still specify version names on the next panel. See Figure 11-30.

```
ADB2CEX1  -------------------- CM - Run a Change ----------------------- 02:15
Command ===>


Change . . . : ADMR7.BCCHG02-DA BC_EMPLOYEE BC_DEPARTMENT

Specify the following for run change:

Data set information:
  PDS for jobs . . . . . . DBOA.RUN.JCL
  Prefix for data sets . . ADMR7

Change reporting options . . . . . . NO   (Yes/No)
Generate base version before run . . AUTO (No,Auto,User)
Generate base version after run  . . AUTO (No,Auto,User)
```

Figure 11-30   CM Run a Change panel (ADB2CEX1)

When reviewing the RUN options for the change, there is an option on the CM Run a Change panel (ADB2CEX1) to generate a base version before or after the change. See Figure 11-30. The name of the base version or versions can be automatically generated as a timestamp if AUTO is specified or the name can be provided by the user.

On the CM - Specify Base Version Options (ADB2CEX3) panel, the Scope Information keyword has the `The object list will be automatically determined` message (Figure 11-31).

```
ADB2CEX3  ------------ CM - Specify Base Version Options ---------------- 02:15
Command ===>


Commands: CONTINUE


Change . . . : ADMR7.BCCHG02-DA BC_EMPLOYEE BC_DEPARTMENT


Specify the following for the base versions:


Existing base version action . .          (Auto,Replace; Default is Auto)


Base version before run:
  Scope Information: The object list will be automatically determined.
    Owner  . . . . . . . :            >            (? to lookup)
    Name . . . . . . . . :                                > (? to lookup)


  Version Information:
    Owner  . . . . . . . .           >            (? to lookup)
    Name . . . . . . . . .                               > (? to lookup)

Base version after run:
  Scope Information: The object list will be automatically determined.
    Owner  . . . . . . . :            >            (? to lookup)
    Name . . . . . . . . :                                > (? to lookup)


  Version Information:
    Owner  . . . . . . . .           >            (? to lookup)
    Name . . . . . . . . .                               > (? to lookup)
```

Figure 11-31   CM - Specify Base Version Options panel (ADB2CEX3)

When the change is finished, the status indicates COMPLETE in the Change Management Repository (Figure 11-32).

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 2 of 2
Command ===>                                               Scroll ===> PAGE


Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands


Sel      ID Owner    Name                           Type    Status   Comment
         * *         *                              *       *        *
--- -------- -------- ------------------------------> ------- -------- -------->
        29 ADMR7    BCCHG01-DA BC_PROJ              FAST    COMPLETE ADD COLUM
        31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE  COMPLETE SAMPLE CH
****************************** END OF DB2 DATA ******************************
```

Figure 11-32   CM Changes panel ADB2C11: Completed change

If the job ends and the status is set to RUNNING, then the job has aborted and must be corrected and restarted.

See the following sources of information:

► For more information about restarting, see *Managing IBM DB2 for z/OS Using the IBM DB2 Administration tool for z/OS Version 10,* SG24-7916.

► For the restart of a change and restart in general for a WSL, see *DB2 Administration Tool for z/OS, V10.2 User's Guide*, SC19-3744.

The RUN process for this change could have also been done using CM Batch interface by specifying the action_run_change action.

11.3.2 Propagate the change by generating or importing a delta change file

This method of change propagation is a two-step process.

1. Generate a delta change file using one of three methods:
   – Change Management PROMOTE function
   – DB2 Object Comparison Tool
   – **EX** (export) line command in the ISPF interface

2. Import one or more delta change files using the Import delta change option in the DB2 ISPF panels, or the Import change action in CM Batch (action_import_change).

In the scenarios, two changes are made:

► BCCHG-1DA: added a column to the end of the BC_PROJ table
► BCCHG-2DA: altered the BC_EMPLOYEE and BC_DEPARTMENT tables

Both changes, BCCHG-1DA and BCCHG-2DA, must be propagated to the test environment BCD076TA.

Masking

Masks (translation masks) allow you to make global changes to naming conventions and to overwrite current values of table space and index space attributes. Masks are used by the DB2 Administration Tool and the DB2 Object Comparison Tool.

Masks can be stored in a file (PDS or sequential, or stored in a DB2 table in the Change Management Repository. There are advantages and disadvantages with using either option.

► If stored in a file, remembering the name of the file can be cumbersome. However, making a duplicate copy of the mask is easy.

► If stored in a table, the mask is easy to find, easy to share, but at this time, difficult to create a copy or duplicate an existing mask.

When propagating changes between environments, the qualifiers or names of the objects might be different. If they are, it will be necessary to use a mask to translate the contents of the change file to match what is used in the target environment. The timing for specifying the mask varies based on the method of propagation used.

Masking in promote in Object Compare differs completely from masking in Import Change:

- ► Masking in promote in Object Compare is applied to the source, and then the source (with masking applied) is compared to the target. Masking is not applied directly to the delta change file.
- ► Masking in import change is applied directly to the input statements. The registered change statements for the imported change contain the new masked values.

When using the EX (export) method of creating a delta change file, the mask can be specified only at the time of the import.

Because all propagation options support mask translation at the time of import, it may be beneficial to set a standard to do masking only when importing a delta change file.

Propagate Step 1: Generate the delta change file

This example demonstrates the use of the EX (export) option to generate the changes (see "Option 3: Use the EX (export) command in the ISPF interface" on page 218). However, the following descriptions include a detailed explanation of each of the other methods (PROMOTE, DB2 Object Comparison Tool, and EX) that can potentially be used. Regardless, the result is the same, which is the generation of a delta change file.

Option 1: Use Change Management promote

Change Management PROMOTE generates the delta change file by comparing two base versions. A base version represents a moment in time snapshot of the objects included in the version scope. It can be generated manually or at run time using either the ISPF or CM Batch interface.

To generate a base version outside of run time, you can use the `GV` (generate base version) line command in the ISPF interface, or the action_generate_base_version action of the CM Batch interface. This type of base version generation requires the existence of a populated version scope. A version scope can be defined and populated using the ISPF interface CM panels. CM Batch also supports generating a base version based on the objects in the registered change statements for that change. No version scope required.

Note: CM Batch cannot be used to define or populate a version scope at this time.

Figure 11-33 shows the ISPF CM - Version Scopes panel (ADB2C42) where the `SO` line command can be issued to populate or define a set of objects to include in a version scope, or the `GV` line command can be issued to generate a new base version on demand. A base version can be manually generated using the CM Batch `action_generate_base_version` action command (simulates the `GV` line command of the ISPF interface).

```
ADB2C42 n --------------- CM - Version Scopes ---------------- Row 1 to 1 of 1
Command ===>                                                Scroll ===> PAGE

Line commands:
 VE - Versions  SO - Version scope objects  GV - Generate new base version
 INS - Insert  U - Update  DEL - Delete  I - Details on version scope
 CP - Copy privileges

Sel          ID Owner    Name                           Comment
             *  *        *                              *

--- ----------- -------- ------------------------------ ----------------------
             1 ADMR7     SAMPLE VERSION SCOPE
****************************** END OF DB2 DATA ******************************
```

Figure 11-33   CM - Version Scopes panel (ADB2C42): (CMM;4;2)

> **Note:** An empty base version is valid. For example, a version scope might have the name of a database that does not exist in the DB2 catalog. If a base version was generated using this version scope, the base version is generated, but it will be empty. When the comparison is done, the results might be a set of CREATE statements, if the target base version is empty and the source base version contains the definition of the objects.

Figure 11-34 contains a list of the CM Batch parameters used to define and manage base versions.

```
sssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
EDIT      DBTLSP.SGOCSAMP(GOCCM2) - 01.02                Columns 00001 00072
Command ===>                                                Scroll ===> CSR
000094 base_version_name = ''
000095 base_version_name_after_run = ''
000096 base_version_name_before_run = ''
000097 base_version_owner = ''
000098 base_version_owner_after_run = ''
000099 base_version_owner_before_run = ''
000100 base_version_scope_name = ''
000101 base_version_scope_name_after_run = ''
000102 base_version_scope_name_before_run = ''
000103 base_version_scope_owner = ''
000104 base_version_scope_owner_after_run = ''
000105 base_version_scope_owner_before_run = ''
```

Figure 11-34   CM Batch Base Version commands

When reviewing the RUN options for the change (Figure 11-30 on page 196), note that there is an option on the CM Run a Change panel (ADB2CEX1) to generate a base version before, after, or before and after the change. The name of the base versions can be automatically generated as a timestamp if AUTO is specified or the name can be provided by the user.

When the change BCCHG02-DA was run, a base version was generated before the change and after the change using the AUTO option to automatically generate the base version name.

> **Note:** This example is unable to use PROMOTE for the change to the BC_PROJ table because a FAST change does not provide an option to generate a base version either before or after the change. To do a PROMOTE, you must generate the base version using the `GV` command in the ISPF interface before the change and repeat that process after the change or generate the base version using CM batch.

To do a PROMOTE using the ISPF interface, complete the following steps:

1. Navigate to the CM menu by enter `CMM` on the Command line of any DB2 Administration Tool panel.

2. Enter the number 4 on the Option line to display the CM - Manage Version panel (ADB2C4), as seen in Figure 11-35

```
ADB2C4 in ------------------- CM - Manage Versions --------------------- 12:54
Option ===> 1


   1 - Display versions                           DB2 System: DB0A
   2 - Display version scopes                     DB2 SQL ID: ADMR7
   3 - Insert a version scope
   4 - Import a version file








Enter display selection criteria (Using a LIKE operator, criteria not saved):
Name . . . . .                            > Created by . .          >
Owner  . . . .          >                   Altered by . .          >
Created within                              Version ID . .
Altered within
```

Figure 11-35   CM - Manage Versions panel (ADB2C4): Import a version file

3. Enter number 1 on the Option line of the CM - Manage Versions panel (ADB2C4) to display the existing base versions on the CM - Versions panel (ADB2C41), as shown in Figure 11-36.

```
ADB2C41 n ------------------ CM - Versions ------------------ Row 1 to 2 of 2
Command ===>                                                Scroll ===> PAGE

Line commands:
 CH - Changes  PR - Promote  VS - Version scope  DEL - Delete  U - Update
 PT - Toggle protected status  I - Details on version  DDL -Generate DDL

Sel           ID T Owner   Name                             Comment
              * * *        *                                *
--- ----------- - -------- ------------------------------> --------------------
           29 B ADMR7    AUTO:2013-04-22-11.28.45.53545
           30 B ADMR7    AUTO:2013-04-22-11.29.02.24337
****************************** END OF DB2 DATA ******************************
```

Figure 11-36   CM - Versions panel (ADB2C41): Base Versions

The letter B under the T heading indicates that these are base versions.

4. Enter the **PR** (promote) line command next to the name of the base version that represents the image that the target should look like as a result of the promotion (ending version). In this example, the **PR** command is issued next to ID 30 (Figure 11-37).

```
ADB2C41 n ------------------ CM - Versions ------------------ Row 1 to 2 of 2
Command ===>                                                Scroll ===> PAGE

Line commands:
 CH - Changes  PR - Promote  VS - Version scope  DEL - Delete  U - Update
 PT - Toggle protected status  I - Details on version  DDL -Generate DDL

Sel           ID T Owner   Name                             Comment
              * * *        *                                *
--- ----------- - -------- ------------------------------> --------------------
           29 B ADMR7    AUTO:2013-04-22-11.28.45.53545
pr         30 B ADMR7    AUTO:2013-04-22-11.29.02.24337
****************************** END OF DB2 DATA ******************************
```

Figure 11-37   CM - Versions panel (ADB2C41): PR promote command

5. On the CM - Promote panel (ADB2CPS), provide the name of the source or start version. The DB2 Administration Tool lookup function can be used to get a list of the existing base versions. This step is especially helpful if you used the AUTO option to name the base version or versions. An example of using the lookup function is shown in Figure 11-38.

```
ADB2CPS n ---------------------- CM - Promote ------------------------- 16:49
Command ===>

Starting Version (Old):
  Owner . . . . . . admr7    >                           (? to lookup)
  Name  . . . . . . AUTO:?                        >  (? to lookup)

 or enter a data set name that contains a Start Version:

  Data set name . . . . . .
  Data set rewritable . . .           (Yes/No)
  Estimated record num. . .           (Only for DS cannot be rewritten)

Ending Version (New):
  Owner . . . . . . ADMR7     >                           (? to lookup)
  Name  . . . . . . AUTO:2013-04-22-11.29.02.24337 >  (? to lookup)

Output data set names:
  Promote JOB JCL .
  Delta change  . .
```

Figure 11-38   CM - Promote panel ADB2CPS: Lookup Starting Version

► Enter the plus sign (+) next to the name of the starting (old) base version to be used (Figure 11-39).

```
ADB2C41 n ------------------- CM - Versions ------------------- Row 1 to 2 of 2
Command ===>                                            Scroll ===> PAGE
Select by typing '+'
Line commands:
 CH - Changes  PR - Promote  VS - Version scope  DEL - Delete  U - Update
 PT - Toggle protected status  I - Details on version  DDL -Generate DDL

Sel          ID T Owner    Name                           Comment
             * * *         *                              *
--- ----------- - -------- ------------------------------> ------------------->
+            29 B ADMR7    AUTO:2013-04-22-11.28.45.53545
             30 B ADMR7    AUTO:2013-04-22-11.29.02.24337
****************************** END OF DB2 DATA ******************************
```

Figure 11-39   CM - Versions panel (ADB2C41): Use a '+' to select the source base version

6. Specify the data set name where the PROMOTE Job JCL is to be stored. This batch job compares the two base versions to create the delta change file. In addition, the name of the delta change file is specified (Figure 11-40).

```
ADB2CPS n ---------------------- CM - Promote ------------------------- 17:18
Command ===>

Starting Version (Old):
  Owner . . . . . . ADMR7    >                          (? to lookup)
  Name  . . . . . . AUTO:2013-04-22-11.28.44.53545 >  (? to lookup)

 or enter a data set name that contains a Start Version:

  Data set name . . . . . .
  Data set rewritable . . .            (Yes/No)
  Estimated record num. . .            (Only for DS cannot be rewritten)

Ending Version (New):
  Owner . . . . . . ADMR7    >                          (? to lookup)
  Name  . . . . . . AUTO:2013-04-22-11.29.02.24337 >  (? to lookup)

Output data set names:
  Promote JOB JCL . DBOA.PROMOTE.JCL
  Delta change  . . DBOA.PROMOTE.DELTA
```

Figure 11-40   CM Promote panel (ADB2CPS): Fill in data set names for PROMOTE

7. The type of change registered for PROMOTE only records the base versions used, location of JCL, location of delta change file. The change cannot be analyzed or run.

When the CM - Register Options panel (ADB2CR0) is displayed, provide a change name, because a PROMOTE is a registered change.

On this same panel there is an option to enter the name of the translation mask to be used to convert the change statements at the time the delta change file is created. See Figure 11-41. Masking during the PROMOTE does not convert the change statements at the time the delta change file is created. See "Masking" on page 198 for more detail.

```
ADB2CRO n -------------------- CM - Register Options ------------------- 17:18
Option ===>

Commands: CONTINUE                                     DB2 System: DBOA
                                                       DB2 SQL ID: ADMR7
Specify the following values to register a change:

Owner . . . . . . . . ADMR7    >  (Optional, default is ADMR7)
Name  . . . . . . . . BCCHGO3_DA PROMOTE DA TO TA                       >
Comment . . . . . . . Generate Delta Change File                       >
Change Type . . . . : COMPARE  (Promote, Change, Compare, Recover, Fast)

Specify the owner and name values to use for this change (? to lookup):
                      Owner         Name
Ignore  . . . . . . .          >                                       >
Mask  . . . . . . . . ADMR7 >      DATA >
Delta Version . . . .          >                                       >
```

Figure 11-41   CM - Register Options panel (ADB2CR0): Name the PROMOTE Change

8. A JCL job stream is generated in the Promote JOB JCL data set specified on the CM -
   Promote panel (ADB2CPS). Submit the job to generate the delta change file
   (Figure 11-42).

```
 File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help

SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 EDIT  ADBMR7.DBOA.PROMOTE.JCL(CHGFILE) - 01.00       Columns 00001 00072
 Command ===>                                             Scroll ===> PAGE
 ****** ***************************** Top of Data ******************************
 000001 //ADBMR7D JOB ,'DB2 UTILITY',
 000002 //*      RESTART=STEPNAME, <== FOR RESTART REMOVE * AND ENTER STEPNAME
 000003 //         REGION=OM,NOTIFY=SCHAUFU,
 000004 //         MSGCLASS=X,
 000005 //         CLASS=A
 000006 //*
 000007 /*JOBPARM SYSAFF=SY4A
 000008 //*
 000009
//***********************************************************ADB2CPS****
 000010 //* START OF PROMOTE FOR CHANGE ID:2031
 000011 //*  O:ADBMR7
 000012 //*  N:BCCHG03-DA PROMOTE DA TO TA2
 000013 //*
 000014 //* USING MASK:
 000015 //*  O:ADBMR7
 000016 //*  N:DATA
 000017 //*
 000018 //* USING IGNORES:
 000019 //*  O:
 000020 //*  N:
 000021 //*
 000022 //* USING END BASE VERSION:
 000023 //*  O:ADBMR7
 000024 //*  N:AUTO:2013-04-22-11.28.45.535454
 000025 //*  D:
 000026 //*
 000027 //* USING START BASE VERSION:
 000028 //*  O:ADBMR7
 000029 //*  N:AUTO:2013-04-22-11.29.02.243377
 000030 //*
 000031 //* USING PROMOTE JOB JCL:
 000032 //*  ADBMR7.DBOA.PROMOTE.JCL(CHGFILE)
 000033 //*
 000034 //* USING DELTA CHANGE:
 000035 //*  ADBMR7.DBOA.PROMOTE.DELTA
 000036
//********************************************************************
 000037 //*
```

Figure 11-42   Promote JCL: Submit to generate the delta change file

Figure 11-43 shows the output delta change file created by the PROMOTE job.

```
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
.
   Menu   Utilities   Compilers   Help

SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 BROWSE      ADBMR7.DBOA.PROMOTE.DELTA                  Line 00000000 Col 001 080
 Command ===>                                            Scroll ===> PAGE
******************************** Top of Data *********************************
DROP      DROP TABLE BCD076DA.BC_DEPARTMENT ;
DROP      COMMIT ;
DROP      DROP TABLESPACE BCD076DA.BCTSEMP ;
DROP      COMMIT ;
CREATE    SET CURRENT SQLID='ADBMR7';
CREATE    CREATE TABLESPACE BCTSEMP
CREATE       IN BCD076DA
CREATE       USING STOGROUP SYSDEFLT
CREATE       PRIQTY 720 SECQTY 100
CREATE       FREEPAGE 0 PCTFREE 5
CREATE       GBPCACHE CHANGED
CREATE       TRACKMOD YES
CREATE       LOGGED
CREATE       DSSIZE 4 G
CREATE       NUMPARTS 5
CREATE       SEGSIZE 32
CREATE       BUFFERPOOL BP2
CREATE       LOCKSIZE ANY
CREATE       LOCKMAX SYSTEM
CREATE       CLOSE YES
CREATE       COMPRESS NO
CREATE       CCSID      EBCDIC
CREATE       DEFINE YES
CREATE       MAXROWS 255;
CREATE     COMMIT ;
CREATE    SET CURRENT SQLID='ADBMR7';
CREATE    SET CURRENT SCHEMA='BCD076TA';
CREATE    CREATE TABLE BC_DEPARTMENT
CREATE       (DEPT_NO             INTEGER NOT NULL WITH DEFAULT,
CREATE        DEPT_NAME           CHAR(35) FOR SBCS DATA NOT NULL
CREATE          WITH DEFAULT,
CREATE        MGR_NO              INTEGER WITH DEFAULT NULL,
CREATE        ADMR_DEPT           INTEGER NOT NULL WITH DEFAULT,
CREATE        LOCATION            CHAR(20) FOR SBCS DATA NOT NULL
CREATE          WITH DEFAULT,
CREATE        EMPLOYEE_CNT        SMALLINT NOT NULL WITH DEFAULT,
```

Figure 11-43   PROMOTE: Delta change file

This file can now be imported as a registered change on a target.

Option 2: Use DB2 Object Comparison Tool

When using the DB2 Object Comparison Tool, comparing is done between the source (new definition - BCD076DA) and target (environment to update BCD076TA) to create a delta change file. There is no need to generate APPLY jobs when just creating the delta change file.

Define the comparison by navigating to the main menu of the DB2 Administration Tool and entering the character assigned to DB2 Object Comparison Tool at the bottom of the panel. In this case it is the letter `C` (Figure 11-44).

