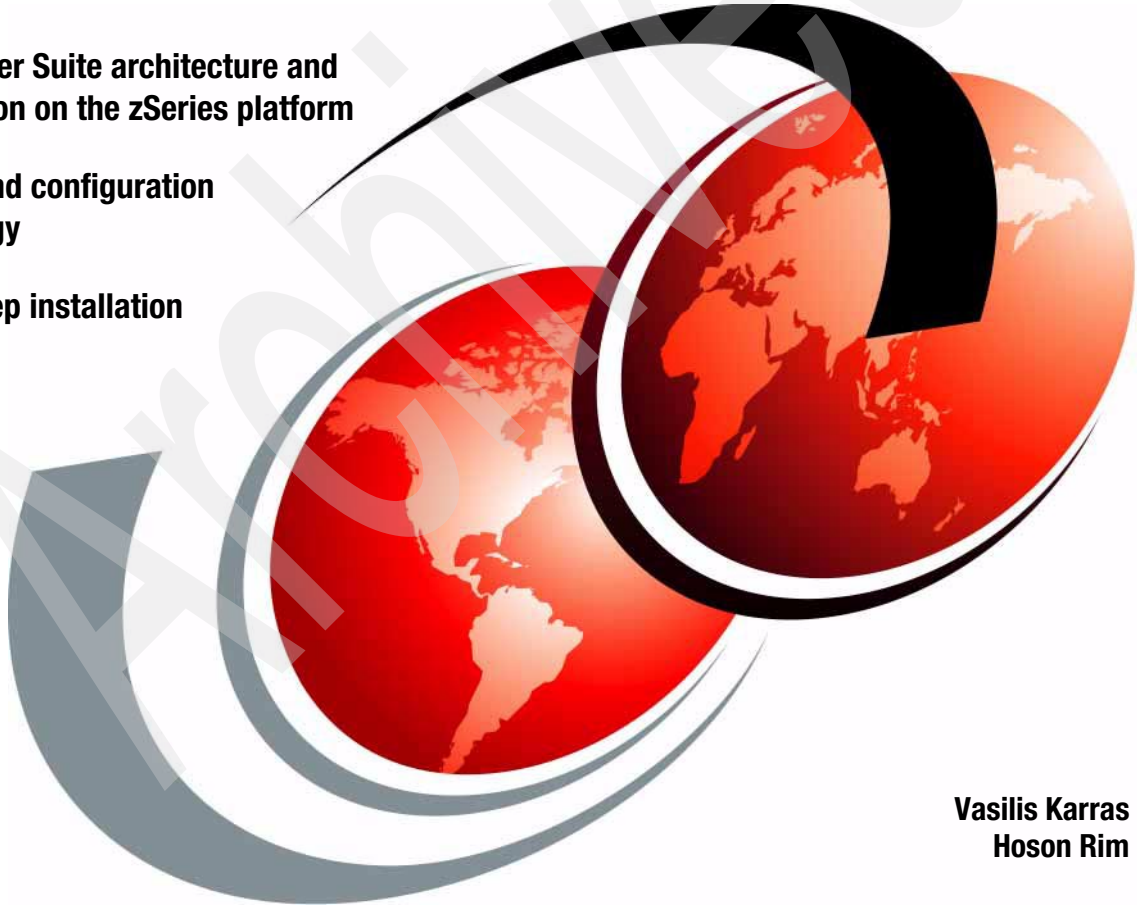
IBM

S1 Consumer Suite for z/OS Installation Guide

- S1 Consumer Suite architecture and configuration on the zSeries platform
- Planning and configuration methodology
- Step-by-step installation



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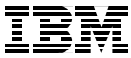

International Technical Support Organization

S1 Consumer Suite for z/OS Installation Guide

July 2002

SG24-6288-00

Take Note! Before using this information and the product it supports, be sure to read the general information in “Notices” on page vii.

First Edition July 2002

This edition applies to Version 5, Release 3 of the Security One (S1) Banking Consumer Suite to be used on the zSeries platform.

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Preface

Today's financial institutions face a demanding and competitive environment. The S1 Corporation has produced a widely accepted suite of products, banking, investments, and relationship management.

This IBM Redbook discusses the S1 Banking product, called Consumer Suite, which has been deployed on the zSeries platform. It is written for technical professionals involved in planning and installing the banking product. The information in this guide is for Version 5.3 of S1 Consumer Banking.

We begin by explaining the S1 Consumer Suite environment as it exists today. The emphasis is on the S1 Consumer Banking module as developed for the zSeries architecture.

Next, we introduce zSeries architecture and discuss the advantages of using the zSeries and z/OS as a proven Web server.

Then we discuss planning for the installation of S1 Consumer Banking on z/OS and UNIX System Services, as well as using AIX as a CSR Web server.

Finally, we describe in detail the installation and customization steps of the S1 Banking module on z/OS. A step-by-step procedure outlines the customization of the S1 Banking module under UNIX System Services. A Web server installation is described on the AIX platform. A Web server installation is also described for CSR.

The team that wrote this 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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1

S1 Consumer Suite overview

This chapter provides an overview of S1 Consumer Suite of products, including:

- Consumer Banking
- Consumer Investments
- Relationship Management

1.1 Product architecture

S1 Consumer Suite is built on a unified, multi-tier architecture that handles messaging, transaction logic, events, and the directory and naming structure. Each tier (client, application, and data access) is responsible for handling specific duties to ensure that Consumer Suite stays robust, secure, and stable.

Figure 1-1 gives an overview of S1 Consumer Suite product architecture.

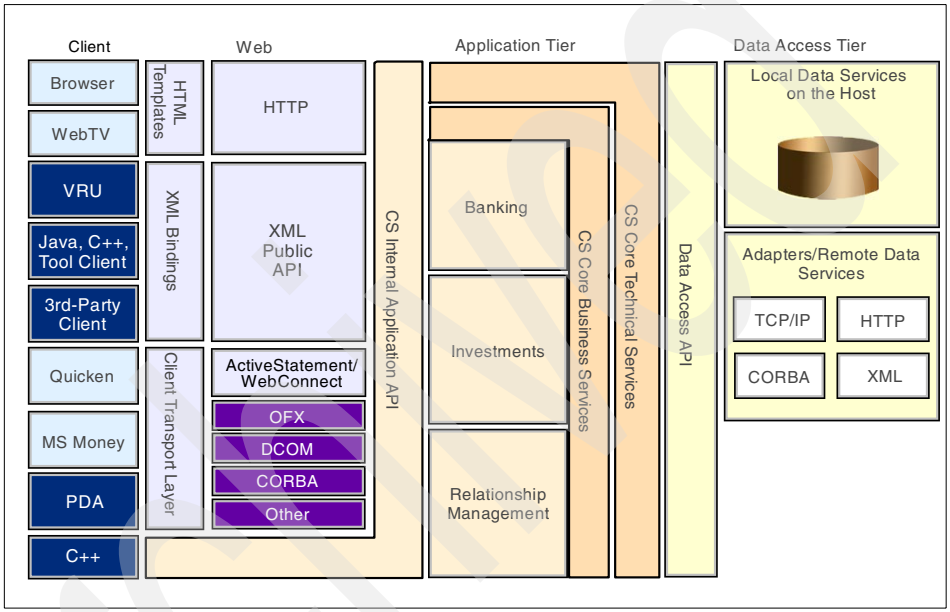

Figure 1-1 S1 Consumer Suite architecture overview

Client tier

When users access their accounts through Consumer Suite, they make requests through the Client tier. These requests may be submitted through different forms, such as a Web browser, a Wireless Application Phone (WAP), a Voice Response Unit (VRU), or Interactive Voice Response (IVR) unit. Other possible venues include palmtop computers or public kiosks.

The Client tier contains the end-user's browser or other access method, Web Server, the Forté WebEnterprise gateway, and the WebEnterprise Client Application, which manages the financial institution's user interface for Consumer Investments. The Client Application is the only part of Consumer Suite that user

requests (such as presentation logic) actually reach. From there, the requests are channeled through a variety of firewalls and secure servers, ensuring that the Application and Data Access tiers remain fully secure and unavailable from the Internet.

For more information, refer to 3.4, “Security” on page 38.

Application tier

The Application tier shows all the major components of the S1 Consumer products - banking, investments, and relationship management. It contains the business logic for those components. In this tier, user requests are validated and processed, and the physical transactions are managed. The Application tier contains logic to support trades, balances, transactions, portfolio, and quotes. All application logging, monitoring, and auditing activities take place in this tier. It also contains business logic common to the entire S1 Consumer Suite.

Data Access tier

The Data Access tier typically contains the application data.The business logic in the application tier submits requests to the Data Access tier to add, update, or delete physical data from the supporting data storage facility. Consumer Suite is designed to allow the physical data to be stored in a local database or in a remote storage facility on the financial institution’s host systems.

If the data is stored remotely, it is accessed using a real-time call to the host system. If the data is stored locally, it is synchronized with the host system using real-time adapters and a batch process.

The Data Access tier also includes communications servers where adapters are implemented. It is the integration point between the Consumer Suite core application and a financial institution’s vendors. A variety of host protocols can be used to communicate through the Data Access tier. Protocols such as 3270, sockets, TUXEDO, CORBA, and DCOM can be implemented through custom-developed interfaces.

1.2 The S1 Consumer Suite of products

Today’s financial institutions face a demanding and competitive environment, including factors such as:

- Huge and constantly growing operational databases
- A demanding customer base
- Customer-centric vs. product-centric marketing
- Rapidly advancing technology that delivers new opportunities
- Reduced time to market

- A highly competitive environment with non-traditional competitors
- Mergers and acquisitions that often cause turmoil and confusion

The S1 Corporation has produced a widely-accepted suite of products to address the demands of the financial industry. The three modules of the S1 Consumer Suite are:

- Consumer Banking
- Consumer Investments
- Relationship Management

The S1 team has ported only the Banking module to the zSeries platform. In the following sections, however, we discuss each of these modules in greater detail.

1.2.1 Consumer Banking

Consumer Banking is built on a unified, multitier technical architecture that handles messaging, transaction logic, events, and the directory and naming structure. Each tier is responsible for handling specific duties to ensure that Consumer Banking stays robust, secure, and stable.

Consumer Banking provides a powerful and versatile banking solution. It is customizable and configurable, and can be implemented in a variety of settings to meet the changing needs of modern financial institutions. Consumer Banking allows users to:

- View and retain an unlimited account history, depending on the configuration
- View account balances
- View cleared transactions
- Enter transactions in the register and assign categories and memos to transactions
- Generate detailed reports to track spending
- Interface with popular financial software, such as Microsoft Money and Intuit Quicken
- Make online payments and transfer funds between accounts
- Schedule recurring payments and transfers

Because of its flexibility, Consumer Banking presents a financial institution with a wide variety of choices. This redbook is designed to assist in helping you to understand the following:

- Consumer Banking's capabilities and features
- Implications of various configuration and implementation decisions
- Dependencies among various implementation choices

We cover the Consumer Banking module in greater detail in Chapter 3, “S1 Consumer Banking planning” on page 31.

1.2.2 Consumer Investments

Built on an open, scalable architecture, Consumer Investments provides a powerful and versatile investments solution. It allows users to:

- Trade stocks, mutual funds, and options
- View portfolio positions by the type of holding
- Track unsettled trades, open orders, order status, and order details
- Search for symbols and get delayed or real-time quotes
- Research potential investments
- Generate capital gains reports

Because of its flexibility, Consumer Investments presents a financial institution with multiple choices and decisions to make.

Consumer Investments is customizable. Functions such as the ability to trade stocks, mutual funds, and options can be configured.

1.2.3 Relationship Management

The Relationship Management module in the Consumer Suite is an application designed to engage the customers of the financial institution so that they not only perform typical financial functions at the site, but are also likely to remain at the site for longer periods of time to perform other functions. This helps financial institutions maintain a one-to-one marketing relationship with their customers.

Relationship Management accomplishes this by designing several components, such as third-party content, targeted marketing, and observations, into the site and by enabling customers to personalize the site to suit their needs and preferences.

User levels

Relationship Management uses the concept of *user levels* to determine the amount of information available to each user. There are three user levels:

- Prospect: A prospect has no security credentials and is allowed access to use limited functionality within Relationship Management, but cannot customize any settings. A Web Enterprise session is automatically created for the prospect.
- Portal user without accounts: Portal users without accounts have the ability to customize their personal links, login method, amount of news content, personal greetings, and custom portfolio. To achieve this level, the user must

be authenticated using login credentials. These credentials can be entered in the login page or delivered by a persistent cookie set on the user's browser.

- Portal user with accounts: Portal users with accounts have all of the customization and personalization available to portal users without accounts. They also have the ability to access their accounts and other S1 Consumer Suite applications. This level can only be achieved by explicit authentication using the S1 Consumer Suite authentication procedure.

Table 1-1 lists the features available to each user.

Table 1-1 Relationship Management features

Characteristics	Features
No account summary or alerts	► Self-enrollment
Default greeting	► Quick quote and lookup
Default news and other content as configured by the financial institution	► Internet search ► Financial calculators
Customized content	► Portfolios
Targeted marketing	► Automatic login to portal

Third-party providers

An integral part of Relationship Management is its relationship to third-party vendors. It is these relationships that enable financial institutions to display news stories and stock quotes, and provide financial calculators to customers. Relationship Management provides standard adapters to interact with third-party providers. Alternative providers can be implemented, but this requires custom adapter development.

Brand

The ability to brand provides the flexibility necessary to present different user experiences. A *brand* is the combination of a locale and a user group. A *locale* is a language that may also have a regional designation (for example, English-US, English-UK, and French-Canadian). A *user group* is a grouping of users, usually for marketing purposes. It can also be called *personality* or *market segment*.

However the financial institution chooses to segment users, each user is assigned to a brand, based on their locale and user group. Locale and user group are determined by the information in the user's personal profile. Templates, financial calculators, and all defaults are configured based on the brand. As a result, one user's experience with Relationship Management may be quite different from another's.

Note: You may also hear the term *branding* used when discussing S1 Consumer Suite products. The processing of customizing the templates and the user interface is sometimes referred to as “branding the application”. This should not be confused with brand as discussed in this section.

Components and features

Relationship Management is comprised of four major components: Portal, Relationship Management, Alerts, and Custom Portfolio. Within each component, there are features that may or may not be available to the user, depending on the category to which the user belongs. Table 1-2 lists these major components and features.

Table 1-2 Relationship Management components

Component	Features
Portal	► General news ► User-defined personal links to external Web sites ► Internet search ► Financial calculators ► Personalization of home page
Relationship Management	► Targeted advertisements ► Targeted news and messages from the financial institution ► Observation of user behavior
Alerts	► Account level ► System level
Custom Portfolio	► Stock quotes ► Stock tracking ► Portfolio tracking

Product architecture

The diagram in Figure 1-2 on page 8 illustrates the major components of Relationship Management architecture. (The diagram does not illustrate actions that are hyperlinks directly from the client, such as financial calculators, and Internet searches.)

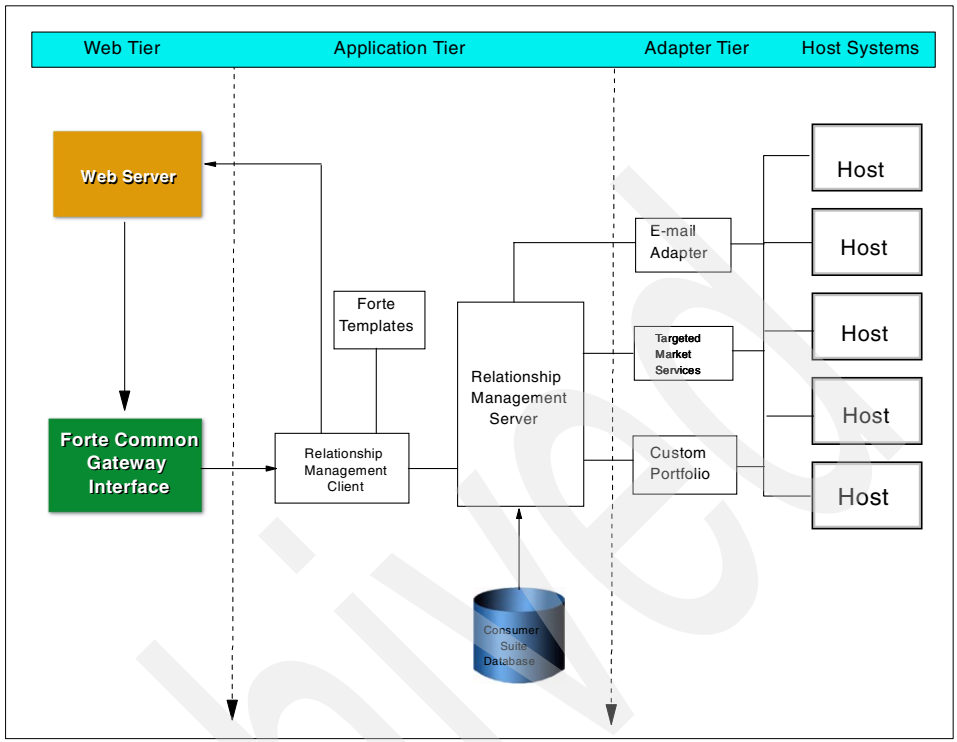

Figure 1-2 S1 Relationship Management architecture

2

zSeries platform overview

Although some industry watchers had predicted the end of the mainframe as the client-server philosophy rose in popularity, this scenario has not come true. This is because the zSeries hardware and software has been refined for four decades to provide unparalleled performance and reliability.

This technology makes the zSeries an excellent server platform, in both highly centralized and client-server environments. The growing popularity of the World Wide Web has increased the demand for powerful zSeries servers with their extremely high availability.

2.1 Benefits of the zSeries platform

Complexity is a way of life for businesses today. An average business must contend with five different architectures in its e-business infrastructure. The challenge customers face is how to manage all of these resources effectively, while transforming their infrastructures. Compounding the problem is the projected shortfall of skills and the explosive growth of the Internet.

Although it sounds like a daunting task, IBM is designing its product line to be “self-managing” so customers can concentrate on their business needs. At the core of many infrastructures is the IBM zSeries 900™ powered by z/OS™. Specifically designed to handle the massive growth in transactional and data demands of the e-business world, z900 and z/OS intelligently manage a multitude of diverse workloads within a single server, out to the network and to data, all according to each customer's business priorities.

2.1.1 Powerful architecture

The z900 servers are based on the z/Architecture, which enables applications to have large memory and can eliminate bottlenecks associated with the lack of addressable memory. This architecture supports a new standard of performance and integration by expanding on the balanced system approach of the S/390® architecture.

zSeries servers automatically direct resources to priority work through Intelligent Resource Director (IRD). The zSeries IRD combines the strengths of three key technologies: Workload Manager, Logical Partitioning, and Parallel Sysplex clustering.

This powerful combination of z900 servers and z/OS provides the ability to intelligently self-manage numerous operating system images executing on a single server, as a single compute resource, with dynamic workload management and physical resource balancing across logical partitions. In short, the system can dynamically allocate processors, channel paths, and channel-and-controller work across multiple virtual servers to ensure that the unpredictable needs of e-business workloads can be managed according to business priorities.

The zSeries and z/OS extend the power of Workload Manager from the edge of a network to the heart of data. Business priorities are used for real-time prioritization of network and I/O requests when combined with Cisco technology and through the IBM Enterprise Storage Server™. The Sysplex Distributor

function of z/OS provides intelligent load balancing of TCP/IP traffic across a Parallel Sysplex cluster. Dynamic Virtual Internet Protocol Addressing (VIPA) support extends the workload distribution and availability features of Parallel Sysplex technology to the TCP/IP network.

