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United States Department of Education

Student Financial Assistance



**Integrated Technical Architecture
Software Installation/Configuration Report**

Task Order #16

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1 Introduction

1.1. Purpose

The Installation and Configuration Report provides the information required for installing and configuring the software infrastructure of the Integrated Technical Architecture (ITA) development environment. Figure 1 below illustrates the current development environment at the Virtual Data Center (VDC) in Meriden, CT. The objective of this deliverable is to report the installation steps and configuration performed during construction of the development environment. In several cases, multiple installations of software packages were implemented on one machine to support development, testing, and staging environments, and required special installation and configuration steps. This deliverable also identifies the steps performed to validate that the software was functioning properly within the Student Financial Assistance (SFA) environment.

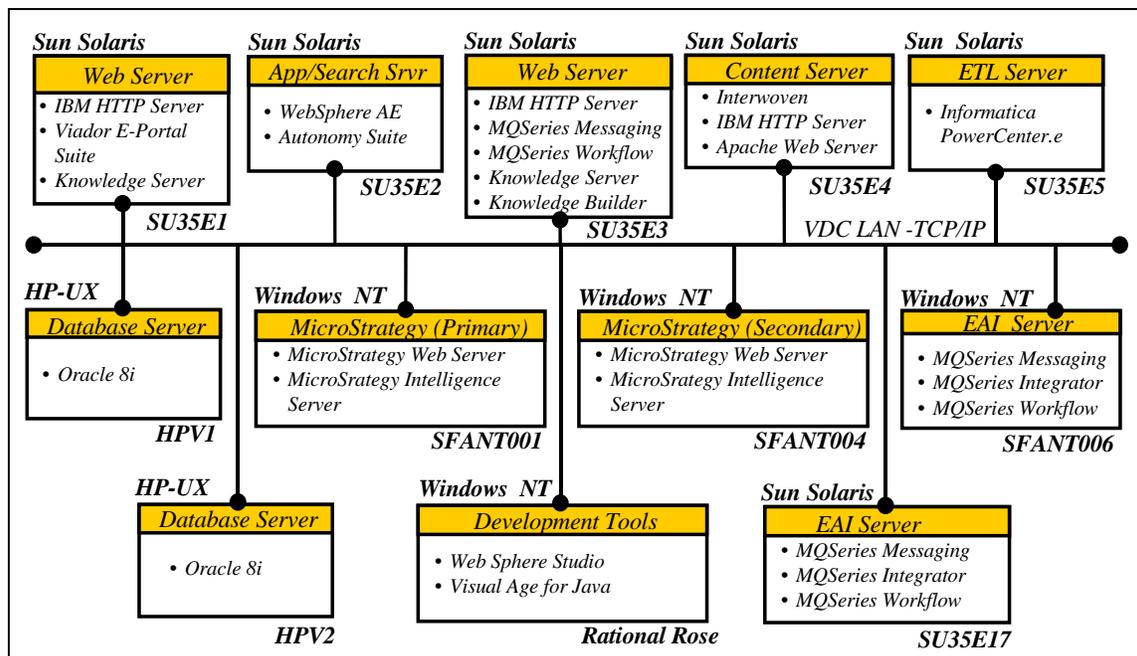


Figure 1 – Integrated Technical Architecture Development Environment

1.2. Scope

This document covers the installation and configuration of the SFA core infrastructure for the ITA. It includes:

- Each task, supplemental to vendor reference manuals, that was performed to install and configure the infrastructure software

- SFA-specific configurations
- Checklist of entry and exit criteria for validating the installation & configuration

The core infrastructure components include:

- Autonomy Suite
- IBM HTTP Server
- IBM MQSeries Integrator
- IBM MQSeries Messaging
- IBM MQSeries Workflow
- IBM Network Dispatcher
- IBM VisualAge for Java
- IBM WebSphere Advanced Edition
- IBM WebSphere Studio
- Informatica PowerCenter.e
- Interwoven TeamSite
- MicroStrategy Suite
- Viador E-Portal Suite

1.3. Layout of this documentation

The installation and configuration of each core infrastructure component will be documented in its own section of this document. Within each infrastructure section, the information is separated as follows:

- **Product Overview** - A brief description of the product and its functionality within the Integrated Technical Architecture.
- **Product Inventory** – Installed product and version information.
- **Development Environment Topology** - Graphically depicts the infrastructure components utilized in the Integrated Technical Architecture development environment.
- **Product Prerequisites for Installation** - Pre-installation hardware and software specifications.
- **Workstation Requirements for Testing Installation** - Client machine requirements necessary to validate product installation and perform SFA configurations.
- **Users and Groups** - Login IDs and groups constructed to install and configure the product, and validate the installation.
- **Directory Structures** - Main file directories constructed to support product installation.

- **Naming Conventions** - Rules and standards that govern the labeling of objects during the product installation and configuration.
- **Installation Checklist** - Pre-installation, installation, and post-installation steps that supplement a vendor's installation manual and identifies SFA specific configurations.
- **Startup and Shutdown Procedures** - Actions to be performed to ensure the integrity of the environment. Startup involves the careful sequenced initialization of software, databases, web servers, etc. Shutdown involves saving configuration changes as needed and gracefully taking down running software in the correct sequence.
- **Backup Procedures** - Actions to be performed to protect data from loss due to adverse events, such as application errors, data corruption, user error, and hardware failure.
- **Installation Gaps** - Variances between the current and target development environment of the Integrated Technical Architecture. This section identifies the short and long-term resolutions necessary to meet the target environment.
- **References** - Documentation used to complete the product installations and configurations. Vendor reference manuals reside at the VDC and SFA Portals.

2 Autonomy Suite

2.1. Product Overview

The Autonomy Suite provides the ability to use natural language searches, personalized profiling, and automated administration features to search both structured and unstructured data.

Autonomy's search function enables automatic management of content. Using pattern-matching technology that conceptually 'profiles' content, the Autonomy product is able to derive an understanding of the context and meaning of information.

2.2. Product Inventory

The Autonomy Suite consists of the collection of products listed below:

Autonomy Product Suite

- Knowledge Server Version 2.1
- Knowledge Update Version 2.1
- Knowledge Fetch Version 2.1
- Knowledge Builder Version 2.1

The development, testing and staging environments currently coexist on SU35E1, SU35E2, and SU35E3.

The following products were installed on the SU35E2 Sun Server with an Internet Protocol (IP) Address of 4.20.14.132:

- Knowledge Server Version 2.1
- Knowledge Update Version 2.1
- Knowledge Fetch Version 2.1

The following product was installed on the SU35E1 Sun Server with an IP Address of 4.20.14.131:

- Knowledge Server Version 2.1

The following product was installed on the SU35E3 Sun Server with an IP Address of 4.20.14.133:

- Knowledge Server Version 2.1
- Knowledge Builder Version 2.1

2.3. Development Environment Topology

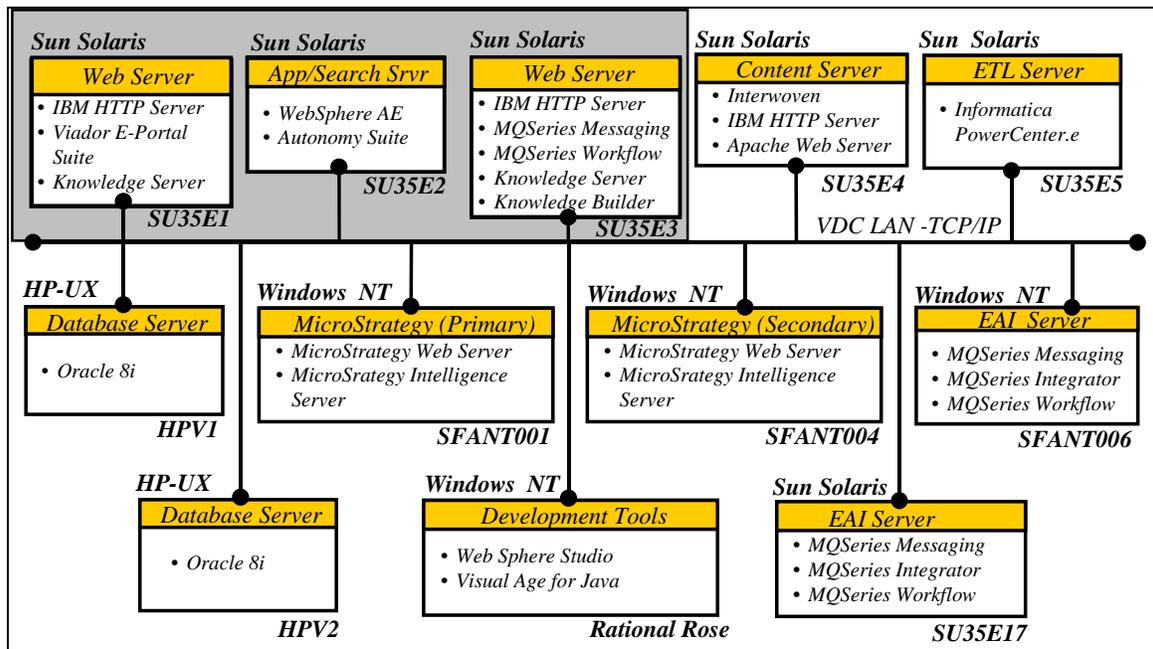


Figure 2 – Autonomy components.

