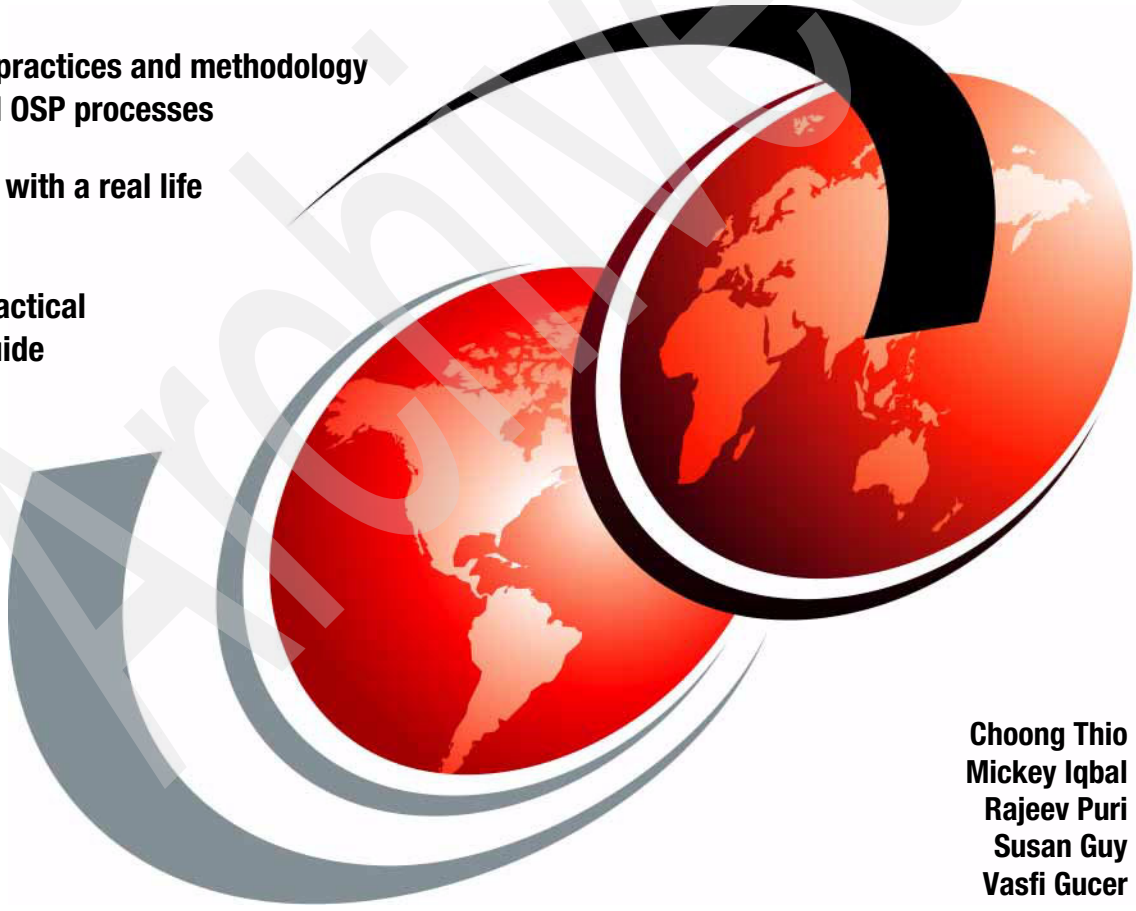
Tivoli software

IBM

Best Practices and Methodology for Electronic Software Distribution and Operating System Provisioning in an On Demand Business

- Learn best practices and methodology for ESD and OSP processes
- Experiment with a real life scenario
- Use as a practical insider's guide



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International Technical Support Organization

Best Practices and Methodology for Electronic Software Distribution and Operating System Provisioning in an On Demand Business

November 2006

SG24-7288-00

Note: Before using this information and the product it supports, read the information in “Notices” on page xi.

First Edition (November 2006)

This edition applies to IBM Tivoli Provisioning Manager is Version 5.1, IBM Tivoli Provisioning Manager Express for Software Distribution is Version 4.1.1 and IBM Tivoli Configuration Manager Version 4.2.3.

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Preface

This IBM® Redbook describes the best practices and methodology for planning, designing, deploying, and managing Electronic Software Distribution (ESD) and Operating System Provisioning (OSP) solutions in an on demand business environment.

We start by discussing Electronic Software Distribution and Operating System Provisioning fundamentals, discuss available IBM solutions and products in these areas, followed by providing best practices and examples for implementing these processes. Finally, we wrap up all these topics in the context of a real life scenario

The target audience of this IBM Redbook is IT professionals implementing Electronic Software Distribution (ESD) and Operating System Provisioning (OSP) solutions in on demand business environments.

The team that wrote this IBM Redbook

This IBM Redbook was produced by a team of specialists from around the world working at the International Technical Support Organization, Poughkeepsie Center.

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using a variety of software tools. Mickey is an advanced database researcher, and his research work on data integration and semantic reconciliation among heterogeneous information sources has been published in internationally reviewed computer science journals and internationally reviewed information systems conference proceedings. Mickey has also filed several patents for IBM, which are related to his work on electronic software distribution and database research. He holds a master's degree in business administration, a master of science degree in management information systems, and a bachelor of science in mechanical engineering.

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1

Introduction

Business and information technology (IT) executives globally are challenged with a common set of business problems. These are centered around reducing their IT costs, leveraging IT to innovate, growing their businesses, reducing operational costs, differentiating their products and services, and nimbly competing in a high pressure economic environment. Various disciplines of IT business systems management, such as systems development, systems monitoring, database design and management, network design and management, applications design, development and support, call center management and support, enterprise resource planning (ERP), client relationship management (CRM), and others have enjoyed a strong focus from IT providers, product and service vendors, and IT managers to address these challenges.

There are established best practices and standards developed and published widely for each of the these IT disciplines. IT practitioners keep refining these best practices and standards to allow IT executives and managers to gain higher tangible and intangible returns on their investment. However, there remains a critical area of systems management that impacts all IT disciplines, which has not received the magnitude of focus and attention it deserves from the perspective of development and sharing of best practices and standards across the IT industry. This critical area of IT systems management comprises two highly inter-related IT disciplines:

- Electronic Software Distribution (ESD)
- Operating System Provisioning (OSP)

This IBM Redbook describes the best practices for planning, designing, deploying, and managing Electronic Software Distribution (ESD) and Operating System Provisioning (OSP) solutions in an on demand business environment.

In this chapter, we will cover the following:

1.1 Electronic Software Distribution fundamentals

One of the foremost challenges of IT management is to provide the right software to the right IT systems at the right time. As the span of an IT environment increases along with the businesses it supports, the complexity and scale of this challenge also increases exponentially, along with the need to support multiple operating systems, multiple heterogeneous hardware, network protocols, different types of applications and users working concurrently, and most importantly, while combating the need to provide timely security and anti-virus updates to their users and infrastructure computing environments. Despite the increase in complexity, it still remains critical for IT managers to continue to address the challenges of providing the right software to the right IT systems at the right time, while minimizing costs and errors and maximizing their return on investments.

Software distribution is part of the change management discipline within IT systems management. *Change management* is the task of adjusting an environment to new demands and requirements. The process of *life cycle management* for every system in this environment is within change management. The life cycle process covers all tasks, including acquiring, deploying, and managing the system, as well as taking it out of service. Software distribution plays an important role in life cycle management. It enables you to deploy new software releases, distribute fixes and patches, and even change the configuration of the systems from one centralized point of administration globally. In some cases, you can reinstall, recover, and reconfigure systems after a system crash without visiting the site. ESD, in an On Demand business, is the technology that enables the automation of software packaging, distribution, and installation of software, such as tools, applications, and middleware, to distributed and heterogeneous hardware and operating systems platforms. This includes:

- The hardware platforms that are the target of an ESD on demand service. These include:
  - Mobile computing devices, such as personal digital assistants (PDAs), cellular phones, and so on
  - Personal computing devices, such as PC desktops and laptops
  - Server computers, such as IBM System x™, p, i, and z servers (or original equipment manufacturer (OEM) manufactured servers corresponding to the latter categories)

- The software or operating systems (OS) platforms that are the target of an ESD on demand service. These include:
  - Linux: Red Hat, SUSE
  - UNIX: IBM AIX, Sun™ Solaris, and HP-UX
  - Windows: Windows XP, 2000, and 2003
  - Others: MAC OS and so on

In its simplest form, the discipline of software distribution can be decomposed into the following five sub-components:

- Change and release management

  Software distribution is commonly triggered by user requests, which in turn are driven by business requirements and business policies. In software distribution, you will not add, remove, or change the features of a single product, but, eventually, you will change the behavior of the whole system that is the target of a software distribution. Within a software distribution task, you might even install, change, or fix multiple applications at the same time. Therefore, the first step in any software distribution activity should be to define the associated release and change management plan, which includes the plan for gathering and implementing any technical requirements, pilot activities distribution routes, coordination and communication with operations and business processes, and any plans for education and training.

  Depending on the software distribution tool used, you can combine multiple software packages into a single distribution package, or you might be able to link software distribution so that the installation of one package causes other packages to be installed. Based on the assignment of a release number to every software distribution task, you will be able to identify and track every change and problem associated with the task.

- Software packaging

  This is the technology that encapsulates the software and required system changes, which are intelligently combined into a distributable and installable format (software packages) along with scripts and utilities to support the installation process. Packaging software means bringing the files and changes to the system necessary to install and configure applications, fixes, and patches on an IT system in a manner that can be handled by the software distribution and installation method.

  Therefore, the format of the packages depends on the software distribution tool used for distributing and installing software. The tasks performed during software installation vary from software package to software package. A software package can contain just a couple of files to be copied, a registry key to be changed, or an INI file to be modified, or it can be as complex as running multiple scripts, modifying a registry, creating desktop shortcuts,

applying complex application or OS patches on servers, rebooting systems and more.

- Software distribution

  This is the task of transporting files or software packages from a distribution repository on a source system to the target system, automatically or manually. Depending on the software distribution tool used, this can be a simple copy command from one shared drive to another, or a much more involved execution with system control, or network bandwidth control, or both, recovery functions, reporting, and extensive logging. Software distribution in larger environments or distributed environments with wide area network (WAN) links may also require a hierarchical distribution through multiple repositories.

- Package or distribution testing

  This is the task of using the software distribution tool to distribute a software package on to one or more test target systems, unpacking the software package, creating necessary directories or file systems or both, copying the files to the right place, creating required system level files and changes (for example, registry and INI file entries), creating icons and shortcuts, and executing special installation scripts in a test site environment while utilizing an approved quality management system to ensure that all planned quality criteria are met.

- Software installation

  This is the task of using the software distribution tool to distribute a software package on to one or more production target systems, unpacking the software package, creating necessary directories or file systems, or both, copying the files to the right place, creating required system level files and changes (for example, registry and INI file entries), creating icons and shortcuts, and executing special installation scripts to install the software, recovering appropriate software distribution tool and software install files, and reporting software install status appropriate business processes and IT staff, in the appropriate production environment.

1.2 Benefits of on demand Electronic Software Distribution

The benefits gained from an efficient and effective on demand ESD service impacts all other IT disciplines along with the businesses that these IT disciplines support. These benefits include:

- Optimal resource provisioning for specific IT infrastructure and business requirements
- Helping ensure the most productive utilization of IT
- Improved IT resource utilization and enhanced service delivery
- Automated management of software updates and patches while significantly reducing costs and time to respond for software (patch) installations in an IT environment
- Quick delivery of value with automation of common tasks for leading products
- Making available the right software resources to the right processes and people at the right time
- Improving systems availability by facilitating the health-check of the IT environment through updates to security policies and various IT business processes
- Helping security by ensuring that IT assets, confidentiality, and data integrity are protected
- Enabling the capability to quickly apply security fixes (patches) to respond to IT virus threats
- Minimizing IT staff resources to perform patch application
- Achieving greater efficiency in new service roll-outs, reducing new service development, and reducing application downtime during rollouts
- Ability to cost-effectively maintain high service levels with existing staff as growth skyrockets
- Assisting in maintaining client satisfaction through reliable and predictable service delivery
- Improving reliability and maintainability of an IT environment
- Reduced costs and time for software provisioning to remote sites in various countries and satellite offices
- Eliminating unnecessary travel to remote offices, thus, further reducing the cost for the business
- Faster, timely, and automated software configuration management will enable more time for quality assurance, and better opportunity to meet business

deadlines while avoiding pitfalls that might result from an insufficient quality assurance process.

1.3 Operating System Provisioning (OSP) fundamentals

OSP is also part of the change management discipline within IT systems management, and is closely inter-related to the ESD discipline. This is because any updates to a pristine OS image after its initial installation will need to be managed through ESD services. OSP technology for an on demand business provides the following automated bare metal provisioning of heterogeneous platforms as well as additional capabilities, such as security hardening and so on:

- The hardware platforms include the following:
  - Personal computing devices, such as desktops and laptops
  - Server computers, such as IBM System x, p, i, and z servers and OEM manufactured servers
- The software or operating systems (OS) platforms may include the following:
  - Linux: Red Hat, SUSE, and so on
  - UNIX: IBM AIX, Sun Solaris, and HP-UX
  - Windows: MS Windows XP, 2000, and 2003
  - Others: MAC OS among several others

In its simplest form, the discipline of OSP comprises the following four sub-components:

- Change and release management: The purpose of this sub-component is to prepare, validate, and process the change request related to an OSP service. An OSP deployment plan is developed based on the change request and an OSP project status report is delivered to the client once the change has been executed. The OSP change and release management process receives an external input in the form of a set of requirements for an OSP-related change from a client. The OSP change request can be focused on any of the several functions related to OSP, such as:
  - Prepare new OS image
  - Prepare new software or patch update for OS image
  - Prepare distribution media and prepare provisioning mechanism
  - Test OS image
  - Test distribution media

- Install OS image
- Update OS image
- Rollback OS image patch
- Remove OS image
- Add entity to production environment
- Distribute OS image
- Delete OS image
- Retire OS image, archive and retire OS image

The OSP change and release management process:

- Uses authorization and validation activities to ensure required data completion and any required approvals from the Change Control Board members.
- Uses screening and review activities by the OSP process coordinator to categorize the OSP request into the appropriate category of OSP (for example, prepare new OS image, prepare new software or patch update for OS image, prepare distribution media, prepare provisioning mechanism, test OS image, test distribution media, install OS image, update OS image, rollback OS image patch, remove OS image, add entity to production environment, distribute OS image, delete OS image, retire OS image, and archive and retire OS image)
- Defines a back out and recovery plan in case of failure
- Uses additional activities to determine, acquire, and assign resources required for the completion of the change request
- Produces an OSP deployment plan along with several OSP change-related project management work products based on Worldwide Project Management Method (WWPMM) methodology
- Develops budgetary and definitive project estimates
- Ensures that all applicable information and work products are reviewed and approved by the client and the Change Control Board before the OSP change can be implemented

► OS imaging: This sub-component includes the technology and processes that provides:

- Technical feasibility approval related to implementing the OSP change order
- Validation of estimated resource requirements for the OSP change management coordinator

  - Preparation of the OS image or media building site for the development of the requested OS image or media
  - Development of the requested OS image media
  - Working with the Quality Assurance team to ensure that the finished product is in compliance with the specified requirements
- OS image testing: The purpose of this sub-component is to assist the OSP test site personnel in:
  - Providing technical feasibility approval related to proceeding further with the test plan, which is part of the operating system imaging plan
  - Validating estimated test plan related resource requirements
  - Preparing the OS image or media test site for the planned testing of the requested OS image media
  - Testing the OS image or media that is provided as input to this testing process
  - After testing and analysis is complete, producing a test report based on the test findings
- OS image distribution and provisioning: The purpose of this sub-component is to assist the technical and management staff with:
  - Providing technical feasibility approval related to implementing the OSP change order
  - Validating estimated resource requirements for the OSP change management coordinator
  - Preparing the production site staging environment to confirm production site readiness
  - Communicating and executing the deployment of the OS image or media
  - Performing any required backup or recovery procedures
  - Analyzing results from various deployments, and taking corrective action
  - Generating status reports that indicate the work done by the production site in response to any requested OS image or media change request

1.4 Benefits of on demand OS Provisioning

The benefits gained from an efficient and effective on demand OSP service impacts all other IT disciplines along with the businesses that these IT disciplines support. These benefits include:

- Optimal resource provisioning for specific IT infrastructure and business requirements
- Ensuring all OS images are secure and compliant with the corporate security policies before they are put into production
- Improved resource utilization and enhanced IT service delivery
- Quick delivery of value with automation of common tasks for leading products
- Improved reliability and maintainability of an IT environment
- Ensuring the most productive utilization of IT
- Achieving greater efficiency in new service roll-outs, reducing new service development, and reducing application downtime during rollouts
- Ability to cost-effectively maintain high service levels with existing staff as growth skyrockets
- Maintaining client satisfaction through reliable service delivery
- Reduced costs and time for OS Provisioning to distributed sites in various countries, HQ, and satellite offices
- Eliminating unnecessary travel to remote offices
- Faster, automated OS Provisioning management has enabled more time for quality assurance, and more opportunity to meet business deadlines while avoiding pitfalls that might result from an insufficient quality assurance process

1.5 Overview of IBM key software distribution products

This section gives you an overview of IBM key software distribution products.

1.5.1 IBM Tivoli Configuration Manager

IBM Tivoli Configuration Manager can help you gain total control over your enterprise software and hardware. Its software distribution capability enables you to rapidly and efficiently deploy complex mission-critical applications to multiple locations from a central point. After systems have been deployed, the inventory module lets you automatically scan for and collect hardware and software

configuration information from computer systems across your enterprise. IBM Tivoli Configuration Manager also has the ability to enforce adherence to your company's policies by changing system configurations as needed to ensure compliance. And IBM Tivoli Configuration Manager includes Microsoft software patch automation capabilities designed to save time, lower costs, and improve quality. The latest version of IBM Tivoli Configuration Manager is Version 4.2.3.

Note: With IBM Tivoli Provisioning Manager Version 5.1 (described in the next paragraph), IBM provides an upgrade path for IBM Tivoli Configuration Manager clients.

Tivoli Provisioning Manager Version 5.1 comes with two packaging options:

- Tivoli Provisioning Manager Version 5.1, which is the new version of Tivoli Provisioning Manager that includes also part of the services currently provided by Tivoli Management Framework plus most of the features of Tivoli Configuration Manager in the context of the Service Oriented Architecture (SOA) infrastructure.
- Tivoli Provisioning Manager for Software Version 5.1, which is the piece of code that implements the coexistence with an existing Tivoli Management Framework installation.

You can refer to Chapter 1, "Tivoli Provisioning Manager V5.1 overview", of the *Deployment Guide Series: IBM Tivoli Provisioning Manager Version 5.1*, SG24-7261 for more information about different packaging options for IBM Tivoli Provisioning Manager V 5.1.

Also, Part 2, "IBM Tivoli Provisioning Manager for Software V5.1" of the same IBM Redbook discusses co-existence and migration considerations from IBM Tivoli Configuration Manager to IBM Tivoli Provisioning Manager.

1.5.2 IBM Tivoli Provisioning Manager

IBM Tivoli Provisioning Manager automates manual tasks of provisioning and configuring servers and virtual servers, operating systems, middleware, applications, storage and network devices acting as routers, switches, firewalls, and load balancers. IBM Tivoli Provisioning Manager allows you to create, customize, and quickly utilize best-practice automation packages. Prebuilt automation packages provide control and configuration of major vendors' products, while customized automation packages can implement your company's datacenter best practices and procedures. You can then automate and execute these procedures in a consistent error-free manner. In fact, using these automation packages, IBM Tivoli Provisioning Manager has the ability to

provision and deploy a server (from bare-metal to full production) with the single push of a button.

IBM Tivoli Provisioning Manager features include a graphical user interface designed to simplify change execution tasks for the datacenter operator, hardware, software, and network resource discovery and drift detection to help ensure that desired configurations are maintained, software distribution, and image and script management to help leverage existing company standards and procedures in a consistent and controlled way. Tivoli Provisioning Manager also incorporates *Solution Install*, a self-managing autonomic technology enabling the deployment of complex applications to multiple real and virtual servers.

As mentioned in the previous note, the latest version of IBM Tivoli Provisioning Manager is Version 5.1 and this product combines the data center provisioning, software distribution and inventory functions and provides a complete solution for all.

You can find more information about IBM Tivoli Provisioning Manager on the Web at:

http://www-306.ibm.com/software/tivoli/products/prov-mgr/function-highlights.html

You can also refer to the IBM Redbook *Deployment Guide Series: IBM Tivoli Provisioning Manager Version 5.1*, SG24-7261.

1.5.3 IBM Tivoli Provisioning Manager Express for Software Distribution

IBM Tivoli Provisioning Manager Express for Software Distribution is an easy-to-use inventory management and software distribution solution. It consists of all the capabilities included in IBM Tivoli Provisioning Manager Express for inventory, combined with the ability to leverage a company-wide distribution system for managing the delivery and updating of business software through a secure, Web-based interface. Tivoli Provisioning Manager Express for Software Distribution will help you identify non-compliant users and quickly deploy critical software updates to reduce user downtime and the need for costly help-desk support. Flexible “push” and “pull” capabilities help administrators easily create and deliver the right software packages to individual laptops, desktops, and servers that are in need of software updates. The users can install (pull) their required software updates at their convenience.

IBM Tivoli Provisioning Manager Express for Software Distribution is one solution in the IBM Express portfolio of solutions designed exclusively for the SMB marketplace.

The latest version of IBM Tivoli Provisioning Manager Express for Software Distribution is Version 4.1.1.

You can find more information about IBM Tivoli Provisioning Manager Express for Software Distribution functionality on the Web at:

http://www-306.ibm.com/software/tivoli/products/prov-mgr-express-software-distribution/

You can also refer to the IBM Redbook *Deployment Guide Series: IBM Tivoli Provisioning Manager Express V4.1 for Software Distribution*, SG24-7236.

1.6 Overview of IBM key OS provisioning products

Next, we will discuss IBM key provisioning products.

1.6.1 IBM Tivoli Provisioning Manager

Refer to 1.5.2, “IBM Tivoli Provisioning Manager” on page 11. Note that the latest version of IBM Tivoli Provisioning Manager is Version 5.1 and this product combines the data center provisioning and software distribution and inventory functions and provides a complete solution for both.

1.6.2 IBM Remote Deployment Manager

IBM Remote Deployment Manager (RDM) facilitates remote deployment of both IBM and non-IBM systems. RDM allows for remote unattended installation of new and existing systems. RDM helps automate deployment tasks such as initial operating system installation, BIOS updates, and disposal of retired systems. All of these tasks can be done without visiting the remote system, reducing travel and labor costs. RDM features include:

- Support for deploying Windows and Linux operating systems
- Ability to capture and deploy images from or to systems
- Interview wizards for Windows and Linux makes it easy to create unattended install scripts
- Integration into IBM Director provides a consistent, single point of management and deployment via a drag-and-drop interface and allows use of IBM Director's task scheduler and group management capability
- Support for IBM and non-IBM hardware that adhere to industry standards including Pre-boot-eXEcution (PXE) and Wake on LAN® (WOL)

- Fast system restoration and deployment with Power Restore feature
- Secure Data Disposal utility for securely eliminating confidential data from systems being retired
- Scripting capability to run multiple RDM tasks in a single step
- Provides an easy, single point of deployment and management for IBM System x BladeCenter® servers
- WAN and multicast support for worldwide deployment

You can find more information about IBM Remote Deployment Manager functionality on the Web at:

http://www-03.ibm.com/servers/eserver/xseries/systems_management/ibm_director/extensions/rdm.html

1.6.3 IBM Network Install Manager (NIM)

NIM can be used as a utility for installing the AIX Base Operating System (BOS) on machines. NIM supports installation using any of the three BOS install types:

- Overwrite
- Preservation
- Migration

NIM also supports the use of mksysb images, bosinst.data files, and other resources to install machines.

Network Installation Management operations include:

- Installing BOS
- Customizing (installing) the software
- Maintaining the software
- Configuring the machine
- Booting diagnostics
- Booting in maintenance mode
- Initializing diskless and dataless clients
- Installing BOS on an alternate disk

You can also refer to the IBM Redbook *NIM: From A to Z in AIX 4.3*, SG24-5524, for more information about IBM Network Install Manager.

1.7 Other topics in this IBM Redbook

There is an urgent need for a standard, global, on demand solution for ESD and OSP to help reduce the overall IT costs and make them more predictable. This IBM Redbook provides the solution. It describes the overall change and configuration management systems context within which ESD and OSP are utilized. This IBM Redbook also presents a formal structured methodology, design considerations, architecture overview and guidelines, and proven best of breed case studies and scenarios for implementing on demand ESD and OSP solutions in global organizations that are leaders within their respective industries. The body of knowledge presented in this IBM Redbook will benefit business analysts, information technology and Management Information Systems professionals, project managers, IT architects, IT specialists and systems administrators in their ESD-related or OSP-related business process planning and design, project planning, IT architecture planning, and ESD and OSP solution implementation and management tasks.

2

Electronic Software Distribution Change Request process

This chapter describes the Electronic Software Distribution (ESD) Change Request process. This chapter includes the following:

2.1 Overview of ESD Change Request process

The ESD Change Request process manages the preparation, validation, processing, and closure of a Change Request related to an ESD service. An ESD deployment plan is developed based on the Change Request and an ESD project status report is delivered to the client once the change has been executed.

The ESD Change Request process uses authorization and validation activities to ensure requirements data completion and any required approvals from the Change Control Board members.

The ESD Change Request process:

- Uses screening and review activities by the ESD process coordinator to categorize the ESD request into the appropriate category of ESD (for example, new software installation, software upgrade, application of patches, removal of software, rollback of software, development of media, testing of media/software, distribution of software, and so on).
- Defines a backout and recovery plan in case of failure by:
  - Using additional activities to determine, acquire, and assign resources required for the completion of the Change Request.
  - Producing an ESD deployment plan along with several ESD change related project management work products based on a formal Project Management methodology, and developing budgetary and definitive project estimates.
- Ensures that all applicable information and work products are reviewed and approved by the client and the Change Control Board before the ESD change can be implemented.

The ESD Change Request process receives external input in the form of a set of requirements for an ESD related change from a client. The ESD Change Request can be focused on any of the several functions related to ESD (for example, new software installation, software upgrade, application of patches, removal of software, rollback of software, development of media, testing of media/software, distribution of software, and so on).

After the ESD change is implemented, an ESD project status report is produced for the client and the ESD Change Request is closed based on the client's approval.

The ESD Change Request process produces three major deliverables which are used in supporting processes within the end-to-end ESD process:

- Software distribution plan
- Project status report
- Project evaluation report

This chapter describes the inputs to the ESD Change Request process, the outputs from the process and the activities involved in the ESD Change Request. (refer to Figure 2-1 on page 20). ESD involves the following Change Request process:

- Preparing Change Request
- Acquiring change control board approval for ESD Change Request
- Determining ESD category and site processes required
- Developing back out and recovery plan
- ESD Change Request resource planning
- Developing ESD preliminary deployment plan
- Client approval of ESD deployment plan
- Executing ESD deployment plan

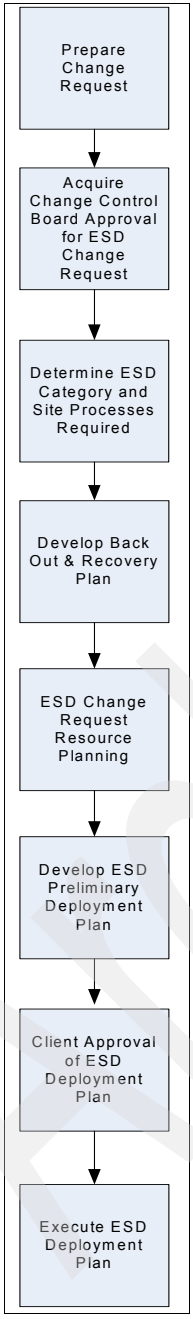

Figure 2-1 Electronic Software Distribution Change Request process

2.2 Electronic Software Distribution building site process measurements

In order to provide a clear picture of the effectiveness and efficiency of the ESD Change Request process, a measurement criteria has been established. The measurements are tracked and used to determine potential quality issues and productivity enhancements and include the following:

- Percentage of requests successfully finalized in requested time frame

  The request forms and the reports belonging to the request will measure the percentage of the successfully completed requests.

- Satisfaction of requester

  The requester must fill in the project evaluation report after completion of the request. The overall satisfaction entered by the requester will be measured to ensure a high quality of the processes and client satisfaction.

- Percentage of requests sent back to requester because of lack of information

  The requester must provide specific information to be able to fulfill the request. If this information is incorrect, not reasonable or not plausible, the request must be sent back, requesting more information.

2.3 ESD Change Request process roles

The following roles are performed in the ESD Change Request process:

- Client IT Architect

  Client IT Architect (CITA) is responsible for establishing strong technical relationships with the assigned client account. CITAs are viewed as consultants to the client and have strong technical and relationship skills. They participate and often lead the broader technical community as they deploy across their assigned territory to support technical sales efforts.

  The scope of a CITA's responsibilities cross all organizational divisions:

  - Services
  - Solutions
  - Hardware
  - Software

  Results generally expected from involvement include increased business, strategic and innovative usage of the organizations technologies and higher client satisfaction.

- Delivery Project Manager

  The role of the *Delivery Project Manager* is to ensure that client needs are satisfied through the formulation, development, implementation, and delivery of application solutions in response to client requirements expressed in approved service requests. The Delivery Project Manager is responsible for the overall project plan, budget, structure, schedule, and staffing requirements for the delivery organization. Expert level knowledge is required across project manager methodologies, including security enabling interface (SEI) or common management model (CMM), emerging technologies and technical architectures pertaining to the client served, and the vision to influence the clients' actions. The Delivery Project Manager holds overall responsibility for cost, schedule, and contractual deliverables.

- Business Analyst

  The *Business Analysis* is responsible for identifying and documenting requirements and analyzing these requirements from a business perspective. They define current and future operational scenarios (processes, models, use cases, plans, and solutions) and work with the client and the IT Architect to ensure proper translation of business requirements to IT solution requirements.

- Offering Architect

  The *Offering Architects* is responsible for establishing strong technical solution offerings.