```
ADB2 dmin -------------- DB2 Administration Menu 10.2.1 ---------------- 19:11
Option ===> c

   1 - DB2 system catalog                              DB2 System: DB0A
   2 - Execute SQL statements                          DB2 SQL ID: ADMR7
   3 - DB2 performance queries                         Userid    : ADMR7
   4 - Change current SQL ID                           DB2 Schema: ADMR7
   5 - Utility generation using LISTDEFs and TEMPLATEs DB2 Rel   : 1015
   P - Change DB2 Admin parameters
  DD - Distributed DB2 systems
   E - Explain
   Z - DB2 system administration
  SM - Space management functions
   W - Manage work statement lists
   X - Exit DB2 Admin
  CC - DB2 catalog copy version maintenance
  CM - Change management

Interface to other DB2 products and offerings:
   C  Object Compare
```

Figure 11-44   DB2 Administration Menu panel (ADB2): C - Object Compare

Use the following steps:

1. Specify the source parameters by enter the number 1 on the Option line of the DB2 Object Comparison Tool Menu (GOCMENU). See Figure 11-45.

```
GOCMENU ---------------- DB2 Object Comparison Tool Menu ---------------- 19:14
Option ===> 1


                                       Specification Status:
  1  - Specify compare source (new)       Incomplete
  2  - Specify compare target (old)       Incomplete
  3  - Specify compare masks              None specified
  4  - Specify ignores                    Using defaults
  5  - Generate compare job               Not generated

  W  - Walk through steps 1 - 5 in sequence
  V  - Generate job to extract version file from source only

  R  - Reset all
  RS - Reset Source
  RT - Reset Target

  S  - Save dialog
  M  - Manage/Restore dialog
  MC - MultiCompare
  MR - Manage saved compare results
```

Figure 11-45   DB2 Object Comparison Tool Menu panel (GOCMENU)

DB2 Object Comparison Tool supports comparisons at the database, table space, and table levels. In this example, the comparison is being done at the database level. To do this, enter the number 1 on the Option line of the Specify Source DB2 Catalog Extract panel (GOC12) and specify the data set name or table name of the source version. See Figure 11-46 on page 210.

Note: DB2 Object Comparison Tool requires the source and target definitions to be extracted and stored in a proprietary format into a set of version files or tables. The input is version files. If a base version stored in the DB2 Admin database is specified, it is first extracted to a file before the compare program is called.

```
GOC12 e -------------- Specify DB2 Source Catalog Extract --------------- 17:50
Option ===> 1


   1 - Source is databases from the DB2 catalog
   2 - Source is table spaces from the DB2 catalog
   3 - Source is tables from the DB2 catalog
   4 - Add schema objects to the DB2 Source catalog extract

Specify compare version file output:
 Version table entry:
   Owner . . .          >             (? to look up)
   Name  . . .                    >   (? to look up)
 Data set:
   Data set name . . compare.src.ver0419


Enter a description (optional):

   Description  . .
```

Figure 11-46   Specify DB2 Source Catalog Extract panel GOC12

Specify the name of the source database by entering the letter **I** (insert) under the Select
column heading of the Specify Source DB2 Databases panel (GOC1D). See Figure 11-47.

```
GOC1D e ----------------- Specify Source DB2 Databases ------- Row 1 to 1 of 1
Command ===>                                              Scroll ===> PAGE

Commands: RESET
Line commands:
 D - Delete  I - Insert


Select Database  Location
        *          *
------ -------- ----------------
i      ........ ................
****************************** END OF DB2 DATA *****************************
```

Figure 11-47   Specify Source DB2 Databases panel (GOC1D)

Specify the full or partial name of the database to get a list of databases to choose from. The full database name is supplied in Figure 11-48.

```
GOC1DA  ------------------- DBOA Compare Add Databases ------------------ 17:52
Option ===>


Enter the partial name of the database you want to add to the compare
operation:


  Partial database name  . . : BCD076DA
  Location name  . . . . . . :                    >


Press enter to search for the database.
```

Figure 11-48   Compare Add Databases panel (GOC1DA)

After selecting the database or databases, press Enter. The word `Added` must be displayed under the Action header so that the object can be included in the comparison (Figure 11-49).

```
GOC1DD  -------------------- DBOA Compare Add Databases ------ Row 1 to 1 of 1
Command ===>                                             Scroll ===> PAGE


Valid line commands are:                      Location: DBOA
 S - Select (add)


Select Database Action
       *        *
------ -------- ------
*     BCD076DA Added
****************************** END OF DB2 DATA ******************************
```

Figure 11-49   Compare Add Databases panel (GOC1DD)

2. Repeat the same process to specify the target database. The target is the environment that must be changed to look like the source. In this scenario BCD076TA is the target.

3. If necessary, specify the translation mask to be used by entering the number 3 on the Option line of the DB2 Object Comparison Tool Menu as shown in Figure 11-50. If the mask is specified at this time, the contents of the delta change file will be translated at the time of its creation.

```
GOCMENU --------------- DB2 Object Comparison Tool Menu --------------- 18:49
Option ===> 3


                                    Specification Status:
   1 - Specify compare source (new)    DB2 catalog extract specified
   2 - Specify compare target (old)    DB2 catalog extract specified
   3 - Specify compare masks           None specified
   4 - Specify ignores                 Using defaults
   5 - Generate compare job            Not generated


   W - Walk through steps 1 - 5 in sequence
   V - Generate job to extract version file from source only


   R  - Reset all
   RS - Reset Source
   RT - Reset Target


   S  - Save dialog
   M  - Manage/Restore dialog
   MC - MultiCompare
   MR - Manage saved compare results
```

Figure 11-50   DB2 Object Comparison Tool Menu panel (GOCMENU)

Enter the name of the mask on the Specify Compare Masks panel (GOC3) as shown in Figure 11-51.

```
GOC3 re --------------------- Specify Compare Masks ---------------------------
Option ===>



Mask Table Entry:
  Owner . . ADMR7    >            (? to look up)
  Name  . . DATA                > (? to look up)
Data Set:
  Mask DSN  . .
Options:
  Edit Mask . . YES (Yes/No)
```

Figure 11-51   Specify Compare Masks panel (GOC3)

The mask used in this scenario is stored in a table in the Change Management repository. The contents of the mask can be seen in Figure 11-52.

```
ADB2C2L n ----------------- CM - Mask Lines ------------------ Row 1 to 2 of 2
Command ===>                                            Scroll ===> PAGE

Mask lines for mask "ADMR7"."DATA"
Commands: CANCEL
Line commands:
  I - Insert  D - Delete  R - Repeat  M - Move  A - After  B - Before

Sel    Sequence Type      From                 To                      Oper.  T
              * *          *                    *                       *      *
--- ----------- --------- -------------------> -------------------> ------ -

           1 DBNAME    BCD076DA             BCD076TA
           2 SCHEMA    BCD076DA             BCD076TA
****************************** END OF DB2 DATA ******************************
```

Figure 11-52   CM - Mask Lines panel (ADB2C2L): DATA mask

The DB2 Object Comparison Tool also has an ignore capability. This enables the user to identify parameters that should not be compared. For example, you might not want to compare the sizes (PQTY and SQTY) between the source and target table spaces. Ignore, as with masks, is an optional facility. The definition of the ignore facility can be stored in a file or in a DB2 table in the Change Management Repository.

4. Generate the compare job by entering the number 5 on the Option line of the DB2 Object Comparison Tool Menu (GOCMENU), as shown in Figure 11-53.

```
GOCMENU ---------------- DB2 Object Comparison Tool Menu ---------------- 18:56
Option ===> 5


                                      Specification Status:
  1 - Specify compare source (new)     DB2 catalog extract specified
  2 - Specify compare target (old)     DB2 catalog extract specified
  3 - Specify compare masks            Mask specified
  4 - Specify ignores                  Using defaults
  5 - Generate compare job             Not generated


  W - Walk through steps 1 - 5 in sequence
  V - Generate job to extract version file from source only


  R - Reset all
  RS - Reset Source
  RT - Reset Target


  S - Save dialog
  M - Manage/Restore dialog
  MC - MultiCompare
  MR - Manage saved compare results
```

Figure 11-53   DB2 Object Comparison Tool Menu panel (GOCMENU): Generate Compare job

Fill in the parameters on the Generate Compare Jobs panel (GOC5). In this instance you are trying to generate only a delta change file. To do this, you must specify the name of the delta change file next to the `Changes file data set name` keyword. It is not necessary to generate the apply jobs. See Figure 11-54.

```
GOC5 re -------------------- Generate Compare Jobs  --------------------------
Option ===>

 Specify the following for DB2 Object Comparison Tool:
                                                            More:     +
 Worklist information:
   Worklist name . . . . . . . COMP     (also used as middle qualifier in DSNs)

 Compare options:
   Suppress DROP of objects  . NO       (Yes/No)
   Suppress DROP of columns  . NO       (Yes/No)
   Suppress adding columns . . NO       (Yes/No)
   Run SQLID . . . . . . . . .          (Blank, an SQLID, or <NONE>)
   Run Validate  . . . . . . . N        (Validate,None)
   Allow implicit drop of
      excluded objects  . . . . NO      (Yes/No)

 Change reporting options  . . NO       (Yes/No)
 Save compare results  . . . . NO       (Yes/No)

 Data set information:
   PDS for jobs  . . . . . . . JCL.CNTL
   Prefix for data sets  . . . ADMR7
   Changes file data set name. COMPARE.DELTA.CHANGE
      Member name . . . . . . .          (if Changes file is an existing PDS)

 Options:
   Generate online . . . . . . YES      (Yes/No)
   Single compare job  . . . . YES      (Yes/No)
     Member name . . . . . . . COMPARE  (default COMPARE )
   Generate apply jobs . . . . CHANGE   (Yes, No, or (Delta) Change)
     Generate one job  . . . .          (Yes, No, or (Per) Process)
       Member prefix . . . . .          (default APPLY )
     As work statement list  .          (Yes/No to append to work stmt list)
     Use customized util opts           (Yes/No)
     Content of apply job(s) . ALL      (All, DDL)
     Unload method . . . . . .          (Unload, Parallel unload, HPU)
     Generate templates. . . . NO       (Yes/No)
     Stop on conversion error.          (Yes/No)
     Use DEFER YES . . . . . . NO       (Yes/No)
   Allow rotate parts  . . . . NO       (Yes/No)
 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
```

Figure 11-54   Generate Compare Jobs panel (GOC5)

Submit the generate JCL job stream. Figure 11-55 and Figure 11-56 on page 216 are displays of the delta change file generated by DB2 Object Comparison Tool. Note the schema and database names have been modified based on the masking options.

```
 GOCMENU ---------------- DB2 Object Comparison Tool Menu --------------- 19:01
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
   Menu  Utilities  Compilers  Help

ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
 BROWSE    ADMR7.COMPARE.DELTA.CHANGE                    Line 00000000 Col 001 080
 Command ===>                                             Scroll ===> PAGE
******************************* Top of Data *********************************
PTSINFO BCD076TA BCTSACT  0 DBOAD    I 0
PTSINFO BCD076TA BCTSDEPT 0 DBOAD    I 0
PTSINFO BCD076TA BCTSEPA  0 DBOAD    I 0
PTSINFO BCD076TA BCTSPJA  0 DBOAD    I 0
PTSINFO BCD076TA BCTSPROJ 0 DBOAD    I 0
UTILINFO         ALTER    TB BCD076TA BCTSDEPT N BCD076TA
CREATE    ALTER TABLE BCD076TA.BC_DEPARTMENT
CREATE      ALTER DEPT_NAME SET DATA TYPE CHAR(30) ;
CREATE    COMMIT ;
UNLOAD  BCD076TA
DROP      DROP TABLESPACE BCD076TA.BCTSEMP ;
DROP      COMMIT ;
CREATE    SET CURRENT SQLID='ADMR7';
CREATE    SET CURRENT SQLID='ADMR7';
CREATE    CREATE TABLESPACE BCTSEMP
CREATE      IN BCD076TA
CREATE      USING STOGROUP GLWG01
CREATE      PRIQTY 100 SECQTY 100
CREATE      FREEPAGE 0 PCTFREE 5
CREATE      GBPCACHE CHANGED
CREATE      TRACKMOD YES
CREATE      LOGGED
CREATE      DSSIZE 4 G
CREATE      NUMPARTS 5
CREATE      SEGSIZE 32
CREATE      BUFFERPOOL BP0
CREATE      LOCKSIZE ANY
CREATE      LOCKMAX SYSTEM
CREATE      CLOSE YES
CREATE      COMPRESS NO
CREATE      CCSID      EBCDIC
CREATE      DEFINE YES
CREATE      MAXROWS 255;
PTSINFO BCD076TA BCTSEMP  5 DBOAD    I 0
PTSINFO BCD076TA BCTSEMP  4 DBOAD    I 0
PTSINFO BCD076TA BCTSEMP  3 DBOAD    I 0
```

Figure 11-55   Delta Change File: generated by Compare

```
  BROWSE      ADMR7.COMPARE.DELTA.CHANGE                  Line 00000037 Col 001 080
  Command ===>                                                   Scroll ===> PAGE
PTSINFO BCD076TA BCTSEMP  2 DBOAD    I 0
PTSINFO BCD076TA BCTSEMP  1 DBOAD    I 0
CREATE    COMMIT ;
CREATE    SET CURRENT SCHEMA='BCD076TA';
CREATE    CREATE TABLE BC_EMPLOYEE
CREATE       (EMP_NO               INTEGER NOT NULL,
CREATE        FIRSTNAME            VARCHAR(12) FOR SBCS DATA NOT NULL,
CREATE        MIDINIT              CHAR(1) FOR SBCS DATA NOT NULL,
CREATE        LASTNAME             VARCHAR(20) FOR SBCS DATA NOT NULL,
CREATE        WORKDEPT             INTEGER WITH DEFAULT NULL,
CREATE        PHONENO              CHAR(4) FOR SBCS DATA NOT NULL,
CREATE        CELLPHONE            CHAR(10) FOR SBCS DATA NOT NULL,
CREATE        HIREDATE             DATE NOT NULL WITH DEFAULT,
CREATE        TERMDATE             DATE NOT NULL WITH DEFAULT,
CREATE        JOB                  CHAR(12) FOR SBCS DATA WITH DEFAULT NULL,
CREATE        MANAGER              CHAR(1) FOR SBCS DATA NOT NULL,
CREATE        EDLEVEL              SMALLINT NOT NULL,
CREATE        SEX                  CHAR(1) FOR SBCS DATA WITH DEFAULT NULL,
CREATE        BIRTHDATE            DATE NOT NULL WITH DEFAULT,
CREATE        SALARY               DECIMAL(9, 2) WITH DEFAULT NULL,
CREATE        BONUS                DECIMAL(9, 2) WITH DEFAULT NULL,
CREATE        COMM                 DECIMAL(9, 2) WITH DEFAULT NULL,
CREATE        CREATED_TS           TIMESTAMP (6) WITHOUT TIME ZONE NOT NULL
CREATE          WITH DEFAULT,
CREATE        CREATED_BY           CHAR(8) FOR SBCS DATA NOT NULL
CREATE          WITH DEFAULT,
CREATE        UPDATED_TS           TIMESTAMP (6) WITHOUT TIME ZONE NOT NULL
CREATE          WITH DEFAULT,
CREATE        UPDATED_BY           CHAR(8) FOR SBCS DATA NOT NULL
CREATE          WITH DEFAULT,
CREATE        CONSTRAINT GLWPEMP
CREATE         PRIMARY KEY (EMP_NO))
CREATE        IN BCD076TA.BCTSEMP
CREATE        PARTITION BY (LASTNAME ASC,
CREATE                         FIRSTNAME ASC,
CREATE                         EMP_NO ASC)
CREATE         (PARTITION 1 ENDING AT ('D'),
```

Figure 11-56   Delta Change File generated by Compare (cont).

After this file is created, it can be imported by using the Import feature of the ISPF interface or through the use of CM Batch (action_import_change).

Running compare to generate the delta change file can also be done by using CM Batch as an alternative to using the panels. See Example 11-1.

Example 11-1   Using Object Compare CM batch

```
//ADMR7D JOB ,'DB2 UTILITY',
// REGION=0M,NOTIFY=ADMR7,
// MSGCLASS=X,CLASS=A
//*
/*JOBPARM SYSAFF=SC63
//LSCLIBS JCLLIB ORDER=DBTLSP.SGOCSAMP
//*
//GOCCM EXEC GOCCM,SSID=DB0A,PLAN=ADB
//GOCCM.PARMS DD *
ACTION_COMPARE = 'Y'
ACTION_IMPORT_CHANGE = 'N'

CMT='**********************'
CMT='*** COMPARE SOURCE ***'
CMT='**********************'
SOURCE_TYPE = 'USER'
ADMIN_DATASET_TYPE = 'SRCVF'
ADMIN_DATASET_DSN = 'COMPARE.SRC.VER0419';

CMT='**********************'
CMT='*** COMPARE TARGET ***'
CMT='**********************'
TARGET_TYPE = 'USER'
ADMIN_DATASET_TYPE = 'TGTVF'
ADMIN_DATASET_DSN = 'COMPARE.TGT.VER0419';

CMT='**********************'
CMT='*** COMPARE MASK   ***'
CMT='**********************'
COMPARE_MASK_OWNER = 'ADMR7'
COMPARE_MASK_NAME = 'DATA'

CMT='****************************'
CMT='*** OTHER COMPARE OPTIONS ***'
CMT='****************************'
PREFIX_FOR_DATA_SETS = 'ADMR7'

ADMIN_DATASET_TYPE = 'DELTA'
ADMIN_DATASET_DSN = 'COMPARE.DELTA.CHANGE';

ALLOW_ROTATE_PARTS = 'Y'

/*
//****************************
//*  COMPARE SOURCE OBJECTS
//****************************
//GOCCM.SRCIN DD *
TYPE='DB' NAME = 'BCD076DA';
/*
//****************************
//*  COMPARE TARGET OBJECTS
//****************************
//GOCCM.TGTIN DD *
TYPE='DB' NAME = 'BCD076TA';
/*
```

Option 3: Use the EX (export) command in the ISPF interface

Export one or more registered changes to a delta change file by issuing the ISPF interface **EX** (export) line command next to the registered change using the ISPF interface.

This scenario exports a completed change, but a change can be exported as soon as it is registered.

Navigate to the CM - Changes panel ADB2C11 and enter `EX` next to the name of the change to be exported. In this case, it is BCCHG-2DA (Figure 11-57)

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 1 of 1
Command ===>                                              Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                              Type    Status   Comment
          * *         *                                 *       *        *
--- -------- -------- ------------------------------> ------- -------- -------->
ex       24 ADMR7     BCCHG-2DA BC_EMPLOYEE BC_DEPAR CHANGE  COMPLETE CHANGE RE
***************************** END OF DB2 DATA *****************************
```

Figure 11-57   CM Changes panel (ADB2C11): Export (EX) change

Press Enter to open the Export Changes panel (ADBPC15), as shown in Figure 11-58. This panel displays information about a set of changes.

```
ADBPC15 n --------------- CM - Export Changes ---------------- Row 1 to 1 of 1
Command ===>                                              Scroll ===> PAGE

Commands: CONTINUE   COMMENT   ADD
Line commands:
 I - Interpret  IC - Include Change  XC - eXclude Change

                                                                    Operation
Sel       ID Owner    Name                              Type    Status  Type
          * *         *                                 *       *       *
--- -------- -------- ------------------------------> ------- -------- ---------
         24 ADMR7     BCCHG-2DA BC_EMPLOYEE BC_DEPAR CHANGE  COMPLETE INCLUDE
***************************** END OF DB2 DATA *****************************
```

Figure 11-58   CM Export Changes panel (ADBPC15)

The BCCHG-2DA change is listed with an Operation Type of INCLUDE. Three primary commands can be issued on the CM Export Changes panel (ADBPC15). You can either click on a command or enter the command on the Command line.

► `CONTINUE`: Use this command after all changes that are to be exported are listed.
► `COMMENT`: Toggle the display of the data stored in the comments field on or off.
► `ADD`: Add multiple changes to the export.