2.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the Autonomy installation and configuration:

- Sun Solaris V2.6
- Root login ID for local Sun machine
- Sun Workshop Compiler C++ V5.0 (necessary on Common Gateway Interface (CGI) machine in order to compile code)

Autonomy products use multiple Transmission Control Protocol (TCP) / IP socket ports per system. The ports used for each environment on SU35E2 are defined in the table below and must be opened for remote administration:

Table 1 – Autonomy TCP/IP Socket Ports

Environment	Data DRE* Query Port	Data DRE Index Port	Community DRE Query Port	Community DRE Index Port	HTTPFetch Service Port	HTTPFetch Spider Port
development	60000	60001	60002	60003	60005	80
test	30000	30001	30002	30003	30005	80
staging	40000	40001	40002	40003	40005	80

* DRE – Dynamic Reasoning Engine

2.5. Workstation Requirements for Testing Installation

A web browser, such as Internet Explorer 4.01 or greater, or Netscape 5 or higher, is necessary to test the Uniform Resource Locator (URL) (<http://<IP address>:<Data DRE query port>/qmethod=v>).

2.6. Users and Groups

The *root* login ID was used for the installation of Autonomy.

2.7. Directory Structures

The following directories were created during the installation. The default owner is root and full permissions have been granted.

The keyword ***system*** in the table below should be replaced with dev, tst, or stg for the respective environment – development, testing or staging.

Additional information on sizing can be found in the documentation for the Autonomy Suite.

Table 2 - Autonomy Directory Structure on SU35E2

DIRECTORY	CONTENTS
/var/ <i>system</i> /autonomy/autonomy_db/	Root Autonomy directory
/var/ <i>system</i> /autonomy/autonomy_db/KnowUpdate210	Installation directory for Knowledge Update
/var/ <i>system</i> /autonomy/autonomy_db/KnowUpdate210/querydre	Contains database for Dynamic Reasoning Engine (DRE)
/var/ <i>system</i> /autonomy/autonomy_db/KnowUpdate210/communitydre	Contains all the files for the Agent Community
/var/ <i>system</i> /autonomy/autonomy_db/KnowServer210	Installation directory for Knowledge Server
/var/ <i>system</i> /autonomy/autonomy_db/KnowServer210/querydre	Contains all the files for the Dynamic Reasoning search Engine (DRE)
/var/ <i>system</i> /autonomy/autonomy_db/KnowServer210/autoindexer	Contains all the files for the file system autoindexer

DIRECTORY	CONTENTS
/var/ system /autonomy/autonomy_db/HTTPFetch210	Contains all the files for the HTTPFetch
/opt/ system /IBMHTTPD/cgi-bin	IBM HTTP Web server CGI directory where Autonomy CGI scripts reside
/opt/ system /IBMHTTPD/htdocs/en_US/KnowUpdate210	Contains the html templates for Autonomy User Interface
/opt/ system /IBMHTTPD/htdocs/en_US/KnowUpdate210Admin	Contains the html templates for Autonomy Administration Interface
/opt/ system /IBMHTTPD/htdocs/en_US/KnowServer210	Contains the html templates for Autonomy User Interface
/opt/autonomy/lib	Contains library files for KnowledgeBuilder
/opt/autonomy/include	Contains include files for KnowledgeBuilder

Table 3 - Autonomy Directory Structure on SU35E3

DIRECTORY	SIZE	CONTENTS
/opt/ system /IBMHTTPD/htdocs/en_US/KnowUpdate210		Contains the html templates for Autonomy User Interface
/opt/ system /IBMHTTPD/htdocs/en_US/KnowUpdate210Admin		Contains the html templates for Autonomy Administration Interface
/opt/ system /IBMHTTPD/htdocs/en_US/KnowServer210		Contains the html templates for Autonomy User Interface
/opt/ system /IBMHTTPD/cgi-bin		IBM HTTP Web server CGI directory where Autonomy CGI scripts reside
/var/ system /autonomy/autonomy_db/KnowServer210/wwwtemplates		Installation directory for Knowledge Server wwwtemplates

Table 4 - Autonomy Directory Structure on SU35E1

DIRECTORY	SIZE	CONTENTS
/opt/ system /IBMHTTPD/htdocs/en_US/KnowUpdate210		Contains the html templates for Autonomy User Interface
/opt/ system /IBMHTTPD/htdocs/en_US/KnowUpdate210Admin		Contains the html templates for Autonomy Administration Interface
/opt/ system /IBMHTTPD/htdocs/en_US/KnowServer210		Contains the html templates for Autonomy User Interface

DIRECTORY	SIZE	CONTENTS
/opt/ <i>system</i> /IBMHTTPD/cgi-bin		IBM HTTP Web server CGI directory where Autonomy CGI scripts reside
/var/ <i>system</i> /autonomy/autonomy_db/KnowServer210/wwwtemplates		Installation directory for Knowledge Server wwwtemplates

2.8. Naming Conventions

The Autonomy product names were given the same name in all environments.

- Knowledge Server is named KnowServer210.
- Knowledge Update is named KnowUpdate210.
- HTTPFetch is named HTTPFetch210.

2.9. Installation Checklist

See the Autonomy Installation Checklist in Appendix A.

2.10. Startup and Shutdown Procedures

Autonomy server products run as UNIX processes. The Autonomy products are configured to automatically start at boot up.

The list of Autonomy processes is below. The Knowledge Server DRE must be started before the Knowledge Server autoindexer and HTTPFetch.

- Knowledge Server DRE
- Knowledge Server autoindexer
- HTTPFetch

The keyword *system* in the table below should be replaced with dev, tst, or stg for the respective environment – development, testing or staging.

2.10.1. Knowledge Server DRE Startup Procedures

To start the Knowledge Server DRE manually follow the steps in the table below.

Table 5 – Starting the Knowledge Server DRE Manually

Step	Description	Action	Comment
1.	Ensure that the process is not already running.	netstat -a grep <query port #>	If nothing is listening on the query port then the Knowledge Server is not running.

2.	Change to Knowledge Server home directory and use startup script	cd /var/ system /autonomy/autonomy_db/KnowServer210 ./StartQuery.sh	
3.	Ensure that the process started successfully.	ps -ef grep queryh	Look for a KnowServer210queryh process that just started.
4.	Ensure that the Knowledge Server process is working.	Go to a web browser at type in the URL below: http://<autonomy machine IP>:<query port #>/qmethod=v	A page should come up displaying information about the Knowledge Server.

2.10.2. Knowledge Server Autoindexer Startup Procedures

To start the Knowledge Server Autoindexer manually follow the steps in the table below:

Table 6 – Starting the Knowledge Server Autoindexer Manually

Step	Description	Action	Comment
1.	Ensure that the process in not already running.	ps -ef grep autoi	If there are autoindexer processes running, follow these steps to determine if the autoindexer is for the correct environment.
2.	Determine the time when the autoindexer started by looking at its log file.	cd /var/ system /autonomy/autonomy_db/KnowServer210/autoindexer head -2 KnowServer210autoindexer.log	The second line of this output should display the time when the autoindexer started. This time will be used to determine the correct process id of the autoindexer for the current environment.
3.	Display the list of autoindexer processes running.	ps -ef grep autoi	

Step	Description	Action	Comment
4.	Match the time from the log file with the time on the process list to determine the correct pid.	If the log file time does not match any of the times of the process list, open the full log file in an editor and look for another starting time.	Note: If the autoindexer was restarted without deleting the log, then another set of starting times are appended into the log file. This is why the times may not match. If no matching times are found, then the autoindexer may already be stopped
5.	Change to autoindexer home directory and use startup script	cd /var/ system /autonomy/autonomy_db/KnowServer210 ./StartIndexer.sh	
6.	Ensure that the process started successfully.	ps -ef grep autoi	Look for a KnowServer210autoindexer that just started.

2.10.3. HTTPFetch Startup Procedures

To start the HTTPFetch manually follow the steps in the table below:

Table 7 – Starting the HTTPFetch Manually

Step	Description	Action	Comment
1.	Ensure that the process is not already running.	netstat -a grep <HTTPFetch service port #>	If nothing is listening on the HTTPFetch service port then HTTPFetch is not running.
2.	Change to HTTPFetch home directory and use startup script	cd /var/ system /autonomy/autonomy_db/HTTPFetch210 ./startfetch.sh	
3.	Ensure that the process started successfully.	ps -ef grep HTTPFetch210	Look for a HTTPFetch210.exe process and a HTTPFetch210spider.exe that just started

2.10.4. Automatic Restart of Autonomy Processes

In order to enable restart on machine reboot, the following files have been added to SU35E2:

/etc/rc0.d/K99Autonomy

/etc/rc1.d/K99Autonomy

/etc/rc2.d/S99Autonomy

2.10.5. Knowledge Server DRE Shutdown Procedures

Since three environments exist on the development server, all Knowledge Server processes have the same name. To determine which process belongs to which environment, carefully follow the procedures in the table below when shutting down the Knowledge Server DRE process.