- Infrastructure Specialist

  The *Infrastructure Specialist* is an individual who creates an application environment below the application layer. These individuals support solution construction, implementation, and systems integration in a technology industry or business specialty. They are proficient in a specialty and are capable of working with requirements, design, implementation, and production projects and engagement. They deliver high quality solutions to clients in response to varying business requirements. They utilize product technology, industry and business skills. They use tools to analyze, manage, design, and implement. They provide technical leadership in computer operating systems and support, and expertise in installing and maintaining system problems. They provide expertise in the management of day-to-day computer operations and are capable of defining processes, roles, and responsibilities.

2.4 ESD change site activities

The following is a list of the activities that are performed as a part of the overall ESD Change Request process. Each activity is made up of a number of tasks and sub-tasks that are performed by specific individuals who perform defined roles within this process. In addition, each of the ESD Change Request process activities requires a set of inputs and produces a number of outputs that have been defined below.

2.4.1 Prepare Change Request

The purpose of the *prepare Change Request* activity is to document a formal Change Request for IT systems related to ESD. The Change Request is created based on an approved change management process, and by using a Change Request template. The Change Request is created based on an analysis of needs and requirements related to the ESD change.

The Change Request may be applicable to one of the three ESD sites, namely:

- Building site

  The *Building site* represents the area of producing an ESD package or a medium, including ESD packages for distribution. The inputs to the Building site are predefined activities and data, including all the information required to build an ESD package, which can be distributed and installed in an automatic way. The output of the Building site is a software package and a set of metadata (for example, the size of the package, name of the package, and version number) or the requested distribution media ready for testing.

- Test site

  The *Test site* represents a part of the client's IT environment, including the different types of workstations, servers, and network. This environment is used to perform all tests defined in the test plan and described in the testing guide, in order to achieve defined quality criteria for the implementation of the required entities. The output of the Test site is a tested ESD package or distribution media that fulfills all defined criteria and is ready to be implemented into the production environment. Data like installation time frame, transmission timeframes and so on, are also added to the appropriate forms produced as part of the Test site processing.

- Production site

  The *Production site* represents the production IT environment. The ESD packages are transferred to the production software distribution repository. From there, the packages can be distributed to defined depot servers in the IT environment. The output of the Production site is a report depending on the results of the requests.

The ESD Change Request may be created in order to perform one or several functions at any one or more of the sites described in this section. These functions are listed in Table 2-1.

Table 2-1 ESD Change Request functions

Site	Request type	Description
Building site	Prepare New Software or Patch	Prepare a new ESD package from specific application or operating system.
Building site	Prepare New Software Update	Prepare a new ESD update package from a specific application or operating system.
Building site	Prepare Distribution Media	Prepare Software Distribution Media containing ESD packages to be distributed by special media.
Test site	Test ESD Package	Test ESD package as described in the Test Plan.
Test site	Test Distribution Media	Test the implementation of ESD package, deployed by a media, other than the network, as defined in Test Plan.
Production site	Install Software	Install an application or ESD package at defined nodes.
Production site	Update Software	Update an installed, activated, and committed software at defined nodes.
Production site	Rollback Software Update	Returning to state before, after installing or activating an update without commitment.
Production site	Remove Software	Remove installed software or patch from defined nodes.
Production site	Commit Software	Commit installed and activated software or software updates at defined nodes. This implies the removal of backups.

Additional Change Requests for the Production Site are given in Table 2-2.

Table 2-2 Change Requests for the Production Site functions

Site	Request type	Description
Production Site	Add Entry to Production Environment	Implement an ESD package or Distribution Media to production environment.
Production Site	Distribute ESD Package	Distribute an ESD package existing in the software repository to defined depot server or nodes.
Production Site	Activate Software	Activate installed software at defined nodes.
Production Site	Delete ESD Package	Delete an ESD package from defined nodes.

Site	Request type	Description
Production Site	Retire ESD Package	Delete an ESD package from defined node(s). Remove an ESD package and all updates from the software repository and all depot servers without archiving.
Production Site	Archive and Retire ESD Package	Archive an ESD package and all updates and afterwards remove the ESD package from software repository and all depot servers.

Tasks

The following tasks are performed during the Prepare Change Request activity:

- Documenting all ESD change related requirements

  This is performed by the Client Architect and Delivery Project Manager, assisted by the Business Analyst.

  The purpose of this task is to explicitly document all ESD change requirements and all desired and potential impacts to the target IT environment.

- Input Change Request info into ESD Workflow/Change Management System

  This is performed by the Client Architect, assisted by the Delivery Project Manager.

  The purpose of this task is to explicitly enter the ESD related change requirements into an end-to-end ESD workflow and change management system. The latter system may comprise of a well-documented manual process, or an automated software-based workflow system, or both.

Inputs and outputs

Input from any of the following external processes may be required during the Prepare Change Request activity of the ESD Change Request process:

- Communications management plan
- IT management requirements

Output from the Prepare Change Request activity of the ESD Change Request Process will produce:

- Early project estimate
- Change request
- Approval to proceed
- Communication sent
- Requirements gathered

The following section is a description of the inputs to and outputs from the Prepare Change Request activity that have not previously been defined in any other section of this IBM Redbook.

Communications management plan

The *communications management plan* defines the regular meetings, reporting, and other communications. The purpose of the communications management plan is to:

- Identify the information requirements of the individual project stakeholders and team members.
- Define the sources of the information for collection or production.
- Document the flow of the information, time frames, recipients, and frequencies.
- Select the technical means and forms of effective delivery.
- Forecast the resources that are necessary to execute the plan.

IT management requirements

The *IT management requirements* are a documentation of all the requirements needed to deliver the in-scope IT management services. IT management services are defined based on the client's perception of services, and scoped according to the requirements of the engagement. The IT management requirement includes:

- An overview of the in-scope IT management services
- A mapping of the in-scope IT management services to the processes and sub-processes required to delivery them
- A mapping of the managed IT elements to their associated sub-processes to structure the base matrix for assembling the requirements

Early project estimate

The *early project estimate* is an estimate of the project cost, schedule, and scope that may be required by the client, during the initial phase of the project life cycle. It may include a planning estimate, done very early prior to project initiation, to provide sizing information for planning purposes only, or a *Rough Order of Magnitude (ROM)* estimate, or both, done during the concept phase of the project, to provide a more detailed sizing of the entire project, including deployment. The planning estimate will be refined during the concept phase of the project (once high level requirements are defined) by the ROM, and finalized in the plan phase by the project statement of work (SOW) or agreement.

The planning estimate should be used during the project initiation stage, at the beginning of concept phase, if requested by the client to provide a planning

estimate for the entire project. Frequently a client would require a ROM estimate at this stage of the project. A ROM estimate is *not feasible* at project startup since the projects requirements are unknown or inadequate; therefore, the planning estimate would be for planning purposes only.

A ROM estimate is an approximation of the project cost when high level requirements are available. It is done early in the project when you need a "ballpark guestimate" for the entire project, usually at the end of concept phase as an input to the client for the *Concept Decision Checkpoint (CDP)* review. Frequently, a client would require a ROM estimate at project initiation. A ROM estimate is not feasible at project startup, since the project's requirements are unknown or inadequate. Therefore, the ROM estimate is only feasible when the project requirements are defined at a high level during concept phase, and would required sign-off by management responsible for the overall end-to-end project.

Change request

A *change request* is a form that contains all the information required to support the decision making processes that are used to manage the unforeseen changes that inevitably arise during the course of all but the simplest of projects.

The prime purpose of change management is to ensure that proposed changes that are of benefit to the project are implemented in a controlled manner and that proposed changes that are of little or no value are not. Change requests support this objective by providing:

- A record of the proposed change and the rationale behind it.
- A record of the results of any analysis of the potential impact of the proposed change.
- The information required by the change control board to decide how to proceed with the proposed change and a record of those decisions.
- Together with the change orders, the information required to monitor the implementation of the change through to completion.

Approval to proceed

The *approval to proceed* is not a work product but a task outcome, for which the consulting management team works with the client management team to obtain the approval that addresses the following:

- Understand the timing
- Immediate next steps
- Dependencies
- Resource constraints

Communications sent

The *communication sent* is not a work product but a task outcome ensuring that the ESD Change Request related communications, which were identified in the project's overall communications management plan, have been executed or sent.

Requirements gathered

Requirements gathered is not a work product but a task outcome that states that the requirements related to a specific ESD Change Request have been gathered.

Requirements entered into system

Requirements entered into system is not a work product but a task outcome that states that all requirements related to a specific ESD Change Request have been gathered, documented, and entered into the specified change management computerized system.

2.4.2 Acquire Change Control Board Approval for ESD Change Request

The purpose of the *Acquire Change Control Board Approval* activity of the ESD Change Request process is to submit the ESD Change Request, and review the request with the *Change Control Board (CCB)*, which is a governing body that oversees and approves any changes to the client's IT and business environment. This activity manages the submission of the ESD Change Request, reviewing of the request with the CCB, obtaining the CCB approval for implementing the change, and making any modifications to the Change Request per guidance received from the CCB.

Tasks

The following tasks are performed during the Prepare Change Request Activity:

- Submit Change Request via ESD workflow tool/system

  This is performed by the Client IT Architect, assisted by the Delivery Project Manager.

  The purpose of this task is to submit the ESD Change Request for review by the CCB.

- Receive acknowledgement receipt from CCB coordinator

  This is performed by the Delivery Project Manager, assisted by the Client IT Architect.

The purpose of this task is to receive acknowledgement from the CCB coordinator that the ESD Change Request has been received and that it has been queued for further processing by the CCB.

- Review request with CCB members

  This is performed by the Delivery Project Manager, assisted by the Client IT Architect.

  The purpose of this task is to review the ESD Change Request with CCB members during a scheduled CCB meeting in order to get CCB's approval for the proposed ESD change.

- Update/Change Request based on CCB member's guidance

  This is performed by the Client IT Architect, assisted by the Delivery Project Manager.

  The purpose of this task is to revisit all ESD change requirements including business and technical justifications of the proposed change based on the objections raised by the CCB, and in light of any new guidance that may have been received from the CCB during the earlier scheduled review of the proposed ESD change. The review of the ESD Change Request with the CCB members is a best practice and the ESD Change Request must only be passed onwards for execution once the CCB has reviewed and approved all aspects of the documented change, and a formal written acceptance from the CCB has been received. If the request is not approved by the CCB, then the ESD Change Request needs to be modified, as per the directions of the CCB, and re-submitted for another review.

Inputs and outputs

Input from any of the following external processes may be required during the Acquire Change Control Board Approval for ESD Change Request activity of the ESD Change Request process:

- IT management requirements
- Change request
- Communications management plan

Output from the Acquire Change Control Board Approval activity of the ESD Change Request process will produce:

- Change order
- Requirements submitted
- Communications received
- Approval to proceed
- Change Control Board's decision to re-submit change with modifications

The following is a description of the inputs to and outputs from the Acquire Change Control Board Approval for ESD Change Request activity that have not previously been defined in any other section of this IBM Redbook.

Change order

A *change order* is a form that contains the information required to manage the implementation of all or part of one or more approved Change Requests. It includes a specification of what must be changed and a high-level implementation schedule.

Requirements submitted

Requirements submitted is not a work product but a task outcome that all requirements related to a specific ESD Change Request have been submitted for further processing by the ESD test, production, or building site.

Communications received

Communications received is not a work product but a task outcome that the responses to the ESD Change Request related communications, which have been identified in the project's overall communications management plan, have been received.

Change Control Board's decision to re-submit change with modifications

The Change Control Board's Decision to re-submit *change with modifications* is not a work product but a task outcome where the CCB decides to re-submit the requirements specific to an earlier Change Request because of any technical or business reason.

2.4.3 Determine ESD Category and Site Processes Required

The purpose of the Determine ESD Category and Site Processes Required activity of the ESD Change Request process is to determine the category of ESD change and to determine the ESD Sites that participate in the execution of the Change Request. This activity determines the category (for example, Remove Software, Test Software, and so on) of ESD change and determines the ESD Sites (for example, Building Site, Production Site, and Test Site) that will participate in the execution of the Change Request.

Tasks

The following tasks are performed during the Determine ESD Category and Site Processes Required Activity:

- Determining ESD request category

  This is performed by the Offering Architect, assisted by the Delivery Project Manager and the Infrastructure Specialist.

  The purpose of this task is to determine the category of requested ESD change. A requested ESD change may be specific to one function, such as packaging new software, or may require the execution of several of the functions listed in Table 2-1 on page 24 and Table 2-2 on page 24. During this step, the determination of all functions, which must be performed in support of a given ESD Change Request, is performed.

- Identifying the involved ESD sites to complete requests

  This is performed by the Offering Architect, assisted by the Delivery Project Manager and the Infrastructure Specialist.

  The purpose of this task is to determine the Sites (Building, Production, and Test) that will be involved in the further processing of the ESD Change Order. As indicated in the Prepare Change Request activity, the Change Request may be applicable to one of the three ESD sites, namely the Building Site, Test Site, and the Production Site. The purpose of this task is to evaluate the change order along with other technical and business details and determine which of the aforementioned three sites will be involved in any further processing of the ESD change order.

Inputs and outputs

Input from any of the following external processes may be required during the Determine ESD Category and Site Processes Required activity of the ESD Change Request Process:

- Change order

Output from the Determine ESD Category and Site Processes Required activity of the ESD Change Request Process will produce:

- Determination of the Request category
- Identification of the ESD site processes required to build, test, and distribute

The following sections are a description of the inputs to and outputs from the Determine ESD Category and Site Processes Required activity that have not previously been defined in any other section of this IBM Redbook.

Identification of the ESD site processes required to build, test, and distribute

ESD site processes required to build, test and distribute are identified is not a work product, but a task outcome where all ESD site processes required to build, test, and distribute are identified.

Determination of the request category

A requested ESD change may be specific to one function, such as packaging new software, or may require the execution of several of the functions listed in Table 2-1 on page 24 and Table 2-2 on page 24. During this step, the determination of all functions, which must be performed in support of a given ESD Change Request, is determined.

2.4.4 Develop backout and recovery plan

The purpose of the *develop backout and recovery plan* activity of the ESD Change Request process is to develop and validate a backout and recovery plan in case the ESD change fails. It also determines how the proposed change may be reversed in case a back out from the change is required. It also tests and validates the backout plan to ensure it is possible to use the backout and recovery plan to back out of the proposed change in case the backout is required in the future.

Tasks

The following tasks are performed during the develop backout and recovery plan activity:

- Conducting backup and recovery assessment

  This is performed by the Offering Architect, assisted by the Delivery Project Manager and the Infrastructure Specialist.

  The purpose of this task is to determine how the proposed change may be reversed in case a backout from the change is required.

- Developing the backout plan

  This is performed by the Offering Architect, assisted by the Delivery Project Manager and the Infrastructure Specialist

  The purpose of this task is to develop a backup plan to ensure that the proposed change may be undone in case it negatively impacts the IT environment, or if for any business or technical reason a backout from the change is required. Established Backup and Recovery techniques may be tailored and used for this purpose.

- Validating the backout plan

  This is performed by the Offering Architect, assisted by the Delivery Project Manager and the Infrastructure Specialist.

  The purpose of this task is to test and validate the backup plan to ensure that it is in fact possible to use the backup plan to back out of the proposed change in case the back out is required in the future.

Inputs and outputs

Input from any of the following external processes may be required during the develop back out and recovery plan activity of the ESD Change Request process:

- Change order
- IT management requirements
- Solution recovery strategy

Output from the develop back out and recovery plan activity of the ESD Change Request process will produce:

- Collected data
- Identified request category
- Solution recovery strategy
- Validated backout plan

The following section is a description of the inputs to and outputs from the develop back out and recovery plan activity that have not previously been defined in any other section of this IBM Redbook.

Collected data

Collected data is not a work product but a task outcome where all data required, including backup media, backup interval, recovery requirements, recovery time objective, recovery point objective, and so on, are collected.

Identified request category

A requested ESD change may be specific to one function, such as Prepare New ESD package, or may require the execution of several of the functions listed in Table 2-1 on page 24 and Table 2-2 on page 24. During this step, the determination of all functions, which must be performed in support of a given ESD Change Request, is performed.

Solution recovery strategy

The *Solution Recovery Strategy* defines the approach to recovering an integrated business system composed of multiple *endpoints* or target clients from the failure of any one of those endpoints. These endpoints may include:

- Business applications
- Web services or other business components
- Business partner systems
- Other business unit systems

The Solution Recovery Strategy defines the approaches to be used in restoring an integrated business system to the most current valid state possible. This strategy considers the endpoints that are involved, and the business processes that are to be recovered. It establishes the state to which each endpoint must be recovered, in order to reach the solution target state for each business process.

It is useful to contrast the Solution Recovery Strategy with a Disaster Recovery Strategy. The *Disaster Recovery Strategy* focuses on recovery of an enterprises' business IT operations as a whole. The Solution Recovery Strategy only addresses the scope of a single business system. As such, the Solution Recovery Strategy provides a small part of the approach necessary to perform disaster recovery for the business. In addition, the Solution Recovery Strategy is of more general use. It addresses recovery of the solution due to an endpoint failure, not necessarily the result of a business IT systems disaster.

The established strategy forms the basis for further design and implementation of the recovery mechanisms for the business system. This has a particularly strong influence on the design of integration systems, such as enterprise application integration, for the solution. In such systems, it may be necessary to:

- Run several complex business transactions through the various endpoints to achieve a valid solution state
- Account for in-flight business transactions between endpoints

The strategy should cover:

- Definition of the set of associated endpoints and valid recoverable states for each business process in the business system
- Definition of the endpoint states that support each business process solution state
- Order of recovery for the endpoints associated with each business process, to bring it to the valid recovered state

- Description of the conceptual level recovery approaches to be used with respect to the endpoints in the different areas of the solution. This will provide an indication of where:
  - Compensating transactions are necessary.
  - Roll back techniques are necessary.
  - Custom recovery techniques are to be considered.
  - Manual procedures will be needed, and so on.

This work should be undertaken as a core element of integrated solution design. The valid solution states should already be under development, if not complete, when this work product is constructed. Similarly, the information states of each endpoint that define these solution states should also be known.

Assuming that these conditions exist, the core of the intellectual effort consists of making the right selections for the recoverable business states, and for the endpoint information recovered states that support them. The remaining effort is in documenting the details of these decisions.

Validated Backout Plan

A *Validated Backout Plan* is not a work product but a task to validate that the backout plan to uninstall or remove or gracefully back out of the specified ESD change is tested and validated.

2.4.5 ESD Change Request Resource Planning

The purpose of the *ESD Change Request Resource Planning* activity of the ESD Change Request process is to determine resource requirements for the proposed change. It also validates all resource requirements for the proposed change from all relevant ESD sites. It obtains a client's approval regarding budgetary resource and cost estimation. Finally, it requests and assigns resources to the development of the project plan.

Tasks

The following tasks are performed during the ESD Change Request Resource Planning activity:

- Determining resource requirements.

  This is performed by the Delivery Offering Manager and the Offering Architect.

  The purpose of this task is to determine what resources (labor, hardware, software, capital, office space, and so on) are required to execute the ESD Change Request.

- Confirming resource requirements with ESD Site Coordinator

  This is performed by the Delivery Offering Manager and the Offering Architect.

  The purpose of this task is to validate what resources (labor, hardware, software, capital, and so on) are required by the relevant ESD (Building, Test, and Production) site coordinator for executing the ESD Change Request.

- Request client approval

  This is performed by the Delivery Project Manager.

  The purpose of this task is to review budgetary project cost estimates with the client and receive client approval to proceed with further planning the execution of the requested ESD change at the relevant ESD (Building, Test, and Production) sites.

- Request and allocate resources to plan.

  This is performed by the Delivery Project Manager.

  The purpose of this task is to request resources from resource manager and assign them to the resource pool used for the development of the project plan.

Inputs and outputs

Input from any of the following external processes may be required during the ESD Change Request Resource Planning activity of the ESD Change Request Process:

- Change order
- Human Resource plan
- Solution recovery strategy
- Estimated preliminary costs

Output from the ESD Change Request Resource Planning activity of the ESD Change Request process will produce:

- Estimated preliminary costs
- Approval to proceed
- Agreement
- Resources assigned to plan

The following is a description of the inputs to and outputs from the ESD Change Request Resource Planning activity that have not previously been defined in any other section of this IBM Redbook.

Human Resource plan

The *Human Resource plan* shows the number of people required to staff the project, analyzed by human resource category and time. It also specifies the facilities and training required for each human resource category and the planned team-building activities.

The purpose of the Human Resource plan is to provide the project manager a tool to help in staff planning, estimating staff costs, coordinating staff acquisition and controlling staff levels, staff-related needs, and team-building activities over the life of the project.

The project manager uses the Human Resource plan when building up or restructuring the resource pool for the project, especially during the startup period of a phase.

The Human Resource plan is also used to provide the project manager with a high-level view of the progress in obtaining and starting staff and, consequently, where the bottlenecks and the areas where management effort should be focused are. Additionally, each time the staffing situation is reviewed, the associated team-building activities are reassessed and augmented accordingly.

Human Resource plan work product structure

The *Human Resource plan* is structured as three components:

- Human resource requirements
- Facilities and training requirements
- Team-building plan

The Human Resource requirements component is structured at the human resource category level.

Note: The staff list and the staff schedule contain information about individual project team members.

The second component includes the team building plan. A team building plan is prepared at the project level, but each project organizational unit (POU) may also prepare a team building plan.

Estimated Preliminary Costs

The *Estimated Preliminary Costs* documents and quantifies the configuration, costs, and assumptions required to acquire and to implement the proposed system. The costs or estimated costs are the best available information given the level of knowledge of the installation, the estimated number of users, the number of interfaces or integration points with other systems, and other facts that will

come to light during the detailed study and planning tasks. The scope of the Estimated Preliminary Costs addresses:

- The estimated software costs to the client
- The estimated hardware costs to the client
- The estimated implementation and integration costs to the client
- The timing and order of installation based on a high-level implementation plan
- The estimated total costs of the system for software, hardware, and services
- All assumptions used in calculating the costs and schedule

The preliminary costing process is iterative throughout the selection phase and will be finalized prior to the integration phase of the project.

The development of the Estimated Preliminary Costs can vary widely depending on the scope and size of the project. The Estimated Preliminary Costs is usually the initial cost document for the discussion, planning, and acquisition of the new system. The original numbers will be approximates that are refined as the actual requirements become known. Early in the Estimated Preliminary Costs task, the Project Manager should meet with the Client Team Manager and appropriate client financial personnel to identify and address the basis and purpose of the numbers. Typically, these numbers are “list” prices from the vendors and illustrate typical hardware, implementation and support costs. During the final definition phase and negotiations, these numbers may change significantly.

Agreement

An *agreement* is the formal definition of the mutual commitments of the delivery organization performing the service, and the sponsor or requestor of service, and of a subcontractor and the delivery organization or of other parties, such as co-contractors. There can be more than two parties to an agreement.

The structure and content of the agreement can vary markedly from project to project. In particular, agreements with external sponsors and subcontractors are usually very different from those with internal organizations.

Resources Assigned to Plan

Resources Assigned to Plan is not a work product but a task to ensure that the required resources are assigned to the project plan for executing a specified Change Request.

2.4.6 Develop ESD preliminary deployment plan

The purpose of the *Develop ESD preliminary deployment plan* activity of the ESD Change Request process is to review resources and change requirements for the purpose of developing an initial plan, to develop building blocks of the

ESD deployment plan, and then to develop an ESD deployment project plan, which is specific to the approved ESD change order.

Tasks

The following tasks are performed during the Develop ESD Preliminary Deployment Plan Activity:

- Reviewing resources and change requirements

  This is performed by the Offering Architect and the Delivery Project Manager.

  The purpose of this task is to review resource and change requirements, cost estimates, resource availability and schedules and business information related to the project management discipline for the purpose of developing an initial plan.

- Building change-specific project work plans

  This is performed by the Delivery Project Manager.

  The purpose of this task is to develop building blocks of the ESD deployment plan. It is based on the agreement with the client and the external inputs of overall organizational breakdown structure, the project definition report from the project's sponsor. By following cost estimates, resource availability, and schedules and business information related to the project management discipline, the building blocks of an ESD deployment plan, including the definitive cost estimates, are developed.

- Develop Change Specific ESD Deployment Plans

  This is performed by the Offering Architect and the Delivery Project Manager.

  The purpose of this task is to develop an ESD deployment plan that is specific to the approved ESD change order.

Inputs and outputs

The Develop ESD Preliminary Deployment Plan activity of the ESD Change Request Process may require input from any of the following external processes:

- Change order
- Estimated preliminary costs
- Solution recovery strategy
- Agreement
- Organizational breakdown structure
- Project definition

Output from the Develop ESD Preliminary Deployment Plan activity of the ESD Change Request Process will produce:

- Initial planning completed
- Review completed
- Deliverable definition
- Human Resource plan
- Product breakdown structure
- Project estimates
- Project management schedule
- Risk definition
- Work breakdown structure
- Software distribution plan
- Change-specific project unit work plans

The following section is a description of the inputs to and outputs from the Develop ESD Preliminary Deployment Plan activity that have not previously been defined in any other section of this IBM Redbook.

Organizational Breakdown Structure

The purpose of the *Organizational Breakdown Structure (OBS)* is to highlight the shape of the project in terms of human resource organization, and to provide a basis for planning the work of each project organizational unit.

Projects are organized into one or more project organizational units. Each project organizational unit is assigned one or both of the responsibilities:

- Completing one or more sub-projects
- Managing one or more other project organizational units

The OBS defines how the project is organized into project organizational units and describes:

- The relationships between the sub-projects and the project organizational units
- The reporting relationships between the project organizational units
- The reporting relationships with the delivery organization and with the other performing organizations
- The team structure of the project organizational units

When the OBS is limited to a depiction of its broad constituent parts, it is called a *high-level OBS*.

The project is organized into *n* project organizational units. Each project organizational unit is assigned one or both of the responsibilities of:

- Completing one or more sub-projects
- Managing one or more project organizational units

The OBS identifies the project organizational units and sub-projects and defines:

- The hierarchical reporting relationships between the project organizational units
- The sub-projects for which each project organizational unit is responsible
- The structure of the teams within the project organizational units

Project definition

The purpose of the *Project definition* is to:

- Formalize the understanding of the Project *charter* by the delivery organization
- Provide the plan elements in order to control the Defining activities
- Give an initial description of the project "shape" used as a framework for the Planning activities
- Provide the plan elements in order to control the Planning activities
- Gather the fundamental characteristics of the project in a unique document

The Project definition contains the results of the Defining activities. Those results are used as a starting point to build the project plan.

Work product structure

The Project definition contains the following components:

- Project objectives
- Project background
- Target solution and overall approach
- Project scope
- Planning framework
- Organization
- Financial
- Appendix A, B, and C

Review completed

Review completed is not a work product, but a task to ensure the formal review of the planned work is completed.

Deliverable definition

A *deliverable definition* provides a description of a deliverable and its components, as well as the associated delivery and acceptance conditions.

A deliverable definition also provides the status of the deliverable.

A deliverable is any verifiable outcome defined in an agreement that must be produced by a project or a sub-project. Included are products or services provided by the delivery organization to the sponsoring organization or by a supplier to the delivery organization.

The purpose of a deliverable definition is to formalize what the releasing and accepting parties have agreed to regarding:

- What the deliverable is and of what it is composed
- When the deliverable will be released
- Which acceptance criteria have to be met by the deliverable
- Which process will be used to check those acceptance criteria

The deliverable definition is not intended to be a development view of the deliverable but a view usable for releasing and accepting activities.

Product Breakdown Structure

The *Product Breakdown Structure (PBS)* is a hierarchical decomposition of the work products into their components or their constituent parts.

The hierarchy may contain more than one level, for example, a software product may be broken down into a number of subsystems, each of which may be broken down into a number of modules.

Each component is given a name and, where feasible, each component at the lowest level in the hierarchy is also assigned to a type, for example, “complex online module” or “technical document”.

The PBS shows how the work products will be built, not necessarily how they will be delivered.

Note: Although they are both hierarchical lists, the PBS and the work breakdown structure (WBS) are two very different things. The PBS is a decomposition of the solution into components and elements that the project will make, reuse, or buy, while the WBS shows all the activities that the project team performs.

The purpose of the PBS is to identify the architecture of the solution and the items that the project must create or reuse as a first step towards defining a strategy to build the solution.

A PBS is particularly useful for operational work products, such as hardware or software products, that can be broken down into a relatively large number of components, each of which can be classified according to a relatively small number of types.

A PBS is not useful for informational work products, such as some study reports, where the activities (and estimates) depend more on the problem solving approach to be followed than on the work product being built. For example, a project to perform a requirements analysis, will depend primarily on the work patterns derived from the technical methods used to plan the project, and therefore, will probably not use a *PBS*.

Project Management Schedule

The purpose of the *Project Management Schedule* is:

- To organize the work of the project along a time scale, in such a way that dependencies are clarified and commitments can be met at the specified due dates
- To provide project management with a sound basis upon which to track and control progress

The structure of the Project management schedule is illustrated in the Gantt chart shown in Figure 2-2, where each work unit is represented by a bar that shows its start and finish dates.

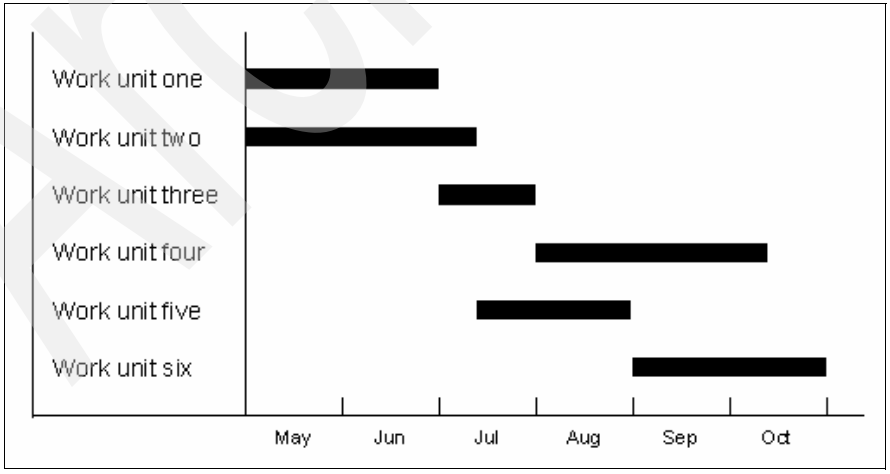

Figure 2-2 Project management schedule

Work units are usually presented in a structured way with a three-level hierarchy of:

- Work units, named “Tasks”, which represent the lowest level to which dependencies must be tracked.
- Intermediate work units, named “Activities”, which can themselves be shown as a breakdown of broader activities.
- Long-running work units, named “Phases”, each of which may contain several activities and tasks.