To propagate both changes, BCCHG01-DA and BCCHG02-DA, using the **EX** option, you must add the changes to the list one at a time by doing clicking the ADD keyword or by entering **ADD** on the Command line (Figure 11-59).

```
ADBPC15 n --------------- CM - Export Changes ---------------- Row 1 to 1 of 1
Command ===> ADD                                              Scroll ===> PAGE


Commands: CONTINUE  COMMENT  ADD
Line commands:
 I - Interpret  IC - Include Change  XC - eXclude Change

                                                                   Operation
Sel       ID Owner    Name                          Type    Status  Type
          * *         *                             *       *       *
--- -------- -------- ------------------------------> ------- -------- ---------
        24 ADMR7     BCCHG-2DA BC_EMPLOYEE BC_DEPAR CHANGE  COMPLETE INCLUDE
             CHANGE REQUEST
****************************** END OF DB2 DATA ******************************
```

Figure 11-59   CM - Export Changes panel (ADBPC15): Using the ADD command

The CM - Add a Change panel (ADBPC15A), Figure 11-60, prompts you either to enter the name of a change or to use the DB2 Administration Tool's lookup feature to get a partial or a full list of the registered changes in the Change Management repository.

```
ADBPC15A  ------------------ CM - Add a Change ------------------------- 14:29
Command ===>


Enter the change information below:


Owner  . . . . . . ADMR7    >  (Optional, default is ADMR7, ? to lookup)
Name . . . . . . . BCCHG01?                  >  (Required, ? to lookup)
```

Figure 11-60   CM - Add a Change panel (ADBPC15A)

A list of changes matching the selection criteria is displayed. Changes to be included in the export can be selected by entering a plus sign (+) next to the change, as shown by the Select by typing a '+' message under the Command line of CM - Changes panel (Figure 11-61).

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 1 of 1
Command ===>                                                  Scroll ===> PAGE
Select by typing '+'
Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands


Sel       ID Owner    Name                          Type    Status  Comment
          * *         *                             *       *       *
--- -------- -------- ------------------------------ ------- -------- -------->
+       29 ADMR7     BCCHG01-DA BC_PROJ             FAST    COMPLETE ADD COLUM
****************************** END OF DB2 DATA ******************************
```

Figure 11-61   CM - Changes panel (ADB2C11)

The selected change is displayed on the CM - Add a Change panel (Figure 11-62).

```
 ADBPC15A  ----------------- CM - Add a Change -------------------------
21:43
 Command ===>


 Enter the change information below:


 Owner  . . . . . . ADMR7    >  (Optional, default is ADMR7, ? to lookup)
 Name . . . . . . . BCCHG01-DA BC_PROJ              >  (Required, ? to lookup)
```

Figure 11-62   CM - Add a Change panel (ADBPC15A)

Press F3. The change will be included in the list of changes to be exported (Figure 11-63).

```
ADBPC15 n --------------- CM - Export Changes ---------------- Row 1 to 2 of 2
Command ===>                                              Scroll ===> PAGE

Commands: CONTINUE   COMMENT   ADD
Line commands:
 I - Interpret  IC - Include Change  XC - eXclude Change

                                                                   Operation
Sel      ID Owner    Name                         Type     Status   Type
         * *         *                            *        *        *

--- -------- -------- ------------------------------> ------- -------- ---------
       31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE   COMPLETE INCLUDE
       29 ADMR7    BCCHG01-DA BC_PROJ             FAST     COMPLETE INCLUDE
****************************** END OF DB2 DATA ******************************
```

Figure 11-63   CM - Export Changes panel (ADBPC15): Multiple changes to be exported

The line commands indicate that the changes in the list can be included (`IC`) or excluded (`XC`).
There is also an interpret (`I`) command that displays general information about the change
itself.

After all the changes are listed, click `CONTINUE` or enter `CONTINUE` on the Command line of the
CM Export Changes panel (ADBPC15).

Specify Data Set / Member Information (ADBPVERD) panel is displayed (Figure 11-64). This
panel is where the delta change file allocation is defined. The file can be a PDS or a
sequential file.

```
ADBPVERD  -------------- Specify Data Set / Member Information -------------

Data Set Name  . . EXPORTED.CHANGES
*Member Name . . . BCCHG

*Volume serial . . . . :                  (Blank for system default volume)
Device type  . . . . . . SYSDA           (Generic unit)
Space units  . . . . . . TRACKS          (TRKS or CYLS)
Primary quantity . . . . 1               (In above units)
Secondary quantity . . . 1               (In above units)
*Directory blocks  . . . 1               (Zero for sequential data set)     *
*Record format . . . . : F               (F or V)
*Record length . . . . : 80              F80
*Block size  . . . . . .
*Data set name type  . .                 (LIBRARY, PDS or blank)
(* Specifying LIBRARY may override zero directory block)
```

Figure 11-64   Specify Data Set / Member Information panel (ADBPVERD)

If the file already exists it can be reused, as shown in Figure 11-65.

```
ADB2CONF  -- DBOA Promote - Replace Delta Change Confirmation ----- 16:49

 Data set already exists:
 'EXPORTED.CHANGES(BCCHG)'

Choose replace or cancel.

Select a choice
1 1.  Replace contents of data set.
  2.  Cancel
```

Figure 11-65   Promote - Replace Delta Change Confirmation panel (ADB2CONF)

The changes are exported automatically. There is no message indicating that anything
happened. The panel in Figure 11-66 shows that two members are in the CM Export
Changes file. The TEST member is from a previous run and is not part of this scenario.

```
 Menu  Functions  Confirm  Utilities  Help
 ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
 EDIT             ADMR7.EXPORTED.CHANGES                    Row 00001 of 00002
 Command ===>                                               Scroll ===> PAGE
          Name     Prompt      Size  Created       Changed        ID
 _____ BCCHG    *Edited
 _____ TEST
          **End**
```

Figure 11-66   PDS Entries for Exported Changes

Sample contents of a delta change file are shown in Figure 11-67

```
ADBPC15 n --------------- CM - Export Changes ---------------- Row 1 to 1 of 2
.  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
  File  Edit  Edit_Settings  Menu  Utilities  Compilers  Test  Help
ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssss
EDIT       ADMR7.EXPORTED.CHANGES(BCCHG) - 01.00          Columns 00001 00072
Command ===>                                                 Scroll ===> PAGE
****** *************************** Top of Data *****************************
000001 SET CURRENT SCHEMA = 'ADMR7';
000002 -------------------------------------------------------------------------
000003 ADMIN ALTER TABLE BCD076DA.BC_DEPARTMENT REPLACE COLUMN "DEPT_NAME" CHAR
000004 (30) FOR SBCS DATA NOT NULL WITH DEFAULT;
000005 -------------------------------------------------------------------------
000006 ADMIN ALTER TABLE BCD076DA.BC_EMPLOYEE RENAME COLUMN FIRSTNME TO FIRSTNA
000007 ME;
000008 -------------------------------------------------------------------------
000009 ADMIN ALTER TABLE BCD076DA.BC_EMPLOYEE INSERT "CELLPHONE" CHAR(10) FOR S
000010 BCS DATA NOT NULL BEFORE HIREDATE;
000011 -------------------------------------------------------------------------
000012 ADMIN ALTER TABLE BCD076DA.BC_EMPLOYEE INSERT "TERMDATE" DATE NOT NULL W
000013 ITH DEFAULT BEFORE JOB;
000014 -------------------------------------------------------------------------
000015 ADMIN DROP VIEW "BCD076DA"."BC_VSTAFAC2";
000016 -------------------------------------------------------------------------
000017 SET CURRENT SCHEMA='BCD076DA';
000018 -------------------------------------------------------------------------
000019 SET CURRENT PATH = "SYSIBM","SYSFUN","SYSPROC","ADMR7";
000020 -------------------------------------------------------------------------
000021 CREATE VIEW BC_VSTAFAC2(PROJ_NO, ACT_NO, ACTDESC, EMP_NO, FIRSTNAME, MID
000022 INIT, LASTNAME, EMPTIME, STDATE, ENDATE, TYPE) AS SELECT ALL EP.PROJ_NO,
000023  EP.ACT_NO, AC.ACTDESC, EP.EMP_NO, EM.FIRSTNAME, EM.MIDINIT, EM.LASTNAME
000024 , EP.EMPTIME, EP.EMSTDATE, EP.EMENDATE, '2' FROM BC_EMP_PROJ_ACT EP, BC_
000025 ACTIVITY AC, BC_EMPLOYEE EM WHERE EP.ACT_NO = AC.ACT_NO AND EP.EMP_NO =
000026 EM.EMP_NO;
000027 -------------------------------------------------------------------------
000028 ADMIN DROP VIEW "BCD076DA"."BC_VPROJRE1";
000029 -------------------------------------------------------------------------
000030 SET CURRENT SCHEMA='BCD076DA';
000031 -------------------------------------------------------------------------
000032 SET CURRENT PATH = "SYSIBM","SYSFUN","SYSPROC","ADMR7";
000033 -------------------------------------------------------------------------
000034 CREATE VIEW BC_VPROJRE1(PROJ_NO, PROJNAME, PROJDEP, RESP_EMP_NO, FIRSTNA
000035 ME, MIDINIT, LASTNAME, MAJPROJ) AS SELECT ALL BC_PROJ.PROJ_NO, BC_PROJ.P
000036 ROJNAME, BC_PROJ.DEPT_NO, BC_EMPLOYEE.EMP_NO, BC_EMPLOYEE.FIRSTNAME, BC_
```

Figure 11-67   Contents of the delta change file created by EX (export)

EX (export) is using the contents of the Change Management Repository to create the delta
change file. Both BCCHG01-DA and BCCHG02-DA applied changes to the BCD076DA
database as reflected in the contents of the delta change file displayed in Figure 11-67. The
EXport ISPF panels do not provide an option to specify the name of a translation mask to be
used in the export process. Therefore, when the change is imported to the target, a mask
must be defined to apply the changes to the correct database or schema.

Propagate Step 2: Import changes to a target

The next step in change propagation is to import the delta change into a target as a registered change. This can be accomplished by using the ISPF panels or through CM Batch. The delta file used in this example is the one generated by the **EX** (export) command. The import option can include one or more delta change files.

Option 1: Use the Import option on the ISPF panels

Navigate to the CM - Manage Changes panel ADB2C1 (Figure 11-68).

```
ADB2C1 in --------------------  CM - Manage Changes -------------------- 17:00
Option ===> 4


   1 - Display changes                                    DB2 System: DB0A
   2 - Create a change                                    DB2 SQL ID: ADMR7
   3 - Create delta for target
   4 - Import changes
   5 - Export changes








Enter display selection criteria (Using a LIKE operator, criteria not saved):
Name . . . . .                            > Created by . .          >
Owner  . . . .         >                    Altered by . .          >
Type . . . . .                              Status . . . .
Created within                              Change ID  . .
Altered within
```

Figure 11-68 CM - Manage Changes panel (ADB2C1)

Specify the number 4 on the Option line to Import Changes. The CM - Import Changes panel (ADB2C14) is displayed. Enter the name of the delta change file (this name will be retained across sessions) and the member name. Press Enter.

The name of the delta change file entered is added to the body of the panel (Figure 11-69).

```
ADB2C14 n ------------------- CM - Import Changes ------------ Row 1 to 2 of 2
Command ===>

Commands : CONTINUE RESET

Input data set information:                               DB2 System: DB0A
  Data set name . EXPORTED.CHANGES
    Member   . . . BCCHG    (member name or pattern if partitioned)

Line Commands :
M - Move  A - After  B - Browse  D - Delete

Select Seq Data set name                                              Oper.
------ --- -------------------------------------------------------    ------

       1 ADMR7.EXPORTED.CHANGES(BCCHG)
****************************** END OF DB2 DATA ******************************
```

Figure 11-69   CM - Import Changes panel (ADB2C14)

After all of the delta change files to be included in the import are in the list, click **CONTINUE** or enter **CONTINUE** on the Command line. The CM Import changes - Select process modes panel (ADB2C14M) is displayed (Figure 11-70).

```
ADB2C14M  ------- CM Import changes - Select process modes ------ 17:12



Specify how to continue Import :

Prereq resolution mode  . TSO      (TSO/Batch)
Execution mode  . . . . . TSO      (TSO/Batch)
```

Figure 11-70   CM Import changes - Select process modes panel (ADB2C14M)

Import is a two-step process. The DB2 Administration Tool does the following operations:

► Determines whether any prerequisite changes are pending for objects involved in the change.
► Registers the change with a status of DEFINED.

The steps can be run in TSO, batch, or a combination of TSO and batch.

This scenario explores applying the changes to the BCD076TA environment. The change statements, however, all point to the BCD076DA environment and must be modified to point to the TA environment. Although contents of the delta change file can be edited using TSO, the best way is to use DB2 Administration Tool's mask. The mask must be predefined. It can be edited though the panels, but there must be at least a place holder.

The mask used in this scenario is shown in Figure 11-71.

```
ADB2EDIT  --------------------  ------------------------- Columns 00001 00072
Command ===>                                               Scroll ===> CSR

000001 DBNAME   :BCD076DA,BCD076TA
000002 SCHEMA   :BCD076DA,BCD076TA
****** *************************** Bottom of Data ***************************
```

Figure 11-71   Mask Example

Press Enter on the CM - Import Changes - Select Process Modes panel. The CM - Register Options panel ADB2CR0 is displayed (Figure 11-72). Provide a change name, and the name of the mask to be used for translating the DDL to point to the correct environment. If you do not know the name of the mask, use the lookup function to see a list of existing masks.

```
ADB2CRO n -------------------- CM - Register Options -------------------- 17:48
Option ===>

Commands: CONTINUE                                    DB2 System: DB0A
                                                      DB2 SQL ID: ADMR7
Specify the following values to register a change:

Owner . . . . . . . . ADMR7    >  (Optional, default is ADMR7)
Name  . . . . . . . . BCCHG03-TA2                                          >
Comment . . . . . . . IMPORTED CHANGE                                      >
Change Type . . . . : PROMOTE  (Promote, Change, Compare, Recover, Fast)

Specify the owner and name values to use for this change (? to lookup):
                      Owner        Name
Ignore  . . . . . . .            >                                  >
Mask  . . . . . . . . ADMR7    >    DATA                            >
Delta Version . . . .            >                                  >
```

Figure 11-72   CM - Register Options panel (ADB2CR0): Name the Imported Change

Click **CONTINUE** or enter the **CONTINUE** command on the Option line. The `Register Successful` message is displayed under the Command line. See Figure 11-73

```
ADB2C14 n ------------------- CM - Import Changes ------------ Row 1 to 2 of 2
Command ===>
Register Successful
Commands : CONTINUE RESET

Input data set information:                             DB2 System: DBOA
  Data set name . EXPORTED.CHANGES
    Member  . . . BCCHG    (member name or pattern if partitioned)

Line Commands :
M - Move  A - After  B - Browse  D - Delete

Select Seq Data set name                                               Oper.
------ --- -------------------------------------------------------     ------


         1 ADMR7.EXPORTED.CHANGES(BCCHG)
****************************** END OF DB2 DATA ******************************
```

Figure 11-73   CM - Import Changes panel (ADB2C14)

The change is now registered and is in a DEFINED status (Figure 11-74), and can be analyzed and run using either the ISPF or CM batch interfaces.

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 4 of 4
Command ===>                                           Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel      ID Owner    Name                             Type    Status    Comment
         * *         *                                *       *         *
--- -------- -------- ------------------------------> ------- -------- -------->
         1 ADMR7     BCCHG1-DA CREATE TABLE SPACE    FAST    COMPLETE CREATE BC
        22 ADMR7     BCCHG1-DA BC_PROJ               FAST    COMPLETE ADD PROJ_
        24 ADMR7     BCCHG-2DA BC_EMPLOYEE BC_DEPAR CHANGE  COMPLETE CHANGE RE
        27 ADMR7     BCCHG3-TA2                      CHANGE  DEFINED  IMPORTED
****************************** END OF DB2 DATA ******************************
```

Figure 11-74   CM - Changes: List of all changes including the imported change

Use the **ST** line command to confirm that the mask did make the necessary changes to the contents of the change file to work against the BCD076TA environment. See Figure 11-75

```
ADB2C1S n ------------- CM - Change Statements ------------- Row 1 to 30 of 30
Command ===>                                             Scroll ===> PAGE

Change statements for change "ADMR7"."BCCHG03-TA2"
Commands: VIEW
Line commands:
 E - Edit  D - Delete  I - Insert  V - View

Sel    Sequence O  Qual      Name               Statement
                * *  *         *                  *
--- ----------- -- -------- ----------------- ------------------------------>

              1                                 SET CURRENT SCHEMA = 'ADMR7'
              2 TB BCD076TA BC_DEPARTMENT       ADMIN ALTER TABLE BCD076TA.BC_D
              3 TB BCD076TA BC_EMPLOYEE         ADMIN ALTER TABLE BCD076TA.BC_E
              4 TB BCD076TA BC_EMPLOYEE         ADMIN ALTER TABLE BCD076TA.BC_E
              5 TB BCD076TA BC_EMPLOYEE         ADMIN ALTER TABLE BCD076TA.BC_E
              6 VW BCD076TA BC_VSTAFAC2         ADMIN DROP VIEW BCD076TA.BC_VST
              7                                 SET CURRENT SCHEMA = 'BCD076TA'
              8                                 SET CURRENT PATH = "SYSIBM", "S
              9 VW BCD076TA BC_VSTAFAC2         CREATE VIEW BCD076TA.BC_VSTAFAC
             11 VW BCD076TA BC_VPROJRE1         ADMIN DROP VIEW BCD076TA.BC_VPR
             12                                 SET CURRENT SCHEMA = 'BCD076TA'
             13                                 SET CURRENT PATH = "SYSIBM", "S
             14 VW BCD076TA BC_VPROJRE1         CREATE VIEW BCD076TA.BC_VPROJRE
             16 VW BCD076TA BC_VPHONE           ADMIN DROP VIEW BCD076TA.BC_VPH
             17                                 SET CURRENT SCHEMA = 'BCD076TA'
             18                                 SET CURRENT PATH = "SYSIBM", "S
             19 VW BCD076TA BC_VPHONE           CREATE VIEW BCD076TA.BC_VPHONE(
             21 VW BCD076TA BC_VEMPDPT1         ADMIN DROP VIEW BCD076TA.BC_VEM
             22                                 SET CURRENT SCHEMA = 'BCD076TA'
             23                                 SET CURRENT PATH = "SYSIBM", "S
             24 VW BCD076TA BC_VEMPDPT1         CREATE VIEW BCD076TA.BC_VEMPDPT
             26 VW BCD076TA BC_VEMP             ADMIN DROP VIEW BCD076TA.BC_VEM
             27                                 SET CURRENT SCHEMA = 'BCD076TA'
             28                                 SET CURRENT PATH = "SYSIBM", "S
             29 VW BCD076TA BC_VEMP             CREATE VIEW BCD076TA.BC_VEMP AS
             31 VW BCD076TA BC_VDEPMG1          ADMIN DROP VIEW BCD076TA.BC_VDE
             32                                 SET CURRENT SCHEMA = 'BCD076TA'
             33                                 SET CURRENT PATH = "SYSIBM", "S
             34 VW BCD076TA BC_VDEPMG1          CREATE VIEW BCD076TA.BC_VDEPMG1
             36 TB BCD076TA BC_PROJ             ALTER TABLE BCD076TA.BC_PROJ ..
***************************** END OF DB2 DATA *****************************
```

Figure 11-75   CM Change Statements for BCCHG03-TA2

Option 2: Use CM Batch to import delta change file

Specify the following actions to be taken in a copy of the CM Batch installation verification job created by DB2 Administration Tool TCz customization. The values must be within single quotation marks, for example 'Y' (for yes). See Figure 11-76.

- ► `action_import_change = 'Y'` (Yes or no.)

- ► `use_mask_for_import_change = 'Y'` (The delta file was created by export thus, the change still refers to the original source of BCD076DA.)

- ► `mask_name = 'DATA'` (This is the mask created as part of the change scenario.)

- ► `mask_owner = 'ADMR7'`

- ► `change_name = 'BCCHG03_TA3'` (To be the name of the registered change.)