Table 8 – Shutting Down the Knowledge Server DRE Process

Step	Description	Action	Comment
1.	Determine which KnowServer query environment to shutdown: dev, tst, or stg.		
2.	Determine the process id <pid> of the Knowledge Server query process.	Go to a web browser and type in the URL: http://<autonomy machine IP>:<query port #>/qmethod=v	A page should come up displaying information about the Knowledge Server. Look for the line that lists the Process ID: <pid>
3.	Kill the process at the UNIX command line.	kill <pid>	
4.	Ensure that the process stopped	ps - ef grep queryh	The pid should not show up in the process list.

2.10.6. Knowledge Server Autoindexer Shutdown Procedures

Since three environments exist on the Autonomy server (dev, tst, stg), all Knowledge Server processes have the same name. Carefully follow the procedures in the table below when shutting down the Knowledge Server Autoindexer process.

Table 9 – Shutting Down the Knowledge Server Autoindexer Process

Step	Description	Action	Comment
1.	Determine which KnowServer autoindexer environment to shutdown: : dev, tst, or stg.		
2.	Determine the time when the autoindexer started by looking at the environment's log file.	cd /var/ /system /autonomy/autonomy_db/KnowServer210/aut oindexer	The second line of this output should display the time when the autoindexer started. This time will be used to determine the correct process id of the autoindexer for the current environment.

Step	Description	Action	Comment
		head -2 KnowServer210autoindexer.log	
3.	Display the list of autoindexer processes running.	ps -ef grep autoi	
4.	Match the time from the log file with the time on the process list to determine the correct pid.	If the log file time does not match any of the times of the process list, open the full log file in an editor and look for another starting time.	If the autoindexer was restarted without deleting the log, then another set of starting times are appended into the log file. If no matching times are found, then the autoindexer may already be stopped.
5.	Kill the process at the command line with the matching time.	kill <pid>	
6.	Ensure that the process stopped.	ps -ef grep autoi	The pid should not show up in the process list.

2.10.7. HTTPFetch Shutdown Procedures

Since three environments exist on the development server (dev, tst, stg), all HTTPFetch processes have the same name. To determine which process belongs to which environment, carefully follow the procedures in the table below when shutting down the HTTPFetch process.

Table 10 – Shutting Down the HTTPFetch Process

Step	Description	Action	Comment
1.	Determine which HTTPFetch environment to shutdown: dev, tst or stg.		
2.	Determine the time when HTTPFetch started by looking at the environment's log file.	cd /var/system/autonomy/autonomy_db/HTTPFetch210	The second line of this output should display the time when the HTTPFetch started. This time will be used to determine the process id of HTTPFetch we will be shutting down, in the current environment.

Step	Description	Action	Comment
		head -2 HTTPFetch.log	
3.	Display the list of HTTPFetch processes running.	ps -ef grep HTTPF	
4.	Match the time from the log file with the time on the process list to determine the correct pid.	If the log file time does not match any of the times of the process list, open the full log file in an editor and look for another starting time.	If HTTPFetch was restarted without deleting the log, then another set of starting times are appended into the log file. If no matching times are found, then the HTTPFetch process may already be stopped.
5.	Kill the process at the command line with the matching time.	kill <pid>	
6.	Ensure that the process stopped.	ps -ef grep HTTPF	The pid should not show up in the process list.

2.11. Backup Procedures

2.11.1. Autonomy Database Backup

Autonomy does not have a backup utility. To backup the Dynamic Reasoning search Engine (DRE) database, copies of the following files need to be made. The keyword **system** in the table below should be replaced with dev, tst, or stg for the respective environment – development, testing, or staging.

Table 11 – Recommended Autonomy Files to Backup

File	Directory Location
DRE.INI and the DRE executable	/var/ system /autonomy/autonomy_db/KnowServer210/querydre
Autoindexer configuration files (*.cfg) files	/var/ system /autonomy/autonomy_db/KnowServer210/autoindexer
All *.log files	/var/ system /autonomy/autonomy_db/KnowServer210/querydre
	/var/ system /autonomy/autonomy_db/HTTPFetch210
All *.db files	/var/ system /autonomy/autonomy_db/KnowUpdate210/querydre

It is recommended that backup procedures are followed daily, or at a minimum, every time that the content is re-indexed.

2.12. Installation Gaps

There are no installation gaps for Autonomy.

2.13. References

- Autonomy Knowledge Server V2.1 documentation
- Autonomy Knowledge Update V2.1 documentation
- Autonomy Knowledge Fetch V2.1 documentation
- Autonomy built-in help guide "<http://4.20.14.132:30000/qmethod=H>"

3 IBM HTTP Server (IHS)

3.1. Product Overview

IBM HTTP Server (IHS) is a web server that is based on the Apache web server. In addition to providing the full range of the Apache web server features, IHS provides enhanced Secure Sockets Layer (SSL) for secure transactions.

3.2. Product Inventory

The following product was installed in the development, test, and staging environments on the SU35E1 Sun server with the IP address of 4.20.14.131:

- IBM HTTP Server 1.3.6.3

The following products were installed in the development, test, and staging environments on the SU35E3 Sun server with the IP address of 4.20.14.133:

- IBM HTTP Server 1.3.6.3 with WebSphere Plug-in
- e-fix# pq36342 (required for WebSphere Plug-in)

The web on server SU35E2 is disabled to allow Interwoven to use the Apache server. Please see the Interwoven Installation Gaps for more information.

3.3. Development Environment Topology

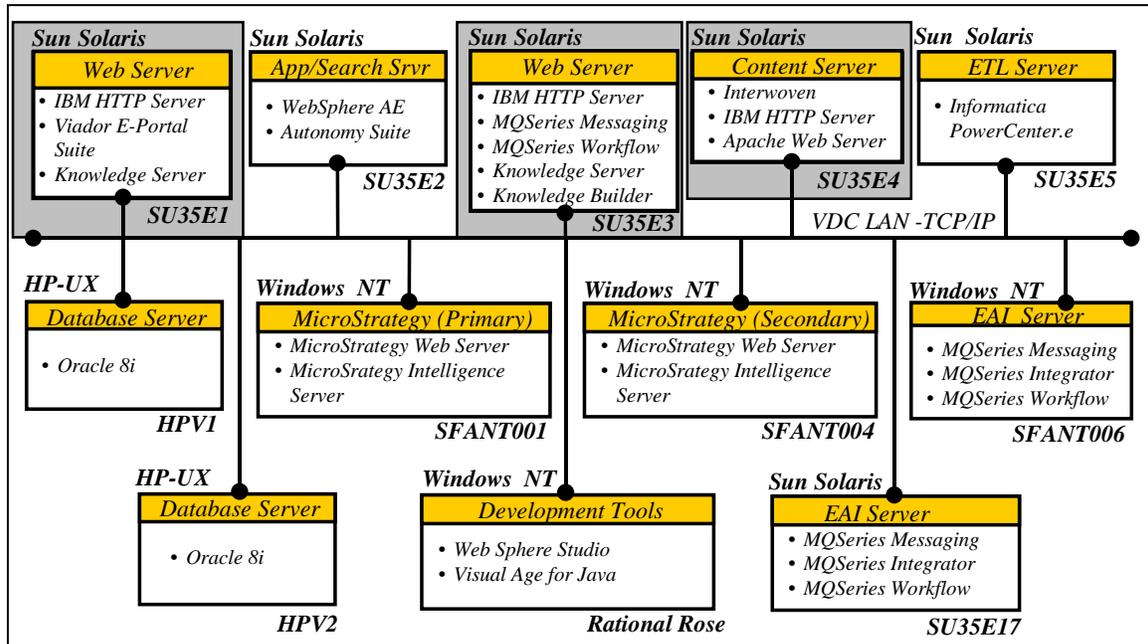


Figure 3 - IBM HTTP Server components.

3.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the IHS installation and configuration:

- Sun Solaris V2.6
- The following TCP/IP socket ports on the listed server must be opened for IHS for use in the indicated environments:

Table 12 – IBM HTTP Server TCP/IP Socket Ports on SU35E1

Environment	IHS Port
Development	8181
Test	8182
Staging	80

Table 13 – IBM HTTP Server TCP/IP Socket Ports on SU35E3

Environment	IHS Port
Development	8081
Test	8082
Staging	80

3.5. Workstation Requirements for Testing Installation

A web browser, such as Netscape 4.x or above, or Internet Explorer 5.0 or above, was necessary to enter the URL and verify that the Welcome page can be viewed. Enter the following URLs in the browser to view the environment’s home web page:

DEV

SU35E1 http://4.20.14.131:8181/

SU35E3 http://4.20.14.133:8081/

TST

SU35E1 http://4.20.14.131:8182/

SU35E3 http://4.20.14.133:8082/

STG

SU35E1 http://4.20.14.131/

SU35E3 http://4.20.14.133/

3.6. Users and Groups

The *root* login ID was used for the installation and configuration of IBM HTTP Server.