Additionally, milestones, which may be at any level, are represented as work units of zero duration.

Risk definition

The *risk definition* provides a description of each anticipated risk associated with the project.

A risk is a future event that may adversely affect the project.

The risk definition contains the following components:

- Risk identification
- Risk description
- Risk analysis or risk revision
- Risk management plan summary
- Risk reassessment history

Formal project management methodology embraces the concept of continuous risk management as defined by the Software Engineering Institute (SEI). The goal of risk management is to identify project risks and develop strategies that eliminate or significantly reduce the probability and impact of the risk occurrence.

Work breakdown structure

The WBS is comprised of two components:

- WBS structure
- Network diagram of the activities

Figure 2-3 on page 45 illustrates the WBS structure component.

No	Name	Type	PBS Xref
1	Top-level activity		
1.1	2nd-level activity		
1.1.1	3rd-level activity	Type one	2.1.1
1.1.2	3rd-level activity	Type two	2.1.1
1.1.3	3rd-level activity	Type two	2.1.1
1.2	2nd-level activity		
1.2.1	3rd-level actvity	Type three	2.1.2
1.2.2	3rd-level activity	Type two	2.1.2
2	Top-level activity		

Figure 2-3 WBS structure component

Figure 2-4 shows the network diagram where each rectangle represents an activity and each arrow represents a dependency between activities.

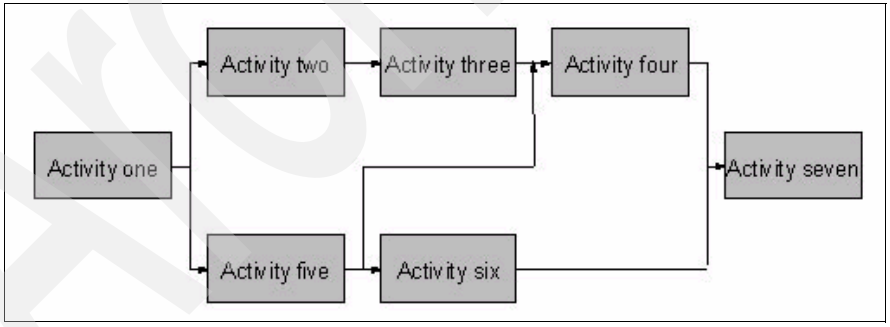

Figure 2-4 The network diagram

2.4.7 Client approval of ESD deployment plan

The purpose of the client approval of ESD deployment plan activity of the ESD Change Request process is to obtain client's approval of the ESD deployment plan.

Tasks

Acquiring the client's approval of final ESD change scope, cost, and schedule is performed during the client approval of ESD deployment plan activity.

This is performed by the Offering Architect and the Delivery Project Manager.

The purpose of this task is to determine to obtain final sign-off from the client with regards to the ESD Change Order's scope, schedule, and cost before the plan can be executed.

Inputs and outputs

Input from any of the following external processes may be required during the client approval of ESD deployment plan activity of the ESD Change Request process:

- Project estimates
- Software distribution plan

Output from the Client Approval of ESD Deployment Plan activity of the ESD Change Request Process will produce:

- Agreement
- Financial plan
- Project management schedule
- Software distribution plan
- Change specific project unit work plans

The following is a description of the inputs to and outputs from the Client Approval of ESD Deployment Plan activity that have not previously been defined in another section of this IBM Redbook.

Financial plan

The *financial plan* is a set of one or more two-dimensional tables that show the estimated and budgeted amounts project expenditure and revenue by expenditure type and accounting period.

The plan may be presented at several levels of detail, depending both on the stage of the project at which it is produced and on the intended audience, as well as the level of detail required for the financial measurement baseline (FMB).

Although a financial plan could be developed for each project organizational unit, typically, one is produced for the project as a whole.

Work product structure

The structure of the Financial plan includes the following components:

- Estimates
  - By phase and expenditure type
  - Project estimates by expenditure type
- Budget
  - Project budget by phase
  - Project budget
- Appendix A
  - Itemized estimates by expenditure type
- Appendix B
  - Consolidated project estimates by phase

2.4.8 Execute ESD deployment plan

The purpose of the *Execute ESD Deployment Plan* activity is to assign the Change Order to the relevant Site Coordinator for further plan execution. Based on planned commitments, the coordinator periodically tracks and monitors the progress and status of the assigned Change Order from each relevant Site Coordinator, provides the client results obtained from implementing the Change Request, obtains the client's acceptance of the results, and releases resources used by the Change Request process and completes other project closeout activities.

Tasks

The following tasks are performed during the Execute ESD Deployment Plan activity:

- Assigning ESD change to relevant Site Coordinator

  This is performed by the Delivery Project Manager and the Offering Architect.

  The purpose of this task is to assign change the order to the relevant (Building, Test, and Production) site coordinator for further plan execution and to receive initial progress report from the site coordinator.

- Tracking and monitoring ESD Change Order Status from the Site Coordinator

  This is performed by the Delivery Project Manager and the Offering Architect.

  The purpose of this task is to perform project control and project monitoring. Based on planned commitments, periodically track and monitor the progress and status of the assigned Change Order from each relevant (Building, Test,

and Production) Site Coordinator and to receive ongoing progress reports from the Site Coordinator and receive a final status report once the Change Request has been completed.

- Communicate change order results to client

  This is performed by the Delivery Project Manager.

  The purpose of this task is to provide the client with the results obtained from implementing the Change Request. Once the ESD change order has been executed, final reports showing success or failure and other status information from the change are gathered from each relevant Site Coordinator and then passed on to the client in the form of a formal report.

- Obtain client acceptance

  This is performed by the Delivery Project Manager.

  The purpose of this task is to obtain the client's acceptance of the results. Once the ESD change order has been executed, final reports showing success or failure and other status information from the change are gathered from each relevant Site Coordinator. These reports are then further aggregated and processed and a final project status report is delivered to the client for formal acceptance of the Change Order's implementation results.

- Release ESD project resources

  This is performed by the Delivery Project Manager.

  The purpose of this task is to release any remaining resources, which were assigned to the execution of the ESD change order. While project closing begins earlier on in the life cycle of the project, once the ESD change order has been executed, and client acceptance of the results has been obtained, any remaining the ESD resources may be released and made available for other work efforts.

- Close Out Change Request in System

  This is performed by the Delivery Project Manager.

  The purpose of this task is to close out the Change Request in the end-to-end ESD workflow or change management system. Once the ESD Change Order has been executed, and client acceptance of the results has been obtained, the Delivery Project Manager must close out the Change Request in the end-to-end ESD workflow or change management using approved project management procedures.

2.4.9 Inputs and outputs

Input from any of the following external processes may be required during the Execute ESD Deployment Plan activity of the ESD Change Request Process:

- Software distribution plan

Output from the Execute ESD Deployment Plan activity of the ESD Change Request Process will produce:

- Initial report
- Final report
- Interim status report
- Project status report
- Resources released
- Project evaluation report
- Change-specific project unit work plans

The following section is a description of the inputs to and outputs from the Execute ESD Deployment Plan activity that have not previously been defined in any other section of this IBM Redbook.

Initial report

The *Initial report* is not a work product but a task to ensure that the initial report based on the work completed as a result of the ESD Change Request plan is produced.

Final report

The *Final report* is not a work product but a task to ensure that the final report based on the work completed is produced.

Interim status report

The *Interim status report* is not a work product but a task to ensure that the interim status report based on the work completed on the ESD Change Request plan is produced.

Project status report

The *project status report* is a scheduled report that is created by the top-level project manager for the project. The project status report includes:

- Status, which describes the state of the project versus the project plans
- Progress, which describes what the project has accomplished

The purpose of the project status report is to provide the line of business management with an accurate assessment of the current state of the project.

The project status report includes the following information:

- Reporting period
- Project status summary
- Resources
- Costs
- Earned value
- Project accomplishments
- Planned accomplishments for next period
- Quality status
- Issues
- Risks
- Changes
- Compliance Incidents

Resources released

Resources released is not a work product but a task to ensure that the resources, which were engaged to complete a Change Request, are released once they have accomplished their assigned tasks.

Project evaluation report

The *project evaluation report* provides a concise summary of the project and the lessons learned during its execution, and identifies potential reusable materials. The purpose of the project evaluation report is to enrich the enterprise's know-how and intellectual capital. A project evaluation report is the basis for organizational learning. It provides a foundation of knowledge from which the enterprise's project processes, procedures, and performance are improved over time.

The project evaluation report includes the following information:

- Project summary
- Lessons learned

This component describes what worked particularly well and what should be improved:

- Intellectual capital
- Close out report

2.5 Summary

The ESD Change Request process activities are:

- Prepare Change Request
- Acquire Change Control Board Approval for ESD Change Request
- Determine ESD category and site processes required
- Develop Backout and Recovery Plan
- ESD Change Request resource planning
- Develop ESD preliminary deployment plan
- Client approval of ESD deployment plan
- Execute ESD deployment plan

In this chapter, we described these activities in detail as a set of structured activities that manage and govern the tasks required to prepare, validate, process, and close an ESD Change Request while adhering to best practices. Although a Change Request can be opened for a number of different ESD services, the request is managed through its life cycle using the ESD Change Request process, which ensures that each time service is requested, the appropriate inputs are received, and consistent and desired outputs are produced.

3

Electronic Software Distribution Building Site process

This chapter describes the Electronic Software Distribution Building Site process and includes the following sections:

3.1 Overview of the Electronic Software Distribution Building Site process

The Electronic Software Distribution Building Site process controls the creation of a software package or distribution medium, which will ultimately be used by an electronic software distribution mechanism during an installation or update process.

The inputs to the Electronic Software Distribution building site are predefined activities and data elements that make up the information required to build an Electronic Software Distribution package that can be distributed and installed in an automatic way. The output of the Electronic Software Distribution building site is a package and a set of data elements about the package, such as the size, name, and version number of the package, or the requested distribution media ready for testing.

The Electronic Software Distribution Building Site process produces the following deliverables that are used in supporting processes within the end-to-end Electronic Software Distribution process:

- Software images
- Software distribution plan
- Executables
- Test report
- Project status report
- Project evaluation report

This chapter describes the inputs to the Electronic Software Distribution Building Site process (as shown in Figure 3-1 on page 55), the outputs from the process, and the activities involved in the Electronic Software Distribution Building Site process, which include the following:

- Analyzing Electronic Software Distribution change order
- Configuring and setting up the required building site
- Developing package or media
- Performing unit or component testing for developed package media
- Updating of Electronic Software Distribution forms
- Handing over of the package or media created

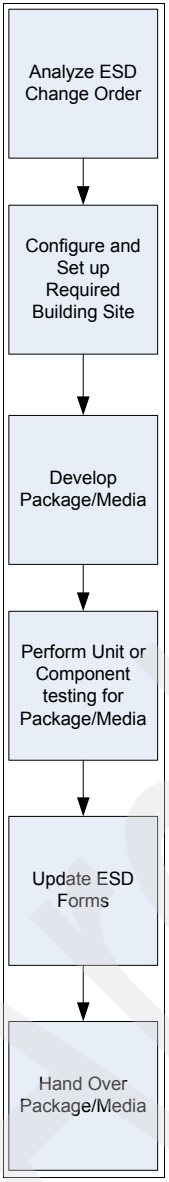

Figure 3-1 Electronic Software Distribution Building Site process

3.2 Electronic Software Distribution Building Site process measurements

In order to provide a clear picture of the effectiveness and efficiency of the Electronic Software Distribution Building Site process, a measurement criteria must be established. These measurements are tracked and used to determine potential quality issues and productivity enhancements. The measurements include the following:

- Percentage of Electronic Software Distribution packages or media built within the requested time period

  Based on the on-going data collection during the Building Site process, the number of Electronic Software Distribution packages that are prepared within the designated time intervals are measured. The measurement starts with the reception of the Electronic Software Distribution building site request and ends with the handing over of the completed packages or media to the requesting entity.

- Percentage of Electronic Software Distribution packages and media successfully tested without returning them to the Electronic Software Distribution building site for rework

  The numbers of correctly prepared Electronic Software Distribution packages or media (such as those packages or media that are 100 percent compliant with all designated business and technical guidelines and requirements that led to their creation) will be measured to provide information about the quality of the Electronic Software Distribution building site activities.

3.3 Electronic Software Distribution Building Site process roles

The following roles are performed in the Electronic Software Distribution Building Site process:

- Solutions Architect

  The *Solutions Architect* designs and configures solutions, which may run on multiple platforms and may be composed of multiple software packages, middleware elements, and other assets. The Solutions Architect performs critical evaluation and selection of the software and hardware components of the solution and prepares for the development of the solution by evaluating and selecting development methodologies and tools.

- Project Manager

  The *Project Manager* (PM) is responsible for leading a project team in delivering a solution to the client using the appropriate business measurements and terms and conditions for the project according to the project charter, project agreement, or contract. The PM has overall performance responsibility for managing scope, cost, schedule, and contractual deliverables, which includes applying techniques for planning, tracking, change control, and risk management. The PM is responsible for managing all project resources, including subcontractors, and for establishing an effective communication plan with the project team and the client. The PM provides day-to-day direction to the project team and regular project status to the client.

- Team Leader

  The *Team Lead* is responsible for a small group of individuals and leads one of several teams on the project and responsible for all coordination activities within the sub-team.

- Test Architect

  The *Test Architect* designs and configures the test cases required to validate the build process. Test Architects participate in test planning activities and develop the test design with input from the Test Specialists. They evaluate the non-functional requirements for testing and participate in the review of the technical acceptance criteria. They oversee the development of the test scenarios and test cases for verifying that the *system is built right*.

- Technical Specialist

  Technical Specialists develop and test the applications and systems from a technical perspective. They participate in design, development, and test planning activities. The Technical Specialists develop the test scenarios and test cases for verifying that the *system is built right*. Usually considered technical experts in their field, the Technical Specialists focus on development and testing of computerized deliverables that impact performance, security, load and capacity, networks, and infrastructure.

- Change Management Delivery Project Manager

  The *Change Management Delivery Project Manager* is an external role and is responsible for providing the software distribution plan.

- Electronic Software Distribution Change Management Coordinator

  The *Electronic Software Distribution Change Management Coordinator* is an external role and is responsible for managing the Electronic Software Distribution change records and schedules.

3.4 Electronic Software Distribution building site activities

The following section is a list of the activities that are performed as part of the overall Electronic Software Distribution Building Site process. Each activity is made up of a number of tasks and sub-tasks that are performed by specific individuals who perform defined roles within this process. In addition, each of the Electronic Software Distribution Building Site process activities requires a set of input and produces a number of outputs that are discussed further.

3.4.1 Analyzing Electronic Software Distribution change order

The purpose of the *Analyze Electronic Software Distribution change order* activity is to provide technical feasibility approval related to proceeding further with implementing the Electronic Software Distribution change order, and to validate estimated resource requirements for the Electronic Software Distribution change management coordinator. This activity is based on a review and analysis of the Electronic Software Distribution change order, Electronic Software Distribution deployment plan, and associated technical documentation.

The Solution Architect conducts a technical feasibility for implementing the change based on the technical and business details provided along with the change order. In addition, part of the analysis performed by the Electronic Software Distribution Building Site Solution Architect and the Electronic Software Distribution Building Site Project Manager includes validating the estimated resource requirements provided as part of a Software Distribution Plan by the Change Management Delivery Project Manager.

Tasks

The following tasks are performed during the Analyze Electronic Software Distribution Change Order activity:

- Validating change-specific Electronic Software Distribution deployment plan for building site

  This is performed by the Solution Architect, assisted by the Project Manager.

  The purpose of this task is to validate the Software Distribution Plan provided by the Change Management Delivery Project Manager.

  The change order and the associated documentation is received from the Change Management Delivery Project Manager and by the Electronic Software Distribution Building Site Solution Architect. It is then reviewed by the Solution Architect and the Electronic Software Distribution Building Site Project Manager for completion, accuracy, and details. The Solution Architect conducts a technical feasibility for implementing the change based on the

technical Electronic Software Distribution architecture and the business details provided along with the change order.

- Confirming Resource Requirements with Electronic Software Distribution Change Management Coordinator

  This is performed by the Project Manager and assisted by the Solution Architect.

  The purpose of this task is to confirm the resource requirements with the Electronic Software Distribution Change Management Coordinator. This task includes the identification of available resources based on the skills required to complete the Change Order Request Type.

Electronic Software Distribution change order

The Electronic Software Distribution change order may have been created in order to perform one of the functions listed in Table 3-1.

Table 3-1 Electronic Software Distribution change order

Site	Request type	Description
Building site	Prepare new software or patch	Prepare a new Electronic Software Distribution package for a specific application or operating system.
Building site	Prepare new software update	Prepare a new Electronic Software Distribution update package for a specific application or operating system.
Building site	Prepare distribution media	Prepare Software Distribution Media containing Electronic Software Distribution packages to be distributed by special media.
Building site	Remove software	Remove installed software or patch from defined nodes.
Building site	Commit software	Commit installed and activated software or software updates at defined nodes. This implies the removal of backups.

Inputs and outputs

Input from any of the following external processes may be required during the Analyze Electronic Software Distribution change order activity of the Electronic Software Distribution Building Site process:

- Software distribution plans
- Component models
- Operation models
- System context documents
- Change orders
- Architecture overview diagrams
- Solution recovery strategies

Output from the Analyze Electronic Software Distribution change order activity of the Electronic Software Distribution Building Site process will produce:

- Software distribution plans
- Approval to proceed

The following section is a description of the inputs to and outputs from the Analyze Electronic Software Distribution change order activity that have not previously been defined in another section of this IBM Redbook.

Software distribution plans

The *Software Distribution Plan* work product is a description of the way software releases will be distributed to the IT systems on which they must be installed, a cost justification of any investment needed to implement the approach, and a plan for the implementation.

A Software Distribution Plan is part of a systems management engagement or part of an IT systems architecture operational model (described in “Operation Model” on page 61). The Software Distribution Plan includes the data required to allow the operations department to perform the software Configuration, Installation, and Distribution (CID) process.

Generating a software distribution plan is a way to avoid significant adverse impact on users and IT infrastructure due to changes and the overall cost of distributing the solution. The plan, when implemented, will provide the users, (who are accepting a new software and possibly new hardware) with the ability to restore their systems to a known state on short notice. Downtime, due to user error or system disruption, cannot be tolerated in mission critical applications, such as a call center for a telephone company or other utility.

Full automation of the software distribution process is not always necessary, but the plan will identify the cost benefit of automation. The information collected in the plan will be critical for level of manual and automated enablement.

Component Model

The *Component Model* work product describes the structure of an IT system in terms of its software components with their responsibilities, interfaces, (static) relationships, and the way they integrate to deliver the required functionality. The component model work product is the main work product documenting the functional aspect of the architecture of an IT System.

Component models are typically defined and documented at two levels:

- The specification level

  Focuses on specifying the components’ responsibilities and characteristics required to deliver the IT system’s requirements (both functional and

non-functional). These specifications are typically technology and product neutral.

Examples of components at the specification level are Messaging Service and eMarketPlace.

- The physical level

  Focuses on how the components will be realized to meet the previously established specifications. Specified components can be transformed into physical components through custom development, the purchase of products, or the reuse of assets.

  An example of components at the physical level can be WebSphere® MQ, DB2, a CRM application, or a Java™ archive file (jar).

The component model documents the specifications and corresponding realizations of all components (either application, or technical, or both), which ultimately will be placed on the operational model, together with a description of their interfaces, dependencies and collaborations via one or more component models.

Operation Model

The *Operational Model* defines and documents the placement of an IT system's components onto geographically distributed nodes, together with the connections necessary to support the required component interactions, in order to achieve the IT system's functional and non-functional requirements within the constraints of technology, skills, and budget.

An Operational Model may be presented at the:

- Specified Level (SOM®)

  In this level, the required characteristics and capabilities of the Operational Model's elements are defined.

- Physical Level (POM)

  In this level, the hardware and software technologies needed to deliver the Operational Model's characteristics and capabilities are identified and configured, whether they are to be bought or developed.

In common practice, the physical level of the Operational Model documents the network of computer systems and their associated peripherals, together with the systems software, middleware, and application software that they run.

An Operational Model generally includes the following:

- One or more relationship diagrams, documenting the static relationships between the Operational Model's elements, in terms of their location or zone, connectivity, and other factors. These diagrams also document the locations of the access points used by the users and other external IT systems that interact with the operational aspects of the IT system.
- One or more walk-through diagrams, describing how the elements in the Operational Model interact in order to support an activity triggered by a user.
- A detailed description of each node or connection in the Operational Model.
- Connection descriptions, which include a table to identify and describe the interactions between components and supported by descriptive text, as required.

At the specification level, each node and connection description includes the element's security characteristics (confidentiality, integrity, and availability) and other *non-functional requirements*.

At the physical level, each node and connection description defines the hardware configuration and component implementations placed on the node or operating over the connection. This may include a definition of the technology requirements (such as the microprocessor, memory, disk, and peripherals for a node, or bandwidth and latency for a network) needed to achieve the specified non-functional requirements:

- A description of how functional and non-functional requirements will be met

  This includes considerations of how the various service levels (of performance and security) will be achieved, as well as defining the system's functional behavior when operating in an acceptable degraded mode caused by planned or unplanned system outages.
- A description of the systems management strategy to be used to ensure the system maintains the target non-functional requirements.

  This will include topics such as a backup and recovery strategy, the approach adopted for data and software distribution, change control, configuration management, and other systems management processes.

System context documents

The *system context document* initially represents the entire system as a single object or process and identifies the interfaces between the system and external entities. Usually shown as a diagram, this representation defines the system and identifies the information and control flows that cross the system boundary.

The Electronic Software Distribution system context document highlights several important characteristics of the system, such as users, external systems, batch

inputs and outputs, external systems, and devices. It also highlights several classes, as follows:

- External events to which the system must respond
- Events that the system generates that affect external entities
- Data that the system receives from the outside world and that must be processed in some way
- Data produced by the system and sent to the outside world

The objects within the system boundary define the scope over which the development team has some control. The users and systems outside the boundary of the system are those that affect the system operation and development, but are beyond the control of the developers within the currently defined scope of the project. Due to this scoping aspect of the Electronic Software Distribution system context, during the early stages of a project, it is useful to review the Electronic Software Distribution system context document with the client to assist in delineating development team and client responsibilities.

Note: The Electronic Software Distribution system context document may limit the breadth of its coverage to emphasize just one class of external interfaces, for example, only the interfaces to external systems. Additionally, the details required at lower levels of elaboration will depend upon what interfaces are to be subsequently developed.

Figure 3-2 shows an Electronic Software Distribution system context diagram.

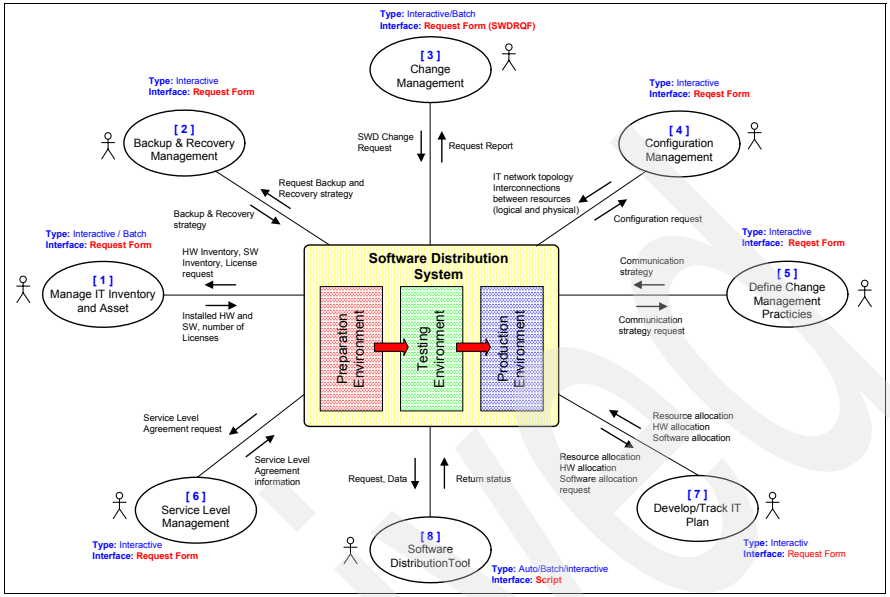

Figure 3-2 Electronic Software Distribution system context diagram

Electronic Software Distribution system context external entities

Each table in this section documents the characteristics of each external entity shown in Figure 3-2 (in numeric sequence).

Note that the owner of each entity described in the following sections may change depending on the business aspects of a specific Electronic Software Distribution project.

Manage IT inventory and assets

Table 3-2 Manage IT inventory and assets entity

Description	IT inventory management environment. The interface to manage IT inventory and assets is to get information about the hardware, software, and licenses related to a specific set of target nodes.
Type	Interactive/Batch.
Owner	Client.

Backup and Recovery management

Table 3-3 Backup and Recovery management entity

Description	Backup and Recovery management defines the type, number and method of backup and recovery methods for specific targets.
Type	Interactive
Owner	Development Team and Operations Team

Change management

Table 3-4 Change management activity entity

Description	All change requests should be handled through the Change Management process.
Type	Interactive/Batch.
Owner	Client Project Manager and Development Team Project Manager.

Configuration management

Table 3-5 Configuration management entity

Description	Configuration management includes information about the network topology and connections, interconnections between resources (logical and physical), and the relationships between assets and operational properties of the assets, which are important for implementing a Software Distribution Change.
Type	Interactive.
Owner	IT Architect.

Change management practices

Table 3-6 Change management practices entity

Description	Change management practices provide overall governance structure and the required communications to the user community before executing a software change. An communication plan will be requested.
Type	Interactive.
Owner	Project Manager.

Service level management

Table 3-7 Service level management entity

Description	The service level management includes information about the Service Level Agreements that need to be met by the Electronic Software Distribution processes.
Type	Automatic/Batch.
Owner	Project Manager.

Develop/Track IT plan

Table 3-8 Develop/Track IT plan entity

Description	The Develop/Track IT plan includes information about the resource allocation (personnel, hardware, and software) of the standard software distribution solution. The resources needed for different Electronic Software Distribution Sites are also requested.
Type	Interactive.
Owner	Project Manager.

Software distribution tool

Table 3-9 Software distribution tool entity

Description	The software distribution tool is used to provide an automation of software changes in the Software Distribution Solution.
Type	Automatic/Batch/Interactive.
Owner	Technical Specialist.

Information flows

Each table in this section documents the characteristics of each information flow that crosses the system boundary (in numeric sequence).

Manage IT inventory and assets

Table 3-10 Manage IT inventory and assets information flow

Description	Keeps track of all installed assets, hardware, and software within the whole IT environment. It also keeps information about the used applications and corresponding licenses.
Number of users	Depends on the client.
Number of transactions	Depends on the client.
Frequency of transactions	Depends on client and applications used.
Volume of data	Depends on the applications in production.

Backup and recovery management

Table 3-11 Backup and recovery management information flow

Description	Keeps information about how, when, and what must be backed up in an IT environment and during which timeframes.
Number of users	Depends on the number of targets.
Number of transactions	Depends on the number of targets and Software Change requests.
Frequency of transactions	Depends on used applications.
Volume of data	Depends on the applications implemented in the Software Distribution Solution.

Change management

Table 3-12 Change management information flow

Description	The Change Management process provides governance for the software distribution process.
Number of users	Depends on the client.
Number of transactions	Depends on the client and applications used.
Frequency of transactions	Depends on the client and applications used.
Volume of data	Depends on the applications in production.

Configuration management

Table 3-13 Configuration management information flow

Description	Configuration of the network, relationship between assets, and operational properties and interconnections between resources are handled.
Number of users	Depends on the client.
Number of transactions	Depends on the client and applications used.
Frequency of transactions	Depends on the client and applications used.
Volume of data	Depends on the applications in production.

Change management practices

Table 3-14 Change management practices

Description	Defines the method and time frame of communication to an user when a Software Change is executed.
Number of users	Depends on the client.
Number of transactions	Depends on the client and applications used.
Frequency of transactions	Depends on the client and applications used.
Volume of data	Depends on the applications in production.

Service level management

Table 3-15 Service level management information flow

Description	Keeps the Service Level Agreements.
Number of users	Depends on the client.
Number of transactions	Depends on the client and applications used.
Frequency of transactions	Depends on the client and applications used.
Volume of data	Depends on the applications in production.

Develop/Track IT plan

Table 3-16 Develop/Track IT plan information flow

Description	Keeps information about the resources planned for standard software distribution solution.
Number of users	Depends on the client.
Number of transactions	Depends on the client and applications used.
Frequency of transactions	Depends on the client and applications used.
Volume of data	Depends on the applications in production.

Software distribution tool

Table 3-17 Software distribution tool information flow

Description	Software Distribution Tool is used to provide an automation of Electronic Software Distribution Changes.
Number of users	Depends on the client.
Number of transactions	Depends on the client and applications used.
Frequency of transactions	Depends on the client and applications used.
Volume of data	Depends on the applications in production.

Architecture overview diagram

The *architecture overview diagram* work product is a schematic diagram that represents the governing ideas and candidate building blocks of an IT system or an entire enterprise. Further, it provides an overview of the main conceptual elements and relationships in an architecture, which frequently include candidate subsystems, components, nodes, connections, data stores, users, and external systems.

As communication is its main purpose, it is more important for the architecture overview diagram to be simple, brief, clear, and understandable than comprehensive in all details. Consequently the diagram uses an informal rich picture notation with components touched at high-level. It typically includes supporting text that explains the main concepts of the architecture.

This type of diagram can be at the:

- IT system level
- Enterprise-wide level

Where alternative architectural solutions are being explored, an architecture overview diagram may be produced for each option to enable various stakeholders to discuss the trade-off between the options.

At an IT system level, the architecture overview diagram is produced very early in a project (possibly at the pre-proposal stage) and influences the initial component model and operational model. It is not intended that design commitments be based on this overview until the (more formal) component model and operational model have been developed and validated.