- ► `change_owner = 'ADMR7'`

- ► `//GOCCM.IMCHG001 DD DISP=SHR,DSN=ADMR7.EXPORTED.CHANGES(BCCHG)` (The change file to be imported.)

```
EDIT       DBTLSP.SGOCSAMP(GOCCME) - 01.04              Columns 00001 00072
Command ===>                                               Scroll ===> CSR
****** *************************** Top of Data ****************************
000001 //ADMR7D JOB ,'DB2 UTILITY',
000002 //         REGION=0M,NOTIFY=ADMR7,
000003 //         MSGCLASS=X,CLASS=A
000004 //*
000005 /*JOBPARM SYSAFF=SC63
000006 //LSCLIBS JCLLIB ORDER=DBTLSP.ADB.PROCLIB
000007 //*
000008 //GOCCM    EXEC GOCCM,SSID=DB0A,PLAN=ADB
000009 //GOCCM.PARMS DD *
000010 action_import_change = 'Y'
000011 use_mask_for_import_change = 'Y'
000012 action_analyze_change = 'N'
000013 mask_name = 'DATA'
000014 mask_owner = 'ADMR7'
000015 change_name = 'BCCHG03_TA3'
000016 change_owner = 'ADMR7'
000017 /*
000018 //GOCCM.IMCHG001 DD DISP=SHR,DSN=ADMR7.EXPORTED.CHANGES(BCCHG)
000019 /*
****** *************************** Bottom of Data **************************
```

Figure 11-76   Import a Change using CM Batch

The imported change is stored in the Change Management Repository as a DEFINED change (Figure 11-77).

```
 ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 5 of 5
Command ===>                                                   Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                              Type     Status   Comment
          * *        *                                  *        *        *
--- -------- -------- ------------------------------> ------- -------- -------->
         29 ADMR7    BCCHG01-DA BC_PROJ                 FAST     COMPLETE ADD COLUM
         31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE   COMPLETE SAMPLE CH
         33 ADMR7    BCCHG03_DA PROMOTE DA TO TA       COMPARE DEFINED   GENERATE
         41 ADMR7    BCCHG03_TA2                       CHANGE   DEFINED
         42 ADMR7    BCCHG03_TA3                       CHANGE   DEFINED
****************************** END OF DB2 DATA ******************************
```

Figure 11-77   CM - Changes panel (ADB2C11)

The two changes that were just registered, BCCHG03_TA2 and BCCHG03_TA3, contain the same set of change statements. This was done to illustrate that either the ISPF panel interface or batch interface of change management can be used to register a change. Both changes are not needed, so cancel change BCCHG03_TA2 using the cancel change line command (CAN), as shown in Figure 11-78.

```
 ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 5 of 5
Command ===>                                                   Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                              Type     Status   Comment
          * *        *                                  *        *        *
--- -------- -------- ------------------------------> ------- -------- -------->
         29 ADMR7    BCCHG01-DA BC_PROJ                 FAST     COMPLETE ADD COLUM
         31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE   COMPLETE SAMPLE CH
         33 ADMR7    BCCHG03_DA PROMOTE DA TO TA       COMPARE DEFINED   GENERATE
         41 ADMR7    BCCHG03_TA2                       CHANGE   CANCELED
         42 ADMR7    BCCHG03_TA3                       CHANGE   DEFINED
****************************** END OF DB2 DATA ******************************
```

Figure 11-78   Cancel change BCCHG03_TA2

The list of statements (Figure 11-79) were imported. These statements are displayed by issuing the **ST** (statements) line command next to ID 42, BCCHG03_TA3 change. The bottom of the list shows that the change for BC_PROJ (Scenario 1) has been included. Also note that the schema and database names were changed, through the use of masking, to BCD076TA, the test environment.

```
ADB2C1S n ------------- CM - Change Statements ------------- Row 1 to 30 of 30
Command ===>                                              Scroll ===> PAGE

Change statements for change "ADMR7"."BCCHG03_TA3"
Commands: VIEW
Line commands:
 E - Edit  D - Delete  I - Insert  V - View

Sel    Sequence O  Qual      Name               Statement
                 *  *  *         *                  *
--- ----------- -- -------- ----------------- ------------------------------->

            1                                  SET CURRENT SCHEMA = 'ADMR7'
            2 TB BCD076TA BC_DEPARTMENT       ADMIN ALTER TABLE BCD076TA.BC_DE
            3 TB BCD076TA BC_EMPLOYEE         ADMIN ALTER TABLE BCD076TA.BC_EM
            4 TB BCD076TA BC_EMPLOYEE         ADMIN ALTER TABLE BCD076TA.BC_EM
            5 TB BCD076TA BC_EMPLOYEE         ADMIN ALTER TABLE BCD076TA.BC_EM
            6 VW BCD076TA BC_VSTAFAC2         ADMIN DROP VIEW BCD076TA.BC_VSTA
            7                                  SET CURRENT SCHEMA = 'BCD076TA'
            8                                  SET CURRENT PATH = "SYSIBM", "SY
            9 VW BCD076TA BC_VSTAFAC2         CREATE VIEW BCD076TA.BC_VSTAFAC2
           11 VW BCD076TA BC_VPROJRE1         ADMIN DROP VIEW BCD076TA.BC_VPRO
           12                                  SET CURRENT SCHEMA = 'BCD076TA'
           13                                  SET CURRENT PATH = "SYSIBM", "SY
           14 VW BCD076TA BC_VPROJRE1         CREATE VIEW BCD076TA.BC_VPROJRE1
           16 VW BCD076TA BC_VPHONE           ADMIN DROP VIEW BCD076TA.BC_VPHO
           17                                  SET CURRENT SCHEMA = 'BCD076TA'
           18                                  SET CURRENT PATH = "SYSIBM", "SY
           19 VW BCD076TA BC_VPHONE           CREATE VIEW BCD076TA.BC_VPHONE(L
           21 VW BCD076TA BC_VEMPDPT1         ADMIN DROP VIEW BCD076TA.BC_VEMP
           22                                  SET CURRENT SCHEMA = 'BCD076TA'
           23                                  SET CURRENT PATH = "SYSIBM", "SY
           24 VW BCD076TA BC_VEMPDPT1         CREATE VIEW BCD076TA.BC_VEMPDPT1
           26 VW BCD076TA BC_VEMP             ADMIN DROP VIEW BCD076TA.BC_VEMP
           27                                  SET CURRENT SCHEMA = 'BCD076TA'
           28                                  SET CURRENT PATH = "SYSIBM", "SY
           29 VW BCD076TA BC_VEMP             CREATE VIEW BCD076TA.BC_VEMP AS
           31 VW BCD076TA BC_VDEPMG1          ADMIN DROP VIEW BCD076TA.BC_VDEP
           32                                  SET CURRENT SCHEMA = 'BCD076TA'
           33                                  SET CURRENT PATH = "SYSIBM", "SY
           34 VW BCD076TA BC_VDEPMG1          CREATE VIEW BCD076TA.BC_VDEPMG1(
           36 TB BCD076TA BC_PROJ            ALTER TABLE BCD076TA.BC_PROJ ..
******************************* END OF DB2 DATA *******************************
```

Figure 11-79   CM - Change Statements panel (ADB2C1S)

The change is now ready to be analyzed (AN) and then run (RN). The IMPORT process can be repeated for the other target environments.

11.4 Change Scenario 3: Recover a change

The Change Management Process can generate a recover change at the time of the analyze job. It is an option on the Generate Analyze Job panel (ADB2C11A), shown in Figure 11-80.

```
ADB2C11A  ----------------- Generate Analyze Job  ---------------------- 15:10
Command ===>

 Specify the following for Analyze:
                                                              More:    +
 Base version method . . . . : A        (Auto, User, or Existing)


 Change reporting options  . . YES      (Yes/No)


 Required data set information:
   PDS for WSL . . . . . . . . DBOA.ANALYZE.WSL
   PDS for jobs  . . . . . . . DBOA.ANALYZE.JCL
   Prefix for data sets  . . . ADMR7

 Options:
   Run SQLID . . . . . . . . .            (Blank, a SQLID, or <NONE>)
   Validate WSL  . . . . . . : NO         (Yes/No)
   Use utility options . . . . NO         (Yes/No)
   Generate templates  . . . . NO         (Yes/No)
   Build JCL to run WSL  . . . NO         (Yes/No)
   Generate a recover change . YES        (Yes/No)
     Data to recover . . . . . E          (Original or Existing)
```

Figure 11-80   Generate Analyze Job panel (ADB2C11A): Recover Change

You have an option to specify the data to recover: original or existing.

► Original means that the data stored in the tables before the change is applied. This only pertains to those objects that would have to be dropped and re-created as a result of the change. Relational integrity is not included.

► Existing means that the data values that were reloaded with the change will be used.

Recover is a named change. The comment is automatically inserted on the CM - Register Options panel (ADB2C11). See Figure 11-81.

```
ADB2CRO n -------------------- CM - Register Options -------------------- 15:21
Option ===>


Commands: CONTINUE                                      DB2 System: DBOA
                                                        DB2 SQL ID: ADMR7
Specify the following values to register a change:


Owner . . . . . . . . ADMR7    >  (Optional, default is ADMR7)
Name  . . . . . . . . BCRECO3_TA                                          >
Comment . . . . . . . RECOVER CHANGE FOR CHANGE ID 42                     >
Change Type . . . . : RECOVER  (Promote, Change, Compare, Recover, Fast)


Specify the owner and name values to use for this change (? to lookup):
                      Owner        Name
Ignore  . . . . . . .           >                                   >
Mask  . . . . . . . .           >                                   >
Delta Version . . . .           >                                   >
```

Figure 11-81   CM - Register Options panel (ADB2CR0): Recover Change

Analyze is a batch job. Submit the generated JCL to do the analyze job. If analyzing finishes normally, the change itself will have a status of ANALYZED, and the recover change will also have a status of ANALYZED and a type of RECOVER. This is shown in Figure 11-82.

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 6 of 6
Command ===>                                             Scroll ===> PAGE


Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands


Sel      ID Owner    Name                          Type    Status   Comment
         * *         *                             *       *        *
--- -------- -------- ------------------------------> ------- -------- -------->
        29 ADMR7    BCCHG01-DA BC_PROJ             FAST    COMPLETE ADD COLUM
        31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE  COMPLETE SAMPLE CH
        33 ADMR7    BCCHG03_DA PROMOTE DA TO TA    COMPARE DEFINED  GENERATE
        41 ADMR7    BCCHG03_TA2                    CHANGE  CANCELED
        42 ADMR7    BCCHG03_TA3                    CHANGE  ANALYZED
        63 ADMR7    BCRECO3_TA                     RECOVER ANALYZED RECOVER C
****************************** END OF DB2 DATA ******************************
```

Figure 11-82   CM - Changes panel (ADB2C11): Imported change is now ANALYZED with a RECOVER change also in an ANALYZE status

To view a complementary recover change, enter the **RE** line command next to the name of the change, as shown in Figure 11-83.

```
ADB2C11 n ------------------ CM - Changes ------------------ Row 1 to 12 of 12
Command ===>                                                Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                                 Type    Status   Comment
           * *        *                                    *       *        *
--- -------- -------- ------------------------------> ------- -------- -------->
          1 ADMR7    BCCHG1-DA CREATE TABLE SPACE    FAST    COMPLETE CREATE BC
         22 ADMR7    BCCHG1-DA BC_PROJ               FAST    COMPLETE ADD PROJ_
         24 ADMR7    BCCHG-2DA BC_EMPLOYEE BC_DEPAR CHANGE  COMPLETE CHANGE RE
         28 ADMR7    DROP BCD076DA                   FAST    COMPLETE
         29 ADMR7    BCCHG01-DA BC_PROJ              FAST    COMPLETE ADD COLUM
         31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE  COMPLETE SAMPLE CH
         33 ADMR7    BCCHG03_DA PROMOTE DA TO TA     COMPARE DEFINED  GENERATE
         41 ADMR7    BCCHG03_TA2                     CHANGE  CANCELED
RE       42 ADMR7    BCCHG03_TA3                     CHANGE  COMPLETE
         61 ADMR7    OCM TEST                        CHANGE  COMPLETE
         62 ADMR7    BCCHG14_UA                      CHANGE  COMPLETE
         63 ADMR7    BCRECO3_TA                      RECOVER ANALYZED RECOVER C
****************************** END OF DB2 DATA ******************************
```

Figure 11-83   CM - Changes (ADB2C11): Using the RE line command

The associated recovery change is displayed (Figure 11-84).

```
ADB2C11 n ------------------ CM - Changes -------------------- Row 1 to 1 of 1
Command ===>                                                Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                                 Type    Status   Comment
           * *        *                                    *       *        *
--- -------- -------- ------------------------------ ------- -------- -------->
         63 ADMR7    BCRECO3_TA                      RECOVER ANALYZED RECOVER C
****************************** END OF DB2 DATA ******************************
```

Figure 11-84   CM - Changes panel (ADB2C11): Results of the RE command

Issue the **OR** line command next to the recover change to locate the associated original change (Figure 11-85).

```
ADB2C11 n ------------------ CM - Changes ------------------ Row 1 to 12 of 12
Command ===>                                              Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                                Type     Status    Comment
          *  *        *                                   *        *         *
--- -------- -------- -----------------------------> ------- -------- -------->
          1 ADMR7    BCCHG1-DA CREATE TABLE SPACE    FAST     COMPLETE CREATE BC
         22 ADMR7    BCCHG1-DA BC_PROJ               FAST     COMPLETE ADD PROJ_
         24 ADMR7    BCCHG-2DA BC_EMPLOYEE BC_DEPAR CHANGE   COMPLETE CHANGE RE
         28 ADMR7    DROP BCD076DA                  FAST     COMPLETE
         29 ADMR7    BCCHG01-DA BC_PROJ             FAST     COMPLETE ADD COLUM
         31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE   COMPLETE SAMPLE CH
         33 ADMR7    BCCHG03_DA PROMOTE DA TO TA    COMPARE  DEFINED  GENERATE
         41 ADMR7    BCCHG03_TA2                    CHANGE   CANCELED
         42 ADMR7    BCCHG03_TA3                    CHANGE   COMPLETE
         61 ADMR7    OCM TEST                       CHANGE   COMPLETE
         62 ADMR7    BCCHG14_UA                     CHANGE   COMPLETE
OR       63 ADMR7    BCRECO3_TA                     RECOVER  ANALYZED RECOVER C
****************************** END OF DB2 DATA ******************************
```

Figure 11-85   CM Changes panel (ADB2C11): OR line command to locate original change

The original change is displayed as a result (Figure 11-86).

```
ADB2C11 n ------------------ CM - Changes ------------------- Row 1 to 1 of 1
Command ===>                                              Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                              Type     Status    Comment
          *  *        *                                 *        *         *
--- -------- -------- ------------------------------ ------- -------- ---------
         42 ADMR7    BCCHG03_TA3                    CHANGE   COMPLETE
****************************** END OF DB2 DATA ******************************
```

Figure 11-86   CM - Changes panel (ADB2C11): OR results

The recover change is ready to run because it is created with an ANALYZED status. To recover a change, the original change must have successfully completed. To run the recover, enter RC next to the original change (not the recover change). See Figure 11-87.

```
ADB2C11 n ------------------ CM - Changes ------------------ Row 1 to 12 of 12
Command ===>                                                 Scroll ===> PAGE

Line commands:
 U - Update  AN - Analyze  RN - Run  VE - Versions  ST - Statements
 PQ - Prerequisites  IG - Ignores  MA - Masks  S - Show WSL  B - Checkpoint
 ? - Show all line commands

Sel       ID Owner    Name                             Type    Status   Comment
          *  *        *                                *       *        *
--- -------- -------- ------------------------------> ------- -------- -------->
          1 ADMR7    BCCHG1-DA CREATE TABLE SPACE  FAST    COMPLETE CREATE BC
         22 ADMR7    BCCHG1-DA BC_PROJ                FAST    COMPLETE ADD PROJ_
         24 ADMR7    BCCHG-2DA BC_EMPLOYEE BC_DEPAR CHANGE  COMPLETE CHANGE RE
         28 ADMR7    DROP BCD076DA                    FAST    COMPLETE
         29 ADMR7    BCCHG01-DA BC_PROJ               FAST    COMPLETE ADD COLUM
         31 ADMR7    BCCHG02-DA BC_EMPLOYEE BC_DEPA CHANGE  COMPLETE SAMPLE CH
         33 ADMR7    BCCHG03_DA PROMOTE DA TO TA    COMPARE DEFINED  GENERATE
         41 ADMR7    BCCHG03_TA2                      CHANGE  CANCELED
RC       42 ADMR7    BCCHG03_TA3                      CHANGE  COMPLETE
         61 ADMR7    OCM TEST                         CHANGE  COMPLETE
         62 ADMR7    BCCHG14_UA                       CHANGE  COMPLETE
         63 ADMR7    BCRECO3_TA                       RECOVER ANALYZED RECOVER C
****************************** END OF DB2 DATA ******************************
```

Figure 11-87   CM - Changes panel (ADB2C11): RC line command to run a recover change

Submit the generated JCL to back out the change. Notice the message at the bottom of Figure 11-88.

```
ADB2UE in -------------- Edit Generated JCL -------------- Columns 00001 00072
Command ===>                                              Scroll ===> CSR