2.1.2 Availability: always on

zSeries servers can deliver the highest level of application availability required in today's global networked environment. Even in a single footprint, zSeries servers are designed to avoid or recover from failures to minimize business disruptions. High availability is realized through very high component reliability and design features that assist in providing fault avoidance and tolerance, as well as permitting concurrent maintenance and repair.

For even higher levels of availability, the superior choice is zSeries 900 with IBM Parallel Sysplex clustering technology. New and faster Coupling Links provide balanced performance for the powerful z900 in a sysplex. ISC-3 links provide up to 2 gigabits/second transfer rates; ICB links provide up to 1 gigabyte/second. In addition, complete backward compatibility exists with S/390 ISC and ICB links.

Another aspect of availability is nondisruptive growth, enabled in the zSeries by Capacity Upgrade on Demand. z900 servers have the capability to add server capacity and virtual servers in a nondisruptive manner, as well as to install FICON, FICON Express, ESCON, OSA-Express Gigabit and Fast Ethernet, Token Ring and ATM, and PCI Cryptographic Coprocessor (PCICC), PCI Cryptographic Accelerator (PCICA) cards, and to activate memory without bringing down the system.

2.1.3 Safe and secure

IBM leads the industry in bringing security to e-business with the integrated security features of z/Architecture. The high-availability CMOS Cryptographic Co-processors feature has earned Federal Information Processing Standard (FIPS) 140-1 level 4, the highest certification for commercial security ever awarded by the U.S. Government. Further, these co-processors are designed as single-chip modules that are individually serviceable, eliminating downtime in the event of a crypto chip repair action.

z900 servers can also support a combined total of 16 optional PCICC and/or PCICA co-processors, leading the industry in supporting up to 3,850 SSL transactions/second. The combination of the three co-processor types enables applications to invoke industry-standard cryptographic capabilities—such as DES, Triple DES and RSA—for scalable e-transaction security and the flexibility to quickly adopt new standards.

Linux for zSeries running on standard z900 engines is capable of exploiting the hardware cryptographic feature provided by the PCI card for SSL acceleration. This enables customers implementing e-business applications on Linux for zSeries to utilize enhanced security of the hardware.

2.1.4 Innovative technology = leading server performance

zSeries technological leadership means that you can reduce the cost and complexity of e-business through self-managing features such as Intelligent Resource Director (IRD), 64-bit architecture, copper technology, HiperSockets, and up to 640 processors working together. With this ability to self-manage, zSeries is a model for IBM's Project eLiza, a project whose purpose is to make the e-business infrastructure, including storage and software, a self-managing system. With systems that self-optimize, self-configure, self-heal and self-protect, Project eLiza will enable IBM to start removing the complexity of ever-expanding e-business infrastructures and help you overcome systems management challenges.

Some examples of zSeries self-management

z/OS Workload Manager (WLM) and IRD on the IBM z900 and z800 can handle unpredictable workloads. This means minimal human intervention to set up and operate the system and effective utilization of CPU and I/O resources.

The zSeries IRD LPAR CPU management function dynamically manages non-z/OS operating systems such as Linux. This means the Workload Manager policy establishes the goal and business importance of a non-z/OS partition like Linux.

2.2 Powered by z/OS

While z900 servers are supported by a multitude of operating systems, their most advanced features are powered by z/OS. z/OS is the foundation for the future of zSeries servers. It is an integral part of the z/Architecture, designed and developed to quickly respond to the demanding quality of service requirements for enterprise e-business.

As a robust operating system, z/OS is based on the new 64-bit z/Architecture. Using the latest software technologies, z/OS delivers the highest qualities of service for enterprise transactions and data, while extending these qualities to new applications. It provides a highly secure, scalable, high-performance base on which to build and deploy Internet and Java-enabled applications.

z/OS takes advantage of the latest software technologies: new object-oriented programming models that permit the rapid design, development, and deployment of applications essential to enterprise e-business. It protects investments in present S/390 applications by providing options for integrating existing applications within an e-business infrastructure.

In addition, z/OS provides a solid base for delivering on the benefits of industry-specific UNIX® and e-business applications, supporting ISO standard C++ libraries as well as new technologies such as Enterprise JavaBeans™, XML, HTML, and Unicode. It supports such technological advances as Parallel Sysplex processing and TCP/IP networking capability, and it complies with industry standards.

z/OS helps make critical data and processing functions accessible to end users regardless of their location. The z/OS base includes z/OS Communications Server, which enables world-class TCP/IP, SNA, and HiperSockets networking support. Enterprise class dependability, performance, scalability, highly secure connectivity, and support for multiple protocols are included.

The SecureWay® Security Server feature and additional security functions help ensure data and transaction integrity. Furthermore, z/OS supports user authentication via Kerberos protocol, or via digital certificates as well as through local user ID. Other cryptographic functions include support of Secure Socket Layer (SSL) protocol and support of typical smart card applications.

2.2.1 Smoothing the path

The systems management function and features of z/OS provide more robust control and automation, as well as better serviceability and availability. For example, Intelligent Resource Director extends the classic strengths of I/O priority queuing by prioritizing requests across zSeries 900 channels via Channel Subsystem Priority Queuing. In addition, it allows I/O channels to move automatically to those workloads that require additional connectivity through Dynamic Channel Path Management.

Furthermore, z/OS provides an entirely new approach for installing and configuring products: a managed system infrastructure. This approach goes beyond Web-based wizards by furnishing a step-by-step installation guide and automated system updates. For example, Managed Systems Infrastructure for Setup can establish a Parallel Sysplex quickly and easily by transparently creating the policies, parmlib specifications, and initialization parameters necessary to configure a basic Parallel Sysplex environment.

2.2.2 An open, flexible server

z900 servers offer the flexibility to manage numerous operating systems on a single server, including z/OS, OS/390, z/VM, VM/ESA, VSE/ESA, TPF, Linux for zSeries and Linux for S/390.

Using virtualization technology as a foundation, z/VM Version 4 (V4) offers new functions that exploit IBM Virtual Machine (VM) capabilities on the mainframe. Virtualization technology allows customers to virtualize processor, communications, storage, and I/O resources, which may reduce the overhead of planning, purchasing, and installing new hardware to support new workloads.

Building upon the solid VM/ESA base, z/VM delivers support for hardware technologies such as FICON and FICON Express channels, OSAExpress—high-speed communication adapters, low-latency HiperSockets, and advanced storage solutions. z/VM also takes advantage of 64-bit real and virtual memory.

Linux for zSeries supports the new 64-bit architecture and HiperSockets on z900 processors. In addition, Linux for S/390 will run 31-bit applications.

Multiple Linux systems can be easily managed on the zSeries 900 with z/VM. z/VM V4 offers an ideal platform for consolidating Linux workloads on a single zSeries 900, enabling you to run hundreds of Linux guest images. Linux images are able to share resources and internal high-speed communications.

The Integrated Facility for Linux is a feature that dedicates a processor for Linux images. Additional processing capability can be purchased exclusively for Linux workloads, without impacting the z900 model designation nor increasing charges for zSeries software on the rest of the server. z/VM V4 supports the IBM Integrated Facility for Linux feature for Linux-based workloads.

2.2.3 Reasons to run your applications on z/OS

Opening up the information system to casual—and occasionally, unknown—users through the World Wide Web means that the unequaled security provided by the zSeries is essential to the protection of critical data. Making the information available to existing and potential customers, rather than just employees of an organization, means that maximum availability is critical. If your Web site is down, a competitor's Web site is often just a click away.

z/OS incorporates many new functions such as integrated UNIX, Web enablement, Print Server, and so on, to make it a super server. While retaining all the features of classic MVS, other features have been added to make it an open server. zSeries provides DCE function, integrates object-oriented support, provides Web serving, and packages TCP/IP in the base product. In addition, it is UNIX branded; that is, z/OS is certified that it has a standard set of UNIX APIs. z/OS is totally compliant with UNIX 95 (XPG4).

z/OS continues to support online transaction and batch processing. The industry is growing in the area of e-business (network computing), data mining (business intelligence), server consolidation, and the use of packaged applications. We expect the z/OS to have significant usage growth in these new areas. Our development efforts are directed at supporting the OLTP and batch as well as all the technologies needed for these growth areas.

z/OS has a number of attributes that distinguish it from other enterprise category servers. A single z/OS can provide 99.9 percent uptime. Parallel Sysplex is the industry's ultimate configuration, providing 99.999 percent uptime.

2.3 zSeries hardware benefits

Several features are implemented in the zSeries hardware to provide high reliability, availability, and serviceability (RAS) for applications. Every zSeries generation over the years has contained more and further enhanced features as the platform matured, and there will surely be more of those features coming in future generations.

Many of zSeries RAS features were developed at a time when the failure of hardware elements was more frequent, and they are very rare nowadays. However, these hardware availability features are just as valuable today. The design concept is to avoid single points of failure (SPOFs). Therefore, most zSeries hardware elements have built-in redundancy or can be circumvented if they fail.

This section lists many of the features that are implemented in the zSeries architectural design.

2.3.1 Reliability features

Reliability is designed into zSeries hardware, including features like these:

- High-reliability technology components
- Parts integration, to reduce the number of parts in the machine

- MCM System Run-In Test in manufacturing, to simulate 9000 hours of extreme customer operation

2.3.2 Availability features

zSeries contains a number of features to enhance availability of the system and its applications. These include

- Fault-tolerant design
- Error correction code
- Storage recovery
- LPAR dynamic storage reconfiguration
- Dynamic I/O configuration
- Dual power feeds
- Concurrent hardware maintenance
- Capacity update on demand (see 2.3.3, “Customer-Initiated Upgrade (CIU)” on page 16)

Lastly, there are a number of features that provide excellent ability to service hardware and software in a zSeries environment:

- Automatic error detection and fault isolation concurrent with system operation
- Automatic remote support capability
- High degree of concurrent maintenance capability in hardware and code
- Multiple Channel Swap—an enhancement for channel problem determination allowing up to four channels to be swapped concurrently with system operation
- Status Panel showing status of N+1 power system
- Enhanced diagnostics for Coupling Links

2.3.3 Customer-Initiated Upgrade (CIU)

As with other IBM platforms, zSeries offers IBM Capacity Advantage. This enables businesses to plan for unpredictable new e-business opportunities or surges of transactions on the Internet. You can prepare now to add future capacity quickly and without disrupting your users, applications, or systems.

We provide new approaches to capacity growth that are aligned with business expenditures and individual needs, offering these features:

- More processors

- Pay when you activate
- Avoid disruption

Capacity Advantage from IBM consists of two approaches:

1. Capacity Upgrade: Preinstalling hardware upgrade features can prepare for the ability to add capacity quickly without ship and install delays.
2. Capacity Standby: Financing options provide cost-effective assurance that capacity will be there for the next online business opportunity.

Capacity Upgrade allows companies to manage unpredictable growth by having extra “dormant” capacity shipped with the original machine for a small premium at initial purchase. When an upgrade is needed, it can be purchased and activated rapidly and in a nondisruptive manner. Growth is easily managed at the lowest cost.

Extra processors are provided within a single server. Although the most likely type of workload is data/transaction serving, this type of capacity on demand can be used for any purpose, including Web servers, application servers, or special purpose servers. Even better, every server with Capacity Upgrade offers you tremendous flexibility:

- A trial period during which you can try out the additional capacity before committing to permanent activation and payment.
- The ability to turn on the capacity immediately when you need it, with billing and payment after the activation.
- Flexibility to pay for additional capacity activation in line with your need - matching expenditures directly to need.
- The flexibility to work with IBM Business Partners or IBM directly to order and pay for capacity you have activated.
- You never need to activate the additional capacity if you don't need it.

How you get Capacity Upgrade

There are four steps to order and implement Capacity Upgrade:

1. Acquisition - Order and Acquire the hardware necessary to deliver built-in processor capacity on demand.
2. Trial Period - If desired, “test drive” the capacity for a number of days. If you turn it off in this period, you will not need to pay for the extra capacity.
3. Permanent Activation - Activate the capacity permanently.
4. Ordering and Payment - Order and pay for the additional activated capacity through IBM or business partners.

With Capacity Upgrade, you are not required to activate the additional capacity on any pre-established schedule, except for Storage, which requires additional capacity to be activated within 12 months of installation.

Which servers support capacity upgrade

Capacity Upgrade is available on:

- IBM zSeries
- S390 G5 and G6 servers

2.4 Advantages of running applications on zSeries

Since the IBM System/360 became available in 1964, companies have been running their mission-critical applications on this centralized platform. It is a system that has evolved into an open architecture compatible with new technologies. More important, most companies have a staff with the necessary knowledge and skills.

While IBM has maintained this heritage, it has also kept up with the innovations in the industry. zSeries has all the infrastructure to play in the world of e-business. WebSphere, Java, Lotus Notes, and many other products have been added to the zSeries repertory. In short, zSeries is an excellent server platform.

2.4.1 Background

Applications benefit from being on the zSeries platform because it offers the highest degree of security, availability and scalability for mission-critical applications, compared to other platforms. Mainframes run a high percentage of business applications around the world for the following reasons:

- Most large companies run their core business applications on z/OS.
- End users are accustomed to good response time.
- z/OS uses known and reliable techniques.

The benefits of running an application on zSeries include:

- Availability
- Scalability
- Concurrent workload
- Security

2.4.2 Availability

Availability is a very important factor and a critical concern in more and more business applications. What is the impact to your business if your application becomes unavailable? In fact, continuous availability is almost a necessity for many business processes.

You must have a strategy to handle unplanned short-term outages, as well as complete disasters. Every component of the system must be analyzed to see if and where any potential point of failure exists. Ideally, each component should have a backup alternative, so that there should never be any unplanned outages. In addition to hardware and software outages, other causes of failure include incorrect procedures in operations or in handling upgrades. Over the years, the zSeries platform has developed system management procedures that address these issues and minimize these types of failures.

The zSeries architecture is designed to isolate and recover failed components. There are many built-in facilities to tolerate failures, such as redundant power supplies, alternative CPU recovery, memory error detection and recovery, and others. Additional components can be added without affecting availability.

There are also built-in remote diagnostics. Certain errors will trigger the system to phone home to an IBM Support Center, so that a customer engineer can be dispatched to take corrective action. The z/OS operating system has a host of features that ensure availability, and system integrity, such as storage protection keys and an automatic restart manager. In fact, 50 percent of z/OS code is devoted to reliability, availability, and serviceability (RAS) of the operating system.

2.4.3 Scalability

Providing better performance for end users has been a key requirement of mainframe systems over the years. During the development of zSeries, sophisticated system management tools were created. These tools, coupled with zSeries' efficient use of hardware, has produced an environment that provides excellent performance even with varying workloads. It should be noted that part of this hardware efficiency is the result of its very powerful I/O capability

These factors, combined with the continuing increase in the processing power of the new IBM chip technology, make zSeries the best scalable platform for excellent performance.

- zSeries has a full range of processing power.
- As your workload grows, you can increase processing power by adding or using more processors and memory.

- zSeries has the most efficient SMP ratio of any platform. Each additional processor contributes a larger percentage of its power to the total than on any other platform.
- zSeries development continues to enhance the processing power.

IBM's mainframe division has over 30 years of experience with SMP (symmetrical multiprocessing). They have architected the hardware and software to make the most efficient use of each additional processor. Because of the contention in accessing common resources, multi-engine machines incur incremental overhead as more processors are added. When two or more processors need to access a resource at the same time, they need to take turns accessing the resource.

Reducing this interference increases the total power of the machine, as the processors do not get tied up waiting and thus can devote more processing power to useful work. This is the MP ratio, and zSeries has the best in the industry.

2.4.4 Concurrent workload

There are many resources to manage in any computing system.These resources are managed and allocated to workloads in a way that affects both the efficiency of the system (which has a direct relation to cost) and the level of service that users receive.

- There can be many types of workloads on a single z/OS system.
- z/OS is designed to handle diverse workloads efficiently.
- Goals are set by the customer based on business need.
- Workload goals are defined in a customer-written policy that controls how much resource each job is allocated.

The workload and resource scheduling components of z/OS have for a long time enabled the efficient running of many concurrent applications. Large batch runs, large print runs, and online transaction systems are commonly found together on a zSeries platform.

The resource management algorithms have been modified and improved with each new level in processor performance, memory size addressing capability, disk I/O performance, and disk size. This has resulted in changes to the task dispatchers and the resource managers in z/OS that allow zSeries to make much better use of the available resources.The zSeries can run concurrent diverse workloads on one server that can achieve processor utilization of close to 100 percent, while still achieving sub-second response times for transaction-based systems.

2.4.5 Security

Data security is critical for business applications. User access security is handled by the application itself. zSeries and z/OS offer system integrity, software reliability and data protection from other users.

The application manages user access security and user access to data (for example, a DB2 database). For protection of the application, z/OS provides the most secure environment for protecting data. Because data is stored in z/OS VSAM data sets, it can be protected by the z/OS Security Server functions (RACF).

In terms of security, z/OS minimizes the risk as follows:

- Resource security

  The z/OS Security Server, which has evolved from MVS RACF, provides an extremely secure environment by providing the ability to protect data sets, transactions, and subsystem access.

- Data security

  Data is essential to your business, and data security means more than just protecting the data from unauthorized user access. Because of the possibility of operational problems or a “disaster”, it is essential that it be backed up. z/OS simplifies backups by providing high-speed data movement and concurrent copy. These proven concepts ensure that even offsite disaster recovery can be managed without losing data.

- Network security

  As more and more companies open up their network environment, it is very important to control who has access to what data and how they can access it. The Internet is one means of communication with the “outside world”. Every company has to make sure that access is controlled and that the data sent and received is safe.

- Security integrity and software reliability

  Concepts and techniques to secure both the zSeries and z/OS have been developed continuously for over 20 years. It is a mature and secure system with hardware techniques such as storage protection, error handling for main storage and channels, and software techniques including significant error handling code in the base operating system. These are coupled with mature Transaction Monitors and Database Managers, creating an integrated environment ensuring system integrity.

2.5 zSeries benefits for ERP solutions

The recent resurgence of the IBM zSeries has been particularly strong in the ERP arena. Because many ERP implementations now provide Web access to users, customers have been very interested in the strengths that the zSeries can provide. This growing number of users means that the scalability of the zSeries is more crucial than ever before. Unpredictable numbers of users and unpredictable use patterns mean that the flexibility of zSeries to reassign compute power based on customer-defined priorities, and its ability to add compute power without bringing the system down, are crucial in meeting unpredictable demand quickly and easily, with the least disruption and cost.

Opening up the information system to casual and occasionally unknown users via the World Wide Web means that the unequaled security provided by the zSeries is essential to the protection of critical data. Opening up the information system to existing and potential customers, rather than just employees of an organization, means that maximum availability is critical. If your Web site is down, a competitor's Web site is often just a click away.

For these reasons, the z/OS has been gaining more ERP market share than any other platform. AMR's most recent surveys indicate that zSeries's share has tripled from 1997 to 1999, and grown faster in percentage (4 points) than any other platform (closest is NT's growth of 3 points from 1997 to 1999). IBM plans to continue to enhance the zSeries in order to build on this growth by providing continuous improvements in capacity, price performance, security, manageability and availability.

z/OS incorporates many new functions such as integrated UNIX, Web enablement, Print Server and so on, to make it a super server. While retaining all the features of classic MVS, other features have been added to make it an open server. zSeries provides DCE function, integrates object-oriented support, provides Web serving, and packages TCP/IP in the base product. In addition, it is UNIX branded, that is, z/OS is certified that it has a standard set of UNIX APIs. z/OS is totally compliant with UNIX 95 (XPG4).

z/OS continues to support online transaction and batch processing. The industry is growing in the area of e-business (network computing), data mining (business intelligence), server consolidation, and the use of packaged applications. We expect the z/OS to have significant usage growth in these new areas. Our development efforts are directed at supporting the OLTP and batch as well as all the technologies needed for these growth areas.

z/OS has a number of attributes that distinguish it from other enterprise category servers. A single z/OS can provide 99.9 percent uptime. As previously mentioned, Parallel Sysplex is the industry's ultimate configuration, providing 99.999 percent uptime. Currently, there is a lot of "posturing" in the availability arena. When IBM says Parallel Sysplex can provide 99.999 percent availability, it is not just referring to hardware uptime, but the availability of the operating system to an application (user).