Subsequently, the component model and operational model are the primary models, and the architecture overview diagram is a derivable view, which is revised if there are changes to the main concepts and relationships (though it is not intended to reflect detailed design decisions).

At an enterprise-wide level, an architecture overview diagram is often produced as part of an overall IT strategy. In this instance, it is used to describe the vision of the business and IT capabilities required by an organization. It provides an overview of the main conceptual elements and relationships, including candidate subsystems, components, nodes, connections, data stores, users, external systems, and a definition of the key characteristics and requirements.

The software distribution architecture overview diagram shown in Figure 3-3 illustrates the essential nature of the proposed solution, conveying the governing ideas and including the major building blocks.

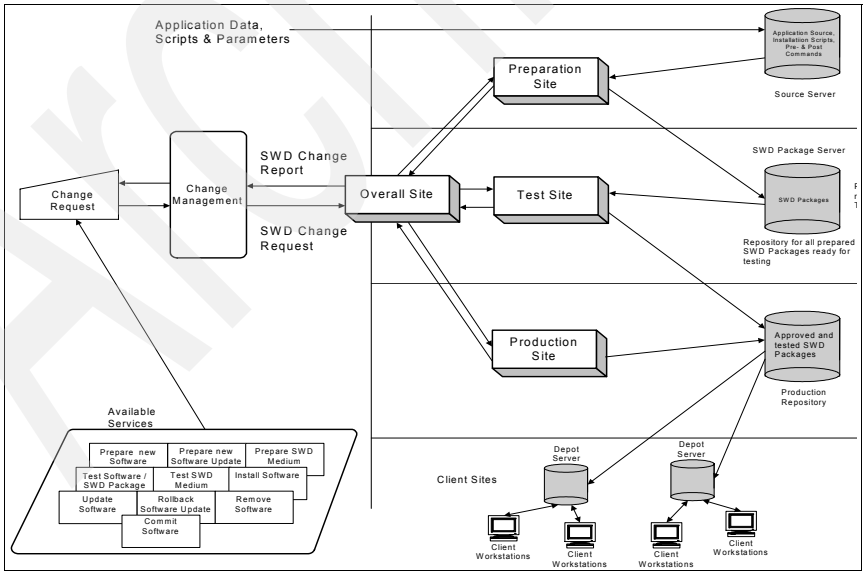

Figure 3-3 Architecture overview diagram

Objectives and key concepts of the software distribution architecture overview diagram

The purpose of the architecture overview diagram is to:

- Communicate a conceptual understanding of the software distribution solution
- Provide a high-level shared vision of the architecture and scope of the proposed IT system
- Explore and evaluate alternative architectural options
- Enable early recognition and validation of the implications of the architectural approach
- Facilitate effective communication between different communities of stakeholders and developers
- Facilitate orientation for new people who join the project

The following section describes the key IT system level architectural concepts depicted in Figure 3-3 on page 70.

The software distribution solution is part of a change management process. Special change requests for applications are delivered to the software distribution overall site. This site is responsible for deploying the software change request to the appropriate (Building, Test, or Production) site.

Depending on the request type, the sites are responsible for fulfilling the request and report the results of activities back to the overall site.

The following sites and interfaces between them are defined to cover the different issues of a software distribution solution:

- Interface between change management and software distribution overall site

  The interface between the change management and the software distribution overall site is a special software change request, which includes the request and the required data depending on the request type.

  The output of the software distribution overall site is a report that includes the result of the activities that has been performed to fulfill the request.

- Overall site

  The overall site is responsible for taking over the software distribution change request from change management. Depending on the request type, the appropriate data must be provided by the requester. The request and data are analyzed and, depending on the request type, the appropriate activities are set up to perform the request. Activities and data are handed over to the appropriate (Building, Test, or Production) site for fulfilment.

After completing of the activities at the (Building, Test, and Production) sites, a report is generated to describe the result of the activities. This report and the data are handed back to the overall site for reviewing. The overall site hands the report back to the change management.

- Interface between the software distribution overall site and preparation (or Building) site

  The interface between the software distribution overall site and the software distribution preparation (or Building) site is a number of activities that must be performed to fulfill the appropriate preparation (or Building) request. The data needed to perform the activities also include the source scripts and parameters of an application that are needed to build a software distribution package, which resides on a special source server.

  The output of the software distribution preparation (or Building) site is a report that includes the result of the activities that has been performed and the entity required by the request. If the preparation (or Building) of a software distribution package was requested, the software distribution package will reside on a special software distribution package server.

- Preparation (or Building) site

  The preparation (or Building) site represents the area of producing a software distribution package or a medium, including software distribution packages for distribution. The input to the preparation (or Building) site are predefined activities and data, including all the information needed to be able to build a software distribution package that can be distributed and installed in an automatic way.

  The output of the preparation (or Building) site is a package and a set of data (such as the size of the package, name of the package, version number, and so on) or the requested distribution medium ready for testing.

- Interface between the overall site and test site

  This interface represents the handover of the predefined activities and the data to the test site. The prepared software distribution packages that will be tested reside on a special server. Distribution medium, used to transmit software distribution packages, is handed over to the administrator of the test side. Standard forms for adding data are handed over in a queue.

- Test site

  The test site represents a part of a client's IT environment, including the different types of workstations, servers, and networks. This stage is to perform all tests defined in a master test plan and described in the testing guide, in order to achieve the defined quality criteria for the implementation of the entities.

The output of the test site is a tested software distribution package or distribution medium that fulfils all the defined criteria and is ready to be implemented into the production environment. Also, data like the installation time frame and transmission timeframes are added to the appropriate forms.

- Interface between overall site and production site

  The interface represents the hand over of the preliminary deployment plan, including activities to perform, data, and forms, to the production environment. If a distribution medium is required, it is also part of the deliverable to the production site.

- Production site

  The production site represents the “live client environment”. The software distribution packages are transferred to the production software distribution repository. From there, the packages can be distributed to a different depot server of the client environment.

  The output of the production site is a report that depends on the results of the requests. The report is handed over to the overall site.

Solution recovery strategies

The *solution recovery strategy* defines the approach to recovering an integrated business system composed of multiple *endpoints* from the failure of any one of those endpoints. These endpoints may include:

- Business applications
- Web services or other business components
- Business partner systems
- Other business unit systems

3.4.2 Configure and setup the building site

The purpose of the *Configure and Setup the Building Site* activity is to prepare the required building site, which will be used to develop the requested package/media entity.

Tasks

The following tasks are performed during the Configure and Setup the Building Site activity:

- Acquiring source code for package or media development

  This is performed by the Solution Architect and assisted by the Team Lead.

  The purpose of this task is to acquire the source code file sets required to build the required package or media.

The building site personnel will physically transfer the approved source code files, which are required to build the package to a system, where version control, license control, and integrity of these files can be maintained. These files are utilized in the future by the building site staff to develop the required package or media. The source code files are also scanned using an antivirus software to ensure that they are not infected by a virus.

- Setting up package or media development environment

  This is performed by the Solution Architect and assisted by the Team Lead.

  The purpose of this task is to prepare a systems environment, which can be used to develop the required package or media.

  Each package and media has a target environment defined for which it must be developed. This target environment constitutes of hardware endpoints or clients on which the package or media is to be developed, software images that may reside on the target endpoint or client, and network connectivity between the source server used to host the source package or media files and the endpoint or client for which the package or media is being developed. This task also sets up the packaging tool required for developing the required package or media.

  This task ensures that the required package or media development environment, which consists of hardware, network, software images, and the connection to the source code repository and the packaging or media generation tool is set up and configured in accordance with the requirements stated in the software distribution plan and change order. A status report is completed once the desired environment has been set up.

- Setting up software required for package or media development

  This is performed by the Solution Architect.

  The purpose of this task is to set up software required for package/media development.

  Prior to the development of any automated installable package or media development, the solution architect manually installs and uninstalls the software code file sets on the target software images and endpoints to examine software installation behavior. The purpose of this installation and uninstallation is also to fine-tune any future approach that may be required to develop the package or media from the given source code file sets.

The following is a description of the inputs to and outputs from the configuration and setup of the building site activity that have not previously been defined in any other section of this IBM Redbook.

Inputs and outputs

Input from any of the following external processes may be required during the configuration and setup activity of the Electronic Software Distribution Building Site process:

- Software distribution plans
- Change orders

Output from the configuration and setup of the building site activity of the Electronic Software Distribution Building Site process will produce:

- Software images
- Sub-project team status reports

The following section is a description of the inputs to and outputs from the configuration and setup of the building site activity that have not previously been defined in any other section of this IBM Redbook.

Software images

A *software image* in this context is defined as a “snapshot” of the operating system and all software or applications residing on a specific hardware (such as a server or workstation). Multiple images may be required by the client if a software change for more than one machine type or configuration is being deployed. The custom software image may be stored on CDs, servers, or another storage medium. Additionally, a customized software image is a client-specific equipment image that contains all relevant software and settings that are common to their situation. Depending on the situation, and other technology employed by the client, images may contain one, two, or three tier applications. Multiple images may be required by the client to match department, local, or user group profiles.

Sub-project team status reports

A *sub-project or team status report* is a scheduled report that is created by the project manager or team leader for each sub-project or team within the project organizational unit that he or she manages. The sub-project or team status report provides information about the progress that the sub-project or team has made relative to its project management schedule during the reporting period.

The Electronic Software Distribution sub-project or team status report provides an accurate and objective view of the status of each Electronic Software Distribution sub-project or team within the responsible project organizational unit. It includes an account of the work completed versus work planned, costs expended versus planned, a forecast of the work remaining, and issues and risks that may jeopardize successful completion of the sub-project.

3.4.3 Develop package or media

The purpose of the *develop package or media* activity is to develop the unattended and automated installation package or media containing the automated install ready package and to create a status report based on the finished product and work results. The latter effort is also called *software packaging*, which is the process and technology that encapsulates the software and required system changes, and intelligently combine these into a distributable and installable format (software packages) along with scripts and utilities to support the installation process.

Packaging software means bringing the files and changes to the system, which are necessary to install and configure applications, fixes, and patches on an IT system, in a manner that can be handled by the software distribution and installation method. The format of the software packages depends on the software distribution tool used for distributing and installing software. The tasks performed during software installation vary from software package to software package. A software package can contain just a couple of files to be copied, a registry key to be changed, or an INI file to be modified, or it can be as complex as running multiple scripts, modifying a registry, creating desktop shortcuts, applying complex application or operating system patches on servers, rebooting systems, and more.

Tasks

The following tasks are performed during the development of the package or media of the building site activity:

- Downloading the source image file set from the image repository

  This is performed by the Solution Architect.

  The purpose of this task is to transfer the package or media and pristine image source code from the image repository to the development endpoint machine.

  The building site personnel download the pristine image and then the package or media source to the development endpoint machine so that the package or media development work can proceed.

- Creating or uploading configuration and control files to the package or media build repository

  This is performed by the Solution Architect.

  The purpose of this task is to develop response files and configuration and control files and transfer them to the source code version controlled repository.

Building Site personnel use the packaging tool or programming language to develop all required response files and control and configuration files needed to develop the package or media entity, and transfer these file sets to the source code repository, which also possesses version control features.

- Developing a software file package block

  This is performed by the Solution Architect.

  The purpose of this task is to develop the unattended and automated installation package or media containing the automated install ready package.

Using the packaging tool or programming language, the Building Site personnel develop the unattended and automated installation package or media containing the automated install ready package, and transfer the final product (set of executables) to the source code repository, which also possesses version control features. A status report based on the finished product and work results is also created.

Inputs and outputs

Input from any of the following external processes may be required during the developed package or media activity of the Electronic Software Distribution Building Site process:

- Software images
- Build procedures
- Source code

Output from the developed package or media activity of the Building Site process will produce:

- Executables
- Sub-project team status reports

The following section is a description of the inputs to and outputs from the developed package or media activity that have not previously been defined in any other section of this IBM Redbook.

Build Procedures

The *Build Procedures* work product describes how to generate an executable copy of the system. This may include such items as which files are required, which links must be in place, which libraries are accessed, the sequence of steps required to generate the system, or any required passwords. This is not a particularly difficult work product, but it is essential to record how the system is generated.

Source Code

The *Source Code* work product is the actual implementation of the system design in the chosen programming language. Depending on the language and environment, there may be several types of code files. In object oriented programming languages, declarations, and definitions of classes, their attributes and methods may be spread across several files. The definitions are then processed by a compiler or precompiler or interpreted to produce the executables.

Executables

The *Executables* work product includes the primary software deliverables for any system development effort. These executables consist of not only the directly executable files installed on the client's computer systems (as in EXE files), but also the installed runtime code libraries (as in DLL files), customizable executable scripts (as in CMD, EXEC, or shell script files), and any other required files (such as device drivers, configuration files, images, icons, and audio files). These executables do not include user support materials but together these make up the full set of product installation files.

3.4.4 Perform unit testing for developed package or media

The purpose of this activity is to perform unit (or component) testing for the developed package or media. The unit or component test is performed by the Building Site staff on the developed package or media in order to identify and resolve problems before turning over the finished product (package or media) to the change requester or test site. The unit test plan work product is utilized to plan and carry out the testing. A test report is generated. If defects are found, then the package is rebuilt using the previously described activity.

Tasks

The conducting unit test task is performed during the Perform Unit or Component Testing for Developed Package or Media of the building site activity.

This is performed by the Test Specialist - Technical.

The purpose of this task is to perform a unit (Component) test for the developed package/media.

A unit (component) test is performed by the building site staff on the developed package or media in order to identify and resolve problems before turning over the finished product (package or media) to the change requester or test site.

Inputs and outputs

Input from any of the following external processes may be required during the Perform Unit or Component Testing for Developed Package or Media activity of the Electronic Software Distribution Building Site process:

- Unit test plan
- Executables

Output from the Perform Unit or Component Testing for Developed Package or Media activity of the Electronic Software Distribution Building Site process will produce a *test report*.

The following section is a description of the inputs to and outputs from the Perform Unit or Component Testing for Developed Package or Media activity that have not previously been defined in any other section of this IBM Redbook.

Unit test plan

A *test plan* is created for each level of testing identified as necessary based on project life cycle testing requirements. Each testing level represents a known level of physical integration and quality of the system solution under development. Each plan identifies the scope of testing for that level, functions, or features to be tested, the testing tasks to be performed, the personnel responsible for each task, and the business and technical risks that can be addressed through that level of testing.

The project needs, based on size, complexity, risks and costs, determine the levels of testing to be used. The following are commonly used levels of tests:

- Unit test
- Integration test
- System test
- Acceptance test
- Operability test
- Systems integration test

For each level of testing, types of testing are selected based on the attributes of the application or system to be tested. Functional types of tests are used to test business functions, and structural types of tests are used to test the technical requirements.

Examples of functional types of tests are:

- Audit and control
- Error handling
- Interface or intersystem
- Transaction flow
- Usability

Examples of structural types of tests are:

- Backup and recovery
- Performance
- Stress
- Volume

For each level of testing, there will specifications that describe the design, execution plans that help run the tests, test results, and test reports that capture the outcome of the testing.

The detailed test plan for each level of testing is created using a different set of steps and techniques. The plan content is adjusted accordingly. Some key sections of the detailed test plans are:

- Test objective
- Functions or features to be tested
- Work items
- Entry and exit criteria for level (if not defined earlier)
- Testing tools and techniques
- Test schedule
- Test environment requirements
- Risks and contingencies

Test report

The *test report* is the executive summary of the test result data. It includes an analysis of the result information to allow management decisions, based on risk, on whether to proceed to the next level of test or to project implementation, or whether more testing is required. It may be automatically generated from the test tool suite or compiled manually.

Some of the factors used to judge the risk are:

- Number of defects found
- Severity levels
- Status of defects: outstanding, investigated, explained, fixed, retested, accepted, and so on.
- Rate of arrival, that is, defects found per test executed, or per tested product component, or both, by test period and level.

Any statistically valid conclusions that can be drawn from these analyses are used to predict the quality level achieved by the tested product and compared to the target level established in the test plans.

The test reports include information about the following:

- Scope of testing

  Any out-of-scope situations are also documented and refer to the risk management process as documented in the test plans.
- What was done and not done versus the plan
- Test results
- Findings about:
  - Functions working
  - Functions not working
- Conclusions
- Quality of software planned versus actual:
  - Test metrics
  - Results
- Issues outstanding
- Recommendations and action plan

3.4.5 Update Electronic Software Distribution Forms

The purpose of the *Update Electronic Software Distribution Forms* activity is to complete all the required paper work (or data entry work into a workflow system) before handing the completed package or media entity onwards to the change requester or to the test site.

Tasks

The task of updating reports and forms is performed during the Update Electronic Software Distribution Forms activity of the Electronic Software Distribution Building Site process.

This is performed by the Test Specialist - Technical.

The purpose of this task is to review the Electronic Software Distribution forms template (which may be in electronic form) and complete the appropriate paper work or data entry.

The project status report is also created to describe all elements of work conducted at the building site in support of the package or media development effort and their results.

Inputs and outputs

Input from any of the following external processes may be required during the Update Electronic Software Distribution Forms activity of the Electronic Software Distribution Building Site process:

- Sub-project team status report
- Test report

Output from the Update Electronic Software Distribution Forms activity of the Electronic Software Distribution Building Site process will produce the *project status report*.

The following section is a description of the inputs to and outputs from the Update Electronic Software Distribution Forms activity that have not previously been defined in any other section of this IBM Redbook.

Project status report

The *project status report* is a scheduled report that is created by the top-level project manager for the project. The project status report includes:

- Status, which describes the state of the Electronic Software Distribution project versus the project plans
- Progress, which describes what the Electronic Software Distribution project has accomplished
- Forecasts, which predicts future Electronic Software Distribution project status and progress based on current project data

3.4.6 Hand Over Package or Media Entity

The purpose of the *Hand Over Package or Media Entity* activity is to complete all required packaging development work or media development work, and to turn over the finished product along with relevant documentation to the Change Request Coordinator.

Tasks

The task of returning the completed package/media to the Change Request Coordinator is performed during the Hand Over Package or Media Entity activity of the Electronic Software Distribution Building Site process.

This is performed by the Solution Architect.

The Building Site personnel complete all required packaging or media development work and turn over the finished product along with relevant documentation to the Change Request Coordinator for further processing (if

required) at the test and production site. The project status report is also provided and this describes all elements of work conducted at the building site in support of the package or media development effort and their results. A project evaluation report is also created and provided to the Change Request Coordinator.

Inputs and outputs

Input from any of the following external processes may be required during the Hand Over Package or Media activity of the Electronic Software Distribution Building Site process:

- Test report
- Executables
- Project status report

Output from the Hand Over Package or Media activity of the Electronic Software Distribution Building Site process will produce:

- Executables
- Project status report
- Project evaluation report
- Building site development completed

The following is a description of the inputs to and outputs from the Hand Over Package or Media activity that have not previously been defined in another section of this IBM Redbook.

Project evaluation report

The *project evaluation report* provides a concise summary of the project and the lessons learned during its execution, and identifies potential reusable materials.

3.5 Summary

This chapter described the following Electronic Software Distribution Building Site process activities:

- Analyzing the Electronic Software Distribution change order
- Configuring and setting up the required Building Site
- Developing the package or media entity
- Performing unit or component testing for the developed package or media entity
- Updating Electronic Software Distribution forms
- Handing over package or media entity

In this chapter, we described these activities in detail as a set of well-defined activities that manage and govern the various tasks within the Building Site process. By controlling the tasks required to perform a technical feasibility approval, the validation of resources required to execute an Electronic Software Distribution change order, preparation of the build site, development and testing of the package or media, and the graceful handoff of the finished package or media to the change request coordinator in a controlled and orderly fashion, a low-cost and high-quality repeatable deliverable can be produced in a short amount of time.

4

Electronic Software Distribution Test Site process

This chapter discusses the Electronic Software Distribution (ESD) Test Site process and includes the following sections:

4.1 Overview of the Electronic Software Distribution Test Site process

The Electronic Software Distribution (ESD) Test Site represents a sample of the client's IT environment, including the different types of workstations, servers and network. This environment is used to perform all tests defined in the test plan, which is part of the overall software distribution plan, in order to achieve defined quality criteria for the implementation of the software distribution entities, such as software packages or media. The desired output of the Test Site is a tested ESD package or distribution media that fulfills all defined criteria and is ready to be implemented into the production environment through software distribution tools. Data like test reports, which include test pass or fail information, installation time frame, transmission time frames and so on, are also documented as part of the ESD Test Site process.

The ESD Change Order may have been created in order to perform one or both functions listed in Table 4-1.

Table 4-1 Functions for the ESD Change Order

Site	Request type	Description
ESD Test Site	Test ESD package	Test ESD package as described in the test plan.
ESD Test Site	Test distribution media	Test the implementation of ESD package, deployed by a media, other than the network, as defined in test plan.

As part of the analysis performed by the Test Site Solution Architect and the Test Site Project Manager, they also validate the estimated resource requirements provided to them as part of the Software Distribution Plan by the Change Management Delivery Project Manager.

Each ESD package and media has a target environment defined for which it must be developed, and against which it should be tested. This target environment constitutes of:

- Hardware clients on which the package or media is to be developed and tested
- Hardware clients on which the package or media is to be deployed and tested
- Software images that may reside on the target endpoint or client
- A testing tool or programming languages required to test the package or media

- Network connectivity between the source server used to host the source package or media files and the endpoint or client for which the package or media is being developed and tested

The process ensures that the required package or media testing environment is set up and configured in accordance with the requirements stated in the software distribution plan's test plan section and the Change Order. A status report is completed once the desired environment has been set up for testing.

Next, the process describes the activities and tasks that the Test Site personnel perform to download the pristine image and the package or media source code to the testing endpoint machines. The required testing is carried out using the package or media testing tools, and the Test Specialist captures the results of each test for further analysis.

During the analysis phase, the Test Specialist analyzes test results and performs the following tasks:

- Determines whether the package or media entity is built according to the required specifications
- Identifies any defects in the package or media entity produced by the building site
- Identifies any defects in the source code file sets of the original software that was transformed into a package or media entity by the building site staff
- Identifies any potential problems and risks that may be caused by the future deployment of the package or media in the target production environment

After the completion of all required package or media testing and analysis work, a reference link to the tested package or media and associated status report and test report are handed over to the Change Request Coordinator for further processing at the production site or for re-work at the building site.

Figure 4-1 illustrates the ESD Test Site process.

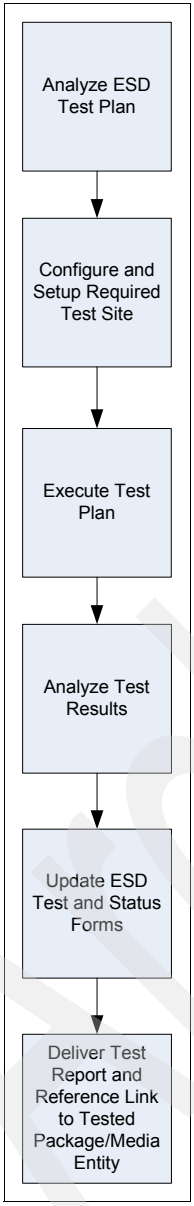

Figure 4-1 ESD Test Site process

The ESD Test Site process produces four major deliverables, which are used in supporting processes within the end-to-end Electronic Software Distribution process:

- Software distribution plan
- Test report
- Project status report
- Project evaluation report

In this chapter, we describe the inputs to the ESD Test Site process, the outputs from the process, and the activities involved in the Test Site which include the following:

- Analyzing the ESD test plan
- Configuring and setting up the required Test Site
- Executing the test plan
- Analyzing the test results
- Updating the ESD test and status forms
- Delivering the test report and reference link to tested package or media entity

4.2 Roles performed in the ESD Test Site process

The following roles are performed in the ESD Test Site process:

- Solution Architect

  Solutions Architects design and configure solutions that may run on multiple platforms, and may be composed of multiple software packages, middleware elements, and other assets. They perform critical evaluation and selection of the software and hardware components of the solution and prepare for the development of the solution by evaluating and selecting development methodologies and tools.

- Project Manager

  Project Managers are responsible for leading a project team in delivering a solution to the client using the appropriate business measurements and terms and conditions for the project according to the project charter, project agreement, or contract. They have overall performance responsibility for managing scope, cost, schedule, and contractual deliverables, which includes applying techniques for planning, tracking, change control, and risk management. They are responsible for managing all project resources, including subcontractors, and for establishing an effective communication plan with the project team and the client. They provide day-to-day direction to the project team and regular project status reports to the client.

- Test Specialist - Technical

  Technical Test Specialists test the applications and systems from a technical perspective. They participate in test planning activities and develop the test design with direction from the Test Architects. They evaluate the non-functional requirements for testability and participate in the review of the technical acceptance criteria. Technical Test Specialists develop the test scenarios and test cases for verifying that the *system is built right*. Usually considered technical experts in their field, they focus on testing of performance, security, load and capacity, networks, and infrastructure.

- Team Leader

  Team Leaders are responsible for a small group of individuals. Team Leaders will direct one of several teams on the project and are responsible for all coordination activities.

4.3 ESD Test Site activities

The following section is a list of the activities that are performed as a part of the overall ESD Test Site process. Each activity is made up of a number of tasks and sub-tasks that are performed by specific individuals who perform defined roles within this process. In addition, each of the ESD Test Site process activities requires a set of inputs and produces a number of outputs that are defined in the following sections.

4.3.1 Analyzing the ESD test plan

The purpose of analyzing the ESD test plan of the ESD Test Site process is to review the ESD test plan, which is part of the software distribution plan, to re-confirm that it is viable to execute, and to confirm the resources required to execute the test plan. The Test Site represents a part of the client's IT environment, including the different types of workstations, servers, and network. This environment is used to perform all tests defined in the test plan, which is part of the software distribution plan, in order to achieve defined quality criteria for the implementation of the entities. The output of the Test Site is a tested ESD package or distribution media that fulfills all defined criteria and is ready to be implemented into the production environment. Data like installation time frame, transmission time frames, and so on, are also added to the appropriate forms.

The Test Site Solution Architect receives the Change Order and associated documentation from the Change Management Delivery Project Manager. The Solution Architect and the Test Site Project Manager then review it for completion, accuracy, and detail. The Solution Architect conducts a technical

feasibility for implementing the change based on the technical and business details provided along with the Change Order.

The ESD Change Order may have been created in order to perform one of several functions listed in Table 4-2.

Table 4-2 Functions for the ESD Change Order

Site	Request type	Description
ESD Test Site	Test ESD Package	Test the ESD package as described in the Test Plan.
ESD Test Site	Test Distribution Media	Test the implementation of ESD package, deployed by a media, other than the network, as defined in Test Plan.

Tasks performed

The following tasks are performed while analyzing the ESD test plan:

- Validating a change specific ESD test plan for Test Site

  The Solution Architect performs this task, assisted by the Project Manager.

  The purpose of this task is to validate the software distribution test plan provided by the Change Management Delivery Project Manager. The Test Site Solution Architect receives the Change Order and associated test plan documentation from the Change Management Delivery Project Manager. The Solution Architect and the Test Site Project Manager then review it for completeness, accuracy, and details. The Solution Architect conducts a technical feasibility for implementing the change based on the testing requirements and the business details provided as input data.

- Confirming resource requirements with the ESD Change Management Coordinator

  The Project Manager performs this task, assisted by the Technical Test Specialist.

  The purpose of this task is to validate the estimated resource requirements.

Inputs and outputs

Input from any of the following external processes may be required while analyzing the ESD test plan activity of the ESD Test Site process:

- Change Order
- Software distribution plan

Output from the analyze ESD production site plan and Change Order activity of the ESD production site process will produce:

- Approval to proceed
- Confirmed plan
- Resource confirmation completion

4.3.2 Configuring and setting up the required Test Site

The purpose of the Configure and Setup Required Test Site activity of the ESD Test Site process is to physically configure all aspects of the Test Site so that it can be utilized in the future by the Test Site staff to test the required package or media.

Tasks

The following tasks are performed while configuring and setting up the required Test Site:

- Acquiring the source code for package or media testing

  The Technical Test Specialist performs this task, assisted by the Team Leader.

  The purpose of this task is to physically transfer the approved source code files, which are required to test the package or media, to a system, where version control and integrity of these files can be maintained, as these files are utilized in the future by the Test Site staff to test the required package or media. The source code files are also scanned using an antivirus software to ensure that they are not infected by a virus.

- Setting up the package or media test environment

  The Technical Test Specialist performs this task, assisted by the Team Leader.

  The purpose of this task is to prepare a systems environment, which can be used to test the package or media. Each package and media has a target environment defined for which it must be developed and tested. This target environment constitutes of:

  - Hardware endpoints or clients on which the package or media is to be tested
  - Hardware endpoints or clients on which the package or media is to be deployed
  - Software images that may reside on the target endpoint or client

– Network connectivity between the source server used to host the source package or media files and the endpoint or client for which the package or media is being developed

This task also sets up the testing tool required for testing the required package or media.

This task ensures that the required package or media testing environment, which consists of hardware, network, software images, connection to source code repository, and the packaging or media testing tool, is set up and configured in accordance with the requirements stated in the software distribution test plan and Change Order. A status report is completed once the desired environment has been set up.

Inputs and outputs

This section describes the inputs to and outputs from the configuration and setup of the required Test Site that have not previously been defined in any other section of this IBM Redbook.

Input from any of the following external processes may be required while configuring and setting up the required Test Site of the ESD Test Site process:

- Executables
- Software distribution plan

Output from the configuration and setup of the required Test Site activity step of the ESD Test Site process will produce:

- File scan for virus completed

  The file scan for virus complete is not a work product but a critical and necessary task output to ensure that the package or media entity's source code is scanned using antivirus tools for detection of any virus or malicious code contained inside the source code.

- Source code acquired

4.3.3 Executing the test plan

The purpose of the execute test plan activity of the ESD Test Site process is to implement the several subtasks associated with the detailed testing of the software package or media per the objectives and directions provided by the ESD test plan, which is part of the overall software distribution plan.

Tasks

The following tasks are performed during the execute test plan activity:

- Performing all required testing

  The Technical Test Specialist performs this task, assisted by the Team Leader.

  The purpose of this task is to carry out all testing work specified in the ESD test plan until completion. The Test Specialist first ensures that the preparation of package or media test environment is completed. The Test Specialist then downloads the pristine image and then the package or media source code to the testing endpoint machines. The required testing is carried out using the package or media testing tools and the Test Specialist captures the results of each test for further analysis.