****** *************************** Top of Data ****************************
==MSG> -Warning- The UNDO command is not available until you change
==MSG>           your edit profile using the command RECOVERY ON.
000001 //ADMR7D JOB ,'DB2 UTILITY',
000002 //*         RESTART=STEPNAME, <== FOR RESTART REMOVE * AND ENTER STEP NAME
000003 //           REGION=0M,NOTIFY=ADMR7,
000004 //           MSGCLASS=X,CLASS=A
000005 //*
000006 /*JOBPARM SYSAFF=SC63
000007 //*
000008 //**********************************************************************
000009 //* DB2 ADMINISTRATION TOOL GENERATED JOB
000010 //*
000011 //* THIS IS A CHANGE MANAGEMENT RECOVER JOB FOR CHANGE ID 42.
000012 //*
000013 //* FOR RESTART:
000014 //*   IF THE JOB FAILS ON OR AFTER THE STEP TO RUN THE ADBTEP2 OR
000015 //*   ADBTEPA PROGRAM (E.G. WITH STEP NAME BEGINNING WITH DB2B),
000016 //*   RESUBMIT AT THE FAILING STEP.  OTHERWISE, RESUBMIT THE ENTIRE JOB.
000017 //*
000018 //* NOTE:
000019 //*   THE PENDING CHANGES ACTION PARAMETER (PCACT) IS BY DEFAULT SET TO
000020 //*   CANCEL.  THIS PREVENTS THE CHANGE FROM BEING RECOVERED WHEN THERE
000021 //*   ARE PENDING CHANGES THAT MODIFY THE SAME OR RELATED OBJECTS.  TO
000022 //*   RECOVER THIS CHANGE AND SET THE PENDING CHANGES, IF ANY, TO
000023 //*   DEFINED STATUS, SET THE PCACT PARAMETER TO SUPERSEDE BEFORE
000024 //*   SUBMITTING THE JOB (E.G. PCACT(SUPERSEDE)).
000025 //*
000026 //*******************************************************ADB2C11A**
000027 //*
000028 //**********************************************************************
ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssN
 The recover job can be submitted now.  The recover strategy has determined   e
 that there are no completed changes that have to be recovered first, and     e
 there are no pending changes that will be set to DEFINED status.             e
 Note: At runtime the recover strategy will be checked again.  The change     e
 will not be recovered if the recover strategy at runtime determines that the e
 change cannot be recovered at that time.                                     e
ssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssssM
000037 //         DD DISP=SHR,DSN=DBOAT.SDSNLOAD
```

Figure 11-88   Recover Change job stream

Non-managed versus managed summary

IBM change management solution offers two options for making changes: non-managed and managed. Table 11-4 compares the two.

Table 11-4   Non-managed versus managed changes summary

Action	Non-managed changes	Managed changes
Interface	ISPF	ISPF or Batch
		Require single or multiple steps: IMPORT, REGISTER, ANALYZE, RUN
		Optional steps: RECOVER, PROMOTE
Online schema evolution	Support non-intrusive (ALTER) and intrusive types of changes	Support non-intrusive (ALTER) and intrusive types of changes.
Specification of a change	AL, ALT, CREATE, DROP	AL, ALT, CREATE, or DROP using IMPORT or REGISTER changes into the Change Management Repository
	Compare DDL file to DB2 catalog - results in a WSL (APPLY) job	Compare DDL file to DB2 catalog results in a REGISTERED change
		Stack changes: add changes to existing registered change.
Propagation of a change	Repeat ISPF commands in each environment.	Repeat ISPF commands in each environment
	Compare source to target, generate APPLY jobs to cause the target to look like the source.	Compare source and target, register a change. Analyze and run the change.
		Compare source to target to produce a delta change file using IMPORT
		Compare base versions to produce a delta change file using IMPORT
		Export a change to create a delta change file using IMPORT
Recover a change	The ALT option, Perform recovery analysis, builds a recovery job to undo all of the intended changes.	Generate a recovery change to back out completed changes.
Auditing changes		Reports are available [a]

a. Optim Configuration Manager provides auditing for all subsystems in one location.

12

Using Optim Configuration Manager

This chapter covers several typical usage scenarios with Optim Configuration Manager.

The scenarios cover the following scenarios:

- ► Usage cases
- ► Defining location alias
- ► Server configuration changes
- ► Client configuration information and changes
- ► Managing applications
- ► Monitoring changes from the DB2 Administration Tool and the DB2 Object Comparison Tool

12.1 Usage cases

This chapter explores, in more detail, the process of using Optim Configuration Manager to manage clients and servers, and the integration with DB2 Administration Tool and DB2 Object Comparison Tool. This chapter describes how to run the use cases. Several principles of these use cases are described in Chapter 7, "InfoSphere Optim Configuration Manager" on page 109.

All cases start from the home page of Optim Configuration Manager (Figure 12-1)[1]. This menu is displayed after you log on to the Optim Configuration Manager server using the server address and port (default 12206) defined during the installation.
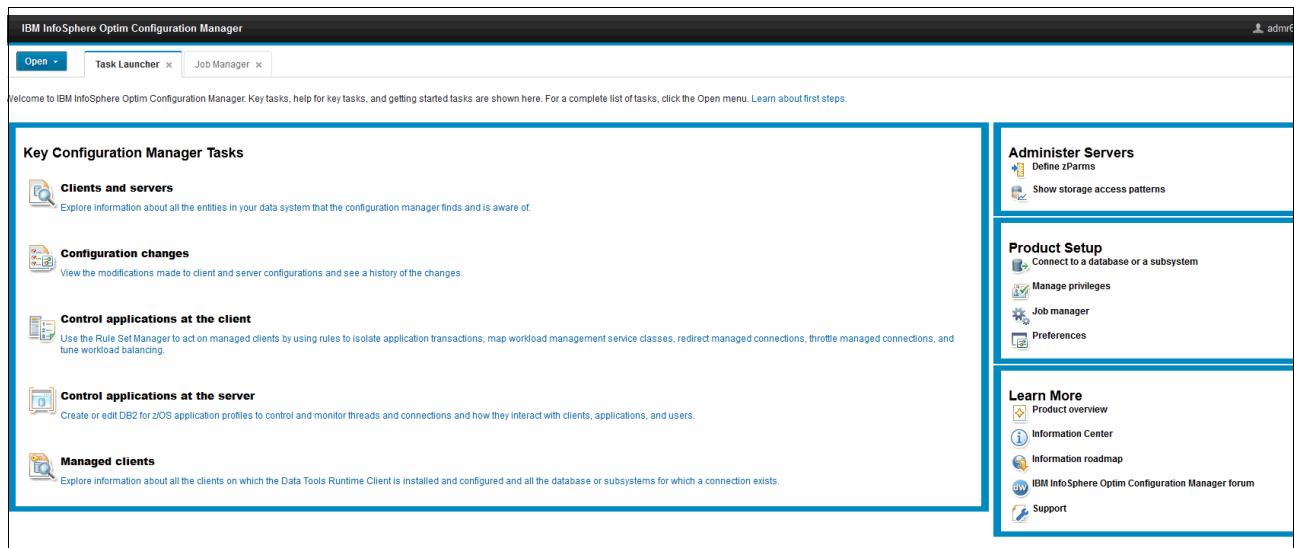
Figure 12-1   Optim Configuration Manager home page

12.2 Defining location alias

To start using Optim Configuration Manager against DB2 for z/OS or DB2 for Linux, UNIX, and Windows, first define a location alias to Optim Configuration Manager. This defines the parameters for connecting to DB2 and optionally validates that the DB2 setup is correct.

The first window presented is the current list of databases defined to Optim Configuration Manager (Figure 12-2 on page 241). To edit an existing location, click the **pencil** icon and to create a new icon, click the **plus** icon.

---

[1] Must zoom in to be able to read the fine print.
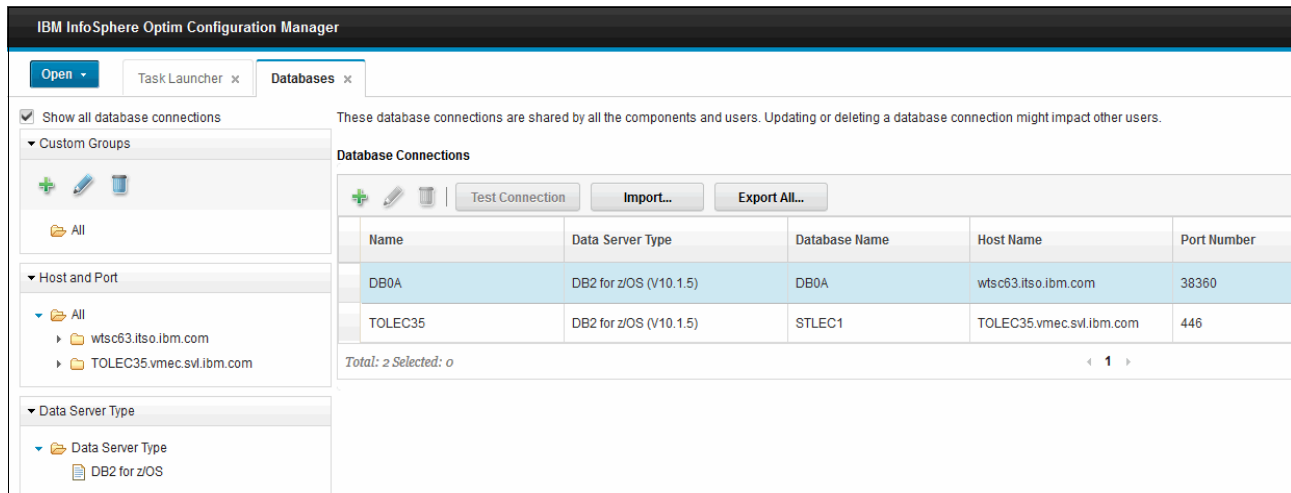
Figure 12-2   List of defined location aliases

The next window opens (Figure 12-3).

Figure 12-3   Defining location detail screen

After you define the subsystem details and test the connection to ensure that it works, run the validation procedure to ensure all required authorities and DB2 stored procedures are installed on your DB2 system. To do this select the **Configuration Manager** tab and, on that page, select the **Feature Validation** tab, and then click **Validate**. This runs a script, testing the environment; the first page of output of validation is shown in Figure 12-4. Subsequent pages are a continuation of catalog authorities.
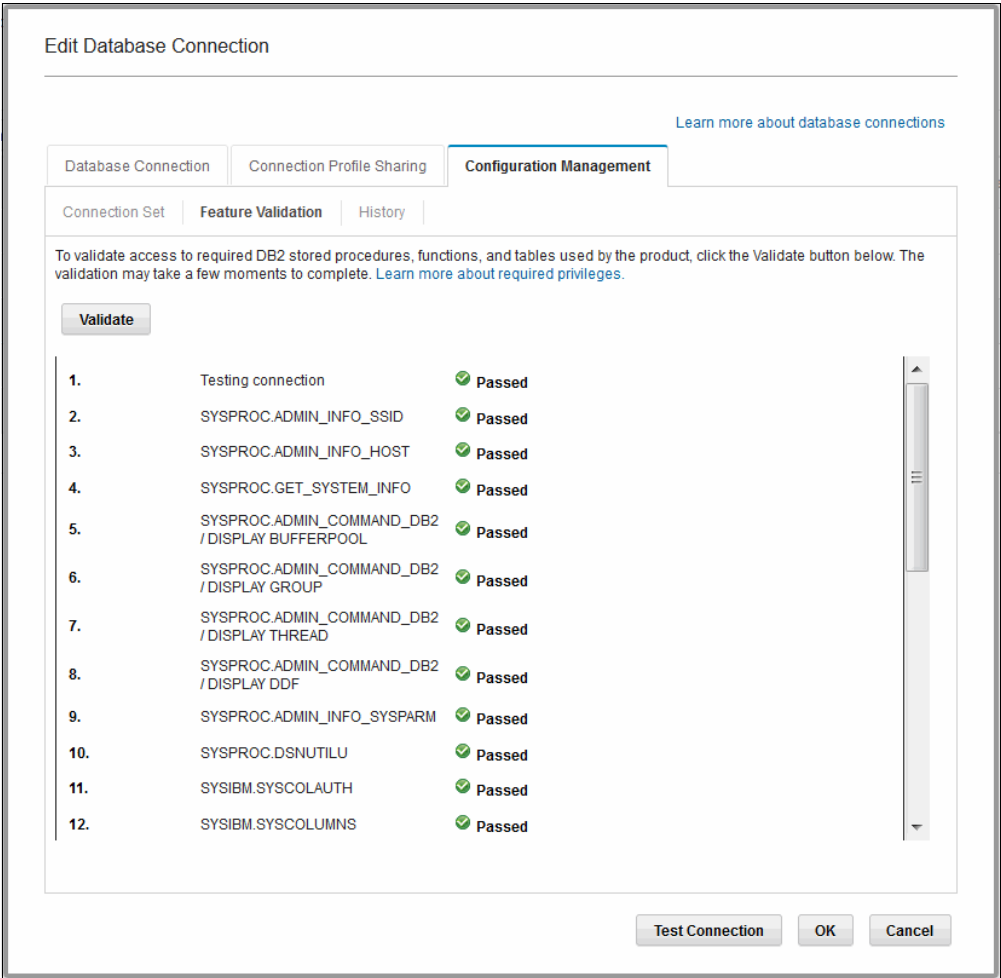
Figure 12-4   Validated Alias Report

If any failures occur, correct the faults and rerun the validate operation until it is successful.

After validation is completed, Optim Configuration Manager starts a background task to collect information about the objects defined within the catalog. It also sets up a job within Job Manager to collect subsequent snapshots of the data. This job can be scheduled to run at your convenience to collect the data. See Figure 12-5 on page 243.

Figure 12-5   Job List: Auto job definition

This job collects all attributes about DB2 objects, as shown in Figure 12-6. You might want to review this list and decide what attributes to collect; you might not want to collect authority attributes in a test system but you would in production.

Figure 12-6   Objects collected

For details about scheduling, see Chapter 7, "InfoSphere Optim Configuration Manager" on page 109.
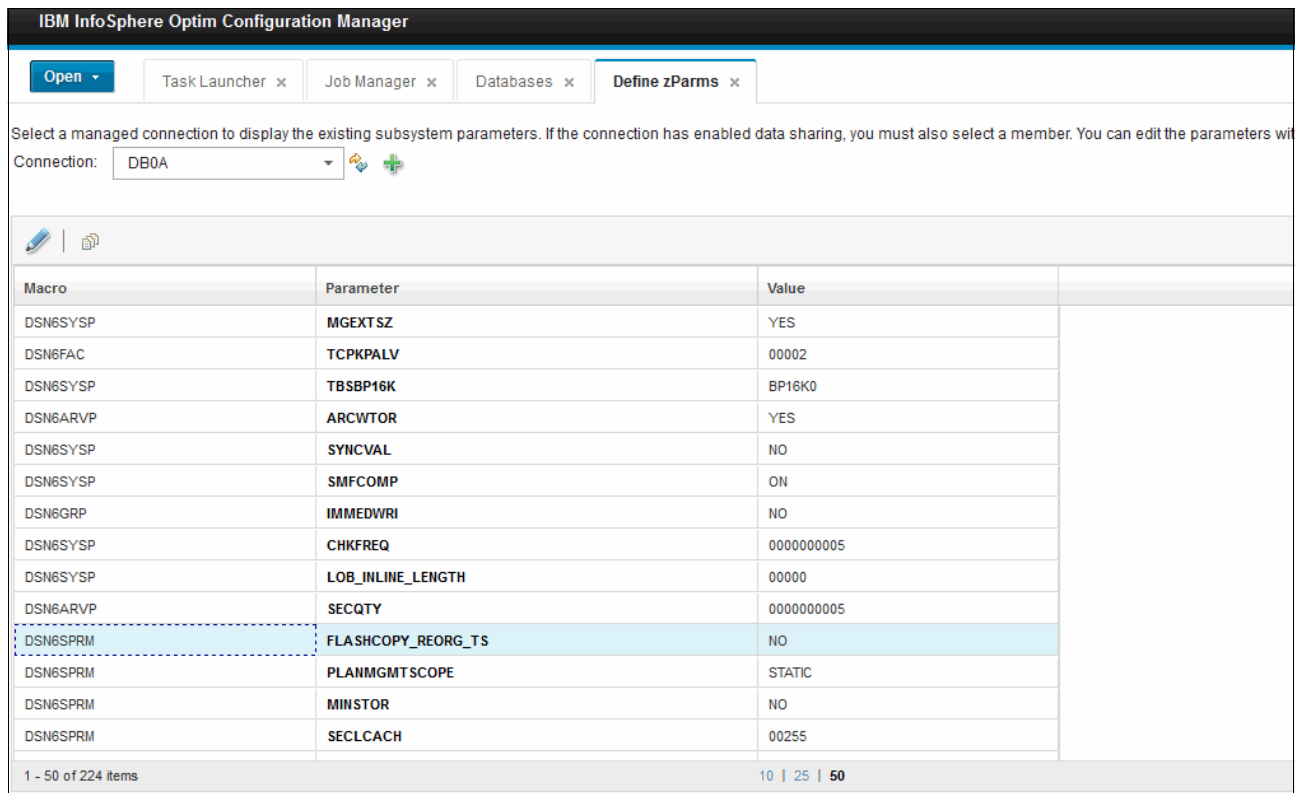
12.3 Server configuration changes

As you have seen, after you define a location alias, Optim Configuration Manager runs a background task to collect information about the objects within DB2. It also creates the auto job for subsequent running. This job collects further information to allow Optim Configuration Manager to track changes to your environment. You can set up your own job and run this on an ad hoc basis if you have a specific requirement.

12.3.1 Making changes

Within Optim Configuration Manager you are able to make changes to DB2 DSNZPARM values that can be updated online and Optim Configuration Manager displays the history of the changes to the DSNZPARMs. To make a change, select **Define ZPARMS** from the main menu, or select **OPEN** → **Define ZPARMS** from the drop-down menu.

The next window opens (Figure 12-7); it shows parameters that can be updated.
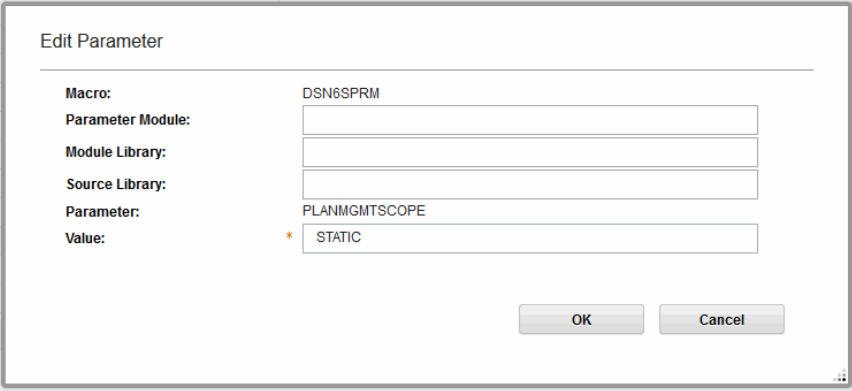
IBM InfoSphere Optim Configuration Manager

| Open ▾ | Task Launcher × | Job Manager × | Databases × | Define zParms × |

Select a managed connection to display the existing subsystem parameters. If the connection has enabled data sharing, you must also select a member. You can edit the parameters wit

Connection: DB0A ▾

Macro	Parameter	Value
DSN6SYSP	MGEXTSZ	YES
DSN6FAC	TCPKPALV	00002
DSN6SYSP	TBSBP16K	BP16K0
DSN6ARVP	ARCWTOR	YES
DSN6SYSP	SYNCVAL	NO
DSN6SYSP	SMFCOMP	ON
DSN6GRP	IMMEDWRI	NO
DSN6SYSP	CHKFREQ	0000000005
DSN6SYSP	LOB_INLINE_LENGTH	00000
DSN6ARVP	SECQTY	0000000005
DSN6SPRM	FLASHCOPY_REORG_TS	NO
DSN6SPRM	PLANMGMTSCOPE	STATIC
DSN6SPRM	MINSTOR	NO
DSN6SPRM	SECLCACH	00255

1 - 50 of 224 items   10 | 25 | **50**

Figure 12-7   Display ZPARMS

Select the parameter that you want to change and select **edit** (using the **pencil** icon). The Edit Parameter window opens (Figure 12-8). Complete the details and click **OK** to make the change.

Parameter	Value
MGEXTSZ	YES
TCPKPALV	00002
TBSBP16K	BP16K0
ARCWTOR	
SYNCVAL	
SMFCOMP	
IMMEDWRI	
CHKFREQ	
LOB_INLINE_LENGTH	
SECQTY	
FLASHCOPY_REORG_TS	
PLANMGMTSCOPE	
MINSTOR	
SECLCACH	

Edit Parameter

Macro:	DSN6SPRM
Parameter Module:	
Module Library:	
Source Library:	
Parameter:	PLANMGMTSCOPE
Value:	* STATIC

OK   Cancel

Figure 12-8   Changing DSNZPARM values

> **Note:** To use this feature, the DB2 stored procedure ADMIN_UPDATE_SYSPARM must be installed.
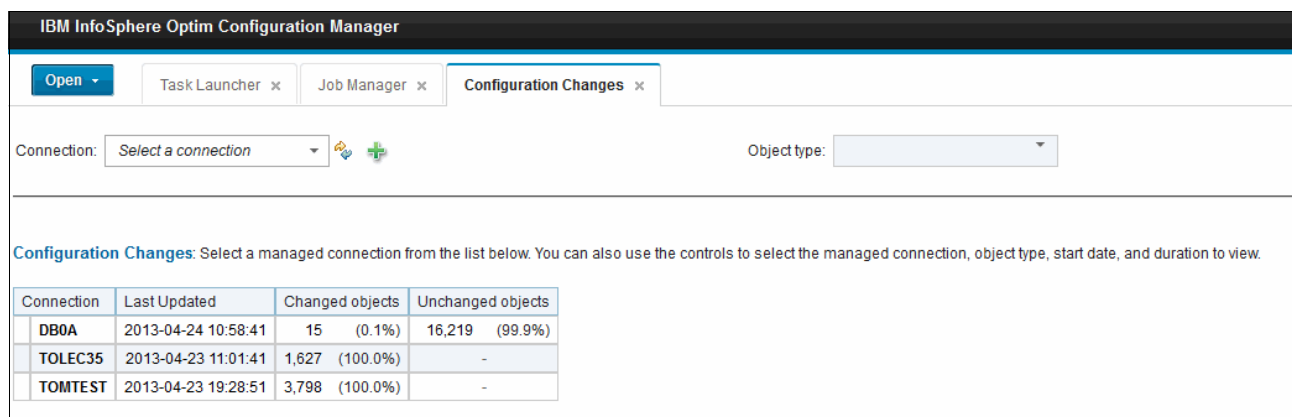
You can see the history of changes made to DSNZPARMS by selecting the parameter and then the **history** icon at the left side of the window. The current and historical values for the selected ZPARM are then displayed.

12.3.2 Identifying changes

Optim Configuration Manager can help you easily identify changes that have been made to the server, either in the last xx day or all changes that have been made. These changes include Object definitions, authorities, PTFs, WLM and DSNZPARMs among others. What is reported depends on the objects that you have selected to collect.

> **Note:** To collect details on PTFs and WLM you must be on Version 3.1

To look at changes made, select **OPEN** → **Configuration Changes**. The summary page opens, which shows all locations that have had object details collected (Figure 12-9). The 100% in the Changed objects column means all locations, because of the background job submitted when creating the connections.

Figure 12-9   Configuration summary of changes

To see changes for DB0A, click the **name**; the next level of detail is displayed (Figure 12-10).

Figure 12-10   Configuration detailed summary report

This report shows that 1,208 tables were created within this subsystem in the last 30 days, and that one was modified. Click the table row to see the details of those changes (Figure 12-11 on page 247)[2].

From this report, you can see that table ADMR6.BC_PROJ was created the latest timestamp for the time of creation, and modifications were made to BC_EMPLOYEE. For updates, we record the before-change and the after-change, with the changes highlighted. All fields on the report can be used for sorting and you can filter the report to only show changes that you are interested in.

---

[2] You must zoom in to be able to read the next several figures.

Figure 12-11   Configuration detailed table changes

A detailed report for packages is shown in Figure 12-12. The report shows that there are new versions of several packages and one package has been deleted; all changes are highlighted.

Figure 12-12   Configuration detailed package changes

Buffer pool changes can be tracked and all changes can be shown by selecting the buffer pool from the summary report. An example of the report is shown in Figure 12-13.

Customize filter
1-50 of 165

#	Type	Time stamp	BP NAME	ID	VP SIZE	VPSEQT	VPPSEQT	VPXPSEQT	DWQT	PCT VDWQT	ABS VDWQT	PGSTEAL	USE COUNT	PGFIX	AUTO SIZE
1	Modify	2013-05-07 17:28:20	BP8K0	100	1000	80	50	0	85	80	0	LRU	6	NO	NO
	New	2013-04-26 10:47:04											11		
2	Modify	2013-05-07 17:28:20	BP16K0	120	500	80	50	0	85	80	0	LRU	6	NO	NO
	New	2013-04-26 10:47:04											8		
3	Modify	2013-05-07 17:28:20	BP0	0	2000	80	50	0	85	80	0	LRU	167	NO	NO
	New	2013-04-26 10:47:04											192		
4	Modify	2013-04-26 11:05:48	BP8K0	100	1000	80	50	0	85	80	0	LRU	12	NO	NO
	New	2013-04-26 10:47:04											11		
5	Modify	2013-04-26 11:05:48	BP0	0	2000	80	50	0	85	80	0	LRU	194	NO	NO