3.7. Directory Structures

The following directories were created during the installation. The default owner is root and full permissions have been granted.

The keyword ***system*** in the table below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

Table 14 – IBM HTTP Server Directory Structure on SU35E1

DIRECTORY	CONTENTS
/opt/ <i>system</i> /IBMHTTPD/	Default directory for IHS program files. The httpd.conf is located in this directory.

DIRECTORY	CONTENTS
/opt/ system /IBMHTTPD/bin	Location of apachectl. Which is used for stop and start
/opt/ system /IBMHTTPD/conf	Location of httpd.conf
/opt/ system /IBMHTTPD/logs	Location of error and info logs for the HTTP server. In particular: error_log

Table 15 – IBM HTTP Server Directory Structure on SU35E3

DIRECTORY	CONTENTS
/opt/ system /IBMHTTPD/	Default directory for IHS program files. The httpd.conf is located in this directory.
/opt/ system /IBMHTTPD/bin	Location of apachectl. Which is used for stop and start
/opt/ system /IBMHTTPD/conf	Location of httpd.conf
/opt/ system /IBMHTTPD/logs	Location of error and info logs for the HTTP server. In particular: error_log
/opt/ system /WebSphere/AppServer/properties	Properties file on Http Server for WebSphere Plug-in

3.8. Naming Conventions

There were no naming conventions used for the installation and configuration of IHS.

3.9. Installation Checklist

See the IBM HTTP Server Installation Checklist in Appendix B.

3.10. Startup and Shutdown Procedures

An automatic startup script exists in /etc/rc2.d called S99IBMHTTPD and an automatic shutdown script exists in /etc/rc0.d and /etc/rc1.d called K99IBMHTTPD.

These scripts are executed by the Operating System (OS) upon an OS startup or shutdown.

Manual Startup and Shutdown

In order to start up or shutdown the IHS manually, use the following procedures.

The keyword **system** in the table below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

Starting the IHS server manually:

- 1 cd /opt/**system**/IBMHTTPD/bin

```
2  ./apachectl start
```

Shutting down the IHS server manually:

```
1  cd /opt/system/IBMHTTPD/bin
```

```
2  ./apachectl stop
```

3.11. Backup Procedures

The /opt/dev/IBMHTTPD, /opt/tst/IBMHTTPD, and /opt/stg/IBMHTTPD directories should be added to the backup schema.

3.12. Installation Gaps

There are no installation gaps for IHS.

3.13. References

- IBM WebSphere AE 3.0.2 CDROM
- upd_readme.txt file on the IBM WebSphere AE 3.0.2 CDROM
- Additional product documentation and supplemental guides are available for viewing at <http://www-4.ibm.com/software/webservers/httpservers/library.html>

4 IBM MQSeries Integrator V2

4.1 Product Overview

The MQSeries Integrator V2 product provides users a quick and easy way to implement real-time, application-to-application message transformation and intelligent message routing. The flexibility and scalability of MQSeries Integrator lets users add, extend, or replace applications within information flows to achieve business integration. It enables the business intelligence of the enterprise to be captured as rules and applied to business events.

Highlights of MQSeries Integrator V2 are:

- Forms the key product in the message brokering layer of the IBM business integration framework.
- Has an open framework allowing a choice of built-in components or third-party offerings.
- Allows message formats to be defined through a dictionary, either one supplied with the product or a third party dictionary.
- Complies with industry standards such as SQL and XML.
- Includes publish/subscribe function compatible with base MQSeries pub/sub, and significantly enhanced.
- Provides graphical tools for constructing how events or data are to be handled.

4.2 Product Inventory

Runtime Sun Server

The following products were installed on the runtime Sun server, SU35E17, with the IP address of 4.20.17.151:

- MQSeries Integrator V2.0.1 for Solaris
- DB2 UDB Enterprise Edition V6.1 for Solaris (installed as part of Integrator)
- MQSeries Messaging V5.1

Buildtime NT Server

The following products were installed on the buildtime NT server, SFANT006, with the IP address of 4.20.14.249:

- MQSeries Integrator V2.01 for NT
- DB2 Universal Database V6.1 for NT

- MQSeries for NT Version 5.1 plus CSD 4
- MQSeries Workflow V3.2.1 for NT

4.3. Development Topology Diagram

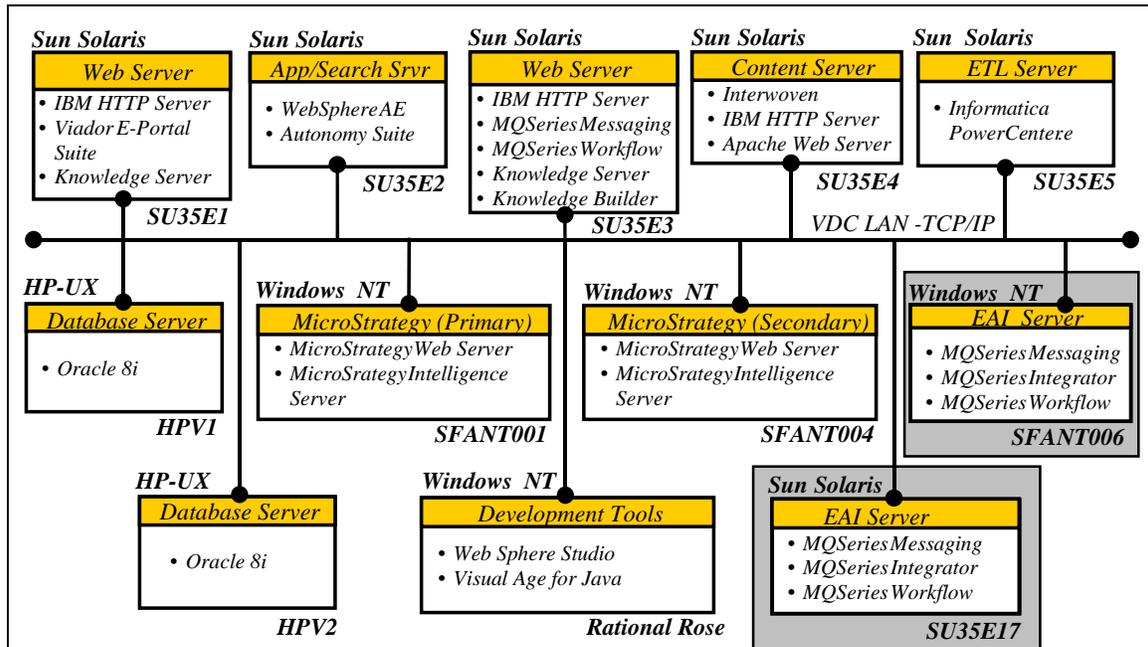


Figure 4 – IBM MQSeries Integrator component

4.4. Product Prerequisites for Installation

The MQSeries Integrator product requires an NT server to support the Build-Time environment and a Sun server to support the Run-Time environment.

Run-Time Environment

The following hardware and software prerequisites were required prior to the MQSeries Integrator V2 installation and configuration:

- Sun E3500 Server
- Sun Solaris V2.7
- The following Solaris patches installed:
 - 106541-11
 - 106950-11

- 106980-11
- 106327-08
- MQSeries for Solaris Version 5.1 plus CSD 4 (U469913)
- DB2 for Solaris Version 6.1 plus FixPak 2 (U469454)
- Open port 1414 by editing the /etc/services file and making the following entry:


```
MQSeries    1414/TCP    #MQSeries channel listener
```
- The mqm group and user ID must exist before any of the MQSeries products are installed.
- Kernel parameters must be set for shared memory. This can be performed by editing the /etc/system file. When more than one installed product recommends a setting for a parameter, the higher setting should be used.

In support of the MQSeries Integrator V2, the following parameters should be used:

Table 16 – MQSeries Integrator V2 Kernel Parameters

KERNEL PARAMETER	VALUE
Lwp_default_stksize	0x4000
Rpcmod:svc_run_stksize	0x4000
shmsys:shminfo_shmmax	4194304
shmsys:shminfo_shmseg	1024
shmsys:shminfo_shmmni	1024
semsys:seminfo_semaem	16384
semsys:seminfo_semmni	1024
semsys:seminfo_semmap	1026
semsys:seminfo_semmns	16384
semsys:seminfo_semmsl	125
semsys:seminfo_semopm	100
semsys:seminfo_semmnu	2048
semsys:seminfo_semume	256
msgsys:msginfo_msgmap	1026

In support of DB2 UDB V6.1, the following parameters should be used:

Table 17 – DB2 UDB V6.1 Kernel Parameters

KERNEL PARAMETER	VALUE
msgsys:msginfo_msgmax	65535
msgsys:msginfo_msgmnb	65535
msgsys:msginfo_msgmni	128
msgsys:msginfo_msgssz	16
msgsys:msginfo_msgtql	256
msgsys:msginfo_msgseg	8192
shmsys:shminfo_shmmax	67108864

In addition, the maximum number of concurrent open file descriptors on the system should be increased to a value greater than 256. This can be done by using the *ulimit* command in the shell in which the broker is being started.