4.3.4 Inputs and outputs

Input from any of the following external processes may be required during the execute test plan activity of the ESD Test Site process:

- Executables
- Software distribution plan

Output from the execute test plan activity of the ESD Test Site process will produce:

- ESD test completed

  The *ESD test completed* is not a work product but a task outcome to ensure that the plan to execute the tests in the correct order to validate the ESD package or media installation and distribution results is completed in the target test environment.

- Image download completed

  The *image download completed* is not a work product but a task outcome to ensure that the download process for the operating system (OS) or software image is completed.

- Package or media installation completed

  The *package or media installation completed* is not a work product but a task outcome to ensure that the installation of package or media in the target test environment is completed.

- Preparation of test environment completed

  The *preparation of test environment completed* is not a work product but a task outcome to ensure that the setup of the technical environment that is

required by the test process, and includes network, hardware, and software setup, is completed.

- Run planned tests

  Run planned tests is not a work product, but a task outcome to ensure that the tests planned to be run in order to validate the ESD package or media installation and distribution results are run in the target test environment.

4.3.5 Analyzing the test results

The purpose of the analyze test results activity of the ESD Test Site process is to analyze test results and produce a report specifying success or failure of the tests conducted on the basis of the ESD test plan.

Tasks

The *perform test analysis* task is performed during the analyze test results activity.

The Technical Test Specialist performs this role, assisted by the Team Leader.

The purpose of this task is to analyze test results and to:

- Determine whether the package or media entity is built according to the required specifications
- Identify any defects in the package or media entity produced by the building site
- Identify any defects in the source code files sets of the original software that was transformed into a package or media entity by the building site staff
- Identify any potential problems and risks that may be caused by the future deployment of the package or media in the target production environment

Inputs and outputs

Input from any of the following external processes may be required during the analyze test results activity of the ESD Test Site process:

- Executables
- Software distribution plan

Output from the analyze test results activity of the ESD Test Site process will produce:

- Test report
- ESD test completed
- Test analysis completed

The following is a detailed description of the inputs to and outputs from the analyze test results activity that have not previously been defined in another section of this IBM Redbook.

Test report

The test report is the detailed report that specifies the test result data. It includes analysis of result information to allow management decisions, based on risk, on whether to proceed to the next level of the test or to project implementation, or whether more testing is required. It may be automatically generated from the test tool suite or compiled manually.

Some of the factors used to judge the risk are:

- Number of defects found
- Severity levels
- Status of defects: outstanding, investigated, explained, fixed, retested, accepted, and so on
- Rate of arrival: defects found per test executed or per tested product, or both, per component, by test period, and level

Any statistically valid conclusions that can be drawn from these analyses are used to predict the quality level achieved by the tested product and compared to the target level established in the test plans.

The test reports include information about the following:

- Scope of testing: any out-of-scope situations are also documented and refer to the risk management process as documented in the test plans
- What was done and not done versus plan
- Test results
- Findings on:
  - Functions working
  - Functions not working
- Conclusions
- Quality of software: planned versus actual
  - Test metrics
  - Results
- Issues outstanding
- Recommendations and action plan

The purpose of the test report is:

- To show status against test and quality targets at any point in time, at specific milestones, at the end of testing, or both
- To provide project management with risk assessment data to support a decision to proceed to the next level of testing or to project implementation by:
  - Summarizing the test results
  - Analyzing trends
  - Predicting the level of quality of the test product to date
  - Identifying flaws or gaps in the testing process and plans
- To explain any anomalies, such as moving to another test level without completing exit criteria, or not moving there when it appears that such criteria were met
- To determine whether testing at a particular level has been satisfactorily completed

The test report is a key client communication artifact. Without its summary of findings and risks, showing the progress against quality measures as defined in the detailed test plans, there are significantly greater opportunities for misunderstandings. These misunderstandings may lead to reduced product quality, or reduced client satisfaction, or both.

If no formal test reporting is to be done, frequent and consistent informal communication is necessary, particularly of defect management activity and its implications for the project. It would be wise to keep an informal record of these communications as well.

In small or very automated testing projects, there may be less need for formalized reporting at any point in time or at milestones, although a conclusive report should not be omitted. In these circumstances, it is assumed that informal communication or automated reporting will provide the client and project team with a clear picture of test status.

Test analysis completed

Test analysis completed is not a work product but a task outcome to verify that the analysis of test results is completed.

4.3.6 Updating ESD test and status forms

The purpose of the update ESD test and status forms activity of the ESD Test Site process is to complete all required electronic data entry before handing over the final test report, project status report and the tested package or media entity onwards to the Change Requester for further processing at the production site or for re-work at the building site.

Tasks

The updating reports and forms task is performed during the update ESD test and status forms activity:

The Technical Test Specialist performs this task, assisted by the Team Leader.

The purpose of this task is to review and complete the appropriate test forms and change completion forms. The project status report is also created to describe all elements of work conducted at the Test Site in support of the package or media testing effort and their results.

Inputs and outputs

Input from any of the following external processes may be required during the update ESD test and status forms activity of the ESD Test Site process:

- Sub-project team status report
- Test report

Output from the update ESD test and status forms activity step of the ESD Test Site process will produce:

- Project status report
- Form update completed
- Test analysis completed

A description of the inputs to and outputs from the update ESD test and status forms activity that have not previously been defined in another section of this IBM Redbook follows.

Form update completed

The form update completed is not a work product but a task outcome to ensure that the forms and reports pertaining to the status of the software test distribution are completed.

Test analysis completed

Test analysis completed is not a work product but a task outcome to verify that the analysis of test results is completed.

4.3.7 Delivering test report and reference link to tested package or media entity

The purpose of the deliver test report and reference link to tested package or media entity activity of the ESD Test Site process is to deliver the source code reference link of the tested package or media entity along with status and test reports to the Change Request Delivery Project Manager. After the completion of all required package or media testing and analysis work, turn over the reference electronic link to the tested package or media and associated status report and test report to the Change Request Coordinator for further processing at the production site or for re-work at the building site.

The *return completed test report and link to change request coordinator* task is performed during the deliver test report and reference link to tested package or media entity activity.

The Team Leader performs this task, assisted by the Project Manager.

After the completion of all required package or media testing and analysis work, the package or media and reference material links, which can be a pointer to a version controlled source code repository, and associated status and test reports, are turned over to the Change Request Coordinator for further processing.

If the tests were successful, then the Change Request Coordinator can pass the work onwards to the production site for distribution of package or media to the target production environment. If the tests showed any defects or if any problems were identified related to the implementation of the package or media in the test environment and potentially in the production environment, then the package or media may need to be re-worked at the building site. The Project Status Report is also provided and this describes all elements of work conducted at the Test Site in support of the package or media testing effort. A Project Evaluation Report is also created and provided to the Change Request Coordinator.

Inputs and outputs

Input from any of the following external processes may be required during the deliver test report and reference link to tested package or media entity activity of the ESD Test Site process:

- Executables
- Project status report
- Test report

Output from the deliver test report and reference link to tested package or media entity activity of the ESD Test Site process will produce:

- Executables
- Project evaluation report
- Project status report
- Test site processing completed

The following section provides a description of the inputs to and outputs from the deliver test report and reference link to tested package or media entity activity that have not previously been defined in any other section of this IBM Redbook.

ESD Test Site processing completed

ESD Test Site processing completed is not a work product, but a task outcome to ensure that the planned effort at the Test Site is completed.

4.4 Summary

The ESD Building Site process activities are:

- Analyzing the ESD test plan
- Configuring and setting up the required Test Site
- Executing the test plan
- Analyzing the test results
- Updating the ESD test and status forms
- Delivering a test report and reference link to the tested package or media entity

These are a set of well-defined activities that manage the tasks performed by the ESD Test Site personnel while completing an ESD request for service to test a package or media entity. This process can include tasks involved in providing technical feasibility approvals, validating resource requirements, preparation of the Test Site, testing of the package or media, and generation of reports and documentation as a result of performing the ESD tests. These activities are critical to the success and quality of deliverables produced during an ESD project.

5

Electronic Software Distribution Production Site process

This chapter describes the Electronic Software Distribution (ESD) Production Site process. The ESD Production Site process manages:

- The approval related to implementing the ESD change order
- The process to validate estimated resource requirements for the ESD change management coordinator
- The preparation of the ESD Production Site staging environment
- The confirmation of ESD Production Site readiness, communication, and execution of the deployment of the ESD package or media
- The performance for any required back out or recovery procedures
- The analysis of the results from various distributions and processes to take corrective actions
- The generation of status reports to indicate the work that the ESD Production Site does, in response to any requested ESD package or media change

The ESD Production Site represents the production information technology (IT) environment. The ESD packages are transferred to the production software distribution repository or staging servers. From there, you can distribute the packages to defined depot servers, and further to other target endpoints of the IT environment. The output of the ESD Production Site is a report that depends on the results of the requests. You can create the ESD change request, in order to perform one or several functions at the ESD Production Site. Table 5-1 lists these functions.

Table 5-1 Functions at the ESD Production Site

Site	Request type	Description
Production Site	Install software	Install an application or ESD package at defined nodes.
Production Site	Update software	Update an installed, activated, and committed software at defined nodes.
Production Site	Rollback software update	Return to state before, after installation or activation of an update without commitment.
Production Site	Remove software	Remove installed software or patch from defined nodes.
Production Site	Commit software	Commit installed and activated software or software updates at defined nodes. This implies the removal of backups.

Additional change requests for the ESD Production Site may include further functions, as Table 5-2 shows.

Table 5-2 Additional functions at the ESD Production Site

Site	Request type	Description
Production Site	Add entity to production environment	Implement an ESD package or distribution media to production environment.
Production Site	Distribute ESD package	Distribute an ESD package existing in the software repository to defined depot server or nodes.
Production Site	Activate software	Activate installed software at defined nodes.
Production Site	Delete ESD package	Delete an ESD package from defined nodes.
Production Site	Retire ESD package	Remove an ESD package and all updates from the software repository and all depot servers without archiving.
Production Site	Archive and retire ESD package	Archive an ESD package and all updates, and then remove the ESD package from software repository and all depot servers.

The ESD Production Site process confirms that all components of the ESD production environment are ready to accept the ESD package or media distribution. Based on the project's communications management plan, the ESD Production Site provides notification to all identified stakeholders that the ESD package distribution change, which they approved, is now being physically scheduled for a distribution. Additionally, the process also includes tasks to schedule package or media distributions, distribution of package or media, and generation of reports based on a review of the resulting distribution logs.

Note: You can initially perform this previous set of tasks for a client identified *beta-testing* environment, where you choose a sample of the production population of endpoints as a test (or beta) group. The process distributes the ESD package or media to this beta group. Based on an analysis of this beta distribution, you can make a further *Go* or *No Go* decision to repeat or not to repeat the activity for the entire Production endpoint environment.

Finally, the ESD Production Site process includes tasks to review reports based on the distribution logs for re-distribution and rollback target identification. This is to roll back ESD package or media from the identified failed targets, and to redistribute ESD package or media to identified failed targets.

Important: The latter tasks are only carried out in case there are any failed endpoints, which result from the initial distribution effort. After the Production Site completes the distribution processing, it fills out the work completion reports and forms, project status, and evaluation reports of the Production Site, and submits them to the change request coordinator.

The ESD Production Site process produces four major deliverables that are used in supporting processes within the end-to-end Electronic Software Distribution process:

- Distribution processing audit trail completed
- Confirmation or validation of the software distribution plan for Production Site
- Project status report
- Project evaluation report

This chapter also describes the inputs to the ESD Production Site process, the outputs from the process, and the activities involved in the production site, as Figure 5-1 on page 104 and the following list show:

- "Analyzing ESD Production Site plan and change order"
- "Preparing Production Site staging environment"
- "Confirming production environment readiness"
- "Executing initial notification plan"
- "Executing the deployment of a package or media entity to production targets"

- “Executing the backout and recovery plan”
- “Completing the ESD Production Site process”

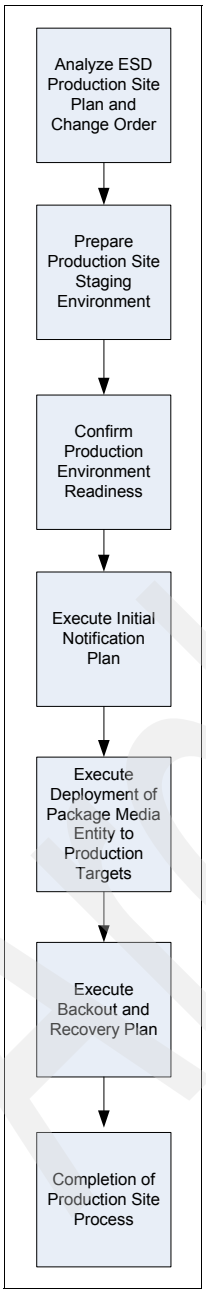

Figure 5-1 ESD Production Site process

5.1 Roles in the ESD Production Site process

The following roles are performed in the ESD Production Site process:

- Solution architect

  A solution architect designs and configures solutions that are composed of multiple software packages, middleware elements, and other assets, and which can run on multiple platforms. The solution architect performs critical evaluation and selection of the software and hardware components of the solution, and evaluates and selects development methodologies and tools to prepare for the development of the solution.

- Project manager

  It is the project manager's responsibility to lead a team in a project. This project could be to deliver a solution to a client, using the appropriate business measurements and terms and conditions for the project, according to the project charter, project agreement, or contract. The project manager has overall performance responsibility for managing scope, cost, schedule, and contractual deliverables, which includes applying techniques for planning, tracking, change control, and risk management. The project manager is responsible for managing all project resources, including subcontractors, and for establishing an effective communication plan with the project team and the client. The project manager provides daily direction to the project team and regular project status to the client.

- Installation coordinator

  The installation coordinator is the individual responsible for system integration activities, which includes ensuring that all technical requirements are in place to support the specified systems. The installation coordinator may also be involved in developing installation plans, procedures, testing environment and data, in system level configuration management, testing facilities management, and software installation and distribution process related technical tasks.

- Team leader

  The team leader is responsible for a small group of individuals. Team leaders direct one of several teams on the project and are responsible for all coordination activities.

5.2 ESD Production Site activities

The following section describes the activities that are performed as a part of the overall ESD Production Site process. Each activity is made up of a number of tasks and sub-tasks that specific individuals, who have defined roles within this process, perform. In addition, each of the ESD Production Site process activities requires a set of input and produces a number of outputs that are also described in the following sections.

5.2.1 Analyzing ESD Production Site plan and change order

The purpose of using the analyze ESD Production Site plan and change order activity of the ESD Production Site process is to ensure a review and analysis of the ESD change order, ESD deployment plan, and associated technical documentation. Therefore, they can provide technical feasibility approval, related to implementing the ESD change order at the production site, and to validate estimated resource requirements for processing at the Production Site.

Tasks

The process performs the following tasks during the analyze ESD Production Site plan and change order activity:

- Validates ESD plan for Production Site:

  This is performed by the Solution Architect, assisted by the Project Manager.

  The purpose of this task is to validate the Production Site software distribution plan that the Change Management Delivery Project Manager provides. The Production Site solution architect receives the change order, Production Site software distribution plan, and associated technical documentation from the Change Management Delivery Project Manager. Then, the Solution Architect and the Production Site Project Manager review it for completeness, accuracy, and detail. The Solution Architect conducts a technical feasibility for implementing the change, based on the technical ESD architecture and the business details provided along with the change order.

- Confirms resource requirements with ESD change management coordinator

  This is performed by the Project Manager, assisted by the Solution Architect.

  The purpose of this task is to validate the estimated resource requirements.

Inputs and outputs

Input from any of the following external processes may be required during the analyze ESD Production Site plan and change order activity of the ESD Production Site process:

- Architecture overview diagram
- Change order
- Component model
- Software distribution plan
- Solution recovery strategy
- System context

Output from the analyze ESD Production Site plan and change order activity of the ESD Production Site process will produce:

- Approval to proceed
- “Confirmed plan”
- “Receive prerequisites”
- “Resource confirmation completed”

The following section is a description of the inputs to and outputs from the analyze ESD Production Site plan and change order activity that this IBM Redbook has not yet defined.

Confirmed plan

The confirmed plan is not a work product. It is a task outcome to ensure that the responsible party reviews, analyzes, and then agrees upon and approves the plan to conduct a particular activity or task. This, therefore, makes further execution of the plan possible.

Receive prerequisites

Receive prerequisites is not a work product. It is a task outcome to verify that the responsible party, who performs a task or an activity, receives the prerequisites required to work on or complete that task or activity.

Resource confirmation completed

Resource confirmation completed is not a work product. It is a task outcome to verify that the party or individual responsible for managing the planned activity or task, confirms the required resource requirements with the relevant resource managers and change review board (if required).

5.2.2 Preparing Production Site staging environment

The purpose of the prepare Production Site staging environment activity of the ESD Production Site process is to set up or validate the existing setup of the Production Site staging server environment, where package or media will be hosted prior to further distribution.

Tasks

The following tasks are performed during the prepare Production Site staging environment activity:

- Setting up package or media production staging environment

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to set up the staging environment where the package or media will reside before it is scheduled for distribution to target endpoint servers. It physically configures all aspects of the production staging server, for example, a source host repository, *or* ensures that this staging area is already configured to receive the package or media from the change coordinator and that this staging area is set up to further distribute this change to targets in the production environment.

  Network and hardware capabilities are set up or their existing setup is validated in support of a future distribution. The distribution tool setup validation is also conducted to ensure that the appropriate distribution mechanism for distributing this package or media to the target endpoint environment is available and properly configured to support the required functions for the production environment. A status report is completed once the desired environment has been set up.

- Promote package or media entity from source server to staging server

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to copy, download, or reference the package or media executables, such that they become available on the production staging environment. The package or media is obtained from the change coordinator directly or through the Test or Building Site. This package or media is promoted (downloaded or copied) on to the staging server environment from where the software distribution tool can access it for further scheduling and distribution processing. In some cases, the package or media may already be available in a version controlled source save repository as a result of the Test or Building Site processes. This repository may also serve as the staging environment for the production site processing.

Inputs and outputs

Input from any of the following external processes may be required during the prepare Production Site staging environment activity of the ESD Production Site process:

- Architecture overview diagram
- Change order
- Component model
- Software distribution plan
- System context
- Executables

Output from the prepare Production Site staging environment activity of the ESD Production Site process will produce:

- Sub-project team status report
- “Preparation of package or media production staging environment”
- “Verify distribution tool setup”
- “Verify network setup of package or media staging server complete”
- “Verify package or media staging server hardware setup complete”
- “Code promote completed”
- “Staging server ready for production process”

The following section is a description of the inputs to and outputs from the prepare Production Site staging environment activity that this IBM Redbook has previously not defined.

Preparation of package or media production staging environment completed

The preparation of package or media production stating environment is not a work product. It is a task outcome to ensure that the environment is completed and ready for production use.

Verify distribution tool setup

Verify distribution tool setup is not a work product. It is a task outcome to verify that the distribution tool setup for use in the production environment is completed.

Verify network setup of package or media staging server complete

Verify network setup of package or media staging server complete is not a work product. It is a task outcome to verify if the setup of the package or media staging server for the production environment is complete.

Verify package or media staging server hardware setup complete

Verify package or media staging server hardware setup complete is not a work product. It is a task outcome to verify that the package or media staging server hardware setup is complete.

Code promote completed

Code promote completed is not a work product. It is a task outcome to verify that the effort related to promotion of code to the staging server environment is completed.

Staging server ready for production process

Staging server ready for production process is not a work product. It is a task outcome to verify whether all work is completed and to ensure that the staging servers are ready to start serving the production environment.

5.2.3 Confirming production environment readiness

The purpose of the confirm production environment readiness activity of the ESD Production Site process is to confirm that all components of the ESD production environment are ready to accept the ESD package or media distribution.

Tasks

The task performed during the confirm production environment readiness activity is confirming whether the production environment is ready for the ESD package or media.

This is performed by the Installation Coordinator, assisted by the Project Manager.

The purpose of this task is to validate the all production resources, which the ESD package or media distribution impacts and places in a condition of readiness to accept the change without any negative impact on the production environment. This readiness review includes validation of all production resources, including the target architecture environment, and all subsystems in the systems context environment. This task also validates that all target endpoints, which are recipients of the specific package or media, have been identified and defined as such to the distribution tool.

Inputs and outputs

Input from any of the following external processes may be required during the confirm production environment readiness activity of the ESD Production Site process:

- Architecture overview diagram
- Change order
- Communications management plan
- Component model
- Software distribution plan
- Solution recovery strategy
- System context

Output from the confirm production environment readiness activity of the ESD Production Site process produces:

- Approval to proceed
- “Confirm stakeholder approvals for production processing”
- “Verify planned production resources ready for change”
- “Verify planned systems context environment ready for change”
- “Verify target architecture environment ready for change”

The following section is a description of the inputs to and outputs from the confirm production environment readiness activity that this IBM Redbook has previously not defined.

Confirm stakeholder approvals for production processing

The confirm stakeholder approvals for production processing is not a work product. It is a task to ensure that all appropriate approvals and sign-offs have been obtained from the appropriate stakeholders.

Verify planned production resources ready for change

Verify planned production resources ready for change is not a work product. It is a task outcome that provides a verification of the fact that the resources that were planned to be used in the production environment are in fact available to execute and complete their tasks.

Verify planned systems context environment ready for change

Verify planned systems context environment ready for change complete is not a work product. It is a task outcome to verify that the target environment, as the production environment's system context diagram specifies, is ready and in position to accept the change.

Verify target architecture environment ready for change

Verify target architecture environment ready for change is not a work product. It is a task outcome to verify that the target environment, as the production environment's architecture diagram specifies, is ready and in position to accept the change.

5.2.4 Executing initial notification plan

The purpose of the execute initial notification plan activity of the ESD Production Site process is to send a notification to all identified stakeholders of the upcoming package or media changes distribution schedule. This activity is based on the project's communications management plan and provides notification to all identified stakeholders that the ESD package distribution change, which they approved, is now being physically scheduled for a distribution.

Tasks

The task performed during the execute initial notification plan activity is called the *execute Production Site communications plan*. This is performed by the Project Manager, assisted by the Team Leader.

The purpose of this task is to send a notification to all identified stakeholders of the upcoming package or media changes distribution schedule.

Inputs and outputs

Input from any of the following external processes may be required during the execute initial notification plan activity of the ESD Production Site process:

- Change order
- Communications management plan

Output from the execute initial notification plan activity of the ESD Production Site process will produce:

- "Change schedule confirmed"
- "Stakeholders notified of upcoming ESD"
- "Validated communication plan"

The following section is a description of the inputs to and outputs from the execute initial notification plan activity that this IBM Redbook has previously not defined.

Change schedule confirmed

Change schedule confirmed is not a work product. It is a task to ensure that the change control board confirms and validates the schedule for implementing the change. The change control board is responsible for approving the implementation of the change in the production environment.

Stakeholders notified of upcoming ESD

Stakeholders notified of upcoming ESD is not a work product. It is a task outcome to verify that all the previously identified stakeholders are notified of upcoming ESD by utilizing the approved change management plan.

Validated communication plan

Validated communication plan is not a work product. It is a task outcome to validate the communication plan with respect to the change for the production environment.

5.2.5 Executing the deployment of a package or media entity to production targets

The purpose of the execute deployment of package or media entity to production targets activity is to schedule the package or media distribution, distribute package or media to target endpoints, and to generate reports based on a review of the resulting distribution logs.

Important: This activity can be performed first for a client-identified beta-testing environment, where a sample of the production population of endpoints is chosen as a beta group, and the ESD package or media is distributed to this beta group. Based on an analysis of the beta distribution, a further *Go* or *No Go* decision may be made to repeat or not repeat the activity for the entire production endpoint environment.

Tasks

The following tasks are performed during this activity:

- Scheduling package or media distribution

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to schedule the package or media entity for deployment to the production target machines. Based on the confirmation of all identified stakeholder's approval for further production processing, the activity uses the software distribution tool and schedules the ESD media or

package based on the specifications, such as time, target name, and so on, that are provided in the change order.

- Distributing package or media

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to distribute the package or media entity for deployment to the production target machines. While utilizing the services of a software distribution tool, the package or media is distributed to the target environment, and the results of this distribution, which are usually in the form of log files based on the tool used for distribution, are collected for further analysis.

- Reviewing distribution logs

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to analyze the results based on logs collected from the distribution of package or media to the production target machines. All software distribution tools, at minimum, generate a log file based report, which indicates the success and failure of the distribution at target endpoints. Various return codes in these log files indicate the level of success and also the causes for failure. The data from these log files is processed to generate meaningful reports to analyze the results of the distributions, to identify all endpoints where the distribution was successful, to identify all endpoints where the distribution should be repeated, and to identify all endpoints from which the package or media should be rolled back because of the nature of the error the distribution causes. A status report is generated as a result of this task, and you can open the problem records in the IT environment's problem management system to address the errors (if any) that resulted from the distribution of the package or media.

Inputs and outputs

Input from any of the following external processes may be required during the execute deployment of package or media entity to production targets activity:

- Change order
- Executables

Output from the execute deployment of package or media entity to production targets activity will produce:

- Confirm stakeholder approvals for production processing
- Package or media distribution scheduled
- Staging server ready for production process
- Stakeholders notified of upcoming ESD distribution

- Package or media distributed to targets
- Distribution logs generated
- Distribution logs analyzed
- Sub-project team status report
- Problem records open

The following section is a description of the inputs to and outputs from the package or media entity to production targets activity that this IBM Redbook has previously not defined.

Package or media distribution scheduled

Package or media distribution scheduled is not a work product. It is a task outcome to verify that the distribution of package or media is scheduled for the production environment.

Package or media distributed to targets

Package or media distributed to targets is not a work product. It is a task to ensure that the package or media is distributed to target endpoints in the production environment.

Distribution logs generated

Distribution logs generated is not a work product. It is a task to ensure that the log files from the distribution or provisioning tool's scheduled production distribution are generated to facilitate the assessment of the success or failures of the distribution on all target endpoints.

Distribution logs analyzed

Distribution logs analyzed is not a work product. It is a task to ensure that the log files from the distribution or provisioning tool's scheduled production distribution are analyzed to assess the success or failures of the distribution on all target endpoints.

Problem records open

Problem records open is not a work product. It is a task to ensure that, based on the review of the results of the provisioning or distribution tool's log files, problem tickets are open to address any failures of the distribution to target endpoints.

5.2.6 Executing the backout and recovery plan

The purpose of the execute backout and recovery plan activity of the ESD Production Site process is to carry out the backout and recovery plan for any endpoints where the distribution was unsuccessful. This is only required if distribution failures occur and if backout criteria are met.

Tasks

The following tasks are performed during the execute backout and recovery plan activity:

- Redistribution or rollback target identification

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to identify redistribution and rollback targets based on the study of distribution log reports. Based on a review of the report data from the log file reports, identify all endpoints where the distribution should be done again, and identify all endpoints from which the package or media should be rolled back because of the nature of the error that the distribution causes.

- Rollback ESD change from identified failed targets

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to roll back ESD package or media from identified target endpoints. While utilizing the services of a distribution tool, the package or media is rolled back from the identified target environment while reinstating the original state of the endpoint, and the results of this distribution are collected for further analysis. These results are usually in the form of log files based on the tool used for distribution.

- Redistributing ESD change to identified failed targets

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to redistribute the package or media entity, for deployment to the identified production target machines. While utilizing the services of a distribution tool, the package or media is redistributed to the identified target environment, and the results of this distribution are collected for further analysis and reporting. These results are usually in the form of log files based on the tool used for distribution. Some of the previous problem records are closed based on the results of the distribution, while others are transferred to the appropriate teams in the IT environment for further resolution.

Inputs and outputs

Input from any of the following external processes may be required during the execute backout and recovery plan activity of the ESD Production Site process:

- Change order
- Sub-project team status report
- Executables

Output from the execute backout and recovery plan activity of the ESD Production Site process will produce:

- Distribution logs analyzed
- “Redistribution targets identified”
- “Rollback targets identified”
- Stakeholders notified of upcoming ESD distribution
- Validated communication plan
- Distribution logs generated
- “Problem record closed or transferred”
- “Rollback completed”
- Sub-project team status report
- Distribution completed

The following section describes the package or media distribution schedule execute backout and recovery plan activity that this IBM Redbook has previously not defined.

Redistribution targets identified

Redistribution targets identified is not a work product. It is a task to ensure that, based on the review of the results of the provisioning or distribution tool's log files, those endpoints are identified where the distribution must be scheduled again, to address any problems with the prior installation attempt. In some cases, the redistribution is scheduled after an identified problem is corrected as a result of opening the problem record or ticket.

Rollback targets identified

Rollback targets identified is not a work product. It is a task outcome to verify that, based on the review of the results of the provisioning or distribution tool's log files, those endpoints are identified where the earlier provided software distribution must be rolled back, to address any problems with the prior installation attempt. In some cases, the rollback is scheduled after an identified problem is corrected as a result of opening the problem record or ticket.

Problem record closed or transferred

Problem record closed or transferred is not a work product. It is a task outcome to validate that, based on the review of the results of the distribution or provisioning tool's log files, problem tickets are closed or they are transferred to the appropriate third-level support personnel for further resolution and closure.

Rollback completed

Rollback completed is not a work product. It is a task outcome to validate that the rollback of a prior change is completed.

5.2.7 Completing the ESD Production Site process

The purpose of the completion of ESD Production Site process activity of the ESD Production Site process is to update the Production Site's work completion reports and forms, and to submit these reports to the change request coordinator.

Tasks

The following tasks are performed during the completion of ESD Production Site process activity:

- Updating Production Sites reports and forms

  This is performed by the Team Leader, assisted by the Project Manager.

  The purpose of this task is to produce a project status report based on the aggregation of all sub-project team status reports for each distribution or rollback activity, and also the reports based on the aggregated analysis of all distribution logs from distribution or backout tasks. This activity will produce a project status report based on the aggregation of all sub-project team status reports for each distribution or rollback activity performed at the Production Site. This activity also includes, within this status report, a section indicating the results based on the aggregated analysis from all distribution logs.

- Submitting reports to the change request coordinator

  This is performed by the Project Manager, assisted by the Project Team Leader.