	New	2013-04-26 10:47:04											192		
6	New	2013-04-26 10:47:04	BP9	9	0	80	50	0	30	5	0	LRU	0	NO	NO
7	New	2013-04-26 10:47:04	BP9	9	0	80	50	0	30	5	0	LRU	0	NO	NO
8	New	2013-04-26 10:47:04	BP8K9	109	0	80	50	0	30	5	0	LRU	0	NO	NO
9	New	2013-04-26 10:47:04	BP8K9	109	0	80	50	0	30	5	0	LRU	0	NO	NO
10	New	2013-04-26 10:47:04	BP8K8	108	0	80	50	0	30	5	0	LRU	0	NO	NO
11	New	2013-04-26 10:47:04	BP8K8	108	0	80	50	0	30	5	0	LRU	0	NO	NO
12	New	2013-04-26 10:47:04	BP8K7	107	0	80	50	0	30	5	0	LRU	0	NO	NO
13	New	2013-04-26 10:47:04	BP8K7	107	0	80	50	0	30	5	0	LRU	0	NO	NO

Figure 12-13   Buffer pool Changes Detail report

An example of DSNZPARM detailed report of changes is shown Figure 12-14.

Configuration Changes > z_v11_NFM > Object type ZPARM from 2013-05-07 for 30 days

Customize filter
1-50 of 668

#	Type	Time stamp	SUBSYSTEM NAME	MACRO	PARAMETER	INSTALL PANEL	INSTALL FIELD	INSTALL LOCATION	VALUE	ADDITIONAL INFO
1	Modify	2013-05-07 17:26:26	DB2A	DSN6SPRM	EDMPOOL	DSNTIPC	EDM LIMIT BELOW THE BAR	5	0000004100	ONLINE=Y
	New	2013-04-26 10:47:43							0000004200	
2	Modify	2013-05-07 17:26:26	DB2B	DSN6SPRM	EDMPOOL	DSNTIPC	EDM LIMIT BELOW THE BAR	5	0000004000	ONLINE=Y
	New	2013-04-26 10:47:43							0000004100	
3	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	IMPTKMOD				YES	ONLINE=Y
4	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	IMPDSSIZE				00004	ONLINE=Y
5	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	DPSEGSZ	DSNTIP71	DEFAULT PARTITION SEGSIZE	1	00032	ONLINE=Y
6	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	AUDITST	DSNTIPN	AUDIT TRACE	1	oooooooooooooooooooooooooooo	ONLINE=N
7	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	CONDBAT	DSNTIPE	MAX REMOTE CONNECTED	4	0000000064	ONLINE=Y
8	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	CTHREAD	DSNTIPE	MAX USERS	2	00030	ONLINE=Y
9	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	DLDFREQ	DSNTIPL1	LEVELID UPDATE FREQUENCY	10	ON	ONLINE=Y
10	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	PCLOSEN	DSNTIPL1	RO SWITCH CHKPTS	8	00005	ONLINE=Y
11	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	IDBACK	DSNTIPE	MAX BATCH CONNECT	6	00100	ONLINE=Y
12	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	IDFORE	DSNTIPE	MAX TSO CONNECT	5	00100	ONLINE=Y
13	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	CHKTYPE	DSNTIPL1	CHECKPOINT TYPE	1	SINGLE	ONLINE=Y
14	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	CHKFREQ	DSNTIPL1	RECORDS\CHECKPOINT	2	0000001000	ONLINE=Y
15	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	CHKLOGR	DSNTIPL1	RECORDS\CHECKPOINT	2	NOTUSED	ONLINE=Y
16	New	2013-04-26 10:47:43	DB2A	DSN6SYSP	CHKMINS	DSNTIPL1	MINUTES\CHECKPOINT	3	NOTUSED	ONLINE=Y

Figure 12-14   DSNZPARM changes detail report

Optim Configuration Manager V3.1 delivered additional functions to track Workload Manager (WLM) changes and the level of maintenance applied to a subsystem. An example of a report showing the program temporary fixes (PTFs) applied to a subsystem is shown Figure 12-15.

Customize filter
1-50 of 4,191

#	Type	Time stamp	SUBSYSTEM NAME	MODULE NAME	LINK MODULE NAME	PTF	APPLY DATE
1	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIRFNX	UK93919	2013-01-29
2	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNITDLE	UK93919	2013-01-29
3	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIZMOS	UK93919	2013-01-29
4	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIRSTR	UK93752	2013-01-24
5	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNICOFS	UK93726	2013-01-24
6	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIDIFS	UK93726	2013-01-24
7	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIETRV	UK93726	2013-01-24
8	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIIDIS	UK93726	2013-01-24
9	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIKDEF	UK93726	2013-01-24
10	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIREFS	UK93726	2013-01-24
11	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNIRLPG	UK93726	2013-01-24
12	New	2013-05-07 17:28:20	V91A	DSNIDM	DSNISRTI	UK93726	2013-01-24
13	New	2013-05-07 17:28:20	V91A	DSNUTILB	DSNUCBMT	UK93663	2013-01-22
14	New	2013-05-07 17:28:20	V91A	DSNUTILB	DSNUCBRT	UK93663	2013-01-22
15	New	2013-05-07 17:28:20	V91A	DSNYASCP	DSNYASTR	UK93944	2013-01-30
16	New	2013-05-07 17:28:20	V91A	DSNWAAP0	DSNWAAPI	UK93652	2013-01-19
17	New	2013-05-07 17:28:20	V91A	DSNWAAP0	DSNWACDF	UK93652	2013-01-19
18	New	2013-05-07 17:28:20	V91A	DSNVLEPL	DSNLDTI2	UK93642	2013-01-19
19	New	2013-05-07 17:28:20	V91A	DSN9PREP	DSN9SCNP	UK93652	2013-01-19
20	New	2013-05-07 17:28:20	V91A	DSNRLLM1	DSNRIT02	UK93712	2013-01-23
21	New	2013-05-07 17:28:20	V91A	DSNJL002	DSNJW007	UK93670	2013-01-22
22	New	2013-05-07 17:28:20	V91A	DSNJL002	DSNJW009	UK93670	2013-01-22

Figure 12-15   PTF detail report

12.4 Client configuration information and changes

The Optim Configuration Manager server contains information about clients connecting into DB2. This data is collected from two separate sources depending whether the client is a Recorded Client or a Managed Client. The types of clients are discussed in Chapter 7, "InfoSphere Optim Configuration Manager" on page 109. By using the Optim Configuration Manager GUI you can look at individual clients, compare two instances of a client, compare two different clients and query WebSphere Application Server statistics.

12.4.1 Displaying client information

To display client properties, you must first know whether you are looking for a Recorded Client or a Managed Client. Managed Clients are clients that have had the Data Tools Runtime Client (DTRC) deployed; these clients communicate with the Optim Configuration Manager server. Recorded Clients are captured through a DB2 `DISPLAY` command.

Recorded Clients

To see Recorded Clients, select **Open** → **Clients Servers**, and so on, and select the Recorded Clients tab. See Figure 12-16 on page 250.

Figure 12-16   Recorded Clients

Next, you can select a client and get the detail for that connection, as shown in Figure 12-17.

Figure 12-17   Recorded Client Detail

Managed Clients

With Managed Clients you can obtain more information than that shown for Recorded Clients, this information is collected in the Optim Configuration Manager repository and is collected through the DTRC installed on the client. Optim Configuration Manager contains information relating to the driver properties, the data source descriptors, and the client properties.

To access Managed Clients, select **Open** → **Managed Client**; the window shown in Figure 12-18 opens.

Figure 12-18   Managed Clients

Select the client for which you want to see details. We selected the client named **SalesApp Test 2 0**; details about that client are presented in the bottom half of the window.

The report has three sections:

► First is Properties (Figure 12-19). You can select the other tabs to expand the other property details.

Figure 12-19   Managed Client Properties

► Second is Driver Properties; details are shown in Figure 12-20.

Properties	Statistics		
Current Selection:	Set as source	Add Compare Job...	
► Data Source Descriptors			
▼ Driver Properties			
db2.jcc.ccsid1390Mapping			1
db2.jcc.ccsid1399Mapping			1
db2.jcc.ccsid930Mapping			1
db2.jcc.ccsid939Mapping			1
db2.jcc.ccsid943Mapping			1
db2.jcc.ccsid954Mapping			1
db2.jcc.charsetDecoderEncoder			1
db2.jcc.decimalRoundingMode			-2147483647
db2.jcc.dumpPool			0
db2.jcc.dumpPoolStatisticsOnSchedule			-1
db2.jcc.enableMultirowInsertSupport			0
db2.jcc.enableT2zosCallSPBundling			0
db2.jcc.enableT2zosLBF			0
db2.jcc.enableT2zosLBFSPResultSets			0
db2.jcc.maxConnCachedParamBufferSize			1048576
db2.jcc.maxRefreshInterval			30
db2.jcc.maxTransportObjectIdleTime			60
db2.jcc.maxTransportObjectWaitTime			31536000
db2.jcc.maxTransportObjects			2147483647
db2.jcc.minTransportObjects			0
db2.jcc.progressiveStreaming			0
db2.jcc.sqljToolsExit.JVMOnCompletion			true

Figure 12-20   Managed Client Driver Properties

► Third is Data Source Descriptors. A portion of the report is shown in Figure 12-21.

Properties	Statistics	
Current Selection:	Set as source	Add Compare Job...
▼ Data Source Descriptors		
DBANSIWARN		false
DBDATE		Y4MD-
DBPATH		.
DBTEMP		/tmp
DELIMIDENT		false
IFX_UPDDESC		1
LKNOTIFY		yes
LOCKDOWN		no
NODEFDAC		no
SUBQCACHESZ		10
activateDatabase		0
affinityFailbackInterval		0
allowNextOnExhaustedResultSet		0
allowNullResultSetForExecuteQuery		0
allowUnassignedParameters		0
atomicMultiRowInsert		0
blockingReadConnectionTimeout		0
charOutputSize		0
concurrentAccessResolution		0
connectNode		-1
connectionCloseWithInFlightTransaction		0
currentLockTimeout		-2147483647
currentQueryOptimization		-2147483647
currentRefreshAge		-9223372036854775807
cursorSensitivity		0
dataSourceName		Datasource TEST2 0
databaseName		SAMPLE
dateFormat		1

Figure 12-21   Managed Clients Data Source Descriptor Report

You can use Optim Configuration Manager to identify changes and compare two clients to each other. This helps to identify differences that might explain a variance in performance between two clients.

12.4.2 Identifying client changes

You previously identified the client that you want to work with and you must set it as your source client. Click **Set as source** (at the top in Figure 12-20 on page 252). This must be done whether you are comparing the same or different clients; it sets the starting point for either comparison. You can run them as "inline" comparisons or set up a scheduled job to run the comparison automatically.

Comparing the same client

After you select the source of the comparison, you can select the version of the client that you want to use as the target for the comparison, as shown in Figure 12-22.
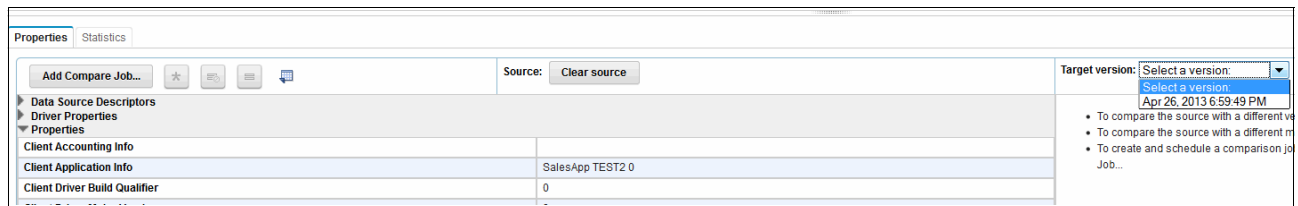
Figure 12-22   Comparing Same Managed Clients select target

When you select the version you want to use as the target, Optim Configuration Manager then compares the two versions. The window in Figure 12-23 opens.
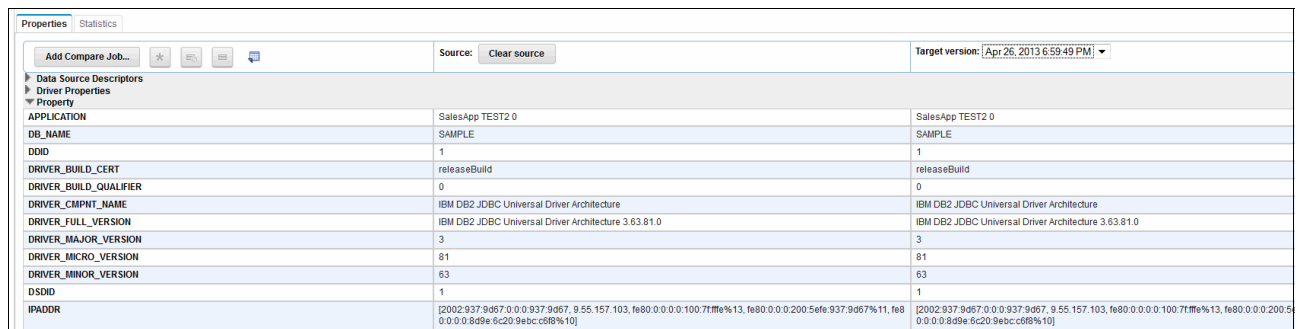
Figure 12-23   Same Managed Client comparison results

In this example, no differences exist between the two versions of the clients. If differences do exist, however, a set of buttons becomes available so you can filter the results to show the following information:

▶ All fields
▶ Only differences
▶ Only equal values

The full report can be exported from Optim Configuration Manager in CSV format to allow further processing. The full list of properties compared by Optim Configuration Manager is in Appendix A, "Optim Configuration Manager Comparison reports" on page 275.

Comparing different clients

Comparing different clients is similar to comparing Managed Clients, except that when you are selecting your target client for the comparison, you select a client from the list of clients in the top half of the screen.

Assume that you have selected the client, shown in Figure 12-24, as the source for your comparison.

Figure 12-24 Comparing different clients select source

To select a different client, instead of selecting a value from the drop-down list, you now select a client from the list of clients that are managed. As shown in Figure 12-25, the client with an ID of 100 is selected as the target client.

Figure 12-25 comparing different clients select target

After the comparison is completed, and the results are listed (Figure 12-26). As shown, there are differences between the two clients. Specifically, two differences exist in the data source descriptor and five exist within the clients properties, for example the client ID (1 and 100). All changes are highlighted in yellow.

Figure 12-26   Comparing different clients results

The buttons are now active. If you click the **Show only differences** button, the comparison output is reduced to the report shown in Figure 12-27.

Figure 12-27   Comparing different clients, showing only differences

12.4.3 Automatically scheduling client comparisons

The previous examples compare the clients or their versions online. You might want to run certain comparisons on a regular basis and for those you can set up comparison jobs within the Managed Client tab.

Assume that you want to set up the previous comparison as a regular job to be scheduled through the Optim Configuration Manager repository. After you select source and target clients, you can click **Add Compare Job** (Figure 12-28) to initiate the add conversation windows.

Figure 12-28   Add Compare Job

By selecting the "Add Compare" button the following conversation is started to guide you through setting up the Optim Configuration Manager batch job. The first screen to be shown is the job properties screen as shown in Figure 12-29.

Figure 12-29   Creating basic properties