Build-Time Environment

The following hardware and software prerequisites were required prior to the MQSeries Integrator V2 installation and configuration:

- NT Server Version 4.0 w/Service Pack 5 or 6a
- Microsoft Internet Explorer 4.01 SP1
- Create an EAI admin account
- A unzip utility or program installed on the server
- DB2 Universal Database V6.1 for NT
- MQSeries for NT Version 5.1 plus CSD 4
- Create the following Local Groups
 - Mqbrka
 - Mqbrasgn
 - Mqbrdevt
 - Mqbrops
 - Mqbrtpic

4.5. Workstation Requirements for Testing Installation

The following configuration is required for testing the MQSeries suite:

- The client code of MQSeries V5.1 must be installed on any client application interested in using the messaging capabilities of MQSeries V5.1.
- The workstation must also have the DB2 client access software installed.

4.6. Users and Groups

The *mqm* group and the *mqm* login ID were created for the installation of MQSeries Messaging and Integrator. The *root* login ID was added to the *mqm* group.

The *db2adm1* group and the *db2inst1* login ID were created for the installation of the DB2 install. The *db2inst1* login ID was added to the *mqm* group. The *root* login ID was added to the *db2iadm1* group.

4.7. Directory Structures

4.7.1. MQSeries Integrator

The following directories were loaded with owner *mqm* and group *mqm*. The directory properties were automatically set during installation of the MQSeries Integrator package. If needed, the directory properties may be reset by the Sun administration command 'pkgchk'.

Table 18 – MQSeries Integrator Directory Structure on SU35E17

DIRECTORY	SIZE	CONTENTS
/var/opt	250 MB	Default location of MQSI program files and documentation
/var/mqsi	40 MB	Default location of MQSI work files
/var/mqsi/registry	30 MB	Default location of MQSI registry files
/var/mqsi/log	4 MB	Default location of MQSI log files
/var/mqsi/brokers	15 MB	Default location of MQSI broker files
/var/mqsi/users	35 MB	Default location of MQSI user files
/var/mqsi/messages	2 MB	Default location of MQSI message files

4.7.2. MQSeries Messaging

The following directories were loaded with owner *mqm* and group *mqm*. The directory properties were automatically set during installation of the MQSeries package. If needed, the directory properties may be reset by the Sun administration command 'pkgchk'.

Table 19 – MQSeries Messaging Directory Structure on SU35E17

DIRECTORY	SIZE	CONTENTS
/var/mqm	60 MB	Default location of MQSeries work files

DIRECTORY	SIZE	CONTENTS
/opt/mqm	100 MB	Default location of MQSeries program files
/var/mqm/log	40 MB	Default location of MQSeries log files
/var/mqm/errors	10 MB	Default location of MQSeries errors
/var/mqm/trace	100 MB	Default location of MQSeries trace logs. This directory is optionally used if trace is enabled. Default is trace disabled.

4.7.3. DB2

The following directories were loaded with owner db2inst1 and group db2iadm1. The Solaris 'pkgadd' command sets the directory properties and they must not be modified.

Table 20 – DB2 Directory Structure on SU35E17

DIRECTORY	SIZE	CONTENTS
/home/db2inst1	500 MB	Default location for all DB2 files

4.8. Naming Conventions

See Deliverable 16.1.2 Integrated Technical Architecture Detailed Design Document –Volume 4 EAI Architecture for a description of the recommended naming conventions for the EAI product systems.

4.9. Installation Checklist

See the MQSeries Integrator Checklist in Appendix C.

4.10. Startup and Shutdown Procedures

Choose Start->Settings->Control Panel->Services from the NT desktop. Start and Stop MQSeries Services via the GUI Services interface.

4.11. Backup Procedures

Please refer to the MQSeries document "MQSeries Integrator Version 2.0.1 Administration Guide" for information on backing up and restoring the MQSeries Integrator system.

4.12. Installation Gaps

There are no installation gaps for MQSeries Integrator.

4.13. References

- MQSeries Integrator Version 2.0.1 Introduction and Planning
- MQSeries Integrator Version 2.0.1 Sun Solaris Installation Guide
- MQSeries Quick Beginning for Sun Solaris

5 IBM MQSeries Messaging and MQSeries Workflow

5.1. Product Overview

The MQSeries Messaging product provides assured, once-only delivery of messages between information technology systems. MQSeries Messaging provides support for applications through the following services:

- Application programming interfaces - the Message Queue Interface (MQI) and Application Messaging Interface (AMI) are supported in several programming languages.
- Communication models - point-to-point (including request/reply and client/server) and publish/subscribe are supported.

The complexities of communications programming are handled by the messaging services and are therefore removed from the application logic. Applications can access other systems and interfaces through gateways and adapters.

The MQSeries Workflow product works with MQSeries Messaging by aligning and integrating an organization's staff resources, processes, and capabilities with business strategies. It enables the organization to accelerate process flow, optimize costs, eliminate errors and improve workgroup productivity. MQSeries Workflow is designed to enable integration of all participants in the business process. It ensures the right information gets to the right person at the right time.

5.2. Product Inventory

The following products were installed on the SU35E3 Sun server with the IP address of 4.20.14.133:

- MQSeries V5.1 for Solaris (messaging)
- DB2 UDB Enterprise Edition V5.2 for Solaris (installed as part of MQSeries V5.1)
- MQSeries Workflow V3.2.1 for Solaris

Although the MQSeries Workflow and Messaging products were installed on SU35E17, section 4 of this document contains the information for the products. This section should be used to compliment the information presented in section 4.

5.3. Development Environment Topology

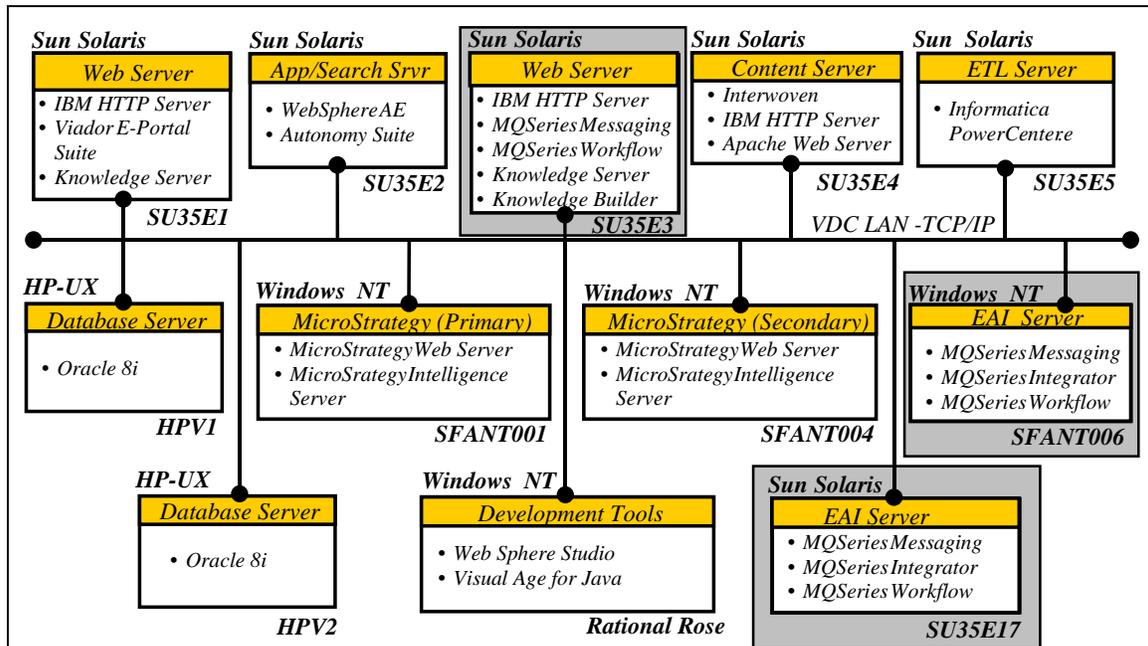


Figure 5 – IBM MQSeries Messaging and IBM MQSeries Workflow components.

5.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the MQSeries Messaging and MQSeries Workflow installation and configuration:

- Sun Solaris V2.6
- The following Solaris patches installed:
 - 105210-13
 - 105568-10
 - 105181-12
 - 105210-19
 - 105490-07
 - 105568-13
 - 105591-05
 - 106125-05
- Sun Workshop Compiler C++ V4.2

- Open port 1414 by editing the /etc/services file and making the following entry:
 MQSeries 1414/TCP #MQSeries channel listener
- MQSeries Workflow V3.2.1 must succeed the installation and availability of MQSeries V5.1 and DB2 UDB.
- The mqm group and user ID must exist before any of the MQSeries products are installed.
- Kernel parameters must be set for shared memory. This can be performed by editing the /etc/system file. When more than one installed product recommends a setting for a parameter, the higher setting should be used. These have been indicated by the 'X' in the appropriate table columns below.