  The purpose of this task is to submit all project reports to the change request coordinator. This task will provide the change request coordinator with the project status report. This report is based on the aggregation of all sub-project team status reports for each distribution or rollback activity performed at the Production Site. This report may be used for further processing, if required, at the test and building sites or for overall project closing. Included within this report is also a section indicating the results based on the aggregated analysis from all distribution logs. A project evaluation report is also created and provided to the change request coordinator.

Inputs and outputs

Input from any of the following external processes may be required during the completion of ESD Production Site process activity:

- Sub-project team status report
- Project status report

Output from the Completion of Production Site process activity will produce:

- Project status report
- Distribution logs generated
- Report updates completed
- Project evaluation report

The following section is a description of the inputs to and outputs from the completion of ESD Production Site process activity that this IBM Redbook has previously not defined.

Report updates completed

Report updates completed is not a work product. It is a task to ensure that the reports pertaining to the status of the production distribution are completed.

5.3 Summary

The ESD Production Site process includes the following activities:

- “Analyzing ESD Production Site plan and change order”
- “Preparing Production Site staging environment”
- “Confirming production environment readiness”
- “Executing initial notification plan”
- “Executing the deployment of a package or media entity to production targets”
- “Executing the backout and recovery plan”
- “Completing the ESD Production Site process”

These activities are a set of well-defined activities to manage and govern the tasks required at the ESD Production Site. The process governs the technical feasibility approval during:

- The implementation of an ESD change order at the Production Site.
- The validation of resource requirements to complete the service request.
- The preparation and setup of the Production Site staging environment.
- The communication and execution of the deployment plan, including any required backout or recovery procedures through the analysis of ESD distribution results.
- The generation of reports.
- By executing the Production Site process, the ESD project team can execute its Production Site activities in a controlled and orderly procedure. It provides a high quality and repeatable set of deliverables in a timely manner.

6

Operating System Provisioning Building Site process

This chapter describes the Operating System Provisioning (OSP) Building Site process.

This chapter discusses the following:

6.1 Overview of the OSP Building Site process

The OSP Building Site process governs the building site personnel in providing technical feasibility approval related to implementing the OSP Change Order. It validates estimated resource requirements for the OSP Change Management Coordinator, preparing of the OS image or media building site for the development of the requested OS image or media, development and testing of the requested OS image or media, and handing it over to the Change Request Coordinator.

The building site represents the area of producing an automated Operating System (OS) image and installation or provisioning capability or a medium, including OS image installation capability for distribution to various parts of the organization that can use the medium to build their servers. The input to the Building Site are predefined activities and data, including all the information required to build an OS image that can be distributed and installed in an automatic way. The output of the Building Site is an automated OS image, the requested distribution media, installation or provisioning capability, and a set of data, for example, the size of the OS, name of the OS Image build, OS version number, and so on.

The Change Order and associated documentation is received from the Change Management Delivery Project Manager by the Building Site Solution Architect. It is then reviewed by the Solution Architect and the Building Site Project Manager for completion, accuracy, and detail. A technical feasibility for implementing the change is conducted by the Solution Architect based on the technical and business details provided along with the Change Order.

The OSP Change Order may have been created in order to perform one or several functions listed in Table 6-1.

Table 6-1 Functions for the OSP Change Order

Site	Request type	Description
Building Site	Prepare new OS image.	Prepare a new OS Image (OSI) for a specific set of hardware and using a specific operating system.
Building Site	Prepare new software or patch update for OS image build servers.	Prepare a new OSI software or patch update package for an existing operating system image build servers.
Building Site	Prepare distribution media.	Prepare Distribution Media (CD or DVD) containing OSI for a specific set of Hardware and using a specific operating system.

Site	Request type	Description
Building Site	Prepare provisioning mechanism.	Prepare a provisioning mechanism that allows automated OSI provisioning for a specific set of hardware and using a specific operating system.

Each OS image and media has a target environment defined for which it must be developed. This target environment consists of:

- Hardware endpoints or servers on which the OS image or media is to be developed
- Hardware endpoints or servers on which the OS image or media is to be deployed
- Software images that may already reside on the target endpoint or server
- Development and provisioning tools and scripting or programming languages required to develop the OS image or media
- Network connectivity between the source server used to host the source OS image or media file set and the endpoint or server for which the OS image or media is being developed

This process ensures that the aforementioned required OS image or media development environment is set up and configured in accordance with the requirements stated in the OSI plan and Change Order. A status report is completed once the desired environment has been set up.

This process allows the building site personnel to use development and provisioning tools and scripting or programming languages to develop all required response files, control and configuration files needed to develop the OS image or media entity, and transfer these file sets to the source code repository, which also possesses version control features. The building site personnel then develops the intended OS image *or* media and also create a status report based on the finished product and work results.

A unit test is conducted to ensure that the OS image or media, which has been developed, meets the specified requirements. If the unit test does not indicate any problems, then no re-work is required, and the completed OS image or media, along with project status and evaluation reports, is handed back over to the Change Request Coordinator.

The OSP Building Site process produces the following deliverables that are used in supporting processes within the end-to-end OS Provisioning process:

- OS imaging plan
- Software images
- Test report
- Project status report
- Project evaluation report

In this chapter, we describe the inputs to the OSP Building Site process, the outputs from the process, and the activities involved in the Building Site, which include the following:

- Analyzing the OS Imaging (OSI) change order
- Configuring and setting up the required building site
- Developing the OS image or media entity
- Performing unit (or component) testing for developed OS image or media entity
- Updating OSI forms
- Handing over an OS image or media entity

Figure 6-1 shows the activities involved in the OS Provisioning Building Site process.

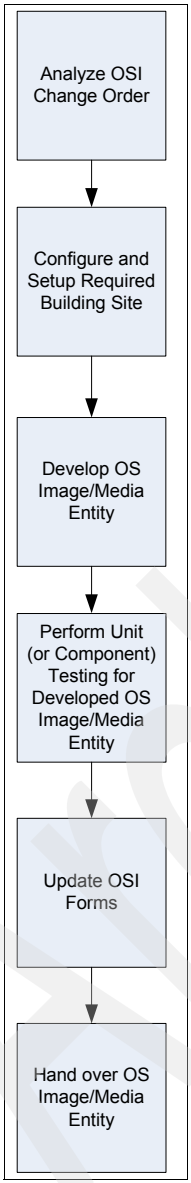

Figure 6-1 Operating System Provisioning (OSP) Building Site process

6.2 Operating System Provisioning Building Site process measurements

In order to provide a clear picture of the effectiveness and efficiency of the OSP Building Site process, a measurements criteria must be established. The results of the defined measurements give a clear picture of the effectiveness and efficiency of the process. Therefore, the following criteria are measured at the OS Imaging Building Site process:

- Percentage of OS images built in the requested time frame

  The number of OS images, which are prepared in a given time frame, are measured. The measurement starts with the receipt of the request and all required prerequisites and ends with the handover of the prepared OS image entity.

- Percentage of OS image media built in the requested time frame

  The number of prepared OSP media prepared in a given time frame are measured. The measurement starts with the receipt of the request and all required prerequisites and ends with the handover of the prepared OS image media entity.

- Percentage of OS Images successfully tested without returning them to the Building Site

  The numbers of correctly prepared OS images will be measured to provide information about the quality of the Building Site activities.

- Percentage of OS Image media successfully tested without returning them to the Building Site

  The numbers of correctly prepared OS image media will be measured to provide information about the quality of the Building Site activities and the quality of used distribution media.

6.3 ESD Building Site process roles

The following roles are performed in the ESD Building Site process:

- Project Manager (PM)

  The PMs are responsible for leading a project team in delivering a solution to the client using the appropriate business measurements and terms and conditions for the project according to the project charter, project agreement, or contract. They have overall performance responsibility for managing scope, cost, schedule, and contractual deliverables, which includes applying techniques for planning, tracking, change control, and risk management. They

are responsible for managing all project resources, including subcontractors, and for establishing an effective communication plan with the project team and the client. They provide day-to-day direction to the project team and regular project status to the client.

- Solutions Architect

  The Solutions Architects design and configure solutions that may run on multiple platforms and may be composed of multiple software packages, middleware elements, and other assets. They perform critical evaluation and selection of the software and hardware components of the solution and prepares for the development of the solution by evaluating and selecting development methodologies and tools.

- Test Specialist - Technical

  The Technical Test Specialists test the OS images, applications, and systems from a technical perspective. They participate in Test Planning activities. and develops the test design with direction from the Test Architect. They evaluate the non-functional requirements for testing and participate in the review of the technical acceptance criteria. They develop the test scenarios and test cases for verifying that the *system is built right*. Usually considered a technical expert in their field, they focus on testing of performance, security, load and capacity, networks, and infrastructure.

- Team Leader

  They are responsible for a small group of individuals. They lead one of several teams on the project and responsible for all coordination activities.

- Change Management Delivery Project Manager

  The Change Management Delivery Project Manager is an external role and is responsible for providing the OS Provisioning plan.

6.4 OSP Building Site activities

The following sections describe the activities that are performed as a part of the overall OSP Building Site process. Each activity is made up of a number of tasks and sub-tasks that are performed by specific individuals who perform defined roles within this process. In addition, each of the OSP Building Site process activities requires a set of input and produces a number of outputs that have been defined in the following sections.

6.4.1 Analyzing the OSP Change Order

The purpose of the Analyze the OSP Change Order activity of the OSP Building Site process is to provide technical feasibility approval related to proceeding further with implementing the OSP Change Order, and to validate estimated resource requirements for the OSP Change Management Coordinator, based upon a review and analysis of the OSP Change Order, OSP Deployment Plan, and associated technical documentation.

Tasks

The following tasks are performed during the Analyze the OSP Change Order activity:

- Validating Change Specific OSI Deployment Plan for Building Site

  This is performed by the Solution Architect, assisted by the Project Manager.

  The purpose of this task is to validate the OS Imaging plan provided by the Change Management Delivery Project Manager and to confirm resource requirements.

  The Change Order and associated documentation is received from the Change Management Delivery Project Manager by the Building Site Solution Architect. It is then reviewed by the Solution Architect and the Building Site Project Manager for completion, accuracy, and detail. A technical feasibility for implementing the change is conducted by the Solution Architect based on the technical OSP architecture and the business details provided along with the Change Order.

- Confirming Resource Requirements with OSP Change Management Coordinator

  This is performed by the Project Manager, assisted by the Solution Architect.

  The purpose of this task is to validate the estimated resource requirements with the ESD Change Management Coordinator. As part of the analysis performed by the Building Site Solution Architect and the Building Site Project Manager, they validate the estimated resource requirements provided to them as part of the Operating System Imaging plan by the Change Management Delivery Project Manager.

Inputs and outputs

Input from any of the following external processes may be required during the Analyze the OSP change order activity of the OSP Building site process:

- Architecture Overview Diagram
- Change order
- OS Imaging plan
- Operational model

- System context
- Solution recovery strategy

Output from the analysis of the OSP change order activity of the OSP Building site process will produce:

- OS Imaging plan
- Approval to proceed

The following section is a description of the inputs to and outputs from the Analyze the OSP Change Order activity that have not previously been defined in another section of this IBM Redbook.

Operating System Imaging plan

An OS Imaging plan is part of a systems management engagement or part of an IT system architecture operational model. The OS Imaging plan includes the data required to allow the operations department to perform the OS configuration, installation, and distribution (or provisioning) process.

Generating an OS Imaging plan is a way to avoid significant adverse impact on users and IT infrastructure due to changes and the overall cost of developing and distributing the solution. The plan, when implemented, will provide users, who are accepting a new or updated OS and possibly new hardware, with the ability to restore their systems to a known state on short notice. Downtime, due to user error or system disruption, cannot be tolerated in mission critical applications, such as an on demand data center for a telephone company or other utility.

Full automation of the OS Imaging and provisioning process is not always necessary, but the plan will identify the cost benefit of automation. The information collected in the plan will be valuable for any mixture of manual and automated processes.

6.4.2 Configuring and setting up required Building Site

The purpose of the Configure and Setup Required Building Site activity of the OSP Building Site process is to physically configure all aspects of the building site so that it can be utilized in the future by the Building Site staff to develop the required OS image or media.

Tasks

The following tasks are performed during the Configure and Setup Required Building Site activity:

- Acquiring source code for OS image or media development

  This is performed by the Solution Architect, assisted by the Team Lead.

The purpose of this task is to acquire the source code file sets required to build the required OS image or media.

The building site personnel will physically transfer the approved source code files, which are required to build the OS image for a system, where version control and integrity of these files can be maintained as these files are utilized in the future by the building site staff to develop the required OS image or media. The source code files are also scanned using an antivirus software to ensure that they are not infected by a virus.

- Setting up OS image or media development environment

  This is performed by the Solution Architect, assisted by the Team Lead.

  The purpose of this task is to prepare a systems environment, which can be used to develop the required OS image or media.

  Each image and media has a target environment defined for which it must be developed. This target environment consists of hardware endpoints or clients on which the OS image or media is to be developed, hardware endpoints or clients on which the OS image or media is to be deployed (in some cases, even existing software images that may already reside on the target endpoint or client), and network connectivity between the source server used to host the source OS image or media files and the endpoint or client for which the OS image or media is being developed.

  The target hardware environment can be made up of stand-alone servers or logical partitions within a virtualized environment. This can include technologies such as Blades and VMWare. Virtualization using logical partitions on a single physical hardware can help reduce the amount of space needed to house these servers. It can also help simplify the management of these partitions using common partition management utility that comes with virtualization software, such as VMWare. However, ample care needs to be taken to ensure that the various applications on each of the logical partitions will work in a virtualization environment.

  This task also sets up the OS image development and provisioning tool, which may be required for developing and eventually deploying the required OS image or media. In addition, the appropriate hardware device drivers need to be acquired from the operating system vendors to ensure the appropriate device drivers are available for the building site hardware environment.

  This task ensures that the above required OS image or media development environment, which consists of hardware, network, connection to source code repository, and the OS image or media development tool is set up and configured in accordance with the requirements stated in the Operating System Imaging plan and Change Order. A status report is completed once the desired environment has been set up.

- Setting up software required for OS image or media development

  This is performed by the Solution Architect.

  The purpose of this task is to access the OS image source code file set, and any applications or patches that must be part of the end product image or media, and install or uninstall them in the OS image or media development environment.

  Prior to the development of any automated installable OS image or media development, the Solution Architect installs and uninstalls all code file sets on the target hardware environment or endpoints to examine software installation behavior. The purpose of this installation and uninstallation is also to fine-tune any future approach that may be required to develop the OS image or media from the given source code file sets.

  In addition, the Solution Architect can consider including common standard tools or applications in the OS image. The Solution Architect can install and uninstall these standard tools or applications on the target hardware environment or endpoints to examine the software installation behavior. These applications are then included in the OS image. This will help reduce the amount of time needed to install these standard tools or applications as there would be no need to distribute and install these applications after the OS image is installed. This should only be considered for standard tools or applications that are common to most servers. Other nonstandard or one-off tools or applications should continue to be distributed and installed using an electronic software distribution technology.

  The Solution Architect can also enhance the OS image by adding automation to tune the OS images for becoming servers with different profiles or appliances, such as Web servers and database servers. This can be achieved by including appropriate applications, such as Web server software or database software, in the OS image. The OS Provisioning technology provides the ability for configuration and parameters to be specified and customized during the build process.

  During the development of the automated installable OS image, all OS customizations, including security hardening, should be manually set. Once the desired configuration is complete and has been unit tested, then the customized OS image can be created.

Inputs and outputs

Input from any of the following external processes may be required during the Configuration and Setup Required Building Site activity of the OSP Building Site process:

- Change order
- Operating System Imaging plan

Output from the Configuration and Setup Required Building Site activity of the OSP Building Site process will produce:

- File Scan for Virus Completed for OS Image
- Source Code Acquired
- Network Setup of OS Image or Media Building Site Completed
- OS Image or Media Building Environment Completed
- OS Image or Media Server Hardware Setup Complete
- OS Image Development and Provisioning Tool Setup Completed
- Pristine Machines for Builds Available
- Sub-project team status report
- Install or Re-installation Completed for OS Image

These are a description of the inputs to and outputs from the Configuration and Setup Required Building Site activity that have not previously been defined in another section of this IBM Redbook:

- File Scan for Virus Completed for OS Image

  File Scan for Virus Completed for OS Image is not a work product, but a task to ensure the OS image or media entity's source code is scanned using antivirus tools for detection of any virus or malicious code contained inside.

- Network Setup of OS image or media Building Site completed

  Network Setup of OS image or media building site completed is not a work product, but a task to ensure that the setup of the network environment, which is required by the OS image or media entity build process, is completed.

- OS image or media Building Environment Completed

  OS image or media Building Environment Completed is not a work product, but a task to ensure that the setup of the OS image development tool environment, which is required by the OS image or media entity build process, is completed. The setup of the technical environment, which is required by the OS image or media entity build process and which includes network setup and hardware or software setup, is completed.

- OS image or media Server Hardware Setup Complete

  OS image or media Server Hardware Setup Complete is not a work product, but a task to ensure that the setup of the server hardware, which is required by the OS image or media entity build process, is completed. The server hardware environment can be made up of stand-alone servers and logical partitions in a virtualization environment.

- OS Image Development & Provisioning Tool Setup Completed

  OS Image Development & Provisioning Tool Setup Completed is not a work product, but a task to ensure that the setup of the OS Image development tool

environment, which is required by the OS image or media entity build process, is completed.

- Pristine Machines for Builds Available

  Pristine Machines for Builds Available is not a work product but a task to ensure that the server or workstation on which the OS Image or media entity is to be developed has been made available.

- Install or Re-Installation Completed for OS Image

  Install or Re-Installation Completed for OS Image is not a work product but a task to ensure that the initial semi-automated installation of the OS image or media entity is completed and the initial semi-automated un-installation of the OS image or media is also completed.This also includes the semi-automated installation and un-installation of standard tools and applications that are to be included in the OS image. Testing of the standard tools and applications in a virtualization environment is also completed successfully. The OS image will also be customized with the appropriate security hardening. The semi-automated process indicates that a fully automated mechanism for installation or un-installation is not invoked to perform this task.

6.4.3 Developing an OS media entity

The purpose of the Develop OS Media Entity activity of the OSP Building Site process is to develop the requested OS image or media at the Building Site and to create a status report based on the finished product and work results.

Tasks

The following tasks are performed during the Develop OS Media Entity activity:

- Developing OS image or media entity

  This is performed by the Solution Architect and is assisted by the Team Leader.

  The purpose of this task is to develop the required OS image or media entity. Once the OS image or media entity has been built, the final product is transferred to the OS image repository. The media can be in the format of CD, DVD, or tape. A status report based on finished product and work results is also created.

Inputs and outputs

Input from the external process, Build Procedures, may be required during the Develop OS Media Entity activity of the OSP Building Site process.

Output from the Develop OS Media Entity activity of the OSP Building Site process will produce:

- Sub-project team status reports
- OS and applications source code and scripts acquired
- OS image or media building environment completed
- OS image or media entity upload to repository completed
- OS image building and provisioning tools

The following is a description of the inputs to and outputs from the Develop OS Media activity that have not previously been defined in another section of this IBM Redbook:

- OS and Applications Source Code and Scripts acquired

  OS and Applications Source Code and Scripts acquired is not a work product, but a task to ensure that the OS and Application source code and scripts required for the development and provisioning of the OS Image have been created.

- OS image or media Building Environment Completed

  OS image or media Building Environment Completed is not a work product, but a task to ensure that the setup of the OS image development tool environment, which is required by the OS image or media entity build process, is completed. The setup of the technical environment, which is required by the OS image or media entity build process, and which includes network setup and hardware or software setup, is completed

- OS image or media Entity Upload to Repository Completed

  OS image or media Entity Upload to Repository Completed is not a work product, but a task to ensure that the transfer of an OS image or media entity to the repository is completed.

- OS Image Building and Provisioning Tools

  OS Image Building and Provisioning Tools is not a work product, but a task to ensure that the tools required for the development and provisioning of the OS Image are available.

6.4.4 Performing unit or component testing for a developed OS image or media entity

The purpose of the Perform Unit or Component Testing for Developed OS image or media Entity activity of the OSP Building Site process is to perform a unit (or component) test of the developed OS image or media entity.

Tasks

The Conduct Unit (or Component) Test task is performed during the Perform Unit or Component Testing for Developed OS image or media Entity activity. It is performed by the Solution Architect, assisted by the Team Lead.

The purpose of this task is to conduct the unit test for the developed OS image or media.

The unit test is performed by the Building Site staff on the developed OS image or media in order to identify and resolve problems before turning over the finished product to the Change Requester or test site. A virtualized environment with logical partitions can be utilized to set up the testing environment. The unit test includes testing of the OS image and also the testing of the standard tools and applications that will work in a virtualized environment.

The Unit Test plan work product is utilized to plan and carry out the testing. A Test Report is generated. If defects are found, then the OS image or media is re-built using the previous activity.

Inputs and outputs

Input from the Unit Test Plan may be required during the Perform Unit or Component Testing for Developed OS image or media Entity activity of the ESD Building Site process.

Output from the Perform Unit or Component Testing for Developed OS image or media Entity activity of the OSP Building Site process will produce a Test Report.

6.4.5 Updating OSP forms

The purpose of the Update OSP Forms activity is to complete all required documentation before handing the completed image or media entity onwards to the Change Requester or to the test site.

Tasks

The Update Reports and Forms task is performed during the Update ESD Forms activity of the ESD Building Site process and is performed by the Project Manager, assisted by the Team Lead.

The purpose of this task is to complete appropriate documentation prior to releasing the OS image or media.The Project Status Report is also created to describe all elements of work conducted at the building site in support of the OS image or media development effort and their results.

Inputs and outputs

Input from any of the following external processes may be required during the Update OSP Forms activity of the OSP Building Site process:

- Sub-project team status report
- Test report

Output from the Update OSP Forms activity of the OSP Building Site process will produce a Project Status Report.

6.4.6 Handing over an OS image or media entity

The purpose of the Hand Over OS image or media Entity activity is to complete all required OS image or media development work and turn over the finished product, along with the relevant documentation, to the Change Request Coordinator.

Tasks

The Return Completed OS image or media to Change Request Coordinator task is performed during the Hand Over OS image or media Entity activity of the OSP Building Site process. This is performed by the Project Manager, assisted by the Team Lead.

The purpose of this task is to complete all required OS image or media development work and turn over the finished product along with relevant documentation to the Change Request Coordinator for further processing (if required) at the test and Production Site. The Project Status Report is also provided, and this report describes all elements of work conducted at the Building Site in support of the OS image or media development effort and their results. A Project Evaluation Report is also created and provided to the Change Request Coordinator.

Inputs and outputs

Input from any of the following external processes may be required during the Hand Over OS image or media activity of the OSP Building Site process:

- Test report
- Project status report

Output from the Hand Over Package or Media activity of the ESD Building Site process will produce:

- Project status report
- Project evaluation report
- Building site development completed

6.5 Summary

The OSP Building Site process activities include:

- OS Imaging plan
- Software images
- Test report
- Project status report
- Project evaluation report

This list constitutes a set of well-defined activities that manage the tasks required by the Building Site personnel to provide a high quality OS image or media and OS Provisioning tools service. The activities govern the tasks involved to perform technical feasibility approvals, validation of resource requirements, setup of the building site, development and test of the OS image or media, and creation of reports and associated documentation through the turning over of a quality product to the OSP Change Coordinator.

7

Operating System Provisioning Production Site process

This chapter describes the Operating System Provisioning (OSP) Production Site process and discusses the following:

7.1 Overview of the OSP Production Site process

The OSP Production Site process assists the production site personnel in providing technical feasibility approval related to implementing the OSP Change Order, validates estimated resource requirements for the OSP Change Management Coordinator, prepares the Production Site staging environment to confirm Production Site readiness, communicates and executes the deployment of the Operating System (OS) image or media, performs any required back out or recovery procedures, analyzes results from various deployments and takes corrective actions if required, and describes the generation of status reports that indicate the work done by the Production Site in response to any requested OS image or media Change Request.

The Production Site represents the production IT environment. The OS images are transferred to the production operating system imaging repository or staging server. From there, the OS images can be distributed to defined depot servers and then deployed or provisioned onwards to other target endpoints of the IT environment. The output of the production site is a report depicting the results of the change requests.

The OSP change request may be created in order to perform one or several functions at the production site. These functions are listed in Table 7-1.

Table 7-1 OSP Change Request functions

Site	Request type	Description
Production Site	Install OS image.	Install an OS image at defined nodes using automated provisioning or media.
Production Site	Update OS image.	Update an existing OS image at defined nodes.
Production Site	Rollback OS image (or patch from build server).	Returning a build server (OS image repository) to a prior state, after having installed an Image update (or patch update from build server).
Production Site	Remove OS image (or patch from build server).	Remove installed OS image or patch from defined nodes.

Additional change requests for the OSP Production Site may include the request shown in Table 7-2.

Table 7-2 Additional change requests for the OSP Production Site

Site	Request type	Description
Production Site	Add entity to production environment.	Implement an OS image (distribution media) to production environment.
Production Site	Distribute or provisions OS image.	Distribute or provision an OS image existing in the OS image repository to defined depot server or nodes.
Production Site	Delete OS image.	Delete an OS image from defined OS image repository nodes.
Production Site	Retire OS image.	Remove an OS image from the OS image repository and all depot servers without archiving.
Production Site	Archive and retire OS image.	Archive an OSP image and all updates and afterwards remove the OSP image from software repository and all depot servers.

As part of the analysis performed by the Production Site Solution Architect and the Production Site Project Manager, they also validate the estimated resource requirements provided to them as part of the OS Imaging Plan by the Change Management Delivery Project Manager.

In order to prepare the Production Site staging environment, the Production Site process includes activities and their underlying tasks to physically configure all aspects of the production staging server (for example, a source host repository) or to ensure that this staging area is already properly configured to receive the OS image or media and that this staging area is set up to further distribute this change to targets in the production environment. The source code from building or test sites is moved to this staging area before its distribution can be scheduled.

The Production Site process describes the tasks performed to confirm that all components of the OSP production environment are ready to accept the OS image or media distribution. Based on the project's communications management plan, the process describes the tasks required to provide notification to all identified stakeholders that the OS image distribution change, which was approved by them, is now being physically scheduled for a distribution, the tasks to schedule and distribute the OS image or media, and the tasks to generate reports based on a review of the resulting distribution logs.

Finally, the Production Site process includes tasks to review reports based on the provisioning logs.

The OSP Production Site process produces three major deliverables, which are used in supporting processes within the end-to-end OS Provisioning process:

- OS Imaging plan
- Project status report
- Project evaluation report

In this chapter, we describe the inputs to the OSP Production Site process, the outputs from the process, and the activities involved in the production site, which include the following:

- Analyzing the OSP Production Site plan and change order
- Preparing the Production Site staging environment
- Confirming the production environment readiness
- Executing the initial notification plan
- Executing deploy or provision of OS image media to production targets
- Executing the backout and recovery plan
- Completing the Production Site process

Figure 7-1 shows the OSP Production Site process.

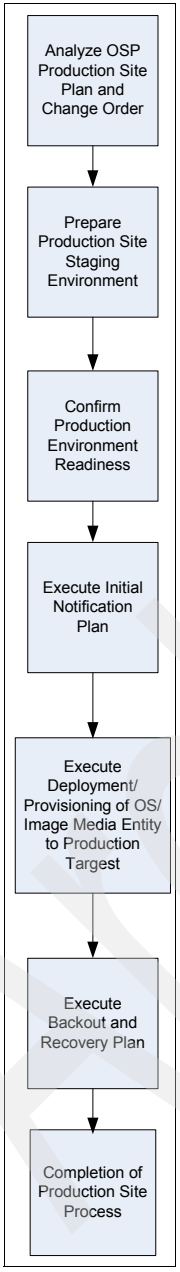

Figure 7-1 Operating System Provisioning (OSP) Production Site process

7.2 OSP Production Site process roles

The following roles are performed in the OSP Production Site process:

- Solution Architect

  Refer to Chapter 6, “Operating System Provisioning Building Site process” on page 121 for this role’s description.

- Project Manager

  Refer to Chapter 6, “Operating System Provisioning Building Site process” on page 121 for this role’s description.

- Change Management Delivery Project Manager

  Refer to Chapter 6, “Operating System Provisioning Building Site process” on page 121 for this role’s description.

- Installation Coordinator

  The Installation coordinator is the individual responsible for systems installation. The activities performed by this individual include:

  – Ensuring that all technical requirements are in place to support the systems that are being installed

  – Developing installation plans

  – Documenting and developing installation procedures

- Team Leader

  Refer to Chapter 6, “Operating System Provisioning Building Site process” on page 121 for this role’s description.

7.3 OSP Production Site activities

The following is a list of the activities that are performed as a part of the overall OSP Production Site process. Each activity is made up of a number of tasks and sub-tasks that are performed by specific individuals who perform defined roles within this process. In addition, each of the OSP Production Site process activities requires a set of input and produces a number of outputs, which are also defined in the following sections.

7.3.1 Analyzing OSP Production Site plan and change order

The purpose of the Analyze OSP Production Site Plan and Change Order activity is to review and analyze the OSP Change Order, OSP Deployment Plan, and associated technical documentation, provide technical feasibility approval related

to implementing the OSP Change Order at the production site, and to validate estimated resource requirements for the OSP Change Management Coordinator.

Tasks

The following tasks are performed during the Analyze ESD Production Site Plan and Change Order activity:

- Validating the OSP plan for Production Site

  This is performed by the Solution Architect, assisted by the Project Manager.

  The purpose of this task is to validate the Production Site Operating System Imaging Plan provided by the Change Management Delivery Project Manager. The Change Order, Production Site Operating System Imaging Plan, and associated technical documentation are received from the Change Management Delivery Project Manager by the Production Site Solution Architect. It is then reviewed by the Solution Architect and the Production Site Project Manager for completeness, accuracy, and detail. A technical feasibility for implementing the change is conducted by the Solution Architect based on the technical OSP architecture and the business details provided along with the Change Order.

- Ensuring that the server hardware or logical partitions in a virtualization environment are available from the available pool of resources

  This is performed by the Solution Architect.

- Confirming the resource requirements with OSP Change Management Coordinator

  This is performed by the Project Manager, assisted by the Solution Architect.