The next window shows the source that you selected (Figure 12-30) and the version of the client that you want to use, in this case the latest. You can change this to a specific version, allowing you to have a "best practice" version of the client to which clients are compared against, ensuring that best options are still selected.

Figure 12-30   Source client properties

Next, choose the target client, or clients, that you want to compare against, as shown in Figure 12-31. On this Target tab, you can compare your source against one or more clients by selecting them from the list of available targets. In this case, you are comparing against only client 100, as in the previous example. You have the option to include or exclude client properties from the comparison (using the Include and Exclude tab), allowing you to ignore properties that you know will differ, for example the user associated with the client.

Figure 12-31   Target clients properties

The final tab on these configuration compare windows is the Options tab (Figure 12-32). On this tab, you configure the report output from the comparison. The **Show only differences** check box is selected, so the report will show only differences between the clients.

Figure 12-32   Compare job options

The configuration of the client is complete. You can now set up a schedule for the job execution. Assume that you require this job to run daily at midday. Figure 12-33 shows how to configure this schedule. This can also be added, or changed, through the Job List within the Job Manager pages.
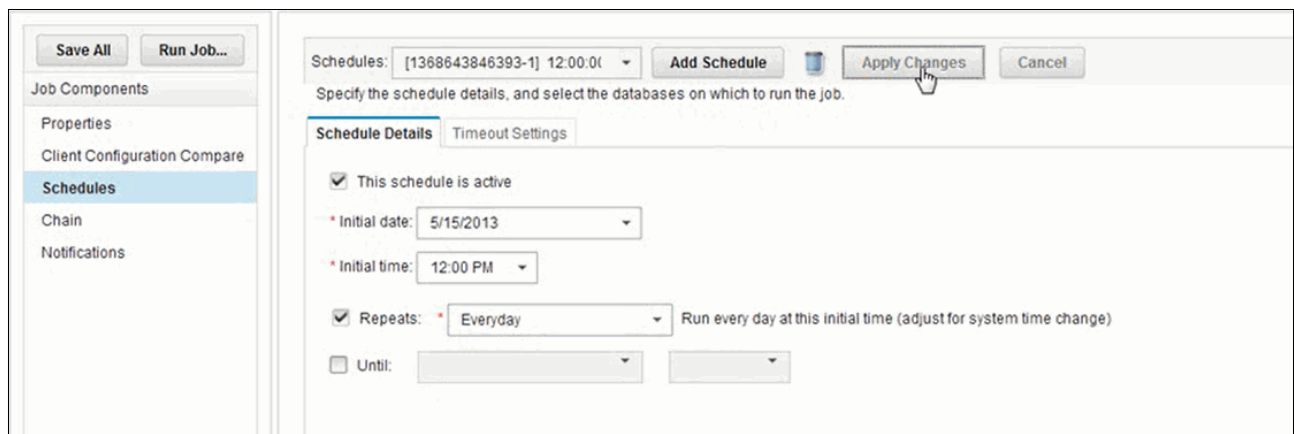
Figure 12-33   Compare job schedule options

With the other properties of the compare process, you can run other Optim Configuration Manager jobs, depending on results of the comparison, and whom to notify of the results.

After you finish defining the properties, save them to the Job List (Figure 12-34) for later processing, or you can run the job immediately.

Figure 12-34   Saving compare job

The client comparison job results are on the History tab of the Job Manager listing, as shown in Figure 12-35. In this case, the job succeeded with warnings. This job should run quickly because all the data is resident in the Optim Configuration Manager DB2 Repository. To view the results of the comparison, click **View log in browser** (Figure 12-35).

Figure 12-35   Job History

The summary report for the comparison opens (Figure 12-36 on page 260). It shows only the differences, as selected. The first managed connection is the source client and within the report details is one line for each target client selected. You can select to either view all the differences (through the Client Application Info column), or you can specifically choose any of the property columns to display those differences.

Figure 12-36 Compare Job Summary report

If all changes are selected, the report shown in Figure 12-37 is displayed, with details for the selected target.

Figure 12-37 Managed Client comparison report summary

From here you can select any values in the Object column to view the details of the differences found, which are shown in Figure 12-38.

Managed Clients Comparison Report Summary

Report Information

Job

Maximum Differences: Unlimited
Show only Differences: Yes

Managed Connections

	Client Application Info	WebSphere Server Name	ID	Host Name:Port	Name	Snapshot Version
Source:	SalesApp TEST2 0	WASStats	1	localhost:50000	SAMPLE	2013-05-15 11:51:14.236 (Latest)
Target:	SalesApp TEST2 0	WASStats	100	localhost:50000	SAMPLE	2013-05-15 11:51:14.236 (Latest)

Report Details

Common Properties

#	Property	Source Value	Target Value
1	DSDID	1	100
2	JDBC_DATASOURCE_NAME	Datasource TEST2 0	Datasource TEST2 86
3	WAS_JNDI_DATASOURCE_NAME	Datasource TEST2 0	Datasource TEST2 86

Datasource Properties

#	Property	Source Value	Target Value
1	dataSourceName	Datasource TEST2 0	Datasource TEST2 86
2	traceFile	jcctraceTEST20.txt	jcctraceTEST286.txt

Figure 12-38   Managed Client comparison detail report

This report is now produced on a regular basis as dictated by the schedule you set up.

12.4.4 Managed Clients and WebSphere Application Server

If the Managed Clients are connecting from a WebSphere Application Server, you can see the statistics for that client. To look at the statistics, first select a client, and then select the Statistics tab next to the Properties tab (Figure 12-39 on page 262). It lists the maximum Connection Pool Size for the period of one week. Other attributes of the Connection Pool can also be shown:

► Free Connections
► Requests for Connections
► Wait TIme for Connections

All attributes can be represented in a graph for average, minimum, and maximum values, either individually or separately.

If any problems are being displayed in the graph, for example excessive wait times for a connection, you can click **Configure the connection pool for this client** (Figure 12-39).
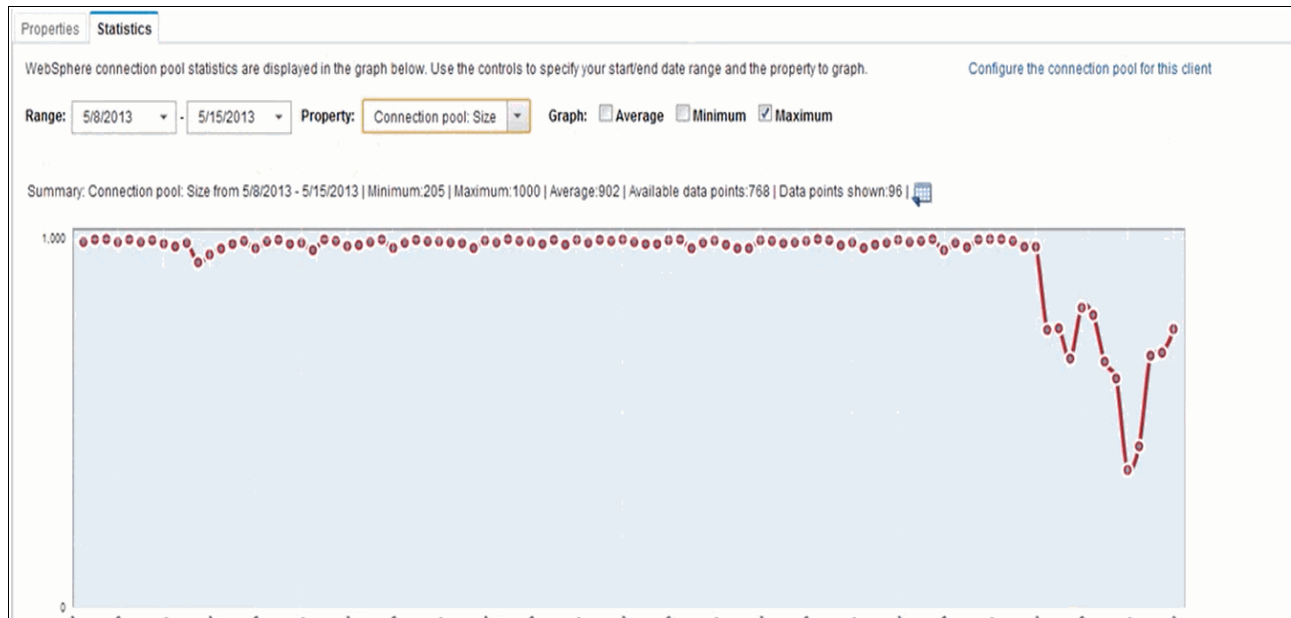
Figure 12-39   Managed Client WebSphere Application Server Statistics

Details of a particular data point on the graph are displayed when you hover the mouse over the data points (Figure 12-40). Raw data for the server is presented below the graph.
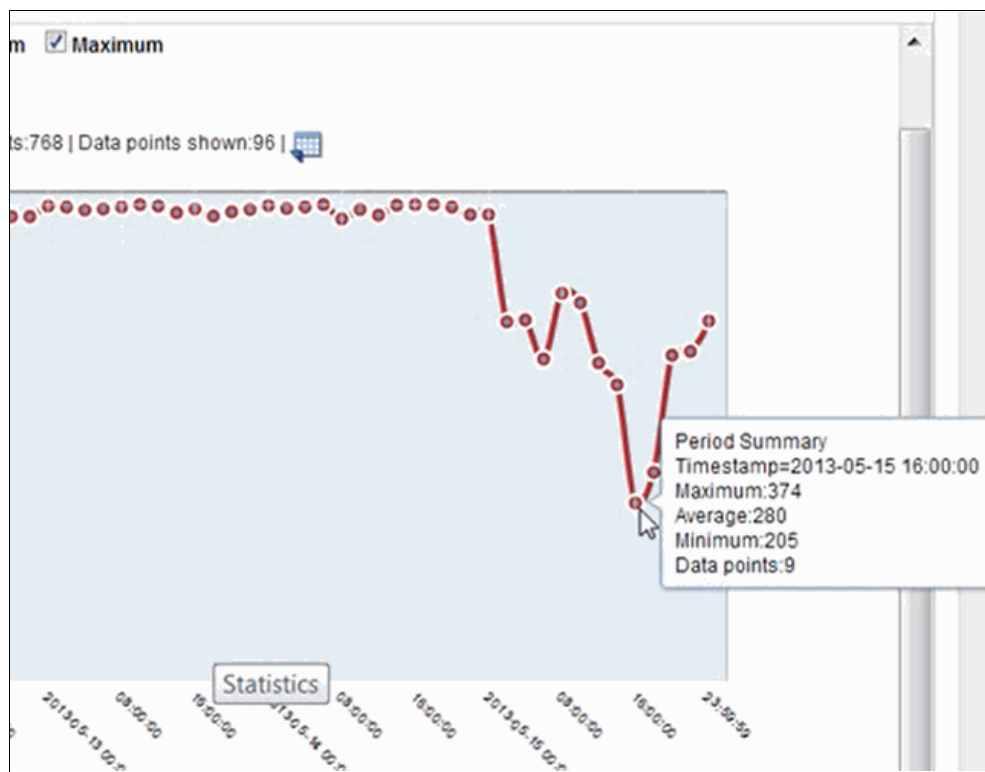
Figure 12-40   Managed Client WebSphere Application Server Data Point

12.5 Managing applications

With Optim Configuration Manager, application properties can be overridden without requiring changes to the application. You can configure properties pertaining to the following areas of the application:

► Application properties, such as schema name
► Driver properties, such as MaxTransportObjects
► WebSphere connection pool
► Redirection, such as database connection

By being able to override the properties, you can centrally and dynamically manage application behavior without requiring any application downtime or application changes. You can dynamically move workloads between servers to allow for maintenance or to isolate poorly behaving workloads and preserve SLAs.

To configure these properties you use rule sets to define rules so that when an application from a Managed Client connects to the Optim Configuration Manager Server, the properties are checked against any active rules. If a match is found, the properties within the client are overridden with what is specified in the rule set. Although there can be only one active rule set for a client at any one time, there can be multiple inactive rules. When creating new rules, do not deactivate any rule until the new one is ready for activation. Activating a new rule set for an application automatically deactivates the active rule set. You can have multiple rules within a rule set and all are checked when the decision is made of what properties to override.

12.5.1 Configuring Application Properties

To configure application properties, select the application that you want to affect from the Managed Clients list, and then click **Add Rule** (Figure 12-41).
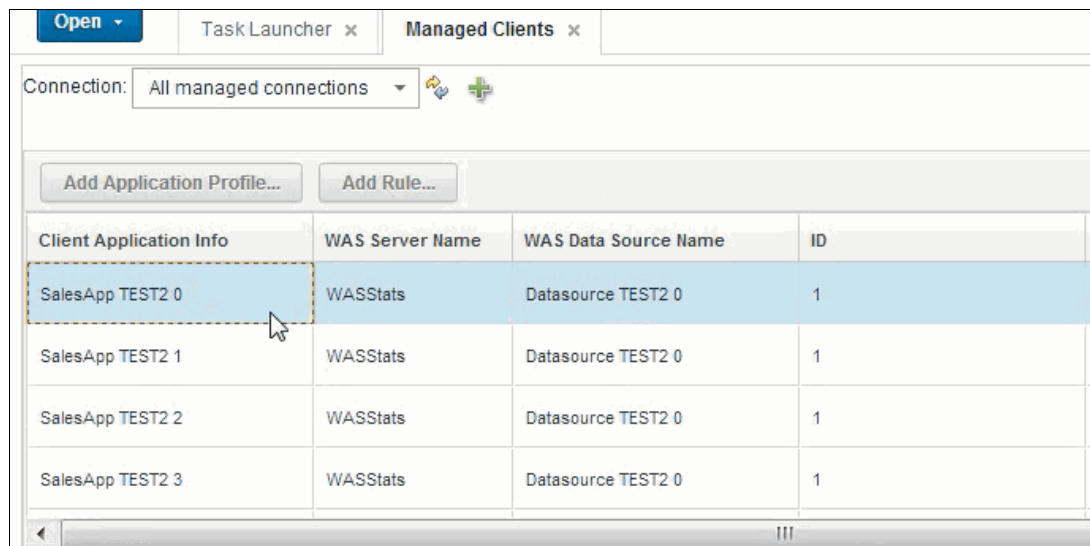
Figure 12-41   Configuring Application Properties

By starting the process from the Managed Client page, Optim Configuration Manager carries across information about the client and application that can be used to identify the application to override.

The Add Rule window opens (Figure 12-42). Select the action you want to take and name the rule set. In this case, you are overriding the Application Properties. Complete the required fields and click **OK**.
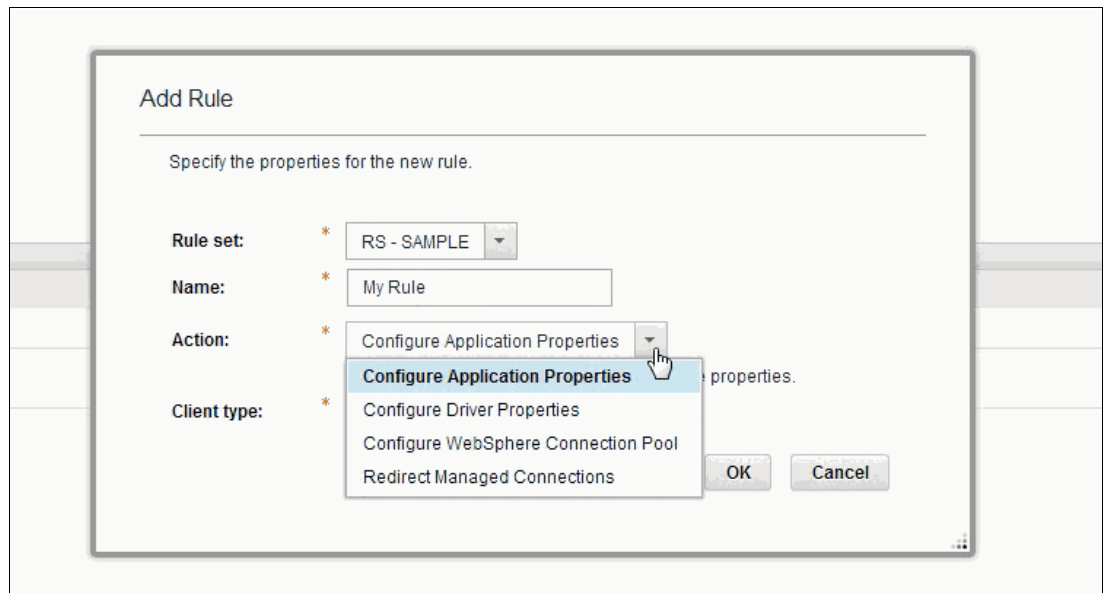
Figure 12-42   Configure Application Properties Add Rule

In the Conditions tab (Figure 12-43), specify the conditions that must be met before any properties are overwritten. The client properties are already completed with information from the Managed Clients page, but you can add more conditions if required.
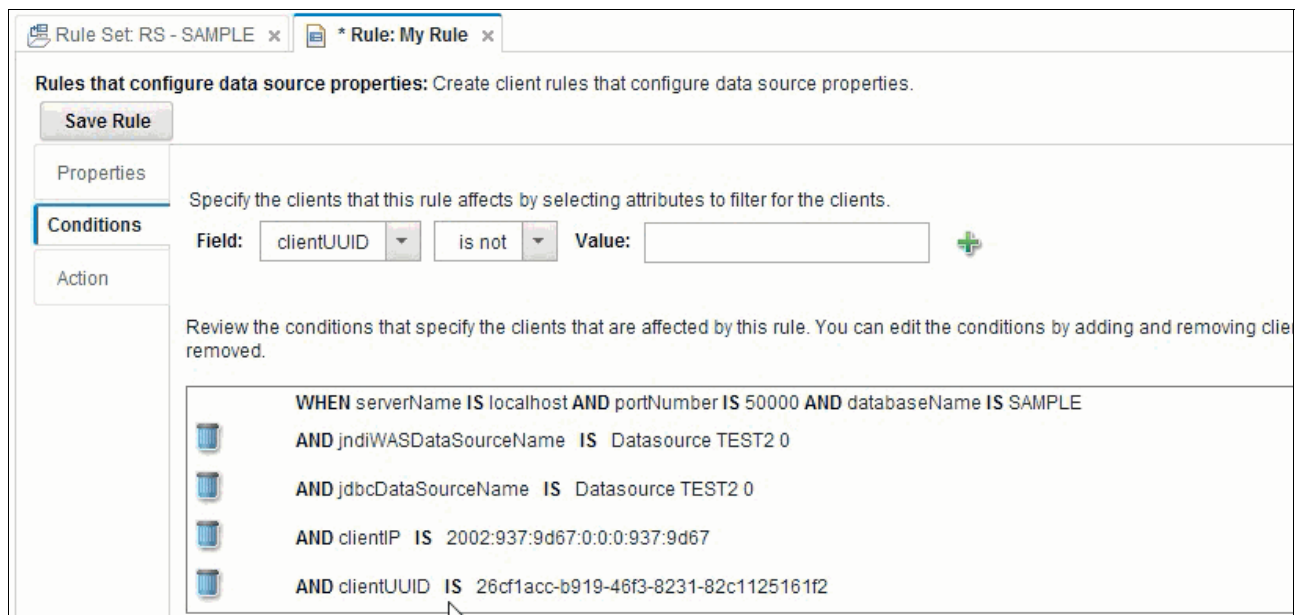
Figure 12-43   Configure application properties conditions

Define the actions that you want done for any application that meets the criteria specified on the Conditions tab. Figure 12-44 shows two actions: set the CURRENT SCHEMA register and set the maxTransportObjects to 50. Save this rule.

Figure 12-44   Configure Application Properties actions

The next page that is displayed (Figure 12-45) shows the defined rule. Note that this rule set is not activated and therefore does not affect any clients.

Figure 12-45   Configure Application Properties: Summary

To activate the rule set, select the rule set you want to activate and then click the **Activate** button when it is displayed. When the rule set is activated, the next time that this client connects, the CURRENT SCHEMA is changed to the one defined in the rule set (in this case THOMAS) and the maxTransportObjects is set to 50; the user is unaware that this is occurring.

After the set is activated, if you amend the rule set, we prefer to use the CLONE feature to clone the rule set and then amend that cloned rule set. If you do not want to do this, you must deactivate the rule set because you cannot edit an active rule set (for obvious reasons).

12.5.2 Configuring Driver Properties

Suppose that you now have a requirement to change several driver properties for clients. In this case, you want to change the value for minTransportObjects to 20 and maxTransportObjects to 50.

Combine this rule with the rule set defined for the application properties changes you defined previously:

1. Clone the rule set for the rule set you want to use. Without this step, you are not able to specify the active rule in the rule set name (shown in Figure 12-42 on page 264).

2. Select **Configure driver properties** from the drop-down list in the Add Rule window.

The Conditions tab opens (Figure 12-46). This is where you define the conditions to trigger the actions. As in the application properties window, the necessary fields to identify the client are already completed if you have selected the client from the Managed Client window, otherwise you must supply this information.

Figure 12-46   Configure Driver Properties Conditions

Define the changes you want to make to the client that matches the specified conditions. Select the Action tab (Figure 12-47). This is where you define the changes to make. In this case, set the minTransportObjects and maxTransportObjects. Although there is a completed list of the most regularly changed properties, if required you can specify other properties.
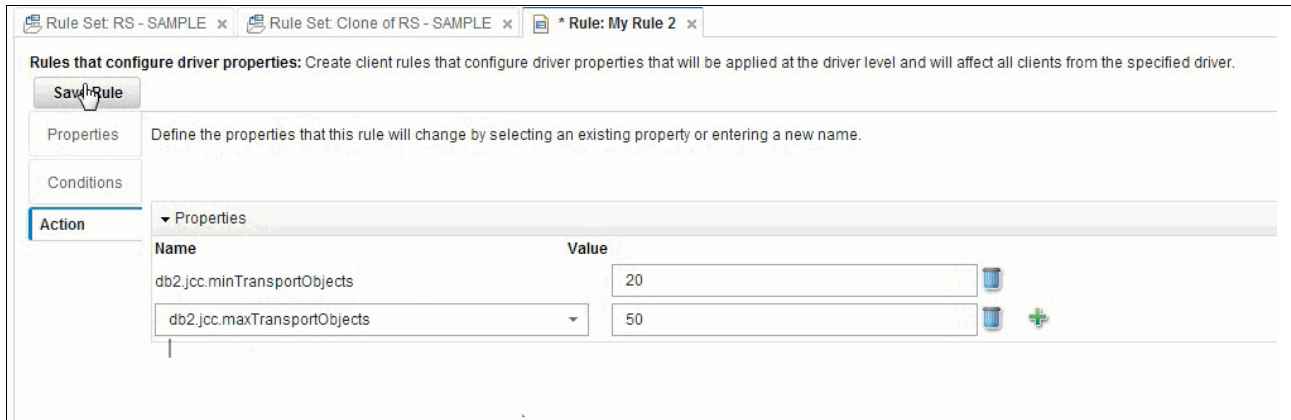
Figure 12-47   Configure Driver Properties: Actions

When complete, save the rule to the cloned rule set. This is not active until the rule set is activated.

12.5.3 Configuring WebSphere connection pool

The only property for the WebSphere Application Server connection pool that can be changed through the rule set is the MaxConnections value. Because of excessive wait times you decide to increase the number of connections to 200.

Again, start from Managed Clients to ensure that the client and server details are prefilled, as shown in Figure 12-48.
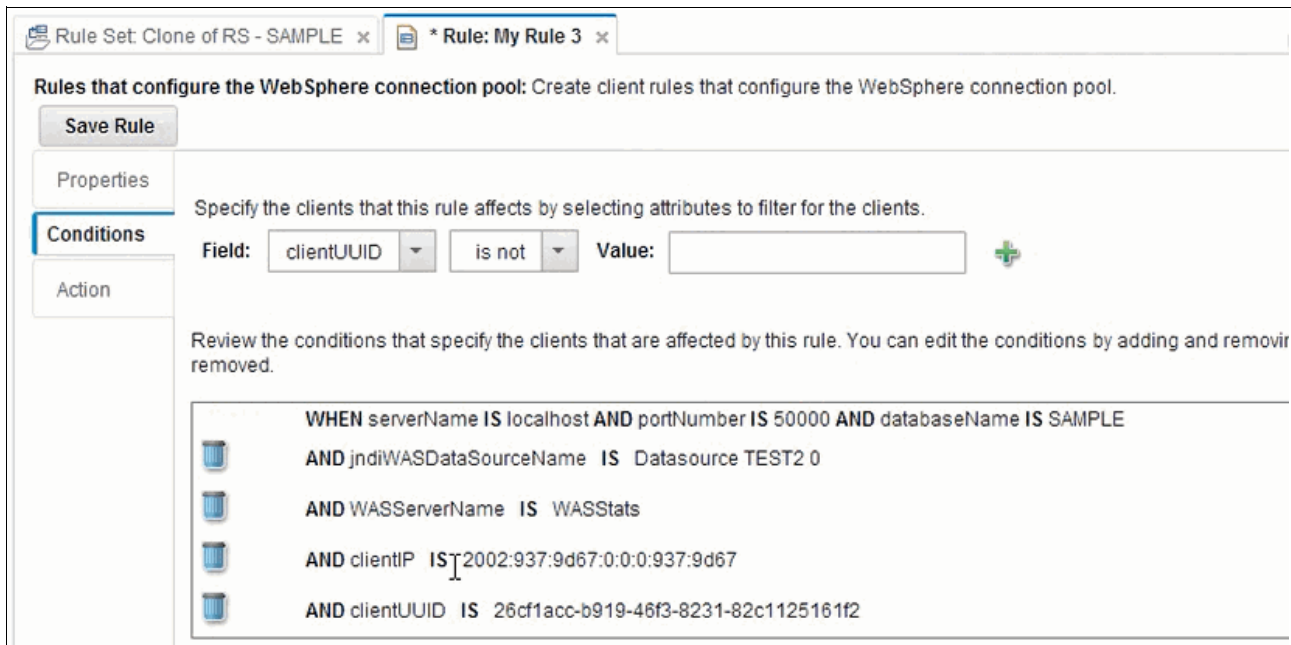
Figure 12-48   Configure WebSphere Application Server connection pool properties

On the Action tab, set the MaxConnections to 200, as shown in Figure 12-49.

Figure 12-49   Configure Was Connection Pool Properties: Actions

When complete, save the rule to the cloned rule set. Remember this is not yet active until the rule set is activated.

12.5.4 Redirecting Managed Clients

You can seamlessly direct clients to other servers so that maintenance can be done. The redirection is dynamic and takes place the next time the relevant connection is made, assuming the rule is activated.

The process for identifying the client to affect, for redirection, is similar the other property client identification. For example see Figure 12-48 on page 267.

After identifying the client, you identify the receiving server for the affected clients on the Action tab. In this example, the clients are redirected to a test DB2 subsystem. See Figure 12-50.
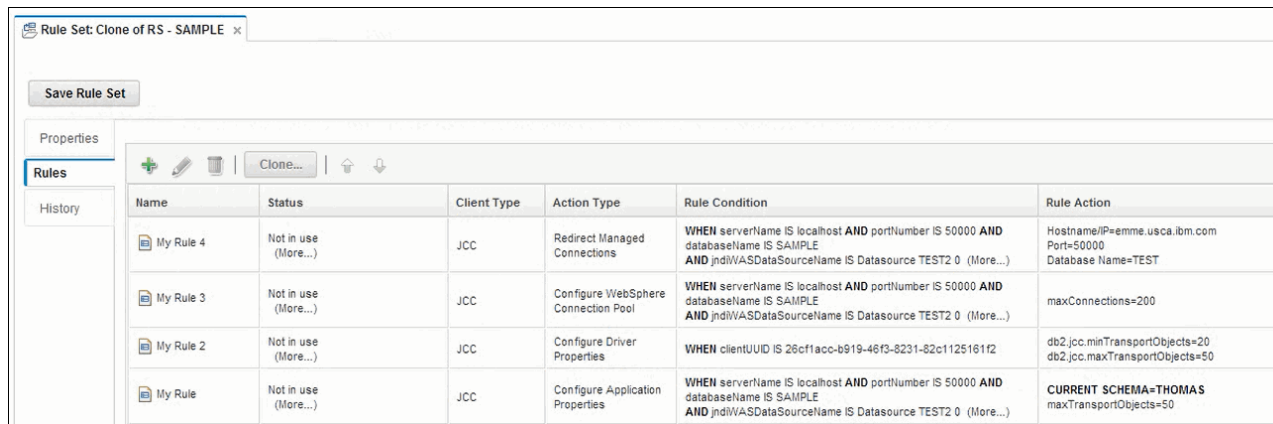
Figure 12-50   Redirect Managed Clients: Action

When activated, any client identified in the Conditions tab is automatically directed to the DB2 subsystem (as identified in Figure 12-50). This is done without affecting the user or the application.

12.5.5 Activating the rule set

The final rule set, covering all examples in this section, is shown in Figure 12-51.

Figure 12-51   Rule Set

> **Note:** In these examples, you added all the rules to one rule set for one client, one for each property type, which is probably not what you would normally do, but is shown here as examples of the process.