Note: It cannot, nor can any other vendor's hardware/software, protect against bad applications (for example, an application outage due to an application software problem).

When the term *availability* is used by non-z/OS people, scheduled outages to upgrade the operating system, for example, are not usually considered as a loss of availability (that time is subtracted from the base). Similarly, the length of an outage does not have a universal definition.

2.6 DB2 features that benefit S1 Consumer Suite

DB2 UDB for z/OS was designed so that you should not have to take DB2 down in order to perform traditional database activities. Every new version of DB2 delivers new functions that are designed to ensure high availability. The development of the latest two versions (V6 and V7) has been especially focused on key vendors such as SAP, Oracle, S1. They contain several high impact features which make S1 more reliable, more scalable, and easier to manage.

Another key area of improvement was performance, based on benchmarks and customer experiences. In this section we discuss the main features that are built into DB2 UDB for z/OS to improve high availability and continuous operation of the database.

Table 2-1 on page 24 summarizes the features which are implemented in the design of DB2 UDB for z/OS. It shows which availability features apply to the frequency, duration, and scope of an outage. It further explains whether this feature helps eliminate planned or unplanned outages, or both.

Table 2-1 DB2 UDB for z/OS availability features

Availability features	Reduces outage frequency	Reduces outage duration	Reduces outage scope	Type of outage
Online Backup with SHRLEVEL CHANGE option		X		Planned
CONCURRENT Option in COPY		X		Planned
COPYDDN and RECOVERYDDN	X			Planned
Backing up indexes		X		Planned
Fast Log Apply		X		Both
ARM Support			X	Unplanned
Online Reorg	X	X		Both
Inline Statistics	X			Planned
Partition Rebalancing	X			Planned
RRS Attachment Facility		X		Planned
Parallel COPY and RECOVER		X		Unplanned
Automatic Recovery at Restart			X	Planned
Partition Independence		X	X	Planned

Legend: X=Applies

The following section describes the main DB2 for z/OS availability features.

2.6.1 Backup and recovery

One of the most significant continuous operation features of DB2 is the COPY utility. It can be used to produce an online backup of a tablespace, while the application continues to read and write the data.

Online Backup with SHRLEVEL CHANGE option

The use of the SHRLEVEL CHANGE option produces a fuzzy image copy during concurrent application workload. To recover to a point of consistency, you may apply necessary log records.

An important aspect of the online backup is the “incremental” online backup. This is a copy of only those tablespace data pages that have been changed since the last backup. Except for a small processor and DASD overhead, the online backup has no impact on the concurrent application activities.

CONCURRENT Option in COPY

If you perform an offline backup of a tablespace, concurrent write activity on this particular table space is not allowed. However, the usage of the CONCURRENT option can significantly reduce the time during which the tablespace is unavailable for write activity. The database activity will be quiesced and made available again automatically. This method does not need the separate quiesce and restart steps.

CHANGELIMIT Option in COPY

The CHANGELIMIT Option in COPY allows DB2 to determine whether to take a full or incremental image copy, depending on the number of pages changed since the last image copy.

With this option, you can avoid running image copy jobs when very few (or no) pages of a table space have changed since the last image copy was taken. The savings in time can be used to maximize the use of batch windows.

COPYDDN and RECOVERYDDN

The options COPYDDN and RECOVERYDDN allow you to create up to four identical copies of the table space.

Parallel COPY and Parallel RECOVER

Previously objects were restored serially, and you could never copy multiple objects in a single COPY job. Now with DB2 UDB for z/OS V6, when you specify a list of table spaces and index spaces, you can also copy and recover some or all of those objects in parallel using the new PARALLEL option of COPY and RECOVER. This feature enables a faster backup and restore of DB2, as it reduces the elapsed time of those jobs.

Backing up indexes

In previous DB2 versions, you could not make image copies of indexes. Therefore, you could recover indexes only by rebuilding the indexes from existing data. This process could be lengthy, especially if index recovery had to wait until the data was recovered, making those indexes unavailable until the rebuild was complete.

In DB2 V6, you can take a full image copy or a concurrent copy of an index, just as you have always done for table spaces. To recover those indexes, you use the RECOVER utility, which restores the image copy and applies log records.

2.6.2 DB2 Restart

Fast Log Apply

A faster log apply process in DB2 UDB for z/OS V6 improves restart and recovery times up to 5 times in order to reduce unplanned outages. The new process sorts out log records so that changes that are to be applied to the same page or same set of pages are together. Then, using several log-apply tasks, DB2 can apply those changes in parallel. This feature requires fewer I/O operations for the log apply and can reduce CPU time.

Alter Checkpoint Frequency

The new SET LOG LOGLOAD(n) command allows you to dynamically change the LOGLOAD system parameter. This parameter controls the frequency of checkpoints. The more frequent checkpoints, the faster the DB2 restart after abnormal termination. On the other hand, too frequent checkpoints negatively affect performance. The new command allows you to adjust the frequency according to your site objectives and do it dynamically, without restarting the system.

Another interesting aspect of the new command is initiating checkpoint on demand by specifying SET LOG LOGLOAD(0). For example, it is recommended to issue this command before suspending log writes in order to reduce the number of database writes during the log write suspension, and consequently reducing the exposure of generating inconsistent 32 K size pages.

Automatic Restart Manager (ARM) Support

ARM is a component that helps availability by providing a fast, efficient restart of critical applications. The purpose of using automatic restart is to reduce the time a particular system is down. When DB2 stops abnormally, the surviving z/OS systems analyze the situation to determine whether the corresponding z/OS has failed too and where DB2 should be restarted. It then restarts DB2 appropriately, either on the same or on a different system.

Automatic Recovery at Restart

When a subsystem failure occurs, a restart of DB2 automatically restores data to a consistent state by backing out uncommitted changes and completing the processing of the committed changes.

2.6.3 DB2 online reorganization

Since DB2 V5, the REORG utility allows the reorganization of an S1 tablespace or index during online operation. The keyword SHRLEVEL allows you to choose standard, read-only online, and read-write online reorganization. With the SHRLEVEL CHANGE option, you have both read and write through almost the entire reorganization process. The process involves these steps:

1. The utility unloads the data from the original tablespace, sorts the data by clustering key, and reloads the data into a shadow copy. Concurrently, S1 has read and write access to the original tablespace, and changes are recorded in the log.
2. The utility reads the log records and applies them to the shadow copy iteratively. During the last iteration, the application has only read access.
3. The utility switches the application access to the shadow copy by renaming the data sets for the table and the indexes. During the actual switch, S1 R/3 has no access to the data.
4. The application reads and writes to the renamed shadow copy. DB2 UDB for z/OS V6 contains several features which further improve online reorg. You can now select rows to be discarded during a REORG, and optionally write the discarded records to a file. An external UNLOAD can be performed faster in comparison to the formerly used DSNTIAUL sample program. Furthermore, processor and elapsed time is greatly reduced.

COPYDDN Option in LOAD/REORG

If you run REORG or LOAD REPLACE and use LOG(NO), then an image copy is required for data integrity. By default, DB2 will place the tablespace in copy-pending status, and you must perform an image copy before you can further change the tablespace.

If you run REORG or LOAD REPLACE with the COPYDDN option, a full image copy is produced during the execution of the utility and DB2 does not place the tablespace in copy-pending status. This eliminates the period of time when the table space is in copy-pending status and a separate COPY step is not required. Therefore, the data is available sooner.

Inline statistics

Prior releases of DB2 require the user to update statistics by executing RUNSTATS after common utility operations on table spaces such as LOAD, REORG and REBUILD INDEX. Version 6 lets you include RUNSTATS within the execution of those utility operations. This avoids the need for separate RUNSTATS jobs and uses less processing resource by making fewer passes over the data. Furthermore, tablespaces will be made available sooner.

2.6.4 Other DB2 features

ALTER column lengths in indexes

Changing the length of a column of a partitioning index can affect partition boundaries and the limit key of a partition. With DB2 V6, the length of the limit key can be changed. If the length of a column that is part of the limit key is altered, and the changed column length affects the partition boundary, the limit key can change. Changing the length of the limit key ensures that the partition boundary does not change.

Partition independence

A key availability feature of DB2 UDB for z/OS is the ability to partition a DB2 tablespace into as many as 256 partitions. In DB2 V6, each partition can be up to 64 GB. This means that one table space can hold up to 16 terabytes of data in a compressed or uncompressed format.

Partition rebalancing

When data in a partitioned table space becomes heavily skewed, performance can be negatively affected because of contention for I/O and other resources. In that case, you might want to shift data among partitions. DB2 V6 enables you to rebalance those partitions more efficiently. Partitioning key ranges can be altered, while applications that access data not affected by the rebalance continue to run.

The actual redistribution is accomplished by running the REORG utility for affected partitions after adjusting the key ranges. The REORG both reorganizes and rebalances the range of partitions. In prior releases of DB2, this task would require that the table space be unloaded, dropped, recreated, and reloaded.

RRS attachment facility

The ICLI server exploits the Recoverable Resource Manager Services Attachment Facility (RRSAF). The RRSAF is a DB2 attachment facility that relies on an z/OS component called z/OS Transaction Management and Recoverable Resource Manager Services (z/OS RRS).

z/OS RRS provides system-wide services for coordinating two-phase commit operations across z/OS products. It is an z/OS system logger application that records events related to protected resources. The system logger allows an application to log data from one system or from multiple systems across a Parallel Sysplex.

Type 2 indexes and row level locking

Until Version 4, DB2 supported a single index structure, now known as a type 1 index. Version 4 introduced a new type of index known as a type 2 index. Type 2 indexes eliminate locks on index pages. Because there are usually fewer rows to a data page than there are index entries on a index page, locking only the data when you lock pages is likely to cause less contention than locking the index. This way you can avoid most of the deadlock and time-out problems on the index that often caused application abends because data was not available.

Another advantage of type 2 indexes is that they let you use other functions (such as processing multiple parallel tasks, improved partition independence, the read-through locks, and row locking).

3

S1 Consumer Banking planning

This chapter describes planning considerations for the S1 Consumer Banking environment. It contains the following topics:

- Planning
- Configuration
- Local and remote data storage
- Security
- Custom adapters
- Tunneling
- XML API

3.1 Planning

Consumer Banking was designed so that a financial institution can change the look and feel of the product easily, to meet its unique requirements. The appearance of the user interface is controlled by a set of templates that can be changed without rebuilding or recompiling Consumer Banking.

3.1.1 Basic options

Consumer Banking uses Cascading Style Sheets (CSS) that allow a financial institution to make the following global changes:

- Text font, font size, and format
- Colors for screen background, fonts and links, and message text
- Icon appearance and other images (replaced with same size and type of image)

Consumer Banking also features a Template Object Model (TOM) to facilitate customization. The TOM allows Consumer Banking to reuse templates or forms in multiple screens, providing a consistent look and feel throughout the product. The user interface templates allow customized implementation of:

- Navigation such as adding, removing, or moving links, sections and section groupings
- Cosmetic changes
- Standard corporate images and logos
- Placement and appearance of fields
- Types of controls used
- Process and program flow, such as confirmations and return screens

More in-depth customization options are also available. For more detailed information about the customization options available in Consumer Banking, see the following documentation, available from S1:

  - *S1 Consumer Banking User Interface Customization Guide*
  - *S1 Template Object Model*

3.1.2 Localization

Localization options allow the financial institution to support multiple versions of the user interface in different languages and *locales*. The locale determines what language and cultural presentation is displayed to the user.

A financial institution can implement a number of template sets within a single installation. This offers the ability to support several different, unique look-and-feel options, known as *identity*, through one implementation of Consumer Banking. This can increase the user's comfort level with the Consumer Banking user interface, and enlarge the financial institution's customer base by providing options that are attractive to different market segments.

Each template set comes with a unique message set, style sheet, and date-time formats. Items supporting localization include:

- Multiple languages and currencies
- Currency and numbers (sign placement, decimal, thousands separator)
- Dates and times (different formats for different countries)

3.2 Configuration

Consumer Banking was designed so that a wide selection of features can be disabled within the installation, if a financial institution does not want to implement these features. Most of the feature selection process is completed through the Customer Service Representative (CSR) application. Through the configuration process, features such as Payments can be removed or enabled separately, individual items can be added to or removed from a screen, and various options within a feature, such as PFM or Transaction History, can be enabled or disabled on demand.

3.2.1 Configuration categories

Consumer Banking features can be configured within different categories. Table 3-1 on page 34 shows the configuration categories and the relationships among the categories.

Consumer Banking uses these categories to configure different functions.

Table 3-1 Categories and descriptions

Categories	Description
Financial institution	- Define the general operation of the application, including the language in which screens display, the features installed, the account register and transaction functions, and the market segments supported - Apply to every account within a specific installation - Provide default settings to some customer parameters and user preferences
Customer/User	- Define the behavior of accounts owned by a particular customer of the financial institution - Apply to all accounts owned by that customer - Define some options that users can set (for example, locale, session time out, and confirmation screens) - Define the behavior of some CSR functions
Product Type	- Define the general behavior of groups of products offered by a financial institution - Classify products into deposit, credit or loan groups - Apply to each account within the product type group

Categories	Description
Product	- Define the behavior of specific financial products such as Student Checking or Visa Gold - Take their defaults from Product Type settings - Apply to every account within a specific product offered by the financial institution
Account	- Define the behavior of a specific account - Take their defaults from Product settings - Apply to all users of a single account. (for example, minimum and maximum amounts are configured at the account level, not per individual account owner)

Most configuration options are set through the Customer Service Representative (CSR) application. For detailed information about configuration options, see the Configuration Help.

In addition to the categories described in this section, there are dependencies between certain configuration options. For example, some options must be set to *Yes* for other options to be available.

3.2.2 System parameters

Certain Consumer Banking options must be configured at the system level. These options can include, but are not limited to, items such as system or adapter IP addresses, file paths or names, and server URLs. Most or all of these parameters need to be set at installation time. For more information about system parameters, contact the engagement team for your implementation.

3.3 Data storage

One of the first and most important decisions faced by a financial institution when implementing a banking solution is the location of data storage and the method of data retrieval. Local storage means keeping the end user, transaction, and other data in the S1 Consumer Suite database. Remote storage means services and data are accessed through third-party, back-end data systems. This section explores the basic advantages and disadvantages of each implementation strategy.

Storage considerations are divided into three major categories:

- Local storage
- Remote storage
- Mixed implementations

3.3.1 Local storage

In a local storage implementation, data is stored in the S1 Consumer Suite database. The financial institution sends the data from their host systems to the data server through a series of batch programs. This allows the financial institution to format the data in an approved, standardized format and reduces the likelihood of runtime errors. Some Consumer Banking features are only available in a local storage implementation, including:

- Personal Financial Management (PFM), including Categories and Reports
- Payee and Account nicknames
- Longer-term data storage

Local storage is only supported in batch mode. However, all Consumer Banking batch processes have been designed so that they can be run more than once a day at the discretion of the financial institution. This is called *near-time* processing.

Scalability can be a deciding factor regarding a local storage implementation. An extremely large financial institution (with millions of customers) must consider physical limitations, such as the batch processing window required to post high volumes of transactions.

Another consideration in a local storage implementation is the speed at which the user is able to view financial transactions. In a local implementation, the user must wait until the batch process runs.

3.3.2 Remote storage

A remote implementation involves accessing data that is stored on the third-party or financial institution system, not in the S1 Consumer Suite database. Some potential advantages of a remote implementation include:

- Reduced operational costs due to reduced data storage and processing needs
- More control by the financial institution of scheduling and business rules
- Elimination of the need for data synchronization of account and transaction information between Consumer Banking and the financial institution's system of record

In a fully remote implementation, there is no batch processing other than customer enrollment. All features are implemented using a real-time request and response architecture.

As a result, the financial institution is limited to the features supported by their back-end and third-party processors. For example, if a financial institution wants to offer Intra-Day Transaction retrieval, but its host system does not provide support for this feature, the financial institution cannot implement Intra-Day Transactions.

In remote storage, data retrieval is subject to the constraints of the financial institution's back-end systems. This can affect performance and availability. Any connectivity problems or back-end host issues can affect the real-time retrieval of data and are beyond the ability of Consumer Banking to support. With local storage, the recovery and failover procedures of a dedicated data center protect the institution and its users from system downtime and lack of access.

Finally, a remote storage implementation eliminates some Consumer Banking functionality, including:

- Personal Financial Manager (PFM) data, including Categories and Reports
- Filter and sort capability on the Register
- Payee and Account nicknames
- Longer-term data storage and archiving, with added revenue potential to the financial institution

3.3.3 Mixed implementations

A financial institution can implement Consumer Banking with both local and remote storage. However, a decision regarding the type of storage used must be made for each feature. Some dependencies exist between features. For example, if Transactions are implemented with local storage, Accounts and Customers must also use local storage.

3.4 Security

Like the rest of the S1 Consumer Suite, Consumer Banking protects the financial institution and its users with the highest industry standard for Internet security. At present, the best available security standard is HTTPS using Secure Sockets Layer (SSL) Version 3. A secure server system protects the data within the S1 Consumer Suite database.

Encryption is controlled at the financial institution rather than within Consumer Banking. This allows each financial institution to set its own security policy and decide what level of security its users must adhere to. S1 highly recommends RC4 encryption with 128-bit keys. A secure browser capable of supporting 128-bit encryption—such as Internet Explorer 4.0 or higher or Netscape 4.0 or higher—protects users and ensures that their information is encrypted while moving between the browser and the financial institution.

3.4.1 Application security

When a user logs in to Consumer Banking, the user is authenticated with a username - password pair. SSL ensures that this information is protected from other users on the Internet. Once authenticated, the user begins a session in Consumer Banking. The session idle time is set by the financial institution. Once the session times out, the user must log in again.

3.4.2 Network security

From the Internet, a user's query must pass though filtering routers, hardened servers, and at least two firewalls before reaching the application servers that host Consumer Banking. These application servers in turn communicate with the database and communications servers that contain sensitive information such as account records.

The network is configured so that the database server and communications server never communicate directly to each other; instead, queries are passed through the application server or servers to provide another layer of authentication and protection. The communications server then must send its requests through another firewall before external servers, such as the financial institution's dedicated database or a third-party host processor, can be contacted.

3.4.3 Operational security

Operational security depends on the security policy in place at the data center hosting the financial institution's database. The S1 Hosting Services division has a thorough and robust security policy in place to protect both the data and the physical devices hosting the data.

3.5 Custom adapters

Adapters enable communication with a financial institution's existing processing systems to fulfill Consumer Banking data and service requirements. In a typical customization effort, adapters are designed, developed, and created to fit the specific needs of a financial institution's implementation. Adapters can be real-time or batch.

Adapters are designed for specific financial institution needs identified during the engagement process. They convert data from the Consumer Banking format into a format that can be read by the back-end processor, then transmit the data to the back-end processor. Adapters also receive data from the processor and convert the data into the Consumer Banking format.