Inputs and outputs

Input from any of the following external processes may be required during the Analyze OSP Production Site Plan and Change Order activity of the OSP Production Site process:

- Architecture overview diagram
- Change order
- Operating System Imaging plan
- Solution recovery strategy
- System context

Output from the Analyze OSP Production Site Plan and Change Order activity of the OSP Production Site process will produce:

- Approval to proceed
- Confirmed backout and recovery plan
- Confirmed Operating System Imaging plan
- Confirm plan for deploying or provisioning to depot servers
- Receive prerequisites

The following is a description of the inputs to and outputs from the Analyze OSP Production Site Plan and Change Order activity that have not previously been defined in another section of this IBM Redbook:

- Confirmed Backout and Recovery Plan

  This is not a work product, but a task to ensure that the backout and recovery plan, which has been specified in the overall OS Imaging and Provisioning Plan, is valid and will work with expected results in the specified production environment.

- Confirmed Operating System Imaging Plan

  This is not a work product, but a task to ensure that the OS Imaging and Provisioning plan is valid for the specified production environment.

- Confirm Plan for Deploying or Provisioning to Depot Servers

  This is not a work product, but a task to ensure that the OS Imaging and Provisioning plan is valid for the specified production environment's depot or staging servers.

7.3.2 Preparing Production Site staging environment

The purpose of the Prepare Production Site Staging Environment activity of the OSP Production Site process is to set up the Staging environment where the OS image or media will reside before it is scheduled for distribution or provisioning to target endpoint servers.

Tasks

The following tasks are performed during the Prepare Production Site Staging Environment activity:

- Setting up OS image or media Production Staging Environment

  This is performed by the Installation Coordinator and is assisted by the Team Leader.

  The purpose of this task is to set up the Staging environment where the OS image or media will reside before it is scheduled for provisioning to target endpoint servers.

- Promote OS image or media Entity from Source Server to Staging Server

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to copy, download, or reference (via file pointers) the OS image or media such that they become available on the production staging environment. The OS image or media is obtained from the Change Coordinator directly or via the test or building site. This OS image media is promoted (downloaded or copied) on to the staging server environment from where it can be accessed by the OS provisioning tool for further scheduling and distribution or provisioning processing. In some cases, the OS image or media may already be available in a version controlled source save repository as a result of the test or Building Site processes and this repository may also serve as the staging environment for the production site processing.

  The staging environment can be set up using stand-alone servers or logical partitions in a virtualized environment. In such a virtualized environment, the setup and teardown of the staging environment using partitions will be simplified.

Inputs and outputs

Input from any of the following external processes may be required during the Prepare Production Site Staging Environment activity of the OSP Production Site process:

- Architecture overview diagram
- Build procedures
- Change order
- OS Imaging plan
- System context

Output from the Prepare Production Site Staging Environment activity of the OSP Production Site process will produce:

- Sub-project team status report
- Preparation of OS image or media Production Staging Environment completed
- Verify deployment or provisioning tool setup
- Verify network setup of OS image or media staging server complete
- Verify OS image or media staging server hardware setup complete
- Code promote complete
- Staging server ready for production process

The following is a description of the inputs to and outputs from the Prepare Production Site Staging Environment activity that have not previously been defined in another section of this IBM Redbook:

- Build procedures

  The Build procedures work product describes how to generate an executable copy of the OS Image. This may include such items as which files are required, which links must be in place, which libraries are accessed, the sequence of steps required to generate the system image, or any required passwords. This is not a difficult work product; however, it is essential to record how the system is generated. Build procedures are documented to ensure that the procedures can be executed at any time by the development team without depending on particular team members. Build procedures can be written as textual guidance, most often as a checklist or sequence of steps or both. In addition, the build procedures need to take into account the differences in hardware environment, that is, stand-alone servers versus virtualization environment using partitions.

  The Build procedures should be developed during project planning.

  Build procedures may need to take into account items or procedures, such as:

  - File structure
  - Unrelated code (for example, from different subsystems) going into one library makes the build processes interdependent
  - The installation process to be used (for example, it may impose limitations on size and structure)
  - The development environment
  - The version control (configuration management) system
  - How to get any runtime executables and third-party software that is not a part of the product but is required to run it
  - How the deliverables are named
  - How the corrective service process affects restrictions on structure and names

- Preparation of OS image or media Production Staging Environment completed

  This is not a work product, but a task outcome to verify that the preparation of OS image or media production staging environment is completed for production use.

- Verify Deployment or Provisioning Tool setup

  This is not a work product, but a task outcome to verify that the provisioning tool setup for use in the production environment is completed.

- Verify Network setup of OS image or media Staging Server complete

  This is not a work product, but a task outcome to verify that the setup of the package or media staging server for the production environment is complete.

- Verify OS image or media Staging Server Hardware Setup complete

  This is not a work product, but a task outcome to verify that the OS image or media staging server hardware setup is complete.

7.3.3 Confirming production environment readiness

The purpose of the Confirm Production Environment Readiness activity of the OSP Production Site process is to confirm that all components of the OSP production environment are ready to accept the OS image or media distribution or provisioning.

Tasks

The Confirm Production Environment is Ready for OS image or media task is performed during the Confirm Production Environment Readiness activity. It is performed by the Installation Coordinator, assisted by the Project Manager.

The purpose of this task is to validate that all production resources, which will be impacted by the OS image or media distribution or provisioning are in a condition of readiness to accept the change without any negative impact on the production environment. This readiness review includes validation of all production resources, including the target architecture environment, and all subsystems in the systems context environment. This task also validates that all target endpoints, which are recipients of the specific OS image or media, have been identified and defined as such to the distribution or provisioning tool.

In addition, this task validates that the hardware environment using stand-alone servers or logical partitions, or both, are set up appropriately. This task also validates the OS customizations and security hardening on the OS image. It also further validates the inclusion of any standard tools or applications in the OS image. Validation that any application in the OS image will work in a virtualization environment will also be confirmed.

Inputs and outputs

Input from any of the following external processes may be required during the Confirm Production Environment Readiness activity of the OSP Production Site process:

- Architecture overview diagram
- Build procedures
- Change order
- Communications management plan
- OS Imaging plan
- Solution recovery strategy
- System context

Output from the Confirm Production Environment Readiness activity of the OSP Production Site process will produce:

- Approval to proceed
- Confirm stakeholder approvals for production processing
- Verify planned production resources ready for change
- Verify planned systems context environment ready for change
- Verify target architecture environment ready for change

7.3.4 Executing initial notification plan

The purpose of the Execute Initial Notification Plan activity of the OSP Production Site process is to send notification to all identified stakeholders of the upcoming OS image or media change's distribution or provisioning schedule. Based on the project's communications management plan, this activity outlines the tasks required to provide notification to all identified stakeholders that the OS image distribution or provisioning change, which was approved by them, is now being physically scheduled for a distribution or provisioning.

Tasks

The Execute Production Site Communications Plan task is performed during the Execute Initial Notification Plan activity by the Project Manager, assisted by the Team Leader.

The purpose of this task is to send notification to all identified stakeholders of the upcoming OS image or media change's distribution or provisioning schedule.

Inputs and outputs

Input from any of the following external processes may be required during the Execute Initial Notification Plan activity of the OSP Production Site process:

- Change order
- Communications management plan

Output from the Execute Initial Notification Plan activity of the OSP Production Site process will produce:

- Change schedule confirmed
- Stakeholders notified of upcoming OSP distribution
- Validated communication plan

The following section is a description of the inputs to and outputs from the Execute Initial Notification Plan activity that have not previously been defined in another section of this IBM Redbook.

Stakeholders Notified of Upcoming OS Provisioning

This is not a work product, but a task outcome to verify all previously identified stakeholders are notified of upcoming OS provisioning by utilizing the approved change management plan.

7.3.5 Executing the deployment or provisioning of OS media to production targets

The purpose of the Execute Deployment or Provisioning of OS Media to Production Targets activity of the OSP Production Site process is to schedule OS image or media distribution or provisioning, distribute or provision an OS image or media, and to generate reports based on a review of the resulting distribution or provisioning logs.

Note: This activity task can be performed initially for a client's identified beta-testing environment, where a sample of the production population of endpoints is chosen as a beta group, and the OS image or media is distributed to this beta group. This beta group can be comprised of stand-alone servers and logical partitions. A virtualization environment can be used to help reduce the amount of physical space required and simplify the systems management of these partitions. Based on an analysis of the beta distribution, a further *Go* or *No Go* decision may be made to repeat or not repeat the activity for the entire production endpoint environment.

Tasks

The following tasks are performed during the Execute Deployment or Provisioning of OS Media to Production Targets activity:

- Scheduling OS image or media Deployment or Provisioning

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to schedule the OS image or media entity for deployment or provisioning to the production target machines. Based on the confirmation of all identified stakeholders' approval for further production processing, the OSP media or OS image are scheduled using the distribution or provisioning tool based on the specification provided in the change order.

- Distributing or provisioning OS image or media

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to distribute and provision the OS image or media entity for deployment to the production target machines. While utilizing the services of a distribution or provisioning tool, the OS image or media is distributed or provisioned to the target environment, and the results of this distribution or provisioning (which are usually in the form of log files based on the tool used for distribution or provisioning) are collected for further analysis. Depending on how the OS image is defined, it can contain OS customization, security hardening configuration, and standard tools or applications.

- Reviewing distribution or provisioning logs

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to analyze the results based on logs collected from the distribution or provisioning of OS image or media to the production target machines or logical partitions in a virtualization environment.

  All OS imaging tools, at the minimum, can be enabled to generate a log file based report, which indicates the success and failure of the distribution or provisioning at target endpoints. Various return codes in these log files may indicate the level of success and the causes for failure as well. The data from these log files is processed:

  - To generate meaningful reports to analyze the results of the distribution or provisioning
  - To identify all endpoints where the distribution or provisioning was successful
  - To identify all endpoints where the distribution or provisioning should be done again

– To identify all endpoints from which the OS image or media should be rolled-back because of the nature of the error caused by the distribution or provisioning

A status report is generated as a result of this task, and problem records may be opened in the IT environment's problem management system to address the errors (if any), which resulted from the distribution or provisioning of the OS image or media.

Inputs and outputs

Input from any of the following external processes may be required during the Execute Deploy or Provision of OS Media to Production Targets activity of the OSP Production Site process:

- Change order
- Build procedures

Output from the Execute Deploy or Provision of OS Media to Production Targets activity of the OSP Production Site process will produce:

- Sub-project team status report
- Confirm stakeholder approvals for production processing
- OS image or media distribution or provisioning scheduled
- Staging server ready for production process
- Stakeholders notified of upcoming OSP distribution
- Distribution logs analyzed
- Distribution logs generated
- Problem records open
- Distribution logs generated
- OS image or media distributed or provisioned to targets

The following is a description of the inputs to and outputs from the Execute Deploy or Provision of OS Media to Production Targets activity that have not previously been defined in another section of this IBM Redbook:

- OS image or media Distribution or Provisioning Scheduled

  This is not a work product, but a task outcome to verify the distribution of OS image or media is scheduled for the production environment.

- Stakeholders Notified of Upcoming OSP Distribution

  This is not a work product, but a task to ensure that all previously identified stakeholders are notified of upcoming OSI distribution by utilizing the approved change management plan.

- OS image or media Distributed or Provisioned to Targets

  This is not a work product, but a task to ensure that the The OS image or media is provisioned to target endpoints in the production environment.

7.3.6 Executing the backout and recovery plan

The purpose of the Execute Backout and Recovery Plan activity of the OSP Production Site process is to review reports based on the distribution or provisioning logs for redistribution or provisioning and roll back target identification, to rollback OSP OS image or media from the identified failed targets, and to redistribute or provision OS image or media to identified failed targets.

Tasks

The following tasks are performed during the Execute Backout and Recovery Plan activity:

- Rollback Target Identification

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to identify change rollback targets based on the study of distribution or provisioning log reports. Based on a review of the report data from the log file reports, identify all endpoints where the distribution or provisioning should be done again, and identify all endpoints from which the OS image or media should be rolled back because of the nature of the error caused by the distribution or provisioning.

- Rollback OSP Change from Identified Failed Targets

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to roll back OSP OS image or media from identified target endpoints. While using the services of a distribution or provisioning tool, the OS image or media is rolled back from the identified target environment while re-instating the original state of the endpoint, and the results of this distribution or provisioning (which are usually in the form of log files based on the tool used for distribution or provisioning) are collected for further analysis.

- Redistribute OSP Change to Identified Failed Targets

  This is performed by the Installation Coordinator, assisted by the Team Leader.

  The purpose of this task is to redistribute the OS image or media entity to the identified production target machines or logical partitions in a virtualization environment. While using the services of a distribution or provisioning tool, the OS image or media is redistributed to the identified target environment, and the results of this distribution or provisioning (which are usually in the form of log files based on the tool used for distribution or provisioning) are collected for further analysis and reporting. Some of the previous problem

records are closed based on the results of the distribution or provisioning, while others are transferred to the appropriate teams in the IT environment for further manual attention and handling.

Inputs and outputs

Input from any of the following external processes may be required during the Execute Backout and Recovery Plan activity of the OSP Production Site process:

- Change order
- Sub-project team status report
- Build procedures

Output from the Execute Backout and Recovery Plan activity of the OSP Production Site process will produce:

- Distribution logs analyzed
- Re-distribution targets identified
- Rollback targets identified
- Sub-project team status report
- Distribution or provisioning completed
- OS image or media distribution or provisioning scheduled
- Distribution logs generated
- Problem record closed or transferred
- Rollback completed
- Distribution completed
- OS image or media distribution or provisioning rollback scheduling completed

The following is a description of the inputs to and outputs from the Execute Backout and Recovery Plan activity that have not previously been defined in another section of this IBM Redbook:

- OS image or media Distribution or Provisioning Scheduled

  This is not a work product, but a task outcome to verify that the distribution of OS image or media is scheduled for the production environment.

- OS image or media Distribution or Provisioning Rollback Scheduling Completed

  This is not a work product, but a task to ensure that the scheduling of OS image or media rollback distribution for the intended production environment is completed.

- Distribution or Provisioning Completed

  This is not a work product, but a task to ensure that an OS image deployment for the identified target endpoints is completed.

7.3.7 Completing the OSP Production Site process

The purpose of the Completion of OSP Production Site process activity of the OSP Production Site process is to update the production site's work completion reports and forms, including project status and evaluation reports, and to submit these reports to the Change Request Coordinator.

Tasks

The following tasks are performed during the Completion of ESD Production Site process activity:

- Updating Production Sites reports and forms

  This is performed by the Team Leader, assisted by the Project Manager.

  The purpose of this task is to produce a project status report based on the aggregation of all sub-project team status reports for each distribution or provisioning or rollback activity, as well as the reports based on the aggregated analysis of all distribution or provisioning logs from all distribution related tasks.

- Submitting reports to Change Request Coordinator

  This is performed by the Project Manager, assisted by the Project Team Leader.

  The purpose of this task is to provide the Change Request Coordinator with the project status report, which is based on the aggregation of all sub-project team status reports for each distribution or provisioning or rollback activity performed at the production site. This report may be used for further processing (if required) at the test and building sites or for overall project closing. Included within this report is also a section indicating the results based on the aggregated analysis from all distribution or provisioning logs. A Project Evaluation Report is also created and provided to the Change Request Coordinator.

Inputs and outputs

Input from any of the following external processes may be required during the Completion of OSP Production Site process activity of the OSP Production Site process:

- Sub-project team status report
- Project status report

Output from the Completion of OSP Production Site process activity of the OSP Production Site process will produce:

- Project status report
- Distribution logs generated
- Report updates completed
- Project evaluation report

7.4 Summary

The OSP Production Site process includes the following activities:

- Analyze OSP Production Site Plan and Change Order
- Prepare Production Site Staging Environment
- Confirm Production Environment Readiness
- Execute Initial Notification Plan
- Execute Deployment or Provisioning of OS Image Media to Production Targets
- Execute Backout and Recovery Plan
- Completion of Production Site process

This set of activities has been defined to manage the tasks required at the OSP Production Site. The OSP Production Site process governs the technical feasibility approval when implementing an OSP Change Order, validation of resource requirements to complete the service request, the preparation and setup of the production site staging environment, and communication and execution of the deployment plan, including any required back out or recovery procedures through the analysis of OSP provisioning or distribution results.

8

Case study

In order for an IT environment to provide maximum value to the overall business environment, it is important that standardized processes and procedures are deployed throughout the IT environment. The consistently accurate and timely delivery of operating systems, applications, and updates on servers and workstations is of strategic importance to the well-being of the IT infrastructure.

This chapter presents a case study that will show you the practical implementation of the topics discussed in the IBM Redbook.

This chapter discusses the following:

8.1 Introduction to case study

The end-to-end software distribution and OS provisioning processes and procedures described in previous chapters of this IBM Redbook are the basic building blocks of successful software and OS updates in any IT environment. These processes and procedures ensure proper communication, handshake and business controls among the many teams involved, including other external business processes, such as Change Management. Additionally, these processes provide a way to measure the quality of service and, therefore, a way to constantly improve services and reduce the overall cost to the business.

This chapter is intended to facilitate further understanding of these processes and procedures by using a practical example to highlight the interaction of these processes, starting from receiving a Change Order, to providing a new operating system image or a software package, to on-going maintenance of operating systems, applications, and software updates. This chapter includes the following considerations:

In the example provided in this chapter, we will model a fictitious company with an IT environment made up of three data centers. The data centers are located in North America, Europe, and Asia Pacific, with five remote sites and hundreds of users at each of their sites. The data centers consist of the following hardware, software, and provisioning environments.

- Hardware from various vendors is deployed at each site, including IBM, HP, Dell, and Sun.
- A mix of vendor operating systems from various vendors have been deployed and are currently in use, including AIX 5L™ V5.2 and V5.3, HP-UX 10i and 11i, Windows 2000 and 2003, Sun Solaris, and Redhat Enterprise Linux.
- Middleware applications, including DB2, Oracle, and WebSphere, are deployed in these data centers.

The data centers are interconnected through a wide area network so that servers can be accessed from anywhere within the three data centers.

The five remote sites consist of the following hardware and software applications:

- The user workstation hardware deployed is:
  - Compaq Presario desktop PCs model SR1930Z, Dell OptiPlex (GX 620 & 690), and HP m7690y series workstations
  - IBM T and X Series notebooks
- Operating systems, including both Microsoft Windows XP Professional and Windows 2000 workstation.

- The application stack for current workstations is a combination of Microsoft Office 2003, Adobe Acrobat 8.0, and Internet Explorer® V6.0.

The data centers and the remote sites are interconnected through a wide area network so that servers and clients can be accessed from anywhere within the network.

The end-to-end electronic software distribution and operating system imaging process has three major activities consisting of the Building, Testing, and Production Site activities. Each of the activities have their own internal processes that interact with external processes and work products, such as the Change Management process, or an Operating System Imaging and Software Distribution plan.

For our example client, we are going to assume that the Operating System Imaging and Software Distribution plan which is created as part of a systems management engagement, is already created and available.

8.2 Configuring and setting up the Building Site

Before any Change Orders for software update packages, software distribution media, removal or commit of software, or provisioning of server operating systems can be addressed, a Building Site must be first set up. The Building Site is an area where all of the activities associated with developing of software packages and operating system images take place. Additionally, it is critical to understand the overall IT environment and the scope prior to setting up the Building Site, so that the Building Site has the necessary build environment for each supported operating system or software application.

For our example client, the IT environment consists of hardware resources, servers, workstations and network and software resources, server and workstation operating systems and applications. The Building Site will require the following resources:

- Physical Area

  The development of software packages and operating system images often requires the transferring of very large amounts of data between Building Site servers and the Building Site test machines. As a result, it is typical that the Building Site is set up on a private network with an external (firewall) link to the campus network. This ensures that all Building Site network traffic remains on the Building Site private network and does not adversely impact the campus network, or the production environment, or both.

- Building Site Development Team

  The labor resource requirement of the Building Site development team for the building of software packages and operating system images is dependent upon a number of factors, such as the size of the IT environment, the required number of operating systems and applications to be supported, the frequency of Change Orders, and so on. Furthermore, one person may perform multiple roles depending upon the size and complexity of the IT environment in question. It is not required that the Building Site development team resources are dedicated to development activities; this will depend upon the size of the IT environment and anticipated number of Change Orders. The Building Site development team is responsible for receiving Change Orders, Operating System Imaging and Software Distribution Plan, Solution Recovery Strategy document, System Context document, Operational Model document, and Architecture Overview document. Additionally, they are responsible for analyzing these documents for resource requirements and understanding the software packaging and operating system imaging requirements, and, finally, for delivering of the software packages and operating system images in the required format to Test Site, as per the Change Order requirements.

Figure 8-1 shows the Building Site process.

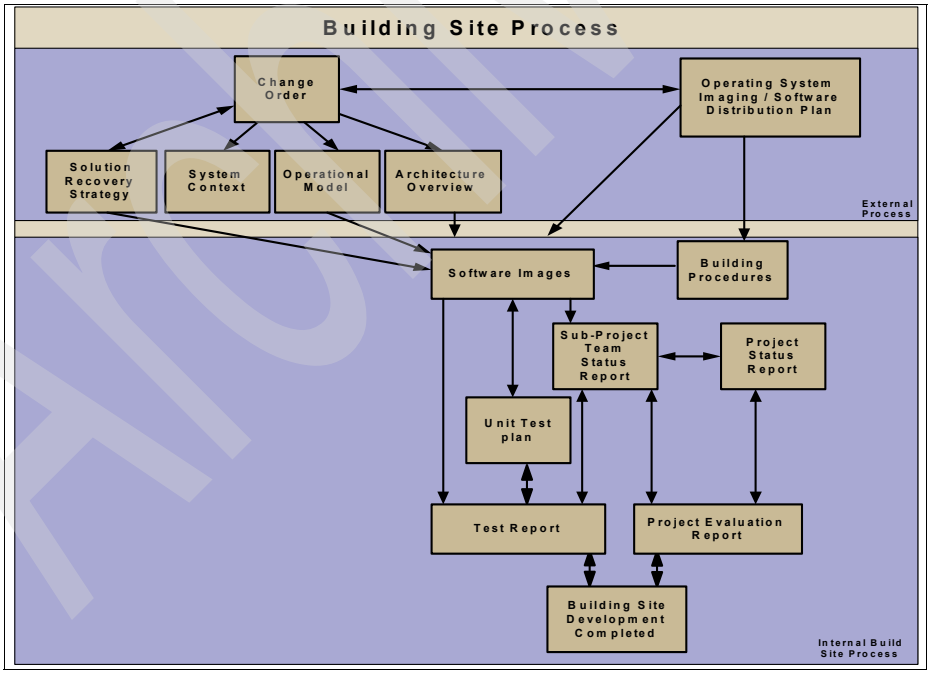

Figure 8-1 Building Site process

The Building Site development team interfaces and collaborates with the Project Manager, Change Management Delivery Project Manager, and ESD Change Manager Coordinator to complete the Change Order end-to-end. The following resources/roles are required as part of the Building Site development team:

- Project Manager
- Team Leader
- Solution Architect
- Test Specialist - Technical

Figure 8-1 on page 162 depicts the end-to-end Building Site process.

- Building Site Hardware

The Building Site development hardware is used for developing and for unit testing newly created software packages and operating system images. The Building Site development hardware requirements are highly dependent upon the type of hardware that exists in the production environment and is required to be supported. The Building Site hardware and software environment is configured to provide a subset of the production environment. This also includes the hardware required to support the manual delivery of software packages and operating system images in the CD/DVD format. Further, from time-to-time, the development hardware requirements will change as newer hardware is provisioned in the production environment and earlier hardware is removed. Typically, this change is reflected through Change Orders. It is normal for the Building Site to have the capability to support earlier hardware and software that may exist in the production environment. In addition, hardware that can support virtualization and multiple logical partitions can be utilized. Each logical partition can simulate a server running its own copy of the operating system. The use of partitionable hardware can help reduce the amount of physical space required to house the hardware.

Additionally, Building Site development servers are equipped with CD/DVD ROM drives to create manual media as required. In addition to each type of development server, the software packaging and operating system imaging repository (source host) server is required to store all of the packages that the development team creates. On the source host server, a versioning scheme is applied to ensure that several versions of the same software packages and operating system images are maintained as required by the production environment. In most cases, there is a separate versioning control system for the production environment and each software package and operating system image that is developed and applied in the production environment is checked-in for later use as required for recovery purposes.

For our example, the following hardware is required based upon what currently exists in the client's production environment:

- Development Source Host Server, which serves as a repository server for software packages and operating system images that have been developed
- IBM System p™ server capable of installing AIX 5L V5.2 and V5.3
- HP Integrity rx7620 server capable of installing HP-UX 10i and 11i
- Sun Fire™ V490 server capable of installing Solaris V6, V7, V8, V9, and V10
- Dell PowerEdge 6800 based server capable of installing Red Hat Linux Enterprise V4
- Dell PowerEdge 6800 based server capable of installing Windows 2000 and 2003
- IBM ThinkPad models T and X, and Dell Optiplex GX 620 and 720 Windows XP Professional server capable of installing Windows XP Professional
- Compaq Presario Model SR 1930Z for Windows 2000 for Workstation server capable of installing Windows 2000 for Workstations
- Internet connectivity for software and operating system vendor sites to download latest software, drivers, updates, and patches as required.

► Building Site Software

The software required by the development team is dependent upon what is being supported in the current production environment and additional products that may be considered in scope. Each version of the operating system with appropriate technology levels and supported applications must be made available to the Building Site development team, as follows:

- IBM AIX 5L V5.2 and V5.3
- HP-UX Operating System versions 10i and 11i
- Sun Solaris Operating System versions V6, V7, V8, V9, and V10
- Red Hat Linux Enterprise and Advanced V3 and V4
- Microsoft Windows Operating System versions 2000 and 2003
- Microsoft Windows XP Professional with Service Pack 1 and 2
- Microsoft Windows 2000 for Workstations
- Applications for servers, including UDB2, Oracle, WebSphere
- Applications for workstations, including Microsoft Office 2003, Adobe Acrobat 8.0, and Internet Explorer V6.0

- Building Site Software Distribution Tools

  It is critical that the developed software packages and operating system images are unit tested by utilizing the same distribution tools that are implemented in the production environment. Therefore, the Building Site must also contain an instance of the distribution toolset similar to the production environment. Typically, this implementation will be much smaller in scale relative to the production environment. Nonetheless, it will have all critical components and functions that are utilized in production.

  For the development and distribution of software packages to servers and workstations, we are going to use the IBM Tivoli Configuration Manager (ITCM) product, and for the building of operating system images, the following tools will be deployed:

  - Network Install Manager (NIM): IBM AIX operating systems imaging
  - Ignite: HP-UX operating system imaging
  - Jumpstart: Solaris operating system imaging
  - Kickstart: Red Hat Linux operating system imaging
  - Remote Deployment Manager (RDM): Microsoft Windows server operating system imaging
  - ImageUltra and ITCM: Microsoft Windows workstation operating systems imaging
  - PXE, Perl, and Korn Shell: For custom installs

- Building Site Development Tools and Languages

  There are a significant number of tools used in developing software packages and operating system images. In addition to these tools, the development team requires scripting language(s) to customize the building of operating system images and software packages to control their behavior. This includes the development of scripts to automate the configuration and customization of the operating systems and the security hardening of the operating system. The development of the software packages and operating system images is highly dependent upon the deployment methodology employed. This can range from CD/DVD images with manual installs to fully automated network based installs. In a typical IT environment, there is a need for both a fully automated network based install and a CD/DVD based manual install for network challenged environments.

The following list of tools and products represent a subset of tools and technologies that are frequently deployed for building, testing, and distribution of software packages and operating system images:

- Network Install Manager (NIM) for AIX
- Ignite for HP-UX
- Jumpstart for Solaris
- Kickstart/UP2date for Red Hat Linux
- IBM Director - Remote Deployment Manager (RDM)
- Thinkvantage ImageUltra Builder
- Norton Ghost from Symantec
- FLEXnet InstallShield and InstallAnywhere from Macrovision Corporation
- Wise Package Studio from Altiris corporation
- IBM Tivoli Provisioning Manager for OS Deployment
- IBM Tivoli Configuration Manager (ITCM)
- Microsoft Systems Management Server (SMS)
- Hewlett-Packard Novadigm
- LANDesk Management Suite
- Scripting languages, such as PXE, Perl, Korn Shell (ksh), C, C++, and Java

Please refer to the previous section for the development tools that will be utilized in the development of software packages and operating system images for this example.

- Building Site Unit Test Environment

  Each software package, operating system image, and media has a target environment. As such, the unit test environment is as critical as the Building Site development environment, and great care should be taken to make sure that adequate test equipment is available to replicate a subset of the production environment. A lack of or an inadequate unit test environment can lead to high failure rate, which will translate into business disruption and higher costs due to server/user workstation unavailability and the cost of diagnosing problems, repeat packaging, and distribution work. The use of logical partitions in a virtualized environment can also be utilized to set up this unit test environment.

- Setup and Configuration of the Building Site

  Once the hardware, software and tools are received by the Building Site development team, as listed above, the next step is to configure and set up the Building Site by setting up the servers and workstations in a similar manner to a production environment. This includes a Building Site source host server, operating system imaging servers, software packaging and unit test servers, and workstations. In addition, in order to decrease the amount of time it takes to distribute and install a software application, some of the standard software applications that are common to most types of servers, can be included and added into the operating system image itself. This will result in the operating system and the standard software applications being installed together from the operating system image, thus eliminating the need for the application to be distributed and installed from the repository. This will only work well for standard applications that are common to most servers and workstations. All other software applications should continue to be distributed and installed via a software distribution tool.

  Relative to other development servers, the Building Site source host server generally has significantly more disk space to host all of the software packages and operating system images. In many cases, the source host server will also host tools and scripts required for building of software packages and operating system images. As the Building Site development team builds new software packages and operating system images, the unit tested and approved packages and images will be copied over to the source host server. Since the Building Site source host server will store all of the Building Site development tools and scripts, software packages, operating system images, and ESD and OSP related documentation & reports, it is extremely important to have a robust backup strategy that regularly archives this data to an external media that can be stored off site.

  The Building Site software packaging servers and operating system imaging servers are set up in a manner as required by the selected software distribution and operating system imaging tools, as per the overall software distribution strategy adopted by the client.

  The Building Site imaging servers will typically have the operating system installed in the same manner as the production servers, plus tools and scripts to develop operating system images required by the Change Order. Similarly, the software packaging development environment will be setup as per the software distribution tool requirements.