You now must activate the rule set for all changes to take effect. To do this, highlight the rule set you want to activate, and click **Activate** (Figure 12-52).

Figure 12-52   Activating the Rule Set

The Confirmation window opens (Figure 12-53). Confirm your action. All clients and applications matching the conditions are then affected by the actions defined in the rule set. If necessary, you can activate the old rule set by reversing the previous actions.
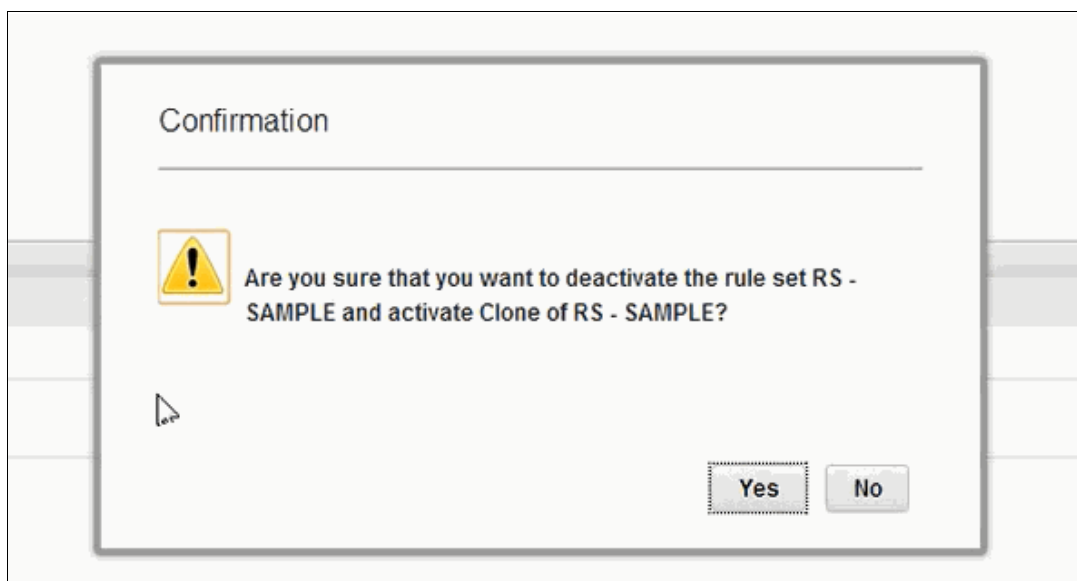
Figure 12-53   Activating the Rule Set: Confirmation

12.6 Monitoring changes from the DB2 Administration Tool and the DB2 Object Comparison Tool

Optim Configuration Manager integrates with changes made using the Change Management functionality that is provided with DB2 Administration Tool and DB2 Objet Comparison Tool. These tools have an interface that records changes directly into the Optim Configuration Manager repository. You can see and explore them through the DB2 Administration Tool Explorer within the Optim Configuration Manager interface, as shown in Figure 12-54 on page 271.

In the Optim Configuration Manager repository, changes to the following items can be recorded:

- ► Table spaces
- ► Tables
- ► Indexes
- ► Views

The initial window shows all changes that are recorded within the Optim Configuration Manager Repository.

Figure 12-54 DB2 Administration Tool Explorer

> **Notes:**
>
> ► To configure the Optim Configuration Manager interface, see Chapter 3, "Installing the DB2 Administration Solution Pack" on page 27.
>
> ► For information about using the Change Management features of DB2 Administration Tool and DB2 Object Comparison Tool, see Chapter 11, "Using DB2 Administration Tool and DB2 Object Comparison Tool" on page 169.

Column one represents the change ID (see Figure 12-55) that is generated within Change Management system. This change ID can be used to tie the change back to the changes generated by DB2 Administration Tool and DB2 Object Comparison Tool. The SQL statements that are executed for that change can be displayed by clicking the change ID that you want to view.

Figure 12-55 DB2 Administration Tool Explorer change ID

The detail of all changes within that change ID are displayed (Figure 12-56).

Figure 12-56   DB2 Administration Tool Explorer Change ID Details

From these details it is simple to see that the change ID added two columns to table TB01 with qualifier Optim Configuration ManagerTEST. Optim Configuration Manager does not capture how the changes were implemented, (for example, any utilities that had to be run to implement the changes), but does report on what changes were made to the object definitions.

The DB2 Administration Tool Explorer cross references to the Server Configuration changes window that is shown in Figure 12-9 on page 245. This allows you to jump between the two dialogs by selecting the icon to the left of the change row (Figure 12-57). In this figure you can see that the icon allows you to jump directly to DB2 Administration Tool Explorer and to automatically filter for the DSN9 connection.

Figure 12-57   Optim Configuration Manager Configuration Manager Link

The next window that opens (Figure 12-58) shows that a filter is applied to the Location column.

Figure 12-58   DB2 Administration Tool Explorer automatic filter

From the windows, shown in Figure 12-55 on page 271 and Figure 12-58, you can select the link icon and jump from DB2 Administration Tool Explorer to Configuration Manger for the specific location, to see all changes for that location.

Alternatively, you can select the change that you are interested in, see the changes that were made, and then use the link to jump to Configuration Manager and view all changes that were made to that specific object. See Figure 12-59. In this case, you see all changes for table TB01 with qualifier Optim Configuration ManagerTEST at the location.

Figure 12-59   DB2 Administration Tool Explorer automatic detail filter

You can select, at a line-item level, to allow further filtering of the link if there are multiple DB2 objects being changed within the same change ID.

In addition, links are available within the various levels of Configuration Manager, so you can jump directly to DB2 Administration Tool Explorer to see related changes. This feature is indicated by the link icon, in Figure 12-60. If you select the icon next to the table spaces, the DB2 Administration Tool Explorer window opens. It lists all changes that relate to table spaces for the selected location.

Figure 12-60   Configuration Manger Automatic Detail Filter

With Optim Configuration Manager and the other components of the DB2 Administration Solution Pack. you now have a comprehensive method of tracking changes made to your DB2 subsystems, and being able to provide an audit capability showing what was changed, when it was changed, and by whom it was changed.

A

Optim Configuration Manager Comparison reports

This appendix contains a list of properties compared by Optim Configuration Manager, divided into three sections:

- ► Data source properties
- ► Driver properties
- ► General properties

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A.1 Data source properties

Table A-1 lists data source properties compared by Optim Configuration Manager.

Table A-1   Data source properties

Properties	
CR_LOCKBLOB	alternateGroupPortNumber
DBANSIWARN	alternateGroupServerName
DBDATE	atomicMultiRowInsert
DBMAXPROC	blockingReadConnectionTimeout
DBPATH	charOutputSize
DBSPACETEMP	cliSchema
DBTEMP	clientAccountingInformation
DBUPSPACE	clientApplicationInformation
DB_LOCALE	clientDebugInfo
DEBUG	clientProgramId
DELIMIDENT	clientProgramName
DUMPCORE	clientRerouteAlternatePortNumber
DUMPDIR	clientRerouteAlternateServerName
DUMPMEM	clientRerouteServerListJNDIName
DUMPSHMEM	clientUser
GCORE	clientWorkstation
IFX_DIRECTIVES	concurrentAccessResolution
IFX_EXTDIRECTIVES	connectNode
IFX_FLAT_UCSQ	connectionCloseWithInFlightTransaction
IFX_UPDDESC	currentDegree
IFX_XASTDCOMPLIANCE_XAEND	currentExplainMode
INFORMIXOPCACHE	currentExplainSnapshot
INFORMIXSTACKSIZE	currentFunctionPath
LIGHT_SCANS	currentLockTimeout
LKNOTIFY	currentMaintainedTableTypesForOptimization
LOCKDOWN	currentPackagePath
LOCKSSFU	currentPackageSet
NODEFDAC	currentQueryOptimization
NOSHMSG	currentRefreshAge
NOSORTINDEX	currentSQLID
OPTCOMPIND	currentSchema
OPTOFC	cursorSensitivity
PDQPRIORITY	dataSourceName
PLOAD_LO_PATH	databaseName
PSORT_DBTEMP	dateFormat
PSORT_NPROCS	dateTimeMutation
SLABEL	decimalRoundingMode
SORTINDEX	decimalSeparator
SQLSTATS	decimalStringFormat
SQL_FROM_DBIMPORT	defaultIsolationLevel
STMT_CACHE	deferPrepares
STMT_CACHE_DEBUG	description
SUBQCACHESZ	downgradeHoldCursorsUnderXa
accountingInterval	driverType
activateDatabase	emulateParameterMetaDataForZCalls
affinityFailbackInterval	enableAlternateGroupSeamlessACR
allowNextOnExhaustedResultSet	enableAlternateServerListFirstConnect
allowNullResultSetForExecuteQuery	enableClientAffinitiesList
allowUnassignedParameters	enableConnectionConcentrator
alternateGroupDatabaseName	enableExtendedIndicators

Properties	
enableMultirowInsertSupport	readOnly
enableNamedParameterMarkers	recordTemporalHistory
enableRowsetSupport	reportLongTypes
enableSeamlessFailover	resultSetHoldability
enableSysplexWLB	resultSetHoldabilityForCatalogQueries
enableT2zosCallSPBundling	retrieveMessagesFromServerOnGe
enableT2zosLBF	retryIntervalForClientReroute
enableT2zosLBFSPResultSets	retryWithAlternativeSecurityMechanism
encryptionAlgorithm	returnAlias
extendedDiagnosticLevel	securityMechanism
fetchSize	sendCharInputsUTF8
floatingPointStringFormat	sendDataAsIs
fullyMaterializeInputStreams	serverName
fullyMaterializeInputStreamsOnBatchExecution	sessionTimeZone
fullyMaterializeLobData	sqljEnableClassLoaderSpecificProfiles
implicitRollbackOption	ssid
interruptProcessingMode	sslConnection
jdbcCollection	sslTrustStoreLocation
keepAliveTimeOut	sslTrustStorePassword
keepDynamic	statementConcentrator
kerberosServerPrincipal	streamBufferSize
loginTimeout	stripTrailingZerosForDecimalNumbers
maxConnCachedParamBufferSize	supportsAsynchronousXARollback
maxRetriesForClientReroute	supportsRawDateTimeRetrieval
maxRowsetSize	sysSchema
maxStatements	timeFormat
maxTransportObjects	timerLevelForQueryTimeOut
monitorCollectionInterval	timestampFormat
monitorEnabled	timestampOutputType
monitorLevel	timestampPrecisionReporting
monitorPort	traceDirectory
monitorServerName	traceFile
monitoredDataSourceName	traceFileAppend
optimizationProfile	traceFileCount
optimizationProfileToFlush	traceFileSize
password	traceLevel
pdqProperties	traceOption
pkList	translateForBitData
planName	updateCountForBatch
plugin	useCachedCursor
pluginName	useIdentityValLocalForAutoGeneratedKeys
portNumber	useJDBC4ColumnNameAndLabelSemantics
profileName	useRowsetCursor
progressiveStreaming	useTransactionRedirect
queryCloseImplicit	user
queryDataSize	xaNetworkOptimization
queryTimeoutInterruptProcessingMode	

A.2 Driver properties

Table A-2 contains a list of driver properties that are compared by Optim Configuration Manager.

Table A-2   Driver properties

Properties	
db2.jcc.ccsid1390Mapping	db2.jcc.maxTransportObjectIdleTime
db2.jcc.ccsid1399Mapping	db2.jcc.maxTransportObjectWaitTime
db2.jcc.ccsid930Mapping	db2.jcc.maxTransportObjects
db2.jcc.ccsid939Mapping	db2.jcc.minTransportObjects
db2.jcc.ccsid943Mapping	db2.jcc.outputDirectory
db2.jcc.ccsid954Mapping	db2.jcc.pdqProperties
db2.jcc.charsetDecoderEncoder	db2.jcc.progressiveStreaming
db2.jcc.currentSQLID	db2.jcc.sqljToolsExitJVMOnCompletion
db2.jcc.currentSchema	db2.jcc.sqljUncustomizedWarningOrException
db2.jcc.decimalRoundingMode	db2.jcc.timerLevelForQueryTimeOut
db2.jcc.defaultSQLState	db2.jcc.traceDirectory
db2.jcc.dsdriverConfigFile	db2.jcc.traceFile
db2.jcc.dumpPool	db2.jcc.traceFileAppend
db2.jcc.dumpPoolStatisticsOnSchedule	db2.jcc.traceFileCount
db2.jcc.dumpPoolStatisticsOnScheduleFile	db2.jcc.traceFileSize
db2.jcc.enableMultirowInsertSupport	db2.jcc.traceLevel
db2.jcc.enableT2zosCallSPBundling	db2.jcc.traceOption
db2.jcc.enableT2zosLBF	db2.jcc.tracePolling
db2.jcc.enableT2zosLBFSPResultSets	db2.jcc.useCcsid420ShapedConverter
db2.jcc.maxConnCachedParamBufferSize	db2.jcc.useSqljSPContextCaching
db2.jcc.maxRefreshInterval	

A.3 General properties

Table A-3 shows the general properties that are compared by Optim Configuration Manager.

Table A-3   General properties

Properties	
APPLICATION	IPADDR
DB_NAME	JDBC_DATASOURCE_NAME
DDID	PORT
DRIVER_BUILD_CERT	SERVER_NAME
DRIVER_BUILD_QUALIFIER	USER
DRIVER_CMPNT_NAME	UUID
DRIVER_FULL_VERSION	WAS_APP_SERVER_NAME
DRIVER_MAJOR_VERSION	WAS_APP_SERVER_VERSION
DRIVER_MICRO_VERSION	WAS_JNDI_DATASOURCE_NAME
DRIVER_MINOR_VERSION	WAS_POOL_SIZE
DSDID	WORKSTATION

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this book.

IBM Redbooks

The following IBM Redbooks publications provide additional information about the topic in this document. Note that some publications referenced in this list might be available in softcopy only.

► *Managing IBM DB2 10 for z/OS Using the IBM DB2 Administration Tool for z/OS Version 10,* SG24-7916

You can search for, view, download or order these documents and other Redbooks, Redpapers, Web Docs, draft and additional materials, at the following website:

ibm.com/redbooks

Other publications

These publications are also relevant as further information sources:

► *DB2 Administration Solution Pack for z/OS Version 1 Release 1 Overview and Customization,* SC19-3785

► *DB2 Administration Tool for z/OS, V10.2 User's Guide*, SC19-3744

► *DB2 Table Editor for z/OS Version 4 Release 4 User's Guide*, SC19-3781

► *DB2 Object Comparison Tool for z/OS Version 10 Release 2 User's Guide,* SC19-3778

► *InfoSphere Optim Configuration Manager for DB2 for z/OS, V2.2: Quick Start Guide,* GC19-3499

► *DB2 10 for z/OS Managing Performance,* SC19-2978

Online resources

These websites are also relevant as further information sources:

- ► DB2 Tools documentation:

  http://www.ibm.com/support/docview.wss?uid=swg27020910

- ► IBM DB2 tools for z/OS

  http://www.ibm.com/software/data/db2imstools/products/db2-zos-tools.html

- ► IBM InfoSphere Optim Configuration Manager for DB2 for z/OS

  http://www.ibm.com/software/products/us/en/infosphere-optim-configuration-manager-z/

- ► *DB2 Tools corner: Introducing the IBM-supported batch interface for change management in DB2 Administration Tool for z/OS V10.1 and DB2 Object Comparison Tool for z/OS V10.1*, article by John Dembinski

  http://www.ibm.com/developerworks/data/library/techarticle/dm-1205toolscorner/?ca=drs

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