3.5.1 Real-time adapters

Real-time adapters are designed according to the rules and conventions of the Real-Time Adapter Architecture (RTAA). The RTAA was developed in Forté to organize the sequence of events within a real-time adapter and to standardize the development approach.

For more information about designing real-time adapters, see the following documentation, available from S1:

- *RTAA Approach*
- *RTAA Programmer's Guide*
- Adapter Interface documentation

3.5.2 Batch adapters

Batch adapters ensure that the files sent to Consumer Banking conform to the standard format defined by Consumer Banking, and that the files sent from Consumer Banking to the financial institution's host processors conform to the financial institution's requirements. For more information about the file formats and constraints on developing batch adapters, see the *S1 Consumer Banking Program Reference Guid*e, available from S1.

3.6 Tunneling

Financial institutions may need to customize a part of the application processing or a user interface screen to collect or display information that is not part of Consumer Banking (for example, a combined interest balance or an invoice numbe)r. Tunneling allows Consumer Banking to pass financial institution-specific data from back-end hosts to the end-user's browser and back, or vice-versa, without any change to the Consumer Banking software.

Tunneled data consists of simple string data in relatively small packet sizes, in the form of name/value pairs. Depending on the specific implementation, Consumer Banking may store the data items in the local database, but does not use or alter the data in any way. It is up to the financial institution, in conjunction with the engagement team, to decide what type of business solution might require tunneling. The size of the custom database column for the tunneled data can be specified during the engagement.

Tunneling can be implemented in the following product areas:

- Customers and Accounts
- Transactions (Ledger and Register)
- Payments and Payees
- Transfers
- Categories

Customizing the user interface templates to collect or display the results of the tunneled data is a separate engagement issue from the tunneling code itself. For example, if a financial institution wishes to display an average weekly balance for a specific account on the Balances screen, the label "Average Weekly Balance" must be coded into the template as a separate effort.

To implement tunneling, all customization must be coordinated among the following areas:

- Templates
- Batch Jobs
- Adapters

3.6.1 Restrictions on tunneled data

A size restriction of 255 bytes of data is suggested to minimize the impact on the database. If a size of greater than 255 bytes is needed, it will require customization of the database schema. Also, the adapters and batch jobs must be coded to enforce size restrictions because Consumer Banking is essentially unaware of the data being passed through it and therefore does not check it or enforce any restrictions.

3.6.2 XML encoding

For tunneled data, Consumer Banking only validates compliance with XML syntax. Tunneled data encoding is a very simple XML-based syntax and must adhere to the following rules:

- Begin with MAP
- Contain 0 or more tag and value pairs in the format: TagName=”value”
- End with />

The following is an example of an XML string:

```
<MAP CurrentAccountBalance=”7888.65” MarketingMessage=”Open a new CD
Account” CusterServiceNumber= ” 1-888-555-5555” />
```

For more information about tunneling, see the following documentation:

- *VFM Tunneling Approach Document*
- *VFM Tunneling Functional Description*

3.7 XML API

S1 provides a well-defined application programming interface (API) to create custom front-end interfaces for the S1 Consumer Suite. This API is defined in Extensible Markup Language (XML).

XML is a platform-independent method for putting structured data, such as configuration parameters or financial information, in a text file. XML files are unambiguous, extensible, and easy to internationalize or localize.

Like HTML, XML uses tags and attributes. But unlike HTML, the tags are completely application-specific. For example, in HTML code, a <p> tag always means paragraph, but in XML it could mean price, person, parameter, or anything else that is specified in the Document Type Definition (DTD).

The S1 XML API allows financial institutions to integrate additional business services and devices with the S1 Consumer Suite business logic. The implementation of the XML API is based on the request/response model outlined in the Interactive Financial Exchange (IFX) specification, version 1.0, and includes support for standard IFX messages as well as S1-specific proprietary extensions.

XML messages currently supported for Consumer Banking include:

- Account Activation
- Customer Enrollment
- Payments Enrollment
- Account Inquiry
- Customer Authorization
- CSR Authorization
- Change Login ID
- Customer Profile Inquiry
- Third-party application connection through Secure Connect
- Support for Single Sign On
- Create Recorded Entries

Through the Client tier, the XML API can support integration with additional front-end access devices such as:

- Standard Web browsers that allow access to the World Wide Web
- Personal computers with personal financial packages, for example, Quicken and Microsoft Money
- Voice response units (VRUs) and interactive voice response (IVR) units with bank-by-phone capabilities
- Consumer hand-held devices such as personal digital assistants (PDAs)
- Mobile telephones with data capabilities

For information about how to use the XML interfaces, see the *XML API Developer's Guid*e - http://w3.pdc.ibm.com/avitraining/AVI51home/xmlapi_ug/index.html

t provides an overview of Interactive Financial Exchange (IFX) client/server processing and describes in detail the interface services and message set descriptions that are defined for the S1 Consumer Suite.

4

S1 Consumer Banking installation

In this chapter, we describe the preparation and installation of S1 Consumer Suite on a zSeries environment. The required subsystem consists of DB2 for z/OS, UNIX System Service in zSeries, and Web server on IBM pSeries.

Specifically, we explain the concept of the S1 five-layer installation, as well as the preparation steps needed for the environment. We then describe how to install each component.

4.1 Installation structure: five-layer approach

S1 uses a five-layer approach (or five-step installation of the products), with the first layer being the operating system. The other four layers (Platform, Base, Repository, and Customer Environment) are included in the S1 Consumer Suite Installation Architecture (IA). Here are the five layers:

- Operating system
- Platform layer
- Base layer
- Repository layer
- Customer Environment layer
  - Starting the applications under USS
  - Web server for AIX
  - Web server for CSR

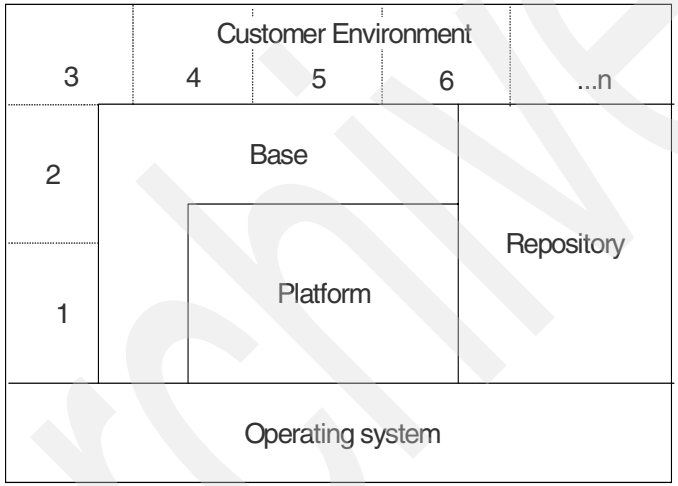

Figure 4-1 The five-layer approach

On the configuration shown in Figure 4-1, each number represents a financial institution. One S1 system can host multiple financial institutions.

Operating system

The z/OS operating system should be installed before the S1 installation begins. It must be V2R8 or later. After the operating system is ready, DB2 for z/OS must be installed and the required user ID must be created.

Platform layer

The platform layer is the first IA layer in an S1 Consumer Suite installation. It contains the third-party software required. These include Java Development Kit 1.2.1, Perl 5.6, and Forte 3.0.N.1. All third-party products are included with the S1 product package, but need to be installed manually with their own configuration values.

Base layer

The base layer is the second IA layer in a S1 Consumer Suite installation. The base layer is very similar to the platform layer, but involves S1 products rather than third-party products. The platform layer and the base layer combine to form the foundation of the Consumer Suite structure, upon which multiple Customer Environments can be installed. Base layer products include any programs and data files that are installed once on an operating system.

There are currently no base layer products created for the z/OS DB2 platform.

Repository layer

The third IA layer of an S1 Consumer Suite installation is the repository layer. This is the layer where the Consumer Suite 5.X Common Architecture and application (Banking, Investment, Relationship Management, or Insurance) are installed. Multiple repositories can exist simultaneously on a server.

Customer Environments layer

Customer Environments is the fourth and last layer of the IA. After a repository is installed, use the IA Environment Manager to create one or more Customer Environments for one or more financial institutions. The Customer Environments layer is the execution environment for each financial institution.

4.1.1 What is Forte and what does it provide

The S1 Consumer Suite is designed to meet the following operational objectives:

- Scalability
- Security
- Reliability
- Portability
- Manageability

Forte provides a solution to address each of these objectives. It provides a flexible infrastructure from development, through execution, to deployment. Its strengths are in the deployment of applications and the flexibility of the system; it's easy to change to meet specific needs.

To help meet the operational objectives, Forte provides:

- Base development, execution and management infrastructure
- Integrated repository-based development environment and the Transactional Object Oriented Language (TOOL)
- Portable, scalable execution environment
- Robust management and operations infrastructure

Forte is an application solution running on several platforms at the same time. It is installed on the CSR Server, the AIX server, and in the USS environment under z/OS. No customization is needed when installed on the CSR server and the AIX server. The code is installed as part of the CD unload process. Under the USS environment, some customization is necessary to connect with the DB2 Database application. Appendix A outlines the Forte installation steps.

You can monitor and respond to events in the S1 Consumer Suite applications using the Forte Process Monitor application. This application is sometimes referred to as “Watchdog”. It allows the user to define responses to state changes in the registered agents, such as nodes, partitions, or applications in the Forte environment, and to restart them if they fail.

Appendix B provides a detailed description of the steps required to implement the Forte Interface under z/OS USS.

4.2 Preparing for the installation

We named our sample financial institution the ITSO. Therefore, the customer environment name is *itso* and the customer’s user ID is *itsousr*.

To prepare this redbook, we installed the S1 Consumer Suite on a zSeries server in two locations. The first installation exercise was performed at the IBM ITSO in Poughkeepsie, NY. Then we moved to the S1 data center in Norcross, GA.

Following are the major installation steps:

- z/OS setup
- DB2 for z/OS setup
- Web server setup on AIX
- SNMP monitor setup

4.2.1 z/OS setup

The first task was to create user IDs and a high level qualifier (HLQ) for the environment.

We followed the steps below:

1. We created a group for the installation ID and for the customer environment ID.

vfmadmin
vfmgroup

2. We created a user ID. Since the installation requires unique user IDs for the customer environment (financial institution), we created user IDs and privileges for the sample financial institution using RACF, as shown in Table 4-1.

Table 4-1 Sample user IDs and privileges

User ID	TSO	USS	DB2 privilege	Group
ITSOUSR	No	Yes	No	VFMADMGRP
ITSOINT	Yes	Yes	Yes	VFMADMIN

3. We customized our UNIX System Service (USS) user ID. We used RACF to modify the user ID to have the following usage:

```
ALU (itsousr) OMVS (CPUTIMEMAX(2147483647))
ALU (itsousr) OMVS (ASSIZEMAX(268435456))
ALU (itsousr) OMVS (PROCUSERMAX(200))
ALU (itsousr) OMVS (FILEPROCMAX(1000))
```

4. We created a HLQ called S1, and its own user catalog:

- S1INSTG
- S1TEMP
- S1BASE
- S1PRD

5. We created a mountpoint in USS, /usr/lpp/redbook, from a TSO command prompt:

```
mkdir /usr/lpp/redbook
```

4.2.2 DB2 for z/OS setup

We used DB2 V6 with PUT level 20008 and PTF PQ40338:

```
db2 zparms
```

Note: The DB2 subsystem must be installed before Consumer Suite.

We used the following parameter for the S1 Consumer Suite:

```
<Customer Environment Owner ID>
itso
<Fully Qualified Application/Database Server Inside Hostname>
grummpy.devlab.nor.s1.com
<Database Port>
5021
<DB2 CLI Plan Name>
cspaclix
<DB2 Subsystem ID>
dsn1
<Database Client Names> (space delimited list)
390LOC
<Database Client IP Addresses> (space delimited list)
10.1.3.8
<Owner ID Password>
itsousr
<Forte Environment Name>
take the default
```

4.2.3 Web servers

We installed two different Web servers for S1. One was for outside the firewall for normal users, and the other was for inside the firewall, for Customer Service Representative (CSR) use.

4.2.4 SNMP monitor setup

We installed the Simple Network Management Protocol (SNMP) monitor on a workstation with the NT operating system.

4.3 Installing the operating system layer - z/OS

In this section we describe in detail how to start the installation on the z/OS platform. We follow the five-layer installation approach.

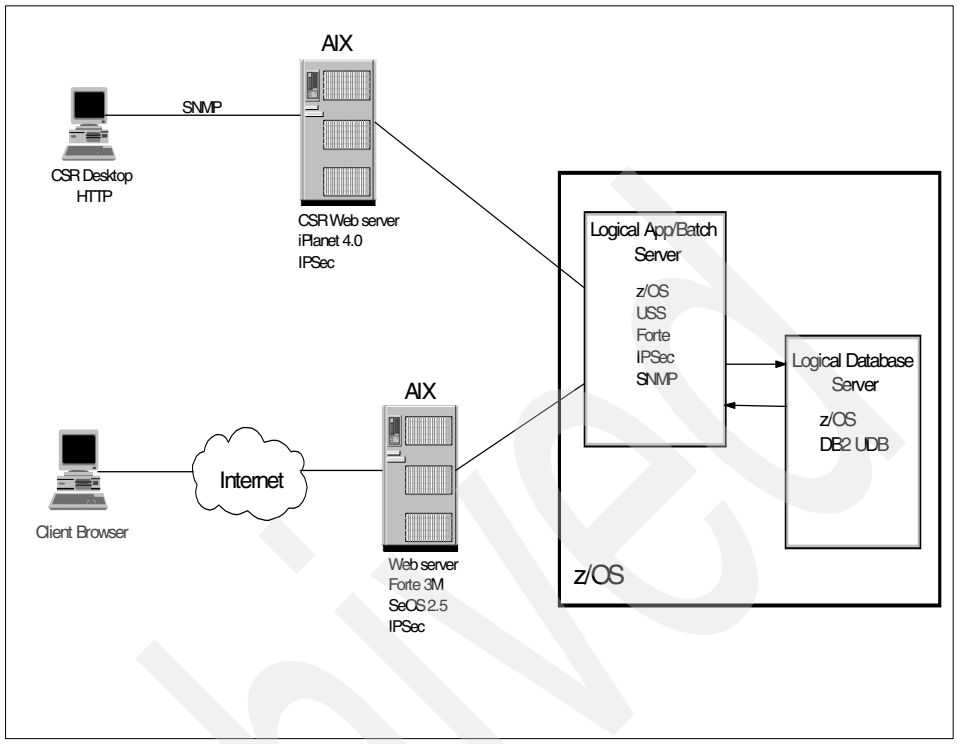

Figure 4-2 S1 Consumer Business environment on z/OS

To install the S1 Consumer Suite on the z/OS platform:

1. Unload Consumer Suite Installation JCL for the application server (USS) from the S1 product tape.
   a. Select a library. We used:

      `S1INSTG.S1.PRODUCT.INSTALL.JCL`

   b. Edit the JCL. Check the cross-reference of installation jobs with installation variables.
      - We changed the <SET DHQL> JCL statement to S1INSTG
      - We changed the <SET THQL> JCL statement to S1INSTG
      - We changed the <SET TVOL> JCL statement to S10001

   c. Submit the job and check for successful completion.

   d. The job shown in Example 4-1 on page 52 created a PDS dataset for the installation.

Example 4-1 Sample IEBCOPY JCL to unload installation JCL from tape to DASD

```
//ITSOINTA JOB ,'LOAD S1 FILE 1',
// CLASS=A,
// MSGCLASS=X,MSGLEVEL=(1,1),
// NOTIFY=&SYSUID
//*
//*****************************************************************
//*
//* Function: Load S1 Installation JCL to Disk
//*
//*****************************************************************
//*
// SET S1INSTG= DISK OUTPUT
// SET S1INSTG= TAPE INPUT
// SET S10001 = TAPE VOLSER
//*
//S1 EXEC PGM=IEBCOPY,REGION=2M
//SYSPRINT DD SYSOUT=*
//TAPE DD DSN=&THLQ..S1.PRODUCT.INSTALL.JCL,
// DISP=SHR,UNIT=(3490,,DEFER),
// LABEL=(1,SL),VOL=SER=&TVOL
//DISK DD DSN=&DHLQ..S1.PRODUCT.INSTALL.JCL,
// DISP=(NEW,CATLG),UNIT=SYSDA,
// LRECL=80,RECFM=FB,BLKSIZE=3200,
// SPACE=(TRK,(5,5,5))
//SYSIN DD *
COPY INDD=TAPE,OUTDD=DISK
/*
//
```

2. Create the HFS environment.

   The IA requires one or more mounted Hierarchical File Systems (HFS). Each mounted HFS hosts one or more components of the S1 Consumer Suite 5.X. The HFS environment should include the mount points and directories shown in Table 4-2 on page 53:

Table 4-2 The HFS environment

Consumer Suite component	Size (MB)	Mount point
RCS	4	/usr/lpp/redbooks/IA/RCS
PERL	10	/usr/lpp/redbooks/IA/PERL
IA Install	100	/usr/lpp/redbooks/install
Forte	350	/usr/lpp/redbooks/forte
Repository	4096	/usr/lpp/redbooks/repos/<repository>
Customer Environment	4096	/usr/lpp/redbooks/custenv/<custenv>
IA Depot	4096	/usr/lpp/redbooks/IA_depot

a. Use the member DFHFS in S1INSTG.S1.PRODUCT.INSTALL.JCL to define the required HFS datasets.

   Each 3390 is about 2 gigabytes. In order to meet this requirement, we used eight 3390 spindles. Since all 16 gigabytes are expanded as a contiguous space, we used SMS pooled DASD.

b. To dynamically mount the HFS data set, use the TSO MOUNT command or the ISHELL file_systems Mount function:

```
Mount filesystem ('s1base.hfs.sc04.data') type(hfs) mode(rdwr)
mountpoint('/usr/lpp/redbooks')
```

   Note: s1base.hfs.sc04.data is the HFS dataset we created using DFHFS.

c. Define directories at the TSO prompt, as follows:

```
mkdir /usr/lpp/redbooks/custenv
mkdir /usr/lpp/redbooks/repos
mkdir /usr/lpp/redbooks/forte
mkdir /usr/lpp/redbooks/forte/351_media
mkdir /usr/lpp/redbooks/IA
mkdir /usr/lpp/redbooks/IA/PERL
mkdir /usr/lpp/redbooks/IA/RCS
mkdir /usr/lpp/redbooks/IA/Install
mkdir /usr/lpp/redbooks/IA/IA_depot
```

d. Change owner and group IDs to itsoint:vfmadmin.

e. Update BPXPRM00 as recommended by S1.

3. Configure the security architecture.

   According to the S1 installation documentation, this step sets up security using IPSEC, but does not implement the security. IPSEC setup is optional for each financial institution.

4. Load the S1 product tape to the HFS environment.

   We used the member S1LDUSS found in S1INSTG.S1.PRODUCT.INSTALL.JCL to load the S1 product into the HFS environment. S1LDUSS will copy the PAX MVS data sets from tape to disk, and then executing a shell script will move the files to the HFS environment. Before executing this job, the HFS environment must be completely set up.

   a. We modified the JCL with following information.