  The Building Site unit test servers and workstations will be utilized to test newly developed software packages and operating system images. It is typical to install and uninstall the software packages and operating systems a number of times to ensure that the newly developed packages and images comply with the Change Order. Typically, the Building Site imaging servers in electronic and manual media format will be used to install operating systems

onto the unit test servers during unit testing of both new and upgraded operating system images. Similarly, the software distribution tool will be used to test the software packages during the unit testing. This method of unit testing is highly effective and cost efficient, as it uses the same tools and processes during the development phase as would be used in the production manner.

Figure 8-2 depicts the required Building Site development/unit test hardware and software, which is consistent with the production environment. It is not uncommon for some of the development/unit test hardware to be used for more than one type of operating system, or configuration, or both, thereby reducing the hardware investment required. In our example, where the client has an operational IBM HW environment, IBM hardware may be used for several versions of Microsoft Windows or for Red Hat Linux Enterprise v4 server development and testing.

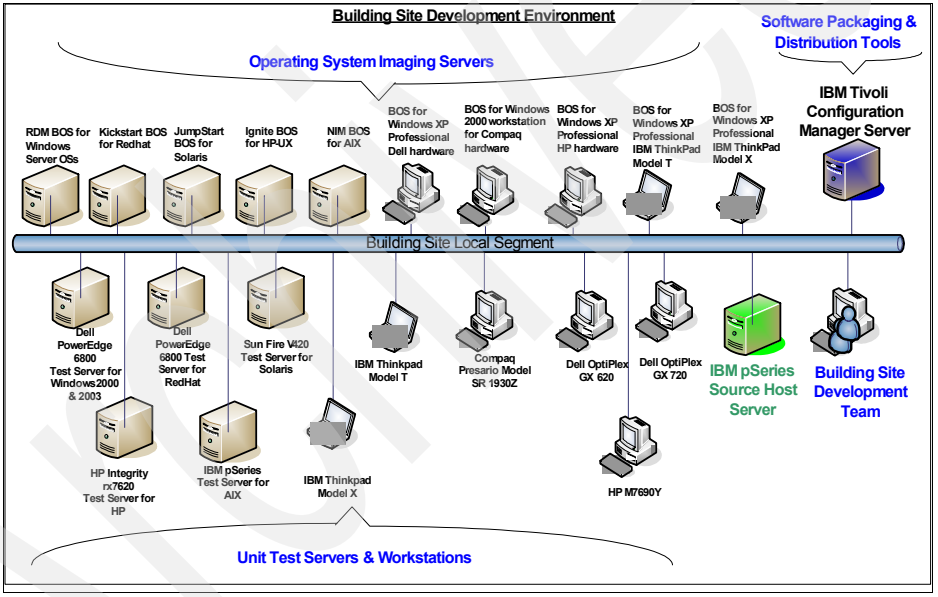

Figure 8-2 Building Site development/unit test hardware and software

Figure 8-3 on page 169 provides the Building Site Environment Setup & Configuration information matrix.

Building Site Environment Setup & Configuration			
Function Description	**Hardware Type**	**Qty.**	**Purpose**
Building Site Source Host	IBM pSeries	1	Package/Image Repository Server for Building Site
IBM Tivoli Configuration Manager	IBM pSeries	1	Software Distribution server for distribution software packages to servers and workstations
Ignite Base Operating System (BOS) Build Server	HP Integrity rx7620	1	For building HP-UX 10x & 11i base operating systems
Jumpstart BOS Build Server	Sun Fire v420	1	For building Solaris v6, v7, v8, v9, v10 base operating systems
Kickstart BOS Build Server	Dell PowerEdge 6800	1	For building Linux RedHat Enterprise and Advanced v3 & v4 base operating systems
NIM BOS Build Server	IBM pSeries	1	For building AIX 5.x base operating systems
RDM BOS Build Server	Dell PowerEdge 6800	1	For building Windows 2000 & 2003 base operating systems
Windows 2000 for Workstation BOS Build Server	Compaq Presario SR 1930z	1	For building Windows XP Professional base operating systems on Compaq Presario SR 1930z hardware
Windows XP Professional BOS Build Server	Dell OptiPlex GX620	1	For building Windows XP Professional base operating systems on Dell OptiPlex GX620 hardware
Windows XP Professional BOS Build Server	Dell OptiPlex GX720	1	For building Windows XP Professional base operating systems on Dell OptiPlex GX720 hardware
Windows XP Professional BOS Build Server	HP M7690Y	1	For building Windows XP Professional base operating systems on HP M7690Y hardware
Windows XP Professional BOS Build Server	IBM Thinkpad Model T	1	For building Windows XP Professional base operating systems on IBM Thinkpad model T hardware
Windows XP Professional BOS Build Server	IBM Thinkpad Model X	1	For building Windows XP Professional base operating systems on IBM Thinkpad model X hardware
Unit Test Servers	Dell, HP, IBM, Sun	5	For unit testing of operating system images and hardware specific application configurations on servers
Unit Test Workstations	Comapq, Dell, HP, IBM	6	For unit testing of operating system images and hardware specific application configurations on workstations

Figure 8-3 Building Site Environment Setup & Configuration information matrix

Essentially, with the completion of the Setup and Configuration of Building Site tasks, the capability to receive and fulfill Change Orders associated with preparing any of the following has been established:

- New Software or Patch
- New Software Update
- New Operating System Image
- New Software/Patch Update for Operating System Image Build Server
- Distribution Media
- Prepare Provisioning Mechanism
- New operating system image with standard tools and applications

Figure 8-4 summarizes work items that are required for the Building Site and the deliverables that are expected from the Building Site. The end goal of the Building Site is to produce the desired software packages and operating system images in a format requested by the client via the Change Order.

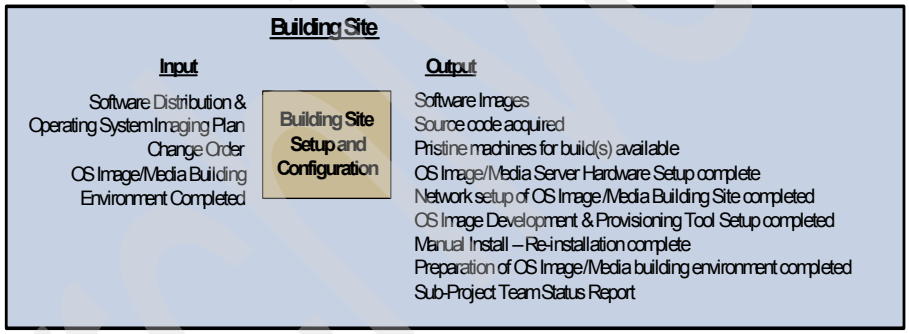

Figure 8-4 Work items

- Configure and Setup Required Test Site

  The next step of the End-to-End ESD and OSP process is to set up an adequate Test Site for performing all tests as required by the Change Order, or defined in the Test Plan, or both. The Test Site process will ensure that the tested software packages and operating system images are independently verified and tested in the manner required by the Change Order and are ready for deployment in the production environment. The resources/roles required for the Test Site process are:

  - Project Manager
  - Solution Architect
  - Test Specialist - Technical
  - Team Leader

Figure 8-5 summarizes the Test Site process that has been followed in this example. This process has been described in detail in Chapter 4, “Electronic Software Distribution Test Site process” on page 85.

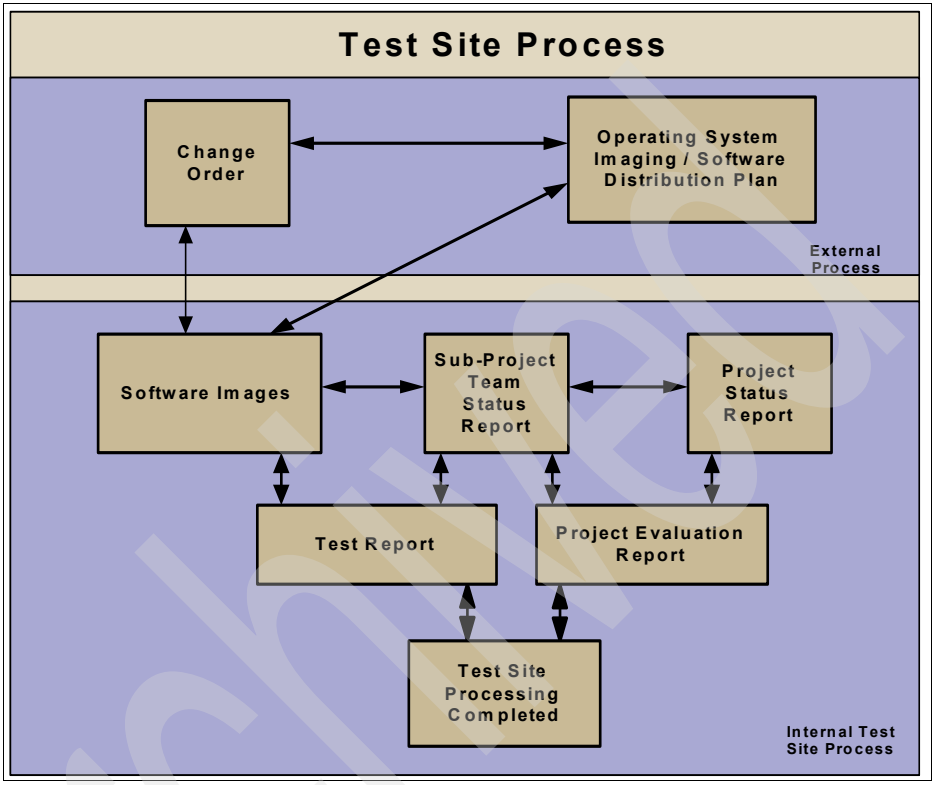

Figure 8-5 Test Site process

One critical success factor for the Test Site environment is that it must also provide a good representation of the client's production environment. In our example, the Building Site environment also provides a representation of a sub-set of the production environment.

For our client, the Building Site unit testing hardware environment will be shared for testing of operating system images and software packages as required by the Test Site process. The testing process will be as per the Test Site process; however, hardware will be shared to reduce the overall cost. In some cases, as per the Change Order, a sub-set of the production environment could also be used for final integration testing. Alternatively, logical partitions in a virtualized environment can be set up as the testing environment. This is especially true if an application that is being updated has multiple components that are installed on multiple servers. In this scenario, it

is critical that the backup and recovery strategy is implemented and has been tested, validated and approved prior to actual distribution of new software. Further, typically, an uninstall software package is also part of the backup and recovery strategy.

Once the Building Site development team has completed building a software package or operating system image, they make the package or image available to the testing team as required by he Change Order. As per the details of the Test Plan, which is part of the overall Software Distribution or Operating System Provisioning plan, required test cases will be developed by the "Test Specialist". The target test environment will be provisioned, with all the required hardware clients, or logical partitions, or both, software images, and testing tools/languages and distribution tools, to conduct all documented tests. The results of the testing documented in Test Reports, Project Status Report, and Project Evaluation will be made available to the ESD Change Coordinator.

Figure 8-6 documents the work products and resources required to Configure and Set up the Test Site, as well as produce the deliverables of this task.

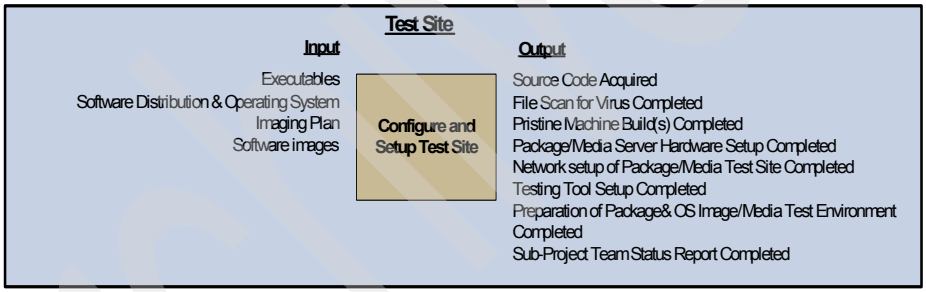

Figure 8-6 Work products and resources required

The successful testing of the software packages and operating system images will allow us to move forward to the next and the final step in the end-to-end ESD and OSP process, which is deployment of packages, or images, or both, in the production environment.

- Configure and Setup Production Site

The production servers and workstations in geographically dispersed data centers and user sites are the target of software packages and operating system images. Typically, prior to mass distribution of software updates, a subset of the servers, or workstations, or both, are selected in the production environment for deployment to ensure that the deployment of software updates will install as intended with the expected outcome. Upon successful results of this initial pilot, the mass distribution can then proceed to the remaining targets. Figure 8-7 depicts the end-to-end Production Site process.

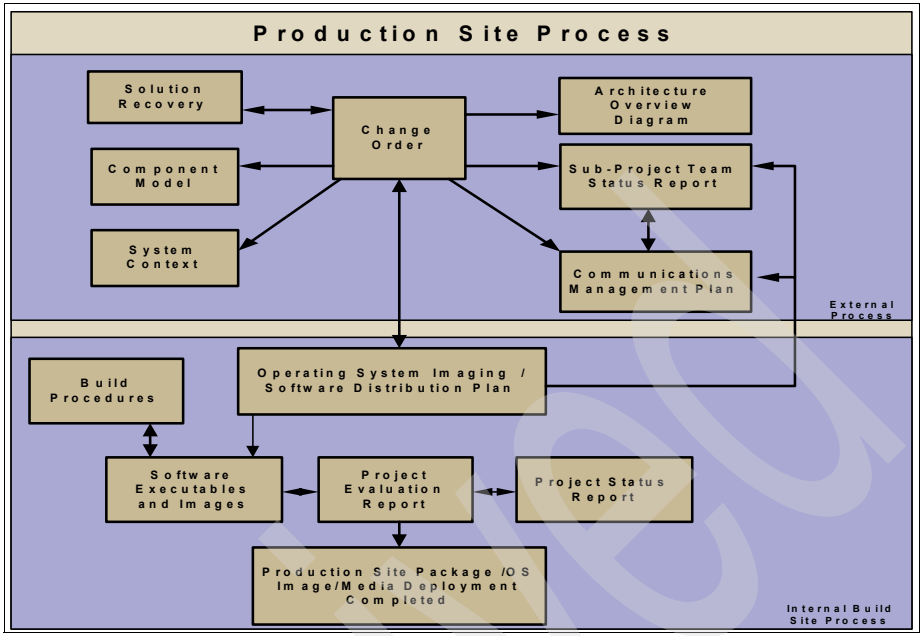

Figure 8-7 End-to-end Production Site process

Further, a software distribution tool should already be deployed and verified prior to distributing software in a production environment. For our example client, the IBM Tivoli Configuration Manager tool and operating system specific imaging tools (NIM, Ignite, Jumpstart, Kickstart, RDM, and ImageUltra) have been deployed to all data centers and remote user sites for the purposes of distribution of software updates, packages, and operating system imaging.

So far, for our example client, we have enabled the:

- Building Site processes, required hardware, software, and distribution tools
- Testing Site processes, required hardware, and software
- Production Site processes, Production Site Build environment, and distribution tool

- Provisioning of IBM WebSphere Application Server V6.1 Server

  Next, let us consider our first Change Order, which is created for the provisioning of a new WebSphere Application server at the North America data center. The components of the WebSphere Application Server are as follows:

  - IBM System p 615 hardware platform
  - AIX 5L V5.3 with Technology Level 1 (AIX 5L V5.3 TL 1)
  - IBM DB2 Enterprise Version 9
  - IBM WebSphere Application Server V6.1

  Refer the Change Order form in Table 8-1, which is received by the Building Site development team.

Table 8-1 Change Order form

Content	Comment
Project identification	Project 101 - Deploy WebSphere Application Server V6.1.
Project/Sub-project	OrderNow.
Project/Sub-project manager	Susan Guy.
Project phase	Final.
Project organizational unit	N/A.
Change order identification	WAS61101.
Change order ID	ESDWAS61101.
Short description	Create a software package for WebSphere Application Server 6.1. The subcomponents of this software package are AIX 5L V5.3 TL1, DB2 Enterprise V9, and WebSphere Application Server V6.1. The requested media type is electronic and DVD.
Status	Open.
For each associated change request	
ID	N/A.
Short description	N/A.
Change order details	N/A.

Content	Comment
Approved by	Mickey Iqbal.
Date approved	August 23, 2006.
Start condition	System p 615 hardware being available.
Target date	August 30, 2006.
Associated Change order IDs	N/A.
Change order history	N/A.
Date	N/A.
Comments	This server is required for project 101, which is for the deployment of an accounting application. Please see the xyz.doc for additional details.

The Change Order is delivered by the Change Management Delivery Project Manager to the Building Site Team Lead. The Building Site Team Lead assigns the Change Order to the Building Site Solutions Architect, who Analyzes the ESD and OSI Change Order to approve the technical feasibility of the request and validates the resource requirement.

The Building Site Solutions Architect reviews the Change Order and associated documentation, Operating System Imaging Deployment Plan, and Operating System Provisioning Architecture document to provide his approval.

Figure 8-8 summarizes the work items that are considered for this deliverable.

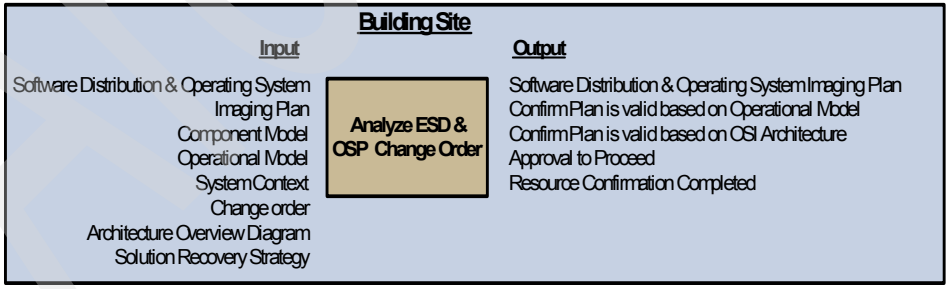

Figure 8-8 Work items

The Solutions Architect starts the operating system imaging process with Build Procedures. The Build Procedures describe, in detail, how the operating system imaging development process is to be carried out inclusive of all required tools, response files, and customization files.

Utilizing the Building Site development environment, first, gather the software and software configuration parameters, then create the AIX 5L V5.3 TL1 operating system image for System p 615 hardware, using the NIM server for AIX 5L V5.3, and create the DB2 Enterprise V9 software package and WebSphere Application Server V6.1 software package utilizing the ITCM tool.

After the initial creation of the AIX 5L V5.3 TL1 Operating System Image, customization, and security hardening scripts, DB2 Enterprise V9, and WebSphere Application Server V6.1 software packages, the Solutions Architect performs the Unit Test to identify and resolve any problems, as per the Unit Test Plan. Upon successful testing of the software packages, the unit test specialist completes the test reports.

Figure 8-9 summarizes the work products that are required to develop software packages and operating system images/media and the deliverables.

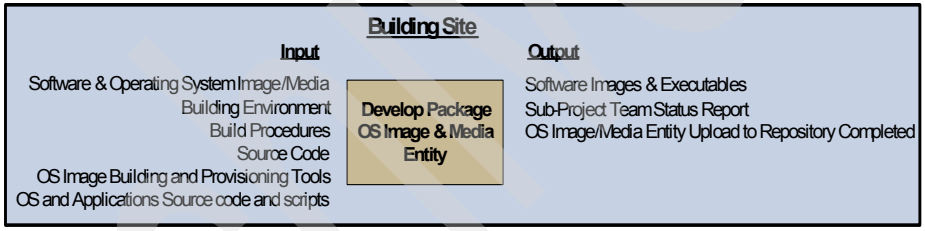

Figure 8-9 Work products

The developer then copies/checks in the tested software package onto the Building Site's source host/repository server. The Solutions Architect completes the work as per the Change Order and returns it to the Team Lead, who in turn works with the Project Manager to complete/update ESD and OSP forms with all of the required information.

Finally, the completed documentation, along with the software packages in electronic (available directly from source host server) and media format entity, is handed over to Test Site testing team.

The Test Site Project Manager and Solution Architect reviews the ESD and OSP Test Plan and confirms the required resources. The resources utilized to complete this task are shown in Figure 8-10 on page 177.

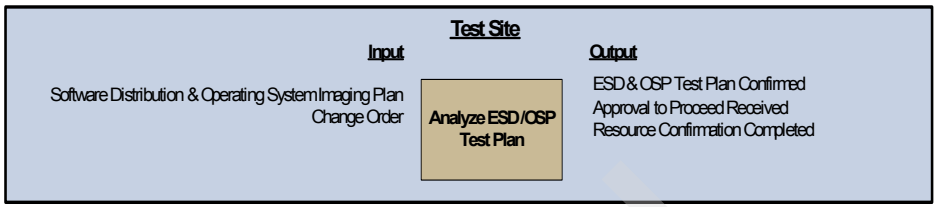

Figure 8-10 Resources utilized

The Test Site Team Lead assigns a Test Specialist to perform the required testing, as per the Test Plan. The Test Specialist reviews the test cases and provisions the IBM System p 615 server required to test software packages for WebSphere Application Server V6.1 testing and performs all required or documented tests. Upon successful testing, the Test Specialist completes all the required testing reports and documents, and, working the Test Team Lead/Project Manager, returns it back to the Change Request Coordinator for the next phase, which is production level deployment. Figure 8-11 documents that required resources and the deliverables from this task.

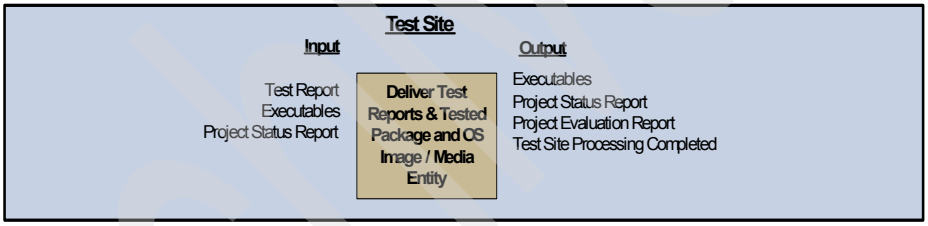

Figure 8-11 Required resources and the deliverables

Before any software updates can be made in a production environment, a Change Order must be created. Figure 8-12 represents a typical interaction between Building Site, Test Site, and Production Site from a stand point of change management process, which is external to the end-to-end ESD and OSP process.

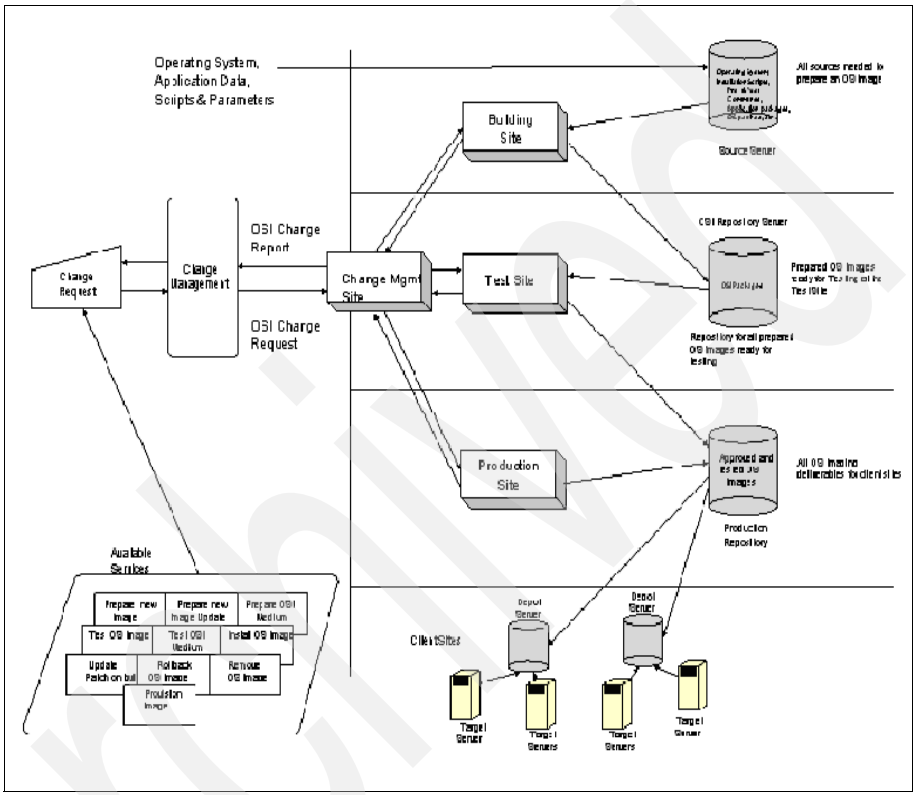

Figure 8-12 Typical interaction between the Building Site, Test Site, and Production Site

At the Production Site, the Change Management Delivery Project Manager works with the Production Site Solutions Architect and the Production Project Manager and provides them the Software Distribution and Operating System Imaging Plan for them to validate required resources to implement the Change Order. While Analyzing the ESD and OSP production Site Plan and Change Order, the Solutions Architect also reviews the Backout and Recovery Plan and confirms or approves the deployment of Software Packages and OS Image onto the staging/depot servers for production deployment.

The Production Site Staging environment is updated from the development source host server. So, whenever a distribution takes place in the production

environment, the production NIM server and IBM Tivoli Configuration Manager server will connect to the production staging server and download the AIX 5L V5.3 TL1 operating system image, DB2 Enterprise, and WebSphere Application Server V6.1 software packages. Figure 8-13 depicts the three separate environments and their inter-connection.

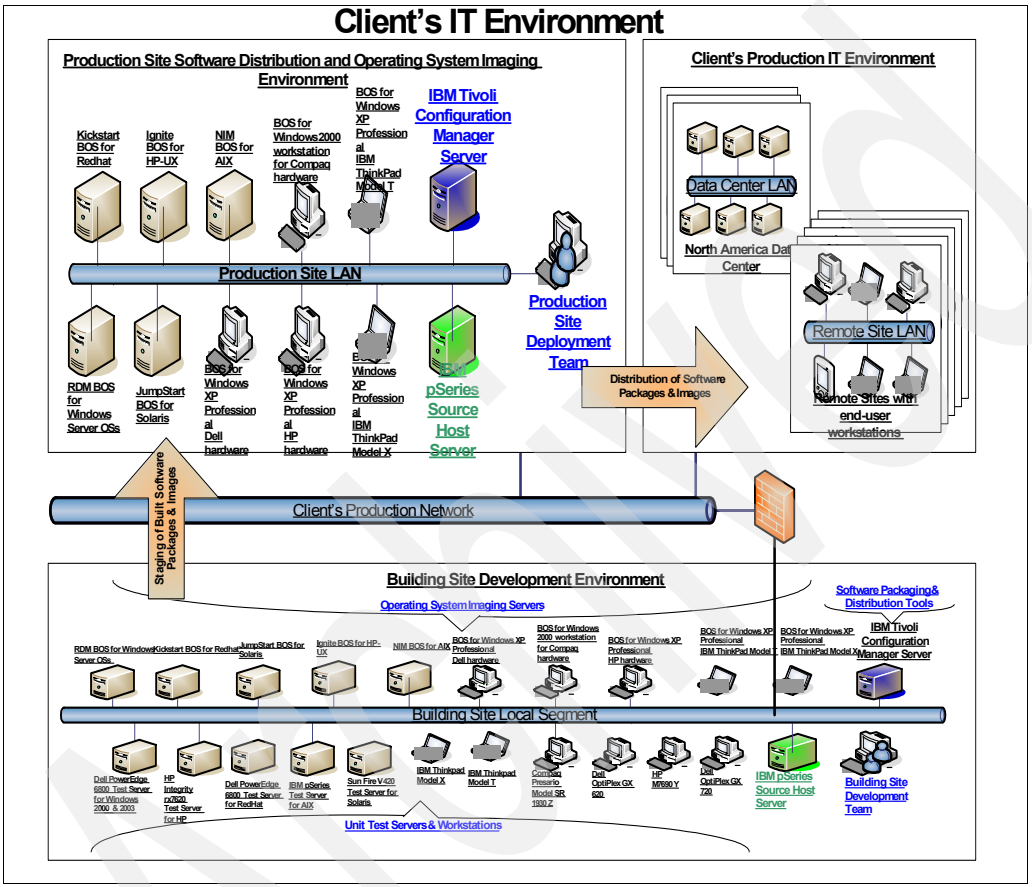

Figure 8-13 Three separate environments and their inter-connection

The next step is to move the software packages and operating system image to the staging environment, from where they will be made available to the production environment. As per the Software Distribution Change Order, at a specified time, the AIX 5L V5.3 TL1 operating system is delivered to the production IBM System p 615 server via NIM and DB2 Enterprise V9 and WebSphere Application Server V6.1 software packages by using the IBM Tivoli Configuration Manager tool. Additionally, the request also was to provide the software packages and operating system image in the DVD format. Therefore, in this case, the DVD of AIX 5L V5.3 TL1 will also be provided.

A similar process is followed regardless of the Change Order or request for OS Images and or software packages. The end-to-end ESD and OSP process, as described here, is highly effective and ensures that for any task, there is proper governance, procedures, required resource availability, and accountability. The inter-dependencies of these processes ensure the end result is an expected one and that it adheres to a high quality criteria for service delivery of ESD and OS Provisioning Services.

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this IBM Redbook.

IBM Redbooks

For information about ordering these publications, see “How to get IBM Redbooks” on page 182. Note that some of the documents referenced here may be available in softcopy only.

- *Deployment Guide Series: IBM Change and Configuration Management Database Configuration Discovery and Tracking Server v1.1*, SG24-7264
- *Deployment Guide Series: IBM Tivoli Provisioning Manager Express V4.1 for Software Distribution*, SG24-7236
- *Deployment Guide Series: IBM Tivoli Provisioning Manager Version 5.1*, SG24-7261
- *NIM: From A to Z in AIX 4.3*, SG24-5524

Online resources

These Web sites and URLs are also relevant as further information sources:

- IBM Tivoli Provisioning Manager:

  http://www-306.ibm.com/software/tivoli/products/prov-mgr/function-highlights.html

- IBM Tivoli Provisioning Manager Express for Software Distribution:

  http://www-306.ibm.com/software/tivoli/products/prov-mgr-express-software-distribution/

- IBM Remote Deployment Manager:

  http://www-03.ibm.com/servers/eserver/xseries/systems_management/ibm_director/extensions/rdm.html

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