In support of the MQSeries products, the following parameters should be used:

Table 21 – MQSeries Kernel Parameters on SU35E3

KERNEL PARAMETER	VALUE	OVERRIDES DB2 SETTING	OVERRIDDEN BY DB2 SETTING
shmsys:shminfo_shmmax	4194304		X
shmsys:shminfo_shmsegr	1024	X	
shmsys:shminfo_shmmni	1024	X	
semsys:seminfo_semaem	16384		
semsys:seminfo_semmni	1024	X	
semsys:seminfo_semmap	1026		
semsys:seminfo_semmns	16384	X	
semsys:seminfo_semmnl	100		
semsys:seminfo_semopm	100		
semsys:seminfo_semmnu	2048		
semsys:seminfo_semume	256		
msgsys:msginfo_msgmap	1026	X	
msgsys:msginfo_msgmax	4096		X

In support of DB2 UDB V5.2, the following parameters should be used:

Table 22 – DB2 UDB V5.2 Kernel Parameters on SU35E3

KERNEL PARAMETER	VALUE	OVERRIDES MQSERIES SETTING	OVERRIDDEN BY MQSERIES SETTING
msgsys:msginfo_msgmax	65535	X	
msgsys:msginfo_msgmnb	65535		
msgsys:msginfo_msgmap	258		X
msgsys:msginfo_msgmni	256		
msgsys:msginfo_msgssz	16		
msgsys:msginfo_msgtql	32768		
msgsys:msginfo_msgseg	32768		
shmsys:shminfo_shmmax	536870912	X	
shmsys:shminfo_shmseg	16		X
shmsys:shminfo_shmmni	300		X
semsys:seminfo_semmni	1024		X
semsys:seminfo_semmap	1026		
semsys:seminfo_semmns	2048		X
semsys:seminfo_semmnu	2048		

5.5. Workstation Requirements for Testing Installation

The following configuration is required for testing the MQSeries suite:

- The client code of MQSeries V5.1 must be installed on any client application interested in using the messaging capabilities of MQSeries V5.1.
- The workstation must also have the DB2 client access software installed.

5.6. Users and Groups

The *mqm* group and the *mqm* login ID were created for the installation of MQSeries V5.1. The *root* login ID was added to the *mqm* group.

The group *fmcsvr* and the *fmc* login ID were created for the installation of MQSeries Workflow. The *fmc* login ID was added to the *mqm* group.

The *db2adm1* group and the *db2inst1* login ID were created for the installation of the DB2 install. The *db2inst1* login ID was added to the *mqm* group. The *root* login ID was added to the *db2iadm1* group.

5.7. Directory Structures

5.7.1. MQSeries Messaging

The following directories were loaded with owner mqm and group mqm. The directory properties were automatically set during installation of the MQSeries package. If needed, the directory properties may be reset by the Sun administration command 'pkgchk'.

Table 23 – MQSeries Messaging Directory Structure on SU35E3

DIRECTORY	SIZE	CONTENTS
/var/mqm	60 MB	Default location of MQSeries work files
/opt/mqm	100 MB	Default location of MQSeries program files
/var/mqm/log	40 MB	Default location of MQSeries log files
/var/mqm/errors	10 MB	Default location of MQSeries errors
/var/mqm/trace	100 MB	Default location of MQSeries trace logs. This directory is optionally used if trace is enabled. Default is trace disabled.

5.7.2. MQSeries Workflow

The following directories were loaded with owner fmc and group mqm. The directory properties were automatically set during the installation of the MQSeries Workflow package. If needed, the directory properties may be reset by the Sun administration command 'pkgchk'.

Table 24 – MQSeries Workflow Directory Structure on SU35E3

DIRECTORY	SIZE	CONTENTS
/opt/fmc	100 MB	Default location of MQSeries Workflow program files

5.7.3. DB2

The following directories were loaded with owner db2inst1 and group db2iadm1. The Solaris 'pkgadd' command sets the directory properties and they must not be modified.

Table 25 – DB2 Directory Structure on SU35E3

DIRECTORY	SIZE	CONTENTS
/home/db2inst1	500 MB	Default location for all DB2 files

5.8. Naming Conventions

The standard for naming the default queue manager is to use the hostname for the server. For SFA, the default queue manager was created with the name 'su35e5'.

In all other instances of the product installations, defaults were used.

5.9. Installation Checklist

See the MQSeries Messaging Installation Checklist in Appendix D and the MQSeries Workflow Installation Checklist in Appendix E.

5.10. Startup and Shutdown Procedures

A custom script was created for startup. The script `/etc/init.d/MQSeries` is symbolically linked to the startup directory as `/etc/rc3.d/S88MQSeries`. The script executes the command `strmqm` to startup the default queue manager.

5.11. Backup Procedures

Please refer to the MQSeries document "MQSeries System Administration", Chapter 15 "Recovery and restart", for information on backing up and restoring the MQSeries system.

5.12. Installation Gaps

There are no installation gaps for MQSeries Messaging or MQSeries Workflow.

5.13. References

- MQSeries System Administration Manual
- MQSeries Quick Beginning for Sun Solaris

6 IBM WebSphere Performance Pack - Network Dispatcher (ND)

NOTE: For Release 1.0 of the Integrated Technical Architecture, Network Dispatcher was not installed in the development environment, due to hardware constraints. When development servers become available, the Network Dispatcher product will be installed and configured in the development environment for SFA. The proceeding documentation reflects the Network Dispatcher installation and configuration on production servers.

6.1 Product Overview

The IBM WebSphere Performance Pack helps information technology administrators to provide better service both to users who access documents stored on the enterprise's server machines and to their internal users who access the Internet. Performance Pack helps host Web-accessible content and provides Internet access.

The Network Dispatcher (ND) component of IBM WebSphere Performance Pack is an administration and configuration tool that provides dynamic load balancing, scalability, and high availability for servers on the Internet or on your Intranet. Network Dispatcher can dynamically monitor and balance requests to available TCP/IP servers and applications in real time, within a local area network or wide area network using several weights and measurements. The dynamic weighting factors used to make the load balancing decision can be augmented by customer-defined rules and requirements for client/server affinity.

Network Dispatcher provides a scalable solution for load balancing requests among various HTTP or other TCP-based servers. This provides higher availability and scalability than with a single server. Incoming user requests are directed to the best server as determined by the health and performance of the servers and the applications running on them. If a server or application problem is detected, user requests are dispatched to alternate servers.

6.2 Product Inventory

The following product was installed on the ND Primary Sun Server, SU35E6, with the Internet IP address of 198.77.163.140 and the Intranet IP address of 4.20.17.140:

- IBM Network Dispatcher V2.1.2.0

The following product was installed on the ND Backup Sun Server, SU35E11, with the Internet IP address of 198.77.163.145 and the Intranet IP address of 4.20.17.145:

- IBM Network Dispatcher V2.1.2.0

Both of these ND machines are connected to the Internet network, 198.77.163.128, and the Intranet network, 4.20.17.128, respectively.

6.3. Development Environment Topology

The Network Dispatcher product has not been installed in development due to hardware constraints. Once hardware and an installation expert is available, Network Dispatcher will be placed in the development environment.

6.4. Product Prerequisites for Installation

To install the Network Dispatcher component of IBM WebSphere Performance Pack on the Solaris platform, you need the following hardware and software prerequisites:

- Sun Solaris V2.6 or 7 (32-bit only)
- Approximately 50 MB of available disk space for the Network Dispatcher server
- JDK Version 1.1.8 Patch level 10 or higher from Sun. Do not use JRE/JDK Version 1.2.*.
- A 10Mb (megabit) or 100Mb Ethernet network interface cards (NICs)

There are 3 Internet clusters (IFAP, Schools Portal, and MicroStrategy) using the 198.77.163.128 network, and 3 Intranet clusters (IFAP, Schools Portal, and Autonomy) using the 4.20.17.128 network.

The clusters are listed in the tables below with their corresponding network information. Each row also identifies the cluster's sticky timeframe, which is the number of seconds that a session may remain inactive before ND reevaluates the load balancing of the cluster.

Table 26 – Internet Clusters

	ND Clusters		Ports	Servers		Sticky Time
				Hostname	IP Address	
Internet	IFAP	198.77.163.160	80 & 443	SU35E10	198.77.163.144	1800
				SU35E12	198.77.163.146	
	Schools Portal	198.77.163.161	80 & 443	SU35E8	198.77.163.142	1800
				SU35E14	198.77.163.148	
	MicroStrategy	198.77.163.162	80 & 443	SFANT002	198.77.163.158	none
				SFANT003	198.77.163.159	

Table 27 – Intranet Clusters

	ND Clusters		Ports	Servers		Sticky Time
				Hostname	IP Address	
Intranet	IFAP	4.20.17.160	80 & 443	SU35E10	4.20.17.144	1800
				SU35E12	4.20.17.146	
	Schools Portal	4.20.17.161	80 & 443	SU35E8	4.20.17.142	1800
				SU35E14	4.20.17.148	
	Autonomy	4.20.17.163	10000	SU35E7	4.20.17.141	none
				SU35E15	4.20.17.149	

6.5. Workstation Requirements for Testing Installation

A web browser, Netscape 4.x or above, or Internet Explorer 5.0 or above, is necessary to enter the published, clustered URL and verify that the Welcome pages of the clustered servers can be viewed.