      ```
      SHLQ--> S1INSTG
      THLQ--> S1BASE
      SHLQ--> S1TEMP
      TVOL--> S10001,S1002
      DVOL--> OS39M1
      ```

      Note: DVOL is used by the last step of the job S1LDUSS. Since SRCS needs a large temporary space, the step requires a dedicated volume.

   b. Before submitting the job S1LDUSS, we modified the following members:

      ```
      SFORTE
      SIAD
      SIAI
      SPERL
      SRCS
      ```

      When we did the installation in the IBM lab in Poughkeepsie, NY, we had a problem on all BPXCOPY steps. To solve it, after we copied each library to an MVS library, we used the oput command to copy from an MVS library to an OMVS file. Then we continued with the steps. Here is an example of using BPXCOPY steps with TSO:

      ```
      oput 'S1BASE.S1.PRODUCT.INSTALL.JCL(SPERL)'  '/tmp/PERL'
      ```

   c. After submitting the job, we checked all return codes from JES2 output and “SYSOUT” at the USS file to make sure we received a return code of zero (0) from *all* steps before continuing.

5. Set the IA environment variables.

   The IA requires several environment variables in order to resolve the paths of the IA depot directory, the customer environment directory, and the repository directory. The following paths should be set in the .profile file for the user ID itsousr:

```
INSTALL_DIR=/usr/lpp/redbooks/IA/install
FORTE_DIR=/usr/lpp/redbooks/forte
REPOS_DIR=/usr/lpp/redbooks/repos
CUSTENV_DIR=/usr/lpp/redbooks/custenv
IADEPOT_DIR=/usr/lpp/redbooks/IA/IA_depot
PERL5LIB=/usr/lpp/redbooks/IA/PERL/lib/perl5
PC=390
```

   Example 4-2 shows the resulting sample .profile for ITSOUSR.

Example 4-2 Example .profile for ITSOUSR

```
# This line sets the prompt to display your login name, and current
# directory.
PS1='$LOGNAME':'$PWD':' >'

# This line exports the variable settings so that they are known to the
# system.
export INSTALL_DIR=/usr/lpp/redbooks/IA/install
export FORTE_DIR=/usr/lpp/redbooks/forte
export REPOS_DIR=/usr/lpp/redbooks/repos
export CUSTENV_DIR=/usr/lpp/redbooks/custenv
export IADEPOT_DIR=/usr/lpp/redbooks/IA/IA_depot
export PERL5LIB=/usr/lpp/redbooks/IA/PERL/lib/perl5
export PC=390
export PATH EDITOR PS1
```

6. Install the Forte environment.

We installed Forte for zSeries by referring to Chapter 16, “Installing Forte System Software on an OS/30 Node” in the supplied *Forte Install Guide.*

The Forte installation media came with the S1 product tape. The media was unloaded during the S1LDUSS job. To install the Forte environment, execute the following steps:

a. Login to the USS environment using the “itsousr” user ID.

b. Change to the $FORTE_DIR:

```
cd $FORTE_DIR
```

c. Untar the media to the directory /$FORTE_DIR:

```
tar -xvf /$FORTE_DIR/30M7_media/forte.tar
```

d. We changed directory, then began to install Forte:

```
cd $FORTE_DIR/ALL_UNIX
./INSTALL.SH
```

e. We used all default parameters:

```
ServerNode
Default port number
CentralEnvironmnet
Central Repository
CSPACLIX for database connect
```

Now that the operating system is prepared, we proceeded to install the S1 Consumer Suite Installation Architecture (IA).

4.4 Installing the platform layer

Perform the following steps for the platform layer, in preparation for installing the IA environments.

1. Add the following directory path to the PATH environment variable:

   ```
   export PATH=$PATH:$IADEPOT_DIR/tools/sw_mfg/s1bin
   ```

2. Run the prepare_IA.ksh script from the $IADEPOT_DIR:

   ```
   cd $IADEPOT_DIR
   ./prepare_IA.ksh
   ```

3. Respond to the following at the prepare_IA.ksh:
   - Enter: `yes` to install PERL and RCS.
   - Enter path for RCS: `/usr/lpp/redbooks/RCS`
   - Enter path for PERL: `/usr/lpp/redbooks/PERL`
   - Choose option **3** for app server/database server.

4.5 Installing the base layer

No base layer products are required on the z/OS DB2 platform at this time.

4.6 Installing the repository layer

The next layer of the Consumer Suite 5.X installation is the repository layer. The repository for the Consumer Suite 5.X application/database server holds all of the available Consumer Suite 5.X software products that can be added to a Customer Environment.

Follow these steps to create the repository.

1. Change to the repository directory:

   ```
   cd $REPOS_DIR
   ```

2. Create the `s1repos` directory in $REPOS_DIR:

   ```
   mkdir s1repos
   ```

   a. If ReposList file exists, delete the file:

   ```
   ls ReposList -- if the file exists, then do the following command.
   rm ReposList
   ```

   b. Put the directory list into the ReposList:

   ```
   ls > ReposList
   ```

   c. Check to ensure the $IADEPOT_DIR/tools/sw_mfg/s1bin directory path is in the PATH environment variable.

   d. From the command line, change to the product release directory in the IA_depot, then issue:

   ```
   mk_390_repos
   ```

   Note: At the $IADEPOT_DIR, we found products installed. We entered each product and release directory, then did the mk_390_repos.

   ```
   cd $IADEPOT_DIR/VBM/vbn_5.3.0.0
   mk_390_repos
   cd $IADEPOT_DIR/VFM/vfm_5.3.0.0
   mk_390_repos
   ```

4.7 Installing the Customer Environment layer

Creating a Customer Environment allows you to configure Consumer Suite 5.X to meet the specific needs of your financial institution. The Customer Environment should contain only those products that are necessary to operate your financial institution's application/database server. You need to have Forte available to install the Customer Environment.

4.7.1 Create the customer environment

Follow these steps to create the customer environment.

1. Change to the installation directory:

   ```
   cd $INSTALL_DIR/bin
   ```

2. Run the IA Environment Manager:

   ```
   ./VFMEnvMgr
   ```

3. Select Customer Environment Maintenance from the Main Menu:

   ```
   Option 6
   ```

4. On the Customer Environment Maintenance Menu, select Create Customer Environment:

   ```
   Option 1
   ```

5. At the Customer Environment Creation screen, enter the name of your Customer Environment (name of the financial institutions), then press Enter:

   ```
   itso
   ```

6. From the Repository Selection screen, select the repository on which you want to build the Customer Environment and press Enter. (This happens automatically.)

7. On the Version Specification screen, enter 5 as the version number.

8. You are now prompted to enter the information listed below. There might be multiple values for the variables. Refer to your Installation Worksheet from the Planning chapter of the Consumer Suite installation guide for assistance with values to all of these variables.

   ```
   <Customer Environment Owner ID>
   itso
   <Fully Qualified Application/Database Server Inside Hostname>
   grummpy.devlab.nor.s1.com
   <Database Port>
   5021
   <DB2 CLI Plan Name>
   cspaclix
   <DB2 Subsystem ID>
   dsn1
   <Database Client Names> (space delimited list)
   390LOC
   <Database Client IP Addresses> (space delimited list)
   10.1.3.8
   <Owner ID Password>
   itsousr
   <Forte Environment Name>
   take the default
   ```

Note: When the menu asks for the database client, it refers to the DB2 database location.

9. At the Review Properties screen, verify that you have entered all of your information correctly. If you have, enter `Y`. If any of these values are incorrect, select **N** and re-enter the customer information.

The preceding steps created the following location:

```
/usr/lpp/redbooks/custenv/itso/forte/DSNAOINI
```

The IA Environment Manager now creates the Customer Environment and returns to the Main Menu.

4.7.2 Install core software products

When installing products into the Customer Environment, it is important to adhere to the proper order.

1. Copy the envagent default file from /misc/install/data to custenv/forte directory and rename it to envagent.def:

   ```
   cp envagent.def
   ```

   This file must be edited according to the instructions in the file.

2. Change ownership to the CustID:

   ```
   su -s itsousr
   ```

3. cd to the $CUSTENV_DIR. Source in fortedef.sh, and then run forteboot.sh. This will start the node manager:

   ```
   cd $CUSTENV_DIR
   ./fortedef.sh
   ./forteboot.sh
   ```

4. At this time we made sure we started the SNMP Monitor on our NT workstation and connected to the node manager.

   During one of our installations, we did not have the SNMP monitor ready at the time of installation, so we renamed the accessmo directory in the repository. When we renamed the directory, then the installation script installed the renamed product. If you do not have the SNMP monitor, then remove the directory—otherwise, the installation will fail.

5. Change to the install directory:

   ```
   cd $INSTALL_DIR/bin
   ```

6. Start the Environment Manager Main Menu:

   ```
   ./VFMEnvMgr
   ```

7. Select Add Core Product:

   ```
   Option 1
   ```

8. Select the appropriate Customer Environment and press Enter.

   ```
   itso
   ```

9. From the Available Core Products list for the Customer Environment, select the following to install and press Enter. (These should be installed one at a time, and *must* be installed in the order listed. Also note that you should *not* install any product ending with cgi or web; these products are for the Web and CSR server only.)

   ```
   arcbin
   arcsvr
   arctpl
   arcbci
   arcdbs
   vfmbin
   vfmsvr
   vfmtpl
   vfmbci
   vfmdbs
   vbmbin
   vbmsvr
   vbmbci
   vbmdat
   vbmdbs
   vbmtpl
   vimbin
   vimsvr
   vimbci
   vimdbs
   vimtpl
   vpubin
   vpusvr
   vpubci
   vpudbs
   vputpl
   ```

   Note: While these products are installing, you can review the activities by looking at the log file, $INSTALL_DIR/log/control:

   ```
   tail -f $INSTALL_DIR/log/control
   ```

10. When all appropriate core products have been added to the Customer Environment, press Esc twice and enter `Y` to exit the IA Environment Manager.

4.7.3 Install components and patches

After all core products are added to the Consumer Suite 5.X application/database server Customer Environment, then you would add all core components, core patches, override products, and override patches required for your financial institution's Web server.

Note: The a_reutqt, a_rmbvsn, and a_smtpem products referred to in step 5 are for Consumer Suite 5.1.2 and later implementations only.

1. From the command line, change to the installation directory:

   ```
   cd $INSTALL_DIR/bin
   ```

2. Run the IA Environment Manager:

   ```
   ./VFMEnvMgr
   ```

3. From the Environment Manager Main Menu, select Add Override Product - Quick Add:

   ```
   Default Override Priority
   ```

4. Select the appropriate Customer Environment and press Enter.

5. From the Override Products list for the Customer Environment, select these override products to install and press Ente:.

   ```
   a_com
   a_reutqt
   a_rmbvsn
   a_smtpem
   c_alerts
   c_custpt
   c_relmgt
   c_pmtbch
   c_trnbch
   c_vbmbch
   c_xfrbch
   ```

6. Repeat step 4 and step 5 for each core patch, override product, and override patch product release set.

7. When all appropriate override products have been added to the Customer Environment, press Esc twice and enter *Y* to exit the IA Environment Manager.

4.7.4 Install DBAccess for BCI

At this point, Consumer Suite is installed. However, in order to execute the BCI component, the batch DB2 access program will need to be installed; refer to the IBM DB2 Utility Guide and Reference - SC26-9015.

1. Untar the installation script from /usr/lpp/redbook/IA/IA_dep/allbci.tar:

   ```
   cd /custenv/itso/db2
   tar -xvf allbci.tar db2
   ```

   Note: This tar command will extract only the DB2 portion of the allbci tar file. From the /db2 directory, the following files will be copied.

   ```
   execsql.tar
   execsql.sh
   execsql.o
   execsql.h
   execsql
   clitrace
   ```

2. Source in the BCI environment:

   ```
   cd /IBM/itso
   ./ fortedef.sh
   ```

3. Make sure the file execsq.sh is accessible under the $FORTE_ROOT directory:

   ```
   cd $FORTE_ROOT
   ls -l execsq.sh
   ```

4. Build the DBAccess utility using execsql.sh:

   ```
   cd $FORTE_ROOT
   execsql.sh
   ```

5. Check that the utility was built. Make sure the date is current and that it is the last file in the list:

   ```
   ls -ltr dbaccess
   ```

6. Do a simple test using query5:

   ```
   dbaccess < query5
   ```

   If BCI is installed successfully, nothing happens at the screen.

4.7.5 Configure the Customer Environment with DB2

Concurrently with the IA installation of products into the Customer Environment, you would create and populate the DB2 databases.

In order to get the sizing parameters, you need a copy of the “complete space calculator.xls” workbook. Enter the data obtained by the client DBA into the input sheet of the workbook. When all data has been entered, execute the UPLOAD macro. This will create two files: tbspsumm.txt and indxsumm.txt.

These files should be uploaded to the mainframe and stored in S1INSTG.TBSPSUMM.TEXT and S1INSTG.INDXSUMM.TEXT respectively. These mainframe files should be pre-allocated with the following DCB parameters:

RECFM	LRECL	BLKSIZE	DSORG
VB	133	6233	PS

Note: During one of our installations, we did not have the worksheet ready for this step, so we just created an empty dataset with these parameters. The DDL used a default size, 1 cylinder per tablespace.

4.7.6 Set up the DB2 installation environment

After the DB2 infrastructure has been configured, customize the DDL with the current environment specifications. Several steps are involved, as described in the following sections.

Unload jobstream libraries

The jobstream libraries must be unloaded from the S1 product tape for the Database Server (DB2).

1. Use JCL such as shown in Example 4-3 on page 64 to unload the S1 installation JCL from tape to a library. Our library was called:

   ```
   S1INSTG.R52L10.IINSTALL.JCLLIB.UNL
   ```

2. Edit the JOB card.
3. Submit the job and check for successful completion.

Example 4-3 Sample IEBCOPY JCL to unload DB2 JCL

```
//ITSOINTA JOB ,'LOAD S1 FILE 1',
// CLASS=A,
// MSGCLASS=X,MSGLEVEL=(1,1),
// NOTIFY=&SYSUID
//*
//S1 EXEC PGM=IEBCOPY,REGION=2M
//SYSPRINT DD SYSOUT=*
//OUT DD DSN=S1INSTG.R50L10.INSTALL.JCLLIB.UNL,
// DISP=(NEW,CATLG),UNIT=SYSDA,
// LRECL=80,RECFM=FB,BLKSIZE=3200,
// SPACE=(TRK,(5,5,5))
//IN DD DSN=S1BASE.R50L10.INSTALL.JCLLIB.UNL,
// DISP=SHR,UNIT=(3490,,DEFER),
// LABEL=(1,SL),VOL=SER=S1009 <---- Use your tape label here
//SYSIN DD *
COPY INDD=IN,OUTDD=OUT
/*
//
```

4. This job creates a PDS dataset for the installations.

   ```
   S1INSTG.R52L10.IINSTALL.JCLLIB.UNL
   ```

5. After we unloaded the installation JCL from the tape, we used member UNLOAD from the library to unload the rest of the jobs.

The following DDL files need to be customized for the various applications:

S1INSTG.S1.CBO.DDL.R52L10 Core product databases DDL (ARCDB01x, VALDB01x, VFMDB01x, VCPDB01x, etc.). This DDL file is required for all installations.

S1INSTG.S1.VBM.DDL.R52L10 DDL exclusively for the Consumer Banking application (VBMDB01x database).

S1INSTG.S1.VIM.DDL.R52L10 DDL exclusively for the Consumer Investments application (VIMDB01x database).

S1INSTG.S1.VPU.DDL.R52L10 DDL exclusively for the Consumer Portal Application (VPUDB01x database).

The following members will be included in each library above:

@README	Definition of all the wildcards used in DDL
CDATBASE	DDL to create database(s)
CFOREIGN	DDL to create foreign keys
CINDEXES	DDL to create indexes

CREATDDL	Optional JCL to create DB2 objects
CSTOGROU	Sample DDL to create DB2 STOGROUP.(it can be executed if the DB2 storage group has not been created previously)
CTABLES	DDL to create tables
CTABSPCS	DDL to create tablespaces
CTRIGGER	DDL to create triggers
DROP_ DDL	DDL to drop tablespaces and storage groups
GRANTTAB	DDL grant access on application tables
SYSTSIN	Control cards for installation

Note: These members will be customized based on the following steps. If you need to partition the database, then go to that member and make your changes.

Customize the DDL members

To customize the members of the DDL library, proceed with the following steps.

1. After all libraries and flat files have been restored, go to ISPF Option 6. Allocate the ISPPLIB and CLIST library to the TSO user ID, as follows:

   ```
   At ISPF option 6 or a TSO Ready prompt, key:
   ex 'S1INSTG,R52L1O.CLIST(ALLOC) 'S1INSTG'
   ```

   This will allocate the ISPPLIB and CLIST libraries. Now we are ready to start the installation tailoring process.

2. Start the DB2 customized panel after the prompts:

   ```
   %instdb
   ```

   This command starts the DB2 Database Installation Panel.

3. Select **Option 1** to customize most of the DDL parameters. A list of PDSs to be modified is displayed. We selected one PDS at a time to customize.

   Table 4-3 on page 66 lists the DDL wildcard parameters to be modified. The values are obtained from the *IBM DB2 UDB Installation Guide* (GC26-9008) in the section “Installation Variable List”.

   Note: Each of these parameters are required. For information on the different wildcard parameters used in the DDL PDS files, review the @README member located in each file.

Table 4-3 DDL wildcard parameters and values

DDL wildcard parameters	Values
DB2 subsystem ID (DB2 MVS subsystem ID).	DSN1
DB2 Data set prefix (the high-level qualifier under which the DB2 libraries are allocated).	DSN610
Database ID is the last digit of the database name that the customer will use to identify the current application environment. This will identify the customer with the same DB2 environment. **Note:** Ensure that you use double quotes.	**"x"**
Table Creator is the SQLID that will be used to create all the DB2 objects. **Note:** Make sure this ID has DBADM authority.	itsoint
SQLID is the ID that will be used as the OWNER of the CLI plan. It needs access to all the application tables. **Note:** Make sure this ID has DBADM authority.	itsoint
DB2 Storage group name is the STORAGE group that will be used to define tablespaces/indexes.	S1STGD40
HLQ is the high-level qualifier that will be used in the storage group definition.	S1PRD
Bufferpool for indexes is a DB2 4k bufferpool to be used for the application indexes.	BP1
Bufferpool for code Indexes is a DB2 4k bufferpool to be used for the code table indexes.	BP3
Bufferpool for code tables is a DB2 4k bufferpool to be used for code tables.	BP5
Bufferpool for active tables is a DB2 4k bufferpool to be used for active tables.	BP4
Bufferpool for inactive tables is a DB2 4k bufferpool to be used for inactive tables.	BP2
8K pages Bufferpool is the default size to be used by DB2. If the client wants to use a 4K page bufferpool instead, the screen will allow him to type a bufferpool from BP1 - BP49 in this entry.	BP8k0

4. Once all the necessary parameters have been typed on the screen, press Enter. A macro will be executed to substitute the corresponding wildcard parameters into the DDL PDS files.

5. Additionally, the sizing information obtained from the spreadsheet will be incorporated into the DDL. This DDL should be manually inspected to ensure that the various parameters besides PRIQTY and SECQTY have been properly assigned.

Suggested values for some of the parameters

- Use LOCKPART YES for the partitioned tablespaces. With selective partition locking, each accessed partition is locked independently. If you are routing work in the sysplex and there are affinities between members and partitions, the use of SPL can help reduce data sharing locking overhead by allowing the child locks (Row/Page) to be granted locally without having them be propagated to the Coupling Facility.
- Use the PIECESIZE parameter option of the create index to indicate how large DB2 should make the data sets that make up a non-partitioned index. To choose the PIECESIZE value, divide the size of the non-partitioning index by the number of data sets that you want. For example, to ensure that you have five data sets for the non-partitioned index, and your non-partitioned index is 10 MB (and not likely to grow much), specify PIECESIZE 2M. If your non-partitioned index is likely to grow, choose a larger value.

  Keep in mind that not more than 32 data sets can be created. Ideally, the value of the primary quantity (PRIQTY) plus (N * Secondary Quantity) should be evenly divisible into PIECESIZE to avoid wasting space.
- TRACKMOD NO on all tablespaces created will enhance the application response time by avoiding the maintenance of the space map page. It will result in less Coupling Facility overhead. The downside is that Incremental Image copies will perform slower.
- FREEPAGE and PCTFREE parameters for tablespaces and indexes should be monitored as the system is tracked in production.
- Utilize 8KB page sizes. Large page sizes cause fewer pages to be written to the Coupling Facility (CF), which reduces accesses to the CF. More data is returned with each page access and fewer locks are taken on a large page size. Use this in tablespaces that are larger (> 20,000 pages) and do not have any known concurrency issues.

Create the Consumer Suite 5.X database

To create the database, we followed these steps:

Customize load JCL

Once changes have been applied in the previous step to each DDL file, it is necessary to execute jobs to define the DB2 objects for the Core product and any associated applications.

Before execution of any jobs, we recommend that you have the local DBA review the various DDL members in the PDS.

Note: Unless the installer has been given at least DBADM authority by the client DBA, they will not be able to execute the CREATDDL jobs.

The job to create the objects for the Core product is contained in the PDS member:

```
S1INSTG.S1.DDL.CBO.DDL.R52L10.LOCAL(CREATDDL)
```

Note: Before submitting these jobs, we found that it is necessary to log off from TSO and log on again. This will free all datasets that have been customized, so that executing jobs will not have dataset contention.

CREATDDL jobs are multi-step jobs with condition code checking. If any step gets a condition code greater than 4 (4 was OK because of unknown DB2 plans), execution will stop. Once the problem has been identified and corrected, comment out any steps that have previously successfully executed. The order of the steps is:

1. DROP (this step is commented out by default; it should be only used if needed.)
2. CSTOGROU
3. CDATBASE
4. CTABSPS
5. CTABLES
6. CINDEXES
7. CFOREIGN
8. CTRIGGER (in case there are any for the Core product)
9. GRANTTAB
10. CCLIPLAN (Executed just for the Core product installation)
11. Refer to the @README member in each DDL file for more information on these members. For more information on the creation of the application CLI plan and Collection ID, see Appendix B (Forte Installation) in the back of this book.

Create object definitions

Now that the Consumer Suite Core product databases have been created, the product-specific database/object definitions need to be created.

Review the product-specific installation guidelines to determine if there are any inter-application dependencies that require the DB2 objects to be created in a specific order. Execute the CREATDDL member for each required product.

Repeat the process

We had to repeat the above process on the following products using the following PDS library:

- **S1INSTG.S1.VBM.DDL.R52L10.LOCAL** -- Exclusively for Consumer Banking database (VBMDB01X and tables)
- **S1INSTG.S1.VIM.DDL.R52L10.LOCAL** -- Exclusively for Consumer Investments database (VIMDB01X and tables)
- **S1INSTG.S1.VPU.DDL.R52L10.LOCAL** -- Exclusively for Portal user database (VPUDB01X and tables)

Load configuration parameters

After the objects have been created, you need to load them with default data. Follow these steps (note that not all tables will be loaded):

1. Select Option **2** from the DB2 Database Installation panel.
2. Select Option **1** on the Configuration Parameters Setup panel.
3. Complete the fields on the Default Data JCL Info panel. Some fields will be pre-loaded, while other values need to be obtained from the *IBM DB2 UDB Installation Guide,* section “Installation Variable List”.
4. The JCL Load dataset contains the DB2 Load JCL to load default data into the tables after the databases have been created.
   - **DB2 subsystem ID** is the DB2 MVS subsystem ID.
   - **DB2 Data set prefix** is the high-level qualifier under which the DB2 data sets are allocated.
   - **Database ID** is the last digit of the database name that the customer will use to identify the current application environment.
   - **Table Creator** is the SQLID creator of all the application tables
   - **Temporary UNIT type** is the unit type for temporary data sets. In cases where there is no special unit type for temporary data sets, then use the unit type used for permanent data sets.
   - **UNIT type** is the unit type for permanent data sets.
   - **Data set High Level** is the high-level qualifier that will be used to catalog the data sets created in the LOAD utilities. Use the same high-level qualifier for files downloaded from tape.
   - **DB2 Plan for program DSNTEP2** is the plan name used by DB2 program DSNTEP2.
   - **DB2 Load Library for DSNTEP2** is the DB2 load library where the DSNTEP2 load module resides.
   - **Installing VBM (y/n)** indicates if the Banking application is being installed.

- **Installing VIM (y/n)** indicates if the Investments application is being installed.
- **Installing VPU (y/n)** indicates if the Portal User application is being installed.
- **Installing ABV (y/n)** indicates if the BroadVision application is being installed.
- **Installing ARQ (y/n)** indicates if the Reuters application is being installed.
- **Installing AEM (y/n)** indicates if the e-mail application is being installed.

5. Once all the values are typed, press <ENTER>. Immediately a macro will be executed that modifies the LOAD JCL with the values specified on the screen. The Load JCL modified by the macro will depend on the applications selected on the screen.
6. Once this step is executed, edit the library with Load utilities and determine if other changes are needed to execute the Load JCL in this environment.

Note: It may be useful to logoff/logon *before* any jobs are executed. This will free all datasets that have been customized, so that executing jobs will not have dataset contention.

7. In order to execute the Load utility against tables in DB2, the user ID executing the JCL needs LOAD utility authority on the different application databases:

```
ARCDB01x Architecture database installed with all the products
VFMDB01x Common database installed with all the products
VCPDB01x Customer portfolio database installed with all the products
VALDB01x Alerts database installed with all the products
VBMDB01x Banking database installed with Consumer Banking
VIMDB01x Investments database installed with Consumer Investments
VPUDB01x Portal user database installed with Portal User.
```

   Here is an example of how to grant this authority:

```
GRANT LOAD ON DATABASE ARCDB01x TO INSTALLER_ID;
```

8. The Load JCL should be executed based on the applications being installed in this environment:

```
  Execute LOADDCBO to load common tables default data. This JCL should
always be executed.
  Execute LOADDVBM to load Banking default data.
  Execute LOADDVIM to load Investments default data.
  Execute LOADDVPU to load Portal User default data.
  Execute LOADDABV to load BroadVision default data.
  Execute LOADDARQ to load Reuters default data.
  Execute LOADDAEM to load e-mail default data.
  Execute CLEARCK to clear any pending problems
```

Update the configuration parameters

Now you can update the configuration parameters, with these steps:

1. Once the LOAD jobs have been executed successfully, execute Option **2** of the Configuration Parameters Setup menu. This allows the modification of the different configuration files, %hilevel.ppp.CONFIG.PARMS.RxxLxx, where ppp is the application identifier (VBM, VPU, VFM, etc.). Enter the data set name of the configuration file to be edited and modified.

2. The following files could be edited, depending of the applications being installed. Update the file with the appropriate information.

```
S1INSTG.VFM.CONFIG.PARMS.R52L10 For CBO (common) default data.
S1INSTG.VBM.CONFIG.PARMS.R52L10 For Consumer Banking default data
S1INSTG.VIM.CONFIG.PARMS.R52L10 For Consumer Investments default data
S1INSTG.VPU.CONFIG.PARMS.R52L10 For Portal User default data
S1INSTG.ABV.CONFIG.PARMS.R52L10 For BroadVision default data
S1INSTG.AEM.CONFIG.PARMS.R52L10 For e-mail default data
S1INSTG.ARQ.CONFIG.PARMS.R52L10 For Reuters default data
```

3. The following is a list of items to check to make sure that the lines exist in each file exactly as they are listed below. If not, add or modify them.

```
S1INSTG.VFM.CONFIG.PARMS.R52L10
CSR.Web.ExternalServer System Value 'http://<Fully Qualified Application
Server Outside Hostname/'
CSR.Web.InternalServer System Value 'http://<Fully Qualified Application
Server Outside Hostname/'
CSR.Web.LogonInternalServer System Value 'http://<Fully Qualified
Application Server Outside Hostname/'
CSR.Web.CGIPath System Value 'cgi-bin/<Customer
EnvironmentName>/comcsr/fortecgi'
CSR.Web.LogonCGIPath System Value 'cgi-bin/<Customer Environment
Name>/comcsr/fortecgi'
CSR.Web>servicePortRange System Value '<Application Outside IP
Address>:<CSR Application Port Range>'
CSR.Web.CookieDomain System value '.<system>.com'
CSR.Web.DocumentRoot System Value '/custenv/<Customer Environment Name>'
```

   In the following example, we have included our configuration of S1INSTG.VFM.CONFIG.PARMS.R52L10.

   Note: The lines above use **http://** instead of **https://** because the CSR application is accessed through the Application Server, not the Web Server as in other products.

4. To determine the ServicePortRange, you will need to consult the app_ports file on the application server in the directory: /custenv/itso/forte. Look for an entry similar to the following:

   ```
   10001-10100 COMCSRWebAccess COMCSRHTTPAccessSO
   ```

   This tells us that the ports from 10001 to 10100 have been reserved for the Common CSR application. For the VFM.Web.ServicePortRange field, select the first n ports from this range, where n is the number of replicates determined in the Capacity Planning Guide. For example, if we need five replicates of the Common CSR application, our variable would look like the following:

   ```
   CSR.Web.ServicePortRange System Value '<IP>:10001-10005'
   ```

5. After all the changes have been applied to the file, press PF3 to exit and save the changes.

   Note: At this point, we generated the parameter using REXX.

6. Execute Option **3** of the Configuration Parameters Setup menu. This executes the REXX program UPDCONFG that reads the file modified in the previous step and creates the necessary UPDATE statements to apply in the corresponding DB2 tables.

   Note: Keep in mind that the file used by this step is the same file modified in Option 2. Do not exit before completing this step.

   If you exit the Database Installation menu prior to executing Option 3 from the Configuration Parameters Setup menu, execute the %INSTDB again and select Option **3** and then Option **2**, without modifying the file. Then execute Option **3** to apply file changes into DB2 tables.

   The result of DB2 UPDATE statements will appear on the screen. To verify successful completion for all the UPDATE statements executed for a particular configuration file, execute the following command from the COMMAND line:

   ```
   F '= -' all
   ```

7. If any SQLCODE < 0 is found, verify the reason. If an SQLCODE = 100 is found, it is because one of the loads did not work properly. Verify execution of the Load jobs again. Scroll through the file and search for any errors. Make sure that everything is correct. Exit by pressing PF3.

8. If any problems are found, make the appropriate changes to the file using Option **2** in the Configuration Parameters Setup. After changes are completed in the file, execute Option **3** from the same panel.

9. Repeat the above for each %hilevel.ppp.CONFIG.PARMS.RxxLxx file. Refer to the Installation Document for each Consumer Suite Application for steps and tasks to edit other files.

Data backup and recovery

Although data backup and recovery are not specifically addressed as part of the Consumer Suite 5.X installation, they are extremely important topics. Before financial data is loaded into the databases, a plan should be in place for backing up the data on a regular basis and for archiving the DB2 Active logs.

DB2 offers several different backup and recovery options, each of which has advantages and disadvantages. You must determine which options are best for your financial institution. For information about data backup and recovery options, refer to *DB2 UDB Utility Guide/Reference* SC26-9015 and *DB2 UDB Administration Guide Vol 1 SC26-9003*.

4.8 Starting Consumer Suite applications on USS

As a final task, installers need to start each Forte application under USS on z/OS. At this point in the installation process, the following conditions exist:

- The Customer Environment is created and configured.
- The Database Server is configured. The database exists and is populated with default data.
- The Forte environment files contain all of the appropriate variables and scripts, for example:

```
fortedef.sh –
forteboot.sh – This script starts the Forte' node manager for the
Application/Database Server.
AppStartup.esc – This script is generated at install time. It contains
instructions for starting each application in the Forte environment. These
instructions are taken from the applications' individual start scripts, or
from a default script.
```

To start up every Consumer Suite Forte application in the Customer Environment, perform the following tasks:

1. Change directory to the customer environment's Forte directory.
2. Source the fortedef.sh file.
3. Start the node manager, if it is not already running.
4. Start the applications using Forte the AppStartup script.

Following are sample commands to perform those operations:

```
cd $CUSTENV_DIR/<Customer Environment Name>/forte.
. ./fortedef.sh
. ./forteboot.sh
escript –i AppStartup.esc
```

4.9 Webserver installation on AIX

This section tells how to install the Webserver component on an AIX workstation.

Note: The following commands are useful when we were not using the terminal directly attached to the IBM pSeries (AIX).

```
DISPLAY=<the PCs IP address>:0.0
export $DISPLAY
```

4.9.1 Installing the code

1. Create the logical volumes with the mount points shown in Table 4-4.

Table 4-4) Logical volumes with mount points

Logical Volume (LV)	Size	Mount Point	Purpose
lvIA	100 MB	/install	
lvcustenv	252 MB	/custenv/itso	
lvrepos	252 MB	/repos/s1repos	
lvpackage	200	/usr/package	Installation

2. Create the groups and user IDs shown in Table 4-5.

Table 4-5 Groups

Groups
vfmadmin
vfmgroup

3. Create the user IDs with attributes shown in Table 4-6.

Table 4-6 User IDs

User Name (user ID)	Purpose	Primary group	Secondary Group
vfmadmin	AIX system administration	vfmgroup	vfmadmin
hsruser	Unique user ID for each financial institute or customer environment	vfmgroup	vfmadmin

4. We took the defaults except for the password requirement. We set the minimum password length to six.

5. Mount the CD.

   We mounted the CD-ROM on mount point /cdrom. The S1 installation manual asks you to create a file system, and then copy the CD contents to the directory. We did not follow this instruction, since we did not have any problem untarring the files from the CD directly.

6. Untar the files.

   We untarred the HTTP1312 (Apache) and latest AIX fixes from CD to the /package directory:

```
Untar HTTP1312.tar
   cd /usr/package
   tar -xvf/cdrom/http1312.tar
Untar the latest AIX fixes.
   cd /usr/package
   tar -xvf/cdrom/aix43307.tar
```

7. Since our AIX server did not have the IBM HTTP server by Apache, we installed the product with the source from the preceding steps.

8. Install JRE 1.3.0. It comes on the S1 product tape in tar format.

```
untar JRE to /usr
   cd /usr
   tar -xvf/cdrom/jre130.tar
```

4.9.2 Installing Apache

1. Configure Apache.
2. Copy http.conf.sample to http.conf:

```
cp /usr/HTTPServer/conf/http.conf.sample /usr/HTTPServer/conf/http.conf
```

3. Edit /usr/HTTPServer/conf/http.conf with following attributes:
   a. Change user to itsousr.
   b. Change group to `vfmadmin`.
   c. Change `DocumentRoot` and corresponding `<directory> tag` to `/custenv/hsr`.
   d. Uncomment the `ServerName` line and change to `<hostname>`.
   e. Remove the existing ScriptAlias line and replace it with a new ScriptAlias:

```
ScriptAlias /cgi-bin/cs5usr/vim "/custenv/cs5usr/forte/cgi-bin/"
```

   f. Configure the SSL key according to IBM HTTP server documentation.
4. Tune Apache performance.

We changed these parameters in /usr/local/apache/conf/httpd.conf to values recommended by S1:

```
Set KeepAliveTimeout = 60
Set MinSpareServers = 5
Set MaxSpareServers = 10
Set StartServers = MinSpareServers
Set MaxRequestsPerChild = 10000
```

In addition to those parameters, the following two parameters should be adjusted according to the expected number of users of the system. Settings should be obtained from the S1 performance team.

```
MaxKeepAliveRequests
MaxClients
```

Save and exit the httpd.conf file.

5. Install DiffUtils-2.7

Note: Although the standard UNIX diff utilities are typically installed in /usr/bin during an AIX OS installation, the standard versions result in incompatibility problems with RCS 5.7.

Therefore, GNU diffutils-2.7 must be downloaded and installed into the /usr/local/bin directory in order to run RCS 5.7. It is available for download as freeware from http://freeware.bull.net or an equivalent site.

Follow the installation instructions for a *bff* type install, or use the following from the S1 CD. Change to the root and untar the file:

```
cd /
tar –xvf /usr/packages/diff27.tar
```

Ensure that /usr/local/bin is in the UNIX path. Update the /etc/environment.

6. Install the Revision Control System (RCS) 5.7, if not previously installed.

Note: This product is required to run the Installation Architecture. It is available for download as freeware from http://freeware.bull.net or an equivalent site.

Follow the installation instructions for a *bff* type install, or use the following from the S1 CD. Change to the root (/) directory, then untar the rcs.

```
cd /
tar –xvf /cdrom/rcs57.tar
```

Ensure that /usr/local/bin is in the UNIX path.

4.9.3 Installing the IA

1. Install the Installation Architecture (IA).
   a. Change to the S1 install directory: `cd /install`
   b. Untar the IA file:

      ```
      tar –xvf /usr/packages/AIX_IA.tar
      ```

   c. Execute the prepare_IA.ksh script and follow the prompts:

      ```
      ./prepare_IA.ksh
      o Press Enter to continue
      o Enter 'y' to set up RCS.
      o Enter '/usr/local/bin' as the RCS installation path.
      o Enter 'y' to set up Perl.
      o Enter '/usr/local/bin' as the Perl installation path.
      ```

   d. Change to the repos directory: `cd /repos`
   e. Untar the repos files:

      ```
      tar –xvf /usr/packages/repos52.tar
      ```

   f. Change the ownership of the /repos directory tree to vfmadmin:vfmgroup from the root directory.

      ```
      chown –R vfmadmin:vfmgroup /repos
      ```

2. Create a Customer Environment using the IA.
   a. Change to the /install/bin directory: `cd /install/bin`
   b. Run the IA Environment Manager: `./VFMEnvMgr`
   c. Select Option **6**, Customer Environment Maintenance.
   d. Select Option **1**, Create Customer Environment. Follow the prompts.
      - Enter the Customer Environment Name = <custenv_name>

        ```
        itso
        ```

      - Select the Repository = <repos_name>

        ```
        s1repo
        ```

      - Consumer Suite Version = 5

        ```
        Take the default value
        ```

      - Customer Environment Owner ID = <custID>

        ```
        itsousr
        ```

      - Fully Qualified Webserver Outside Hostname = <web_outside_hostname>

        ```
        aixrt.devlab.nor.s1.com
        ```

- Webserver Outside IP Address = <web_outside_IP>

  `10.0.20.8`

- Webserver Port Number = <port#>

  `80`

- Fully Qualified Application Server(s) Inside Hostnames =<app_inside_hostname>(the address of USS hostname)

  `uss hostname WTSCPLX1`

- Application Server Inside IP Address(es) = <app_inside_IP>

  `10.1.3.84`

- Environment Properties Correct (Y/N) = Y

  `y`

The customer environment is now created.

3. Populate the Customer Environment.

   Once the customer environment has been created, it must be populated with the required core and override products.

   a. Start IA Environment Manager:

      ```
      cd /install/bin
      ./VFMEnvMgr
      ```

   b. Enter the Customer Environment Name = <custenv_name>: `itso`

   c. Add Core Product (1) (Quick Add –Default Override Priority):

      ```
      Select all products that contain the <>web extension. Press Enter. Do
      NOT install the <>cgi products.
      ```

      Note: Multiple products can be selected by using the space bar and arrow keys.

   d. Select **d** to disable prompting by the Environment Manager.

      If you add multiple products at the same time, then d is useful because it does not prompt you every time that the system is ready to install a product. If you install one product at a time, then using y is OK.

      All core <>web products should be added successfully. Go back to the main menu of the Environment Manager.