6.6. Users and Groups

You need to login as the local UNIX *root* to install and configure the Network Dispatcher component of the IBM WebSphere Performance Pack.

6.7. Directory Structures

The following directories were created during the installation. The default owner is root and full permissions have been granted.

Table 28 – Network Dispatcher Directory Structure on SU35E6 and SU35E11

Directory	Sizes	Contents
/opt/nd	~20MB	Default path for IBM Network Dispatcher files
/opt/nd/dispatcher/bin		ND Startup & High availability scripts
/opt/nd/dispatcher/configurations		ND configuration files
/opt/nd/dispatcher/logs		ND logs

6.8. Naming Conventions

There were no naming conventions used for the installation of ND. Defaults were used throughout the process.

6.9. Installation Checklist

See the IBM ND Installation Checklist in Appendix F.

6.10. Startup and Shutdown Procedures

Manual Startup and Shutdown

Startup

In order to start the ND server manually, type the following command at the UNIX system prompt:

```
/etc/init.d/nd start
```

Shutdown

In order to stop the ND server manually, type the following command at the UNIX system prompt:

```
/etc/init.d/nd stop
```

Automatic Startup and Shutdown

The ND script in the /etc/init.d directory can be used to startup and shutdown Network Dispatcher automatically. A startup rc exists in /etc/rc3.d called S99nd links to the /etc/init.d/nd file. A shutdown script exists in /etc/rc0.d called K99nd that also links to the /etc/init.d/nd file. These scripts will be executed by the Operating System upon a OS startup or shutdown.

6.11. Backup Procedures

By using existing system backup tools and procedures, you need to backup the following Network Dispatcher related files and directories:

- /etc/init.d/nd
- /opt/nd

6.12. Installation Gaps

Table 29 – Network Dispatcher Installation Gaps

GAP	SHORT-TERM SOLUTION	LONG-TERM SOLUTION
The Network Dispatcher product has not been installed at the VDC because of hardware constraints.	None	Procure hardware and install the Network Dispatcher product.

6.13. References

- IBM WebSphere Performance Pack for Multi-platforms - Getting Started V3.0
- IBM SecureWay Network Dispatcher User's Guide V2.1
- IBM WebSphere Performance Pack: Load Balancing with IBM SecureWay Network Dispatcher Red Book
- Additional IBM Network Dispatcher information can be found at <http://www.software.ibm.com/network/dispatcher>.

7 IBM VisualAge for Java

7.1 Product Overview

The VisualAge for Java product provides an integrated development environment that supports the complete cycle of Java program development. VisualAge for Java is tightly integrated with the WebSphere Application Server. This integration enables VisualAge developers to create, deploy, and test their Java programs without leaving VisualAge.

Developers can use VisualAge for Java visual programming features to quickly develop Java applets and applications. The Visual Composition Editor provides point and click capabilities to design a user interface for programs, specifies the behavior of the user interface elements, and defines the relationship between the user interface and the program.

VisualAge for Java generates the Java code to implement what is visually specified in the Visual Composition Editor. In many cases, programs can be designed and executed without writing any Java code. VisualAge for Java also enables the importing of existing code and exporting code as required from the underlying file system.

7.2 Product Inventory

The following products were installed on the Rational Rose NT server with the IP address of 4.20.14.228:

- IBM VisualAge for Java V 3.02
- Java Development Kit (JDK) 1.1.8

7.3. Development Topology Diagram

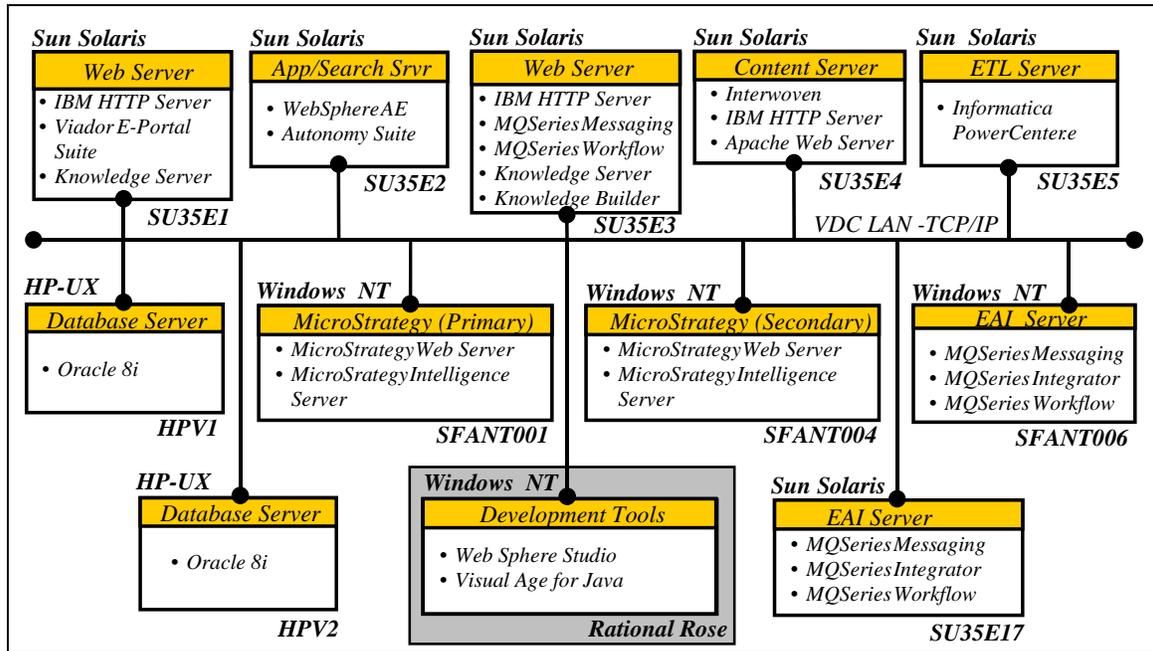


Figure 6 – IBM VisualAge for Java component.

7.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the VisualAge for Java installation and configuration:

- Windows NT 4.0 with Service Pack 3
- Minimum of 64 MB RAM (96 MB recommended)
- Repository must have 35 MB for a basic installation, but will increase in size.

7.5. Workstation Requirements for Testing Installation

There are no additional workstation requirements for testing.

7.6. Users and Groups

The *websphere* login ID was created for the installation and configuration of WebSphere Studio. This login ID has systems administrator privileges.

7.7. Directory Structures

The following directories were created during the installation.

Table 30 – VisualAge for Java Directory Structure

DIRECTORY	SIZE	CONTENTS
\IBM\Java	421 MB	Root directory for Java program files

7.8. Naming Conventions

There are no naming conventions used in the installation of IBM VisualAge for Java. Defaults were used throughout the installation.

7.9. Installation Checklist

See the IBM VisualAge for Java Installation Checklist in Appendix G.

7.10. Startup and Shutdown Procedures

There are no startup and shutdown procedures for this application. VisualAge for Java is a development tool that is started when the application is launched and is shutdown when the application is closed.

7.11. Backup Procedures

There are no backup procedures for this application.

7.12. Installation Gaps

There are no installation gaps for VisualAge for Java.

7.13. References

- readme.htm file on the IBM VisualAge for Java V3.0.2 CDROM
- IBM VisualAge for Java V3.0.2 CDROM

8 IBM WebSphere Advanced Edition

8.1. Product Overview

IBM WebSphere Application Server (WAS) is an e-business application deployment environment built on open standards-based technology. WebSphere Advanced Edition (AE) application server allows use of Java servlets, Java Server Pages (JSP) and Extensible Markup Language (XML) to quickly transform static Web sites into vital sources of dynamic Web content while also performing as a high-capacity Enterprise Java Bean (EJB) server for implementing EJB components that incorporate business logic.

8.2. Product Inventory

The following products were installed on the SU35E2 Sun server with the IP address of 4.20.14.132:

- IBM WebSphere V3.0.2
- efix # pq36342 (patch that updates IBM WebSphere V3.0.2 to V3.0.2.1)
- DB2 5.2 fixpatch 10

8.3. Development Environment Topology

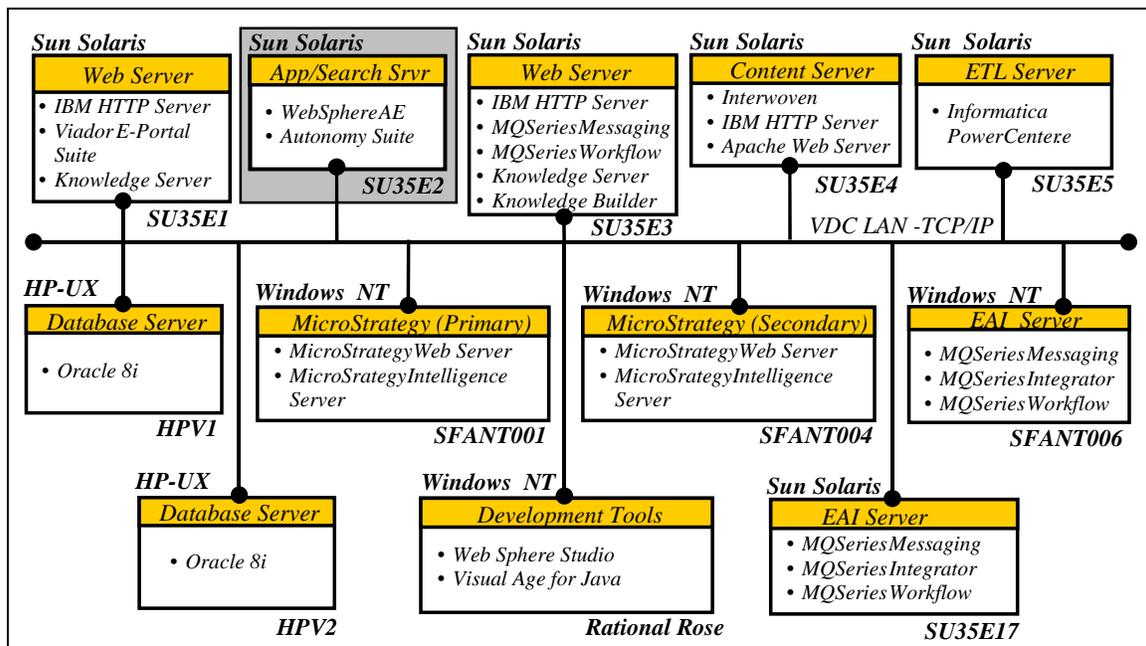


Figure 7 – IBM WebSphere Advanced Edition component.

8.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the WebSphere AE installation and configuration:

- Sun Solaris V2.6
- Minimum of 256 MB RAM, 512 MB recommended
- 75 MB of free space for installation
- *Root* login ID for local Sun machine
- Sun Java Development Kit (JDK) V1.1.8

8.4.1. DB2 TCPIP Socket Port Numbers

The DB2 installation needs two TCP/IP socket ports defined per instance. Below are the port numbers, database names, and user Ids used for each environment.

Table 31 – DB2 TCP/IP Socket Ports on SU35E2

Environment	DB2 Connection Port	DB2 Interrupt Port	DB2 Database Name	Db2 Instance Name	Solaris Userid that manages database
Development	50002	50003	Dev	db2dev	db2dev
Testing	50004	50005	Tst	db2tst	db2tst
Staging	50006	50007	Stg	db2stg	db2stg

8.4.2. WebSphere TCPIP Socket Port Numbers

The WebSphere Application Server uses multiple TCP/IP socket ports per system. The ports used on each server are defined below. The keyword ***system*** in the definitions below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

- **Queue.properties** – Located in /opt/***system***/WebSphere/AppServer/temp directory on the application server and the web server. This file specifies the port and queue definitions that OSE remote (WebSphere’s internal protocol) uses to accomplish communication between the web server and the application server.
- **Bootstrap.properties** - Located in /opt/***system***/WebSphere/AppServer/properties directory on the application server and the web server, this file contains the WebSphere plugin definitions.
- **Location Service Daemon** - The location Service daemon port number is specified in the /opt/***system***/WebSphere/AppServer/bin/admin.config. The location service daemon is used by the admin server to communicate with the application servers.

- **Admin BootStrap** – This is the socket port that the Admin Server uses to listen for admin clients.

Table 32 - WebSphere TCP/IP Socket Ports on SU35E2

System	Queues. properties	Bootstrap. properties	Location Service Daemon	Admin bootstrap
Development	8112 ,8113	8282	9002	902
Testing	8120, 8121	8283	9001	901
Staging	8130, 8131	8284	9006	906

8.5. Workstation Requirements for Testing Installation

A web browser, Netscape 4.x or above, or Internet Explorer 5.0 or above, is necessary to enter the URL and test the WebSphere server applications.

8.6. Users and Groups

The *root* login ID was used for the installation and configuration of IBM WebSphere AE.

Aside from an installation login ID, each instance of the DB2 database requires a userid. In this configuration, three userids were used to satisfy the needs of WebSphere and associated software.

They were:

- db2dev – configured on su35e2
- db2tst – configured on su35e2
- db2stg – configured on su35e2

8.7. Directory Structure

The following directories were created during the installation. The default owner is root and full permissions have been granted. The keyword *system* in the table below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

Table 33 – WebSphere Directory Structure on SU35E2

DIRECTORY	CONTENTS
/opt/ <i>system</i> /WebSphere/AppServer	Default location of Application Server program files
/opt/ <i>system</i> /WebSphere/AppServer/bin	Executables and libraries for Application Server

DIRECTORY	CONTENTS
/opt/ system /WebSphere/AppServer/properties/bootstrap.properties	Properties file on Application Server and Http Server
opt/ system /WebSphere/AppServer/temp	
opt/ system /WebSphere/AppServer/logs	Location of error and info logs. Tracefile and nanny log are particular useful.
opt/ system /WebSphere/AppServer/classes	
opt/ system /WebSphere/AppServer/deployedEJBs	
opt/ system /WebSphere/AppServer/deployableEJBs	
opt/ system /WebSphere/AppServer/hosts	
opt/ system /WebSphere/AppServer/jdk	
opt/ system /WebSphere/AppServer/lib	
opt/ system /WebSphere/AppServer/servlets	
opt/ system /WebSphere/AppServer/temp	
opt/ system /WebSphere/AppServer/theme	
opt/ system /WebSphere/AppServer/web	

8.8. Naming Conventions

There were no naming conventions used for the installation and configuration of IBM WebSphere AE. Defaults were used throughout the installation.

8.9. Installation Checklist

See the IBM WebSphere AE Installation Checklist in Appendix H.

8.10. Startup and Shutdown Procedures

The keyword **system** in the table below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

Manual Startup and Shutdown

To shutdown the WebSphere Application Server (WAS), perform the steps in the following table:

Table 34 – Shutting Down the WebSphere Application Server Manually

Step	Description	Action	Comment
1.	Change Directory to the WebSphere bin directory.	cd /opt/ system /WebSphere/AppServer/bin	Within this directory there is a script created at SFA to automate the shutdown of WAS in a particular environment.
2.	Execute this script from the bin directory.	./wasstop	

To start the WebSphere Application Server, perform the steps in the following table:

Table 35 – Starting the WebSphere Application Server Manually

Step	Description	Action	Comment
1.	Ensure that the server is not already running.	/usr/ucb/ps auxwww grep java grep -vi adminclient	If any processes are running from the path /opt/ system /WebSphere/AppServer then ensure to kill these processes. On environments with multiple instances running at the same time, be careful not to kill a WebSphere process from a different environment.
2.	Ensure that db2 is running.	su - <db2 userid>	If db2 was already running, then it's OK to continue.
		db2start	
3.	Exit back to root		
4.	Start the WebSphere Application Server. There is a script created at SFA to automate the start of WAS. This script must be executed from the bin directory.	cd /opt/ system /WebSphere/AppServer/bin	
		./wasstart	
5.	Tail the log file for startup success.	Switch to a different terminal window	Watch for the words below in the tracefile:

Administration Server now open for E-Business.

Beware that the log is accumulative so that earlier entries will exist.

Step	Description	Action	Comment
		cd /opt/ <i>system</i> /WebSphere/AppServer/logs	
		tail -f ./tracefile	

Automatic Startup and Shutdown

DB2

A startup rc exists in /etc called rc.db2. An update was made to the /etc/inittab file to automate the db2 start upon bootup.

See the install of DB2 in this document for the one time execution on db2iset. The automated startup will not work with out it.

WebSphere Application Server

A rc startup file exists in /etc/rc3.d called S99WebSphere. This startup file will start the administrative server and the IFAP application server if present. The S99WebSphere startup file calls a WAS startup script in /opt/*system*/WebSphere/AppServer/bin called wasstart.

8.11. Backup Procedures

The directories where the application programs are located should be added to the daily backup schema.

8.12. Installation Gaps

There are no installation gaps for WebSphere AE.

8.13. References

- IBM WebSphere Getting Started Manual
- IBM WebSphere Installation Guide
- upd_readme.txt file on the IBM WebSphere AE V3.0.2 CDROM
- IBM WebSphere AE V3.0.2 CDROM
- Additional product documentation and supplemental guides are available for viewing at <http://www-4.ibm.com/software/webservers/appserv/library.html>

9 IBM WebSphere Studio

9.1. Product Overview

WebSphere Studio is a suite of tools that brings all aspects of web site development into a common interface. Content authors, graphic artists, programmers, and webmasters can all work on the same projects, each having access to the required files. WebSphere Studio provides the capability to cooperatively create, assemble, publish, and maintain dynamic interactive Web applications.

The Studio is composed of the Workbench, the Page Designer, the Remote Debugger, and wizards, and it comes with companion web development products. WebSphere Studio enables developers to create interactive web sites that support advanced business functions. These functions include the creation of Java beans, database queries, and Java servlets.

9.2. Product Inventory

The following product was installed on the Rational Rose NT server with the NAT'ED IP address of 4.20.14.228:

- IBM WebSphere Studio V 3.0.2

9.3. Development Environment Topology