4. Continue to install the override products.

   a. From the Main Menu, select **(2) Add Override Product (Quick Add – Default Override Priority)**.

   b. Select and install all override products displayed in the list.

   c. Select **d** to disable prompting by the Environment Manager.

All override products should be added successfully.

From the Main Menu, press Esc twice and enter `y` to exit the Environment Manager.

5. WebEnterprise installation

   Change to the customer environment and untar the forte.tar file:

   ```
   cd /custenv/ibm_env
   tar –xvf cdrom/forte.tar
   ```

6. Configure Customer Environment

   a. Change to the customer Forte environment:

   ```
   cd /custenv/itso/forte/cgi-bin
   ```

   b. Change the owner ID and group ID of the fortecgi to customer ID and group:

   ```
   chown itsousr:vfmadmin fortecgi
   ```

   c. Create a fortecgi.dat file in the /custenv/itso/forte/cgi-bin directory.

   The file should contain the following line for each Consumer Suite application that is installed:

   ```
   <Service Object Name> <application listening port #*> <IP Address of
   applicationserver*> 4
   ```

   For example:

   ```
   VBMHTTPAccessSO 7005 10.1.3.8 4
   VIMHTTPAccessSO 5006 10.1.3.8 4
   PortalHTTPAccessSO 5007 10.1.3.8 4
   ```

   Note: The values with an asterisk (*) are defined in the database in the cfgparmvalue table.

   d. Change the ownership of the fortecgi.dat file to itsousr:vfmgroup:

   ```
   chown itsoudr:vfmgroup fortecgi.dat
   ```

   e. Change the permissions of the fortecgi.dat file to 640:

   ```
   chmod 640 fortecgi.dat
   ```

4.9.4 Starting and stopping the Webserver

This section documents the commands used to start and stop the IBM HTTP Apache Webserver on the AIX system.

1. Change to the /usr/HTTPServer/bin directory:

   ```
   cd /usr/HTTPServer/bin
   ```

2. To start the Webserver, issue the Apache start command:

```
./Apached start
```

3. To stop the Webserver, issue the Apache stop command:

```
./apachectl stop
```

4.9.5 Verifying the Webserver configuration

Start the Apache Webserver if it is not already running. Open a Web browser and connect to the following URL for each application that is installed on the system. A fortecgi usage error should be displayed onto the screen. This confirms that the Webserver is correctly configured to access the fortecgi.

```
Banking
http://<fully qualified webserver outside hostname>:<port #>/cgi-bin/<
custenv_name>/vbm/fortecgi
Investments
http://<fully qualified webserver outside hostname>:<port #>/cgi-bin/<
custenv_name>/vim/fortecgi
Portal
http://<fully qualified webserver outside hostname>:<port #>/cgi-bin/<
custenv_name>/vpu/fortecgi
```

Note: The port # is only required in the URL if it is set to a value other than port 80.

4.10 Webserver installation for CSR on AIX

The installation and configuration of the Customer Service Representative (CSR) Web server is very similar to that of the front-end Webserver. This section documents the changes necessary to install and configure the CSR Webserver. All procedures that are not documented in the following sections are assumed to be identical to those of the front-end Web server.

4.10.1 Configuring Apache

Modify the following parameters:

1. Change User to <custID> (e.g. hsruser).
2. Change Group to vfmadmin.
3. Change DocumentRoot to /custenv/<custenv_name>.
4. Uncomment the ServerName line and change ServerName to <hostname>.

5. Remove the existing ScriptAlias line and replace it with a new ScriptAlias referencing the installed CSR applications:

```
ScriptAlias /cgi-bin/<custenv_name>/<appname>
"/custenv/<custenv_name>/forte/cgi-bin/"
```

For example:

```
ScriptAlias /cgi-bin/cs5usr/comcsr "/custenv/cs5usr/forte/cgi-bin/"
ScriptAlias /cgi-bin/cs5usr/vbmcsr "/custenv/cs5usr/forte/cgi-bin/"
ScriptAlias /cgi-bin/cs5usr/vimcsr "/custenv/cs5usr/forte/cgi-bin/"
ScriptAlias /cgi-bin/cs5usr/vpucsr "/custenv/cs5usr/forte/cgi-bin/"
```

4.10.2 Configuring the customer environment

1. Create a fortecgi.dat file in the /custenv/<custenv_name>/forte directory. It should be owned by <custID>. The file should contain a line with the following information for each Consumer Suite application that is installed:

```
<Service Object Name> <application listening port #*> <IP Address of
application server*> 4
```

For example:

```
COMCSRHTTPAccessSO 5001 10.1.3.8 4
VBMCSRHTTPAccessSO 5002 10.1.3.8 4
VIMCSRHTTPAccessSO 5003 10.1.3.8 4
VRMCSRHTTPAccessSO 5004 10.1.3.8 4
```

Note: The values with an asterisk (*) are defined in the database in the cfgparmvalue table.

2. Change the ownership of the fortecgi.dat file to <custID>:vfmgroup:

```
chown <custID>:vfmgroup fortecgi.dat
```

3. Change the permissions of the fortecgi.dat file to 644:

```
chmod 644 fortecgi.dat
```

Note: If SeOS is to be installed, see Appendix C, “Installing SeOS” on page 97. This is not a required step.

A

Installation checklists

This appendix supplies the installation checklists for AIX, z/OS, DB2 V6, and Forte.

RS/6000 AIX installation checklist

Table A-1 Checklist - RS/6000 AIX installation tasks

Install task	Completed	Comment
Complete the installation worksheets		
Create the required logical volumes		
Install Apache		
Install JRE 1.3.0		
Configure Apache		
Tune Apache		
Install DiffUtils-2.7		
Install Revision Control System (RCS) 5.7		
Create a Customer Environment using IA		
Install WebEnterprise		
Populate the Customer Environment		
Configure Customer Environment		
Start and stop Webserver		
Install SeOS		
Install IPSec		
Verify the Webserver Configuration		
Configure Apache on CSR Webserver		
Configure Customer Environment on CSR Webserver		
Verify configuration on CSR Webserver		

z/OS installation checklist

Table A-2 Checklist - z/OS installation tasks

Install task	Completed	Comment
Load Consumer Suite USS Installation JCL from S1 Product Tape		
Load Consumer Suite DB2 Installation JCL from S1 Product Tape		
Load S1 Product Tape to HFS environment		
Set IA variables		
Install the Forte Environment		
Install IA		
Install the Base Layer		
Create the Repository		
Add Repository Products		
Adding Application Repository products		
Create Customer Environment		
Install Core Software products		
Install Core components, Core patches, Override products and Override patches		
Install DBAccess for BCI		
Obtain sizing parameters		
Set up the installation environment		
Customize the load JCL		

Install task	Completed	Comment
Load the configuration parameters		
Update the configuration parameters		
Start Consumer Suite applications		

DB2 V6 installation checklist

Table A-3 Checklist - DB2 V6 installation tasks

Install task	Completed	Comment
Check DB2 V6 install		
Apply DB2 APAR PQ40338		Apply latest service level
Apply DB2 Service to Level 200008		
Customize DB2		
Define type of storage management for DB2 STOGROUP		SMS- or Volume-defined
Review and document current DB2 buffer pool allocations		
Review and document current DB2 log usage		
Supply answers to questions for use with spreadsheet in determining DB2 table sizes		
DB2 subsystem name for S1 products		Is this a new subsystem?
Define alias for S1 DB2 installation data sets		
Define alias and usercatalog for production DB2 tables		
Define DBADM owner for DB2 objects		
Define TSO ID for usage of DBADM group		
Supply answers to questions needed to configure the DB2 tables		

Forte installation checklist

Table 4-7 Checklist - Forte installation tasks

Install Task	Completed	Comment
Complete the installation worksheets		
Create the required logical volumes		
Install Apache		
Install JRE 1.3.0		
Configure Apache		
Tune Apache		
Install DiffUtils-2.7		
Install Revision Control System (RCS) 5.7		
Create a Customer Environment using IA		
Install WebEnterprise		
Populate the Customer Environment		
Configure the Customer Environment		
Start and stop Webserver		
Install SeOS		
Install IPSec		
Verify the Webserver Configuration		
Configure Apache on CSR Webserver		

B

Forte installation on z/OS

This appendix describes how to set up and run the Forte application under the z/OS USS environment.

Installing Forte

Installing Forte consists of the following tasks:

- Checking the hardware and software requirements for the node
- Using a platform-specific installation program to copy the Forte system software directory structure and source files to your target node
- Setting Forte environment variables
- Configuring Forte system management processes for the target node

Forte provides platform-specific installation programs to install the application and set environment variables on each kind of Forte node. The installation programs and the Forte source files they require are included on the Forte System Software CD. In the case of Forte for z/OS, they are included on IBM 3490 tape media.

The Forte DB2 interface is implemented using the IBM-supplied CLI/ODBC interface. When any Forte application connects to DB2 using this interface, the application provides a user ID, password, and database name (Communication database defined in DDF).

The DB2 ODBC driver does not use the provided user ID and password to validate the user connection or to name the default object qualifier for the connection; instead, the default object qualifier is the z/OS user ID that started the Forte Node manager. In other words, all Forte applications in a given Forte environment connect to DB2 with the same user ID and security privileges. None of the queries generated by Forte are qualified, so by default, the user ID used to start the node manager will be the qualifier of the tables.

The Forte system software for the OS/390 platform comes on IBM 3490 tape media, with standard labels, in IEBGENER format. The MVS user who unloads the tape and runs the Forte installation script must be able to do the following:

- Run MVS batch jobs
- Login to the UNIX Services environment (using OMVS, telnet, or rlogin) having read/write access to the Forte unload directory and the Forte installation directory in the Hierarchical File System (HFS)
- Edit and submit JCL from TSO
- Execute basic commands in the OS/390 UNIX Services environment

Hardware and software requirements

The Forte system software Release 3 for OS/390 requires IBM OS/390 Release Release 10 with Program Update Tape (PUT) maintenance level 9808 or later. You must have an MVS installation at or above the maintenance level required.

To unload and install the Forte system software, you create two directories, in different locations, in the z/OS UNIX HFS:

- A temporary *unloading* directory, which can be deleted after the installation is complete
- A permanent *installation* directory that will be used by all users who connect to the Forte partitions to execute Forte applications

Disk space

The unloading directory requires at least 90 MB of disk space for the HFS path where you will unload the software, and the installation directory requires at least 110 MB of disk space for the Forte software.

Performing the installation

The Forte system software for the z/OS platform comes on IBM 3490 tape media, with standard labels, in IEBGENER format. The tape contains a UNIX tape archive (tar) file that contains the Forte System Software.

To install Forte, you must unload the tar file into a temporary directory in your UNIX Hierarchical File System (HFS), run the UNIX tar command to expand the file, and then run the UNIX installation shell script INSTALL.SH to build your Forte distribution in a permanent location.

Depending on the installation options you choose, the INSTALL.SH program does the following:

- It requests certain environment information from you.
- It creates the Forte installation directory, and copies the Forte directory structure and source files to the installation directory.
- It sets the Forte installation's environment variables.
- It configures the appropriate Forte system management services for the installation.

The following steps describe how to install Forte on your z/OS node.

Installing the Forte application on a z/OS node with USS

1. Log in to the UNIX Services environment using the user ID that will be used to unload the Forte product tape and install the Forte software.

   You can log in using either the TSO OMVS command, or by using an rlogin or telnet client on another system.

2. Create a temporary directory for unloading the tape.

   For example, to create /tmp/forte for unloading the tape, issue the UNIX command:

   ```
   mkdir /tmp/forte
   ```

3. Log on to TSO.

4. Create and submit an IEBGENER batch job to unload the tar file from the 3490 tape cartridge into the temporary unloading directory created in step 2.

   Following is an example JCL file you can use to place the FORTE.TAR file into the temporary HFS directory /tmp/forte:

   ```
   //FRTEUNLD JOB (0000)
   //*
   //UNLOAD EXEC PGM=IEBGENER
   //SYSIN DD DUMMY
   //SYSPRINT DD SYSOUT=*
   //SYSUT1 DD DSN=FORTE.TAR,DISP=OLD,
   // UNIT=3490,
   // VOL=SER=FOR3G0,
   // LABEL=(1,SL),
   // BLKSIZE=27920,LRECL=80,RECFM=FB
   //SYSUT2 DD PATH='/tmp/forte/forte.tar',
   // PATHOPTS=(OWRONLY,OCREAT,OEXCL),
   // PATHMODE=(SIRWXU,SIRGRP,SIROTH)
   ```

5. Log in to the UNIX Services environment, again using the same user ID you used to unload the Forte product tape.

6. Expand the tar file that you unloaded in step 4 .

   If you unloaded the Forte tar file into /tmp/forte/forte.tar, use the following two UNIX commands to complete this step:

   ```
   cd /tmp/forte

   tar xovf forte.tar
   ```

7. Run the Forte installation script from the ALL_UNIX directory by doing the following:

   ```
   cd ALL_UNIX
   ./INSTALL.SH
   ```

   The installer will prompt you for the information required in the following steps.

8. Specify a Forte installation path.

   The default target directory for your installation is /forte, which the INSTALL.SH program will create for you. You can place the installation wherever you wish, but all directories in your target installation path must conform to the 8.3 naming convention, in which no name may exceed eight characters, with a three-character extension. This convention guarantees the directory will be portable. If you specify a non-existent directory path, the INSTALL.SH program will create the path for you.

9. Choose an installation option.

   – **Install and set up the Central Server Node**

     This specifies that your node will support Forte server partitions and will host Forte system management processes—the Environment Manager and Repository Server—for your Forte environment. The Repository Server can run elsewhere on other servers, but is installed here by default.

   – **Install and set up for Server Node**

     This specifies that your node will support Forte server partitions, but will not be a central server node.

   – **Install Files only:**

     This specifies that you want to copy only the Forte directory structure and source files to your node, and leave the node setup for later.

10. Confirm your installation options.

    After you confirm your choices, the INSTALL.SH program checks that the target disk is mounted and that it has enough free space for the installation. If either of these checks fails, the installation aborts.

    If all checks pass, the installation program creates the $FORTE_ROOT directory, copies the installation files, installs the example applications, if applicable, and configures the appropriate Forte system management processes without requiring further input.

11. Remove the temporary directory where you unloaded the tape:

    If you unloaded the tape into /tmp/forte, you can remove the directory with the command:

    ```
    rm -rf /tmp/forte
    ```

What happens when you install Forte

Your Forte installation consists of three components:

- FORTE_ROOT directory structure

  The FORTE_ROOT directory structure is your Forte development software.

- fortedef.sh file

  The fortedef file is a shell script that defines the Forte configuration for your node in a a series of environment variables, whose values INSTALL.SH sets at installation.

- forteboot.sh file

  The forteboot file is a shell script that you use to start Forte. The script contains commands to start Forte components in whatever configuration you may define (INSTALL.SH provides a default configuration).

The following sections describe these components in further detail.

4.10.3 Understanding the FORTE_ROOT directory structure

Your FORTE_ROOT directory is the directory you define as the target directory for your Forte installation. The INSTALL.SH program sets the location of your FORTE_ROOT directory as the value of the FORTE_ROOT environment variable in your fortedef file.

Do not change the structure of your FORTE_ROOT directory. The directory structure within the FORTE_ROOT directory must remain intact in order for Forte to function properly, as Forte relies on the path links within the structure to locate and use Forte components.

The setup program installs the FORTE_ROOT structure wherever you choose, and you can move the structure after installation wherever you choose, as long as you keep the structure intact.

Note: Keep in mind if you move FORTE_ROOT, you must change the Forte environment variables (in your FORTEDEF and FORTEBOOT files) defining the location of files and directories in the structure.

The FORTE_ROOT/install directory contains much of the workings of Forte (that is, what the system uses to run itself), organized into a group of subdirectories containing such things as:

- Executables
- Forte dynamically linked libraries
- B-tree seed repositories
- Example programs (if you have installed them) \
- Scripts
- Diagnostic tools

Understanding the fortedef script

The fortedef shell script defines the Forte configuration for your node in a series of environment variables, according to the information you pass to it at installation time. It also defines the appropriate dynamically linked library path for your platform.

You can use the fortedef script as a template for creating other fortedef scripts for other Forte configurations, or for other users. To use your own fortedef scripts, you can either source them manually before starting Forte, or reference them in your .login file.

You can also include a fortedef script in your .profile file to automatically initialize your UNIX Services environment for Forte access.

Understanding the forteboot script

The INSTALL.SH creates the forteboot script as an encapsulated way for you to start Forte or any of its components. The script contains commands to start Forte server processes.

The forteboot script starts Forte system management processes in accordance with the setup options you chose during installation. For example, if you selected the central server setup option, the forteboot script starts an environment manager process and repository server process.

In its default configuration, the script sources the fortedef script to set your Forte environment variables at Forte runtime, and defines command lines for starting Forte development applications.

You can modify the forteboot script to add whatever shell-based logic you like (such as prompts for using different fortedef files), or different command lines for starting various Forte applications. You can also use the forteboot script as a template to make other forteboot scripts.

You can include the forteboot script in your /etc/rc file to automatically bring up your Forte node manager and repository server whenever UNIX Services starts running in your z/OS environment.

You should place the forteboot command at the *end* of your /etc/rc file, after the startup of the TCP/IP INETD daemon. Because of the time it takes to start Forte server processes, this portion of the startup can take a noticeable length of time.

C

Installing SeOS

This appendix describes how to install SeOS. This is an optional step to be performed during the configuration of a Customer Environment, when installing WebServer for CSR.

Installing SeOS

If SeOS (a Computer Associates eTrust Access Control product) is to be installed, install it according to the Computer Associates (CA) documentation. This is not a required step and should not conflict with existing security measures.

Configuring IPSec

IPSec may be configured on AIX, and the rules exported, run through an AIX-to-390 configuration script, transferred to the 390 and imported on the 390.

This is only a suggested configuration for IPSec configuration. Existing security should not be compromised.

```
      Start smit
      Select “Communications Applications and Services”
      Select “TCP/IP”
      Select “Configure IP Security (IPv4)”
      Select “Basic IP Security Configuration”
      Select “Add IP Security Tunnel”
      Select “Use Manual Session Key Refresh Method (Manual Tunnel)”
      This next selection depends on if there is a physical firewall between the AIX and the
    390, or it is a direct Host-Host connection.
      Select Authentication with AH, Encryption with ESP
      Source Address is webserver inside IP address
      Destination Address is application server inside IP address
          If a physical firewall is between the AIX and the 390, the firewall IP must be added.
          Encapsulation Mode = tunnel
          Policy = encr/auth
          Authentication Algorithm = HMAC_MD5
          Encryption Algorithm = 3DES_CBC
          Source Authentication Key, Source Encryption Key, Destination Authentication Key,
        Destination Encryption Key are left blank, AIX will create these keys randomly
          Set all SPI parameters to 500
          Tunnel Lifetime = 0
          Replay Prevention = no
          Select OK to create the tunnel
          Next, you must modify this tunnel to create the remaining keys and authentication
        algorithms for export
          Fill in blank authentication algorithms with HMAC_MD5 and select OK.
          Select Export IP Security Tunnel and export this newly created tunnel definition
        (ipsec_tun_manu.exp) to /usr/packages
          Exit smit
          Run aixtunnl.ksh script in the /usr/packages directory
          Two files will be created in the /usr/packages directory. These are fwexpmctx.manual
        and fwexppolicy. Transfer these two files to the 390 and import them into the 390 IPSec
        tunnel.
# Page to display indicating the Administration Server is not installed
<files apadminred.html>
ErrorDocument 404 /9ainterim.htm
</files>
```

Example 4-4 S1INSTG.ABV.CONFIG.PARMS.R52.L10

```
# Database Parameter Initialization File
######################################################################
# CMVC STRING
# @(#) vfmdbs/inst/data/default/vfmConfigParms.dat, csCBODatabase, csCommon_5.2 1.7 00/10/11
08:35:11 /home/beavis/webCMVC/vc/1/1/3/2/s.77
######################################################################
# File.................: vfmConfigParms.dat
# Create Date.........: 03/19/1999
# Author..............: David Brunner
# Copyright (C).......: Security First Technologies
# Usage...............: (See usage function)
#
# Description.........:
# This file contains VFM Configuration parameter definitions which are
# initialized/updated at initallation time.  This file is passed to the
# updateConfigParms.ksh script, which reads each parameter and value
# and updates the value in the database.
#
# Installer Notes:
# Installers are instructed to make the necessary changes to the Value
# data below before running the updateConfigParms.ksh script.
#
# Developer Notes:
# The Type values below are fixed.  To create a new type, support for
# the Type must be added to the updateConfigParms.ksh script.
#
# Field Definitions:
#  Parameter Name - This is a human readable name for the parameter and
#    is the same name as defined in the Forte' Business model.  This name
#    is ignored by the script, so it can be changed without impact.
#  Type - This specifies the type or class of parameter.  A new type
#    cannot be added without adding support for it in the
#    updateConfigParms.ksh script.
#  DatabaseField - Specifies the exact name of the column in the database
#    table corresponding to the parameter.  This value is used by the
#    script directly to build the appropriate SQL statement.
#  Value - The exact value that will be assigned to the parameter.
#    Note: If the Value is non-numeric (i.e. text, date, time, etc.), it
#    must be specified with surrounding single quotes (i.e. 'My Text String').
#  Usage - A user-specified comment which must start with # and continues to
#    the end of the line.
#
# General:
#  Comment lines beginning with # are allowed. Comments at the end of a line are
#  also allowed; the comment must begin with #.  Because the script processing
#  this file filters comments by truncating the rest of any line when it sees a #,
```

```
#  you cannot include a # as part of any of the Data Fields.  Blank lines are
#  allowed as well.
#
# Modification  History:
#  Date       Who         Description
#  ---------- ----------  ----------------------------------------
#  03/18/1999 dbrunner    Script created
#  11/08/1999 seong       modified for maintanance
#  03/20/2000 seong       changed for split Banking component
#  06/02/2000 jbuyze      added CSR config values
#  09/19/2000 jbuyze      added session persistences config parameters
#  10/11/2000 jparks      added web encrypt key
#########################################################################

##################
# FI Parameters
##################
.
.<deleted the line>
.
.####################
# System Parameters
####################

# Parameter Name                   Type    DatabaseField  Value
Usage
# --------------                   ----    -------------  -----                          -----

# CSR.Web.HasClient (Boolean) true OR false
# This parameter flags whether the product is being run as a Forte server
# application or a client application.  The S1 standard is to deploy
# applications as server applications which would REQUIRE this value to be
# "false".  This parameter should be set to "true" in a development database.

CSR.Web.HasClient                  System  value          'FALSE'


# CSR.Web.ExternalServer (TextData)
# Set to the fully qualified address of the external webserver.
# For end-user applications, this is the address of the webserver machine, accessible
# to the world-at-large.
# For CSR applications, this is the address of the appserver machine, accessible to CSR
# users already on the secure network.

CSR.Web.ExternalServer           System  value          'http://aixrt1.devlab.norc.s1.com/'


# CSR.Web.InternalServer (TextData)
```

```
CSR.Web.InternalServer           System  value          'http://aixrt1.devlab.norc.s1.com/'

# CSR.Web.LogonInternalServer (TextData)

CSR.Web.LogonInternalServer      System  value          'http://aixrt1.devlab.norc.s1.com/'

# CSR.Web.CGIPath (TextData)

CSR.Web.CGIPath      System  value          'cgi-bin/itso/comcsr/fortecgi'

# CSR.Web.LogonCGIPath (TextData)

CSR.Web.LogonCGIPath System  value          'cgi-bin/itso/comcsr/fortecgi'

# CSR.Web.ServiceName (TextData)

CSR.Web.ServiceName              System  value          'COMCSRHTTPAccessSO'

# CSR.Web.LogonServiceName (TextData)

CSR.Web.LogonServiceName         System  value          'COMCSRHTTPAccessSO'

# CSR.Web.ServicePortRange (TextData)
# The value of this parameter should match the port number generated for the application
# on the appserver.  Check CSR_port files in the /custenv/<Customer Environment Name>/forte
# directory.

CSR.Web.ServicePortRange             System  value          '10.1.3.8:10002-10002'

# CSR.Web.AutoLogonTemplate (TextData)
# The auto-logon template.

CSR.Web.AutoLogonTemplate        System  value          'vfmtpl/support/csr_autologon.tmpl'

# CSR.Web.LogonTemplate (TextData)
# The logon template.

CSR.Web.LogonTemplate              System  value          'vfmtpl/support/logon.tmpl'

# CSR.Web.PostLogonTemplate (TextData)
# The post-logon template.
```

```
CSR.Web.PostLogonTemplate              System  value          'vfmtpl/support/base_index.tmpl'


# CSR.Web.UnexpectedErrorTemplate (TextData)
# The unexpected error template.

CSR.Web.UnexpectedErrorTemplate      System  value
'vfmtpl/support/unexpected_error.tmpl'


# CSR.Web.DocumentRoot (TextData)
# The document root

CSR.Web.DocumentRoot      System  value          '/custenv/itso'


# CSR.Web.CookieDomain (TextData)
# The value for this parameter should be set to be the same as the
# corresponding parameter in VBM4.0 in the html.rc file.

CSR.Web.CookieDomain             System  value          '.s1.com'


# CSR.Web.CookiePath (TextData)
# The value for this parameter should be set to be the same as the
# corresponding parameter in VBM4.0 in the html.rc file.

CSR.Web.CookiePath               System  value          '/cgi-bin'


# CSR.Web.SessionTimeout (TextData)
# years:months:days:hours:minutes:seconds:milliseconds
# This parameter is optional and may not be specified.  Forte has a default
# timeout for all session set to 30 minutes.  This allows a change in that
# default value.

CSR.Web.SessionTimeout             System  value          '0:00:00:00:15:00:000'


# CSR.Web.UseSecureCookies (Boolean) true OR false.
# This parameter flags whether common CSR application will use secure webserver
# (i.e., https) or not. This parameter should be set to "false" in a
# development database.

CSR.Web.UseSecureCookies           System  value          'FALSE'

# VFM.Web.SessionPersist (Boolean) true OR false.
# This parameter defines whether the web enterprise sessions will be backed up to a file
```

```
# or not. This parameter should be set to "false" in a development database.

VFM.Web.SessionPersist             System  value          'false'

# VFM.Web.SessionPersistRootDir (TextData)
# This parameter defines where session backup files are stored if the VFM.Web.SessionPersist
# configuration parameter is set to true.  This parameter has no effect if the
# VFM.Web.SessionPersist is set to FALSE.

VFM.Web.SessionPersistRootDir      System  value          '/tmp'

# VFM.Web.SessionPersistNumRoots (Integer)
# This parameter defines how many file systems are used to store the persisted files.
# This has been added mainly for os390 it will default to one in most cases.
# This parameter has no effect if the VFM.Web.SessionPersist is set to FALSE.

VFM.Web.SessionPersistNumRoots     System  value          '1'

# VFM.Web.EncryptKey (TextData)
# This parameter defines the key used by web enterprise to encrypt session ids
# when they are sent across the network.
# This parameter should be different for every installation.

VFM.Web.EncryptKey     System  value          'a;sldkfj'
```

```
# Database Parameter Initialization File
#######################################################################
# CMVC STRING
# @(#) a_rmbvsn/vrmdbs/inst/data/default/bvsnConfigParms.dat, csCBORelMgtDatabase,
ad_rmbvsn_5.1.3 1.1 00/11/20 16:55:47 /home/beavis/webCMVC/vc/1/6/3/5/s.71
#######################################################################
# File................: bvsnConfigParms.dat
# Create Date.........: 06/20/2000
# Author..............: cdaniell
# Copyright (C).......: Security First Technologies
# Usage...............: (See usage function)
#
# Description.........:
# This file contains Broadvision Configuration parameter definitions which are
# initialized/updated at initallation time.  This file is passed to the
# updateConfigParms.ksh script, which reads each parameter and value
# and updates the value in the database.
#
# Installer Notes:
# Installers are instructed to make the necessary changes to the Value
# data below before running the updateConfigParms.ksh script.
# Once you make the necessary changes below, run the following
# command to update the parameters in the database:
#   updateConfigParms.ksh -d dbname -f vimConfigParms.dat
```

```
# To verify the current value of a System parameter in the database,
# run modifyCfg.ksh -d dbname -p ParameterName
#
# Developer Notes:
# The Type values below are fixed.  To create a new type, support for
# the Type must be added to the updateConfigParms.ksh script.
#
# Field Definitions:
#  Parameter Name - This is a human readable name for the parameter and
#    is the same name as defined in the Forte' Business model.  This name
#    is ignored by the script (except for System parameters).  For System
#    parameters, the name cannot be changed and represents the parameter
#    name exactly as stored in the CFGParmValue table.
#  Type - This specifies the type or class of parameter.  A new type
#    cannot be added without adding support for it in the
#    updateConfigParms.ksh script.  Types currently supported:
#      FI
#      PortalFI
#      AlertFI
#      System
#  DatabaseField - Specifies the exact name of the column in the database
#    table corresponding to the parameter.  This value is used by the
#    script directly to build the appropriate SQL statement.
#  Value - The exact value that will be assigned to the parameter.
#    Note: If the Value is non-numeric (i.e. text, date, time, etc.), it
#    must be specified with surrounding single quotes (i.e. 'My Text String').
#  Usage - A user-specified comment which must start with # and continues to
#    the end of the line.
#
# General:
#  Comment lines beginning with # are allowed. Comments at the end of a line are
#  also allowed; the comment must begin with #.  Because the script processing
#  this file filters comments by truncating the rest of any line when it sees a #,
#  you cannot include a # as part of any of the Data Fields.  Blank lines are
#  allowed as well.
#
# Modification  History:
#  Date       Who         Description
#  ---------- ----------  ------------------------------------------
#  06/20/2000 cdaniell    File created
#  06/21/2000 vlimdi      Relationship.JavaScript changed to RelationshipJavaScript
#  06/17/2000 cdaniell    Corrected various configuration parameters
#  07/31/2000 vlimdi      Adding VRM.RelationshipJavaScript.BVIM
#  10/23/2000 vlimdi      Adding VRM.Component.Disable and RelationshipTunneledDataAdapterSO
######################################################################

####################
# System Parameters
####################
```

```
# Parameter Name                      Type    DatabaseField     Value
Usage
# --------------                      ----    -------------     -----
-----

VRM.Relationship.BVHostName   System value 'kovu.devlab.norc.s1.com'
VRM.RelationshipJavaScript.BVObservation System value 'vrm_observe.jsp'
VRM.RelationshipJavaScript.FINews  System value 'vrm_banknews.jsp'
VRM.RelationshipJavaScript.FILink  System  value 'vrm_banklinks.jsp'
VRM.RelationshipJavaScript.FIAd   System  value 'vrm_bankad.jsp'
VRM.RelationshipJavaScript.BVLogin  System  value
'http://%1/cgi-bin/bv1to1/inetcgi/vrm_login.jsp?username=%2&password=%3'
VRM.RelationshipJavaScript.CreateUser  System  value 'vrm_create_new_user.jsp'
VRM.RelationshipJavaScript.UpdateUserPrefs System  value 'vrm_update_profile.jsp'
VRM.RelationshipJavaScript.DetermineUserGroup System  value 'vrm_determine_usergroup.jsp'
VRM.RelationshipJavaScript.GetUserPreferences System  value 'vrm_get_user_prefs.jsp'
VRM.RelationshipJavaScript.BVObservationParms System  value
'&item=%1&type=%2&trgtinfo=%3&infopvdr=%4'
VRM.RelationshipJavaScript.BVReassignUser System  value 'vrm_reassign_user.jsp'
VRM.RelationshipJavaScript.BVReassignUserParms System  value '&oldUsername=%1&newUsername=%2'
VRM.RelationshipJavaScript.DeleteUser  System  value
'http://%1/cgi-bin/bvtest/bvtest/vrm_delete_user.jsp?username=%2&password=%3'
VRM.RelationshipJavaScript.BVIM                System  value   '<interaction_manager>'
VRM.Component.Disable                          System  value   'false'
RelationshipTunneledDataAdapterSO              System  value
'site/BVTunneledDataAdapter_CLO/BVAdapters_clO-BVTunneledDataAdapterSO'
```

```
# Database Parameter Initialization File
#####################################################################
# CMVC STRING
# @(#) a_reutqt/vcpdbs/inst/data/default/reutqtConfigParms.dat, csCBOCustPortDatabase,
ad_reutqt_5.1.3, O 1.1 OO/11/2O 17:O8:21 /home/beavis/webCMVC/vc/1/6/3/6/s.18
#####################################################################
# File...............: reutqtConfigParms.dat
# Create Date.........: O6/2O/2OOO
# Author..............: cdaniell
# Copyright (C).......: Security First Technologies
# Usage...............: (See usage function)
#
# Description.........:
# This file contains Reuters Adapters Configuration parameter definitions which are
# initialized/updated at initallation time.  This file is passed to the
# updateConfigParms.ksh script, which reads each parameter and value
# and updates the value in the database.
#
# Installer Notes:
# Installers are instructed to make the necessary changes to the Value
```

```
# data below before running the updateConfigParms.ksh script.
# Once you make the necessary changes below, run the following
# command to update the parameters in the database:
#   updateConfigParms.ksh -d dbname -f vimConfigParms.dat
# To verify the current value of a System parameter in the database,
# run modifyCfg.ksh -d dbname -p ParameterName
#
# Developer Notes:
# The Type values below are fixed.  To create a new type, support for
# the Type must be added to the updateConfigParms.ksh script.
#
# Field Definitions:
#  Parameter Name - This is a human readable name for the parameter and
#    is the same name as defined in the Forte' Business model.  This name
#    is ignored by the script (except for System parameters).  For System
#    parameters, the name cannot be changed and represents the parameter
#    name exactly as stored in the CFGParmValue table.
#  Type - This specifies the type or class of parameter.  A new type
#    cannot be added without adding support for it in the
#    updateConfigParms.ksh script.  Types currently supported:
#      FI
#      PortalFI
#      AlertFI
#      System
#  DatabaseField - Specifies the exact name of the column in the database
#    table corresponding to the parameter.  This value is used by the
#    script directly to build the appropriate SQL statement.
#  Value - The exact value that will be assigned to the parameter.
#    Note: If the Value is non-numeric (i.e. text, date, time, etc.), it
#    must be specified with surrounding single quotes (i.e. 'My Text String').
#  Usage - A user-specified comment which must start with # and continues to
#    the end of the line.
#
# General:
#  Comment lines beginning with # are allowed. Comments at the end of a line are
#  also allowed; the comment must begin with #.  Because the script processing
#  this file filters comments by truncating the rest of any line when it sees a #,
#  you cannot include a # as part of any of the Data Fields.  Blank lines are
#  allowed as well.
#
# Modification  History:
#  Date       Who         Description
#  ---------- ----------  ------------------------------------------
#  06/20/2000 cdaniell    File created
#  06/21/2000 vlimdi      Customportfolio changed to  CustomPortfolio
#########################################################################


###################
```

```
# System Parameters
####################

# Parameter Name                      Type    DatabaseField     Value
Usage
# --------------                      ----    -------------     -----
-----

VCP.CustomPortfolio.SymbolLookupTail  System        value    '&ANYWHERE=Y&COUNT='
VCP.CustomPortfolio.Base             System        value    'http://data.moneynet.com/data'
VCP.CustomPortfolio.DelayedQuote      System        value    'rawquotes/quote.asp?SYMBOL='
VCP.CustomPortfolio.Host              System        value    'data.moneynet.com'
VCP.CustomPortfolio.LookupBySymbol    System        value    'rawlookup/lookup.asp?SYMBOL='
VCP.CustomPortfolio.PartnerId         System        value    'SECURITY'
VCP.CustomPortfolio.RealTimeQuote     System        value    'rawquotes/rtquote.asp?SYMBOL='
VCP.CustomPortfolio.SymbolLookup      System        value    'rawlookup/lookup.asp?NAME='
VCP.CustomPortfolio.SymbolLookupMaxResults      System        value    '1000'
```

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

IBM Redbooks

For information on ordering these publications, see “How to get IBM Redbooks” on page 110.

- *DB2 UDB Server for OS/390 and z/OS Version 7 Presentation Guide,* SG24-6121
- *DB2 for z/OS and OS/390 Version 7 Using the Utilities Suite,* SG24-6289

Other resources

These publications are also relevant as further information sources:

- *DB2 PM for OS/390 V7 Installation and Customization,* SC27-0860
- *DB2 UDB for OS/390 and z/OS Utility Guide and Reference*, SC26-9945
- *DB2 UDB for OS/390 and z/OS V7 Administration Guide,* SC26-9931
- *DB2 for z/OS and OS/390 Version 7 Installation Guide,* SG26-9936
- *DB2 for z/OS and OS/390 Version 7 Command Reference,* SG26-9934
- *DB2 for z/OS Version 7 Program Directory, GI10-8182*

Information on the XML interfaces on the Web:

- `http://w3.pdc.ibm.com/avitraining/AVI51home/xmlapi_ug/index.html/`

S1 Corp publications (for more information, refer to the S1 Web site at `http://www.qup.com/Products/ibs.htm/`):

- *Consumer Suite Installation Guide, Version 5.X*
- *S1 Consumer Banking User Interface Customization Guide*
- *S1 Consumer Banking Program Reference*
- *S1 Template Object Model document*
- *RTAA Approach*
- *RTAA Programmer’s Guide*

- *Adapter Interface documentation*
- *VFM Tunneling Approach Document*
- *VFM Tunneling Functional Description*
- *DB2Access Install Guide*

Referenced Web sites

These Web sites are also relevant as further information sources:

- `http://www.qup.com/Products/ibs.htm/` S1 Web site
- `http://www.ibm.com/` IBM Web site

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S1 Consumer Suite for z/OS Installation Guide

(0.2"spine)
0.17"<->0.473"
90<->249 pages

S1 Consumer Suite for z/OS Installation Guide

Redbooks

S1 Consumer Suite architecture and configuration on the zSeries platform

Planning and configuration methodology

Step-by-step installation

Today's financial institutions face a demanding and competitive environment. The S1 Corporation has produced a widely accepted suite of products, which includes banking, investments, and relationship management.

This IBM Redbook discusses the S1 Banking product, which has been deployed on the zSeries platform. It is written for technical professionals involved in planning and installing the banking product. The information in this guide is for Version 5.3 of S1 Consumer Banking.

We begin by explaining the S1 Consumer Suite environment as it exists today. The emphasis is on the S1 Consumer Banking module as developed for the zSeries architecture.

Next, we introduce zSeries architecture and discuss the advantages of using the zSeries and z/OS as a proven Web server.

Then we discuss planning for the installation of S1 Consumer Banking on z/OS and UNIX System Services, as well as using AIX as a CSR Web server.

Finally, we describe in detail the installation and customization steps of the S1 Banking module on z/OS. A step-by-step procedure outlines the customization of the S1 Banking module under UNIX System Services. A Web server installation is described on the AIX platform. A Web server installation is also described for CSR.

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SG24-6288-00 ISBN 0738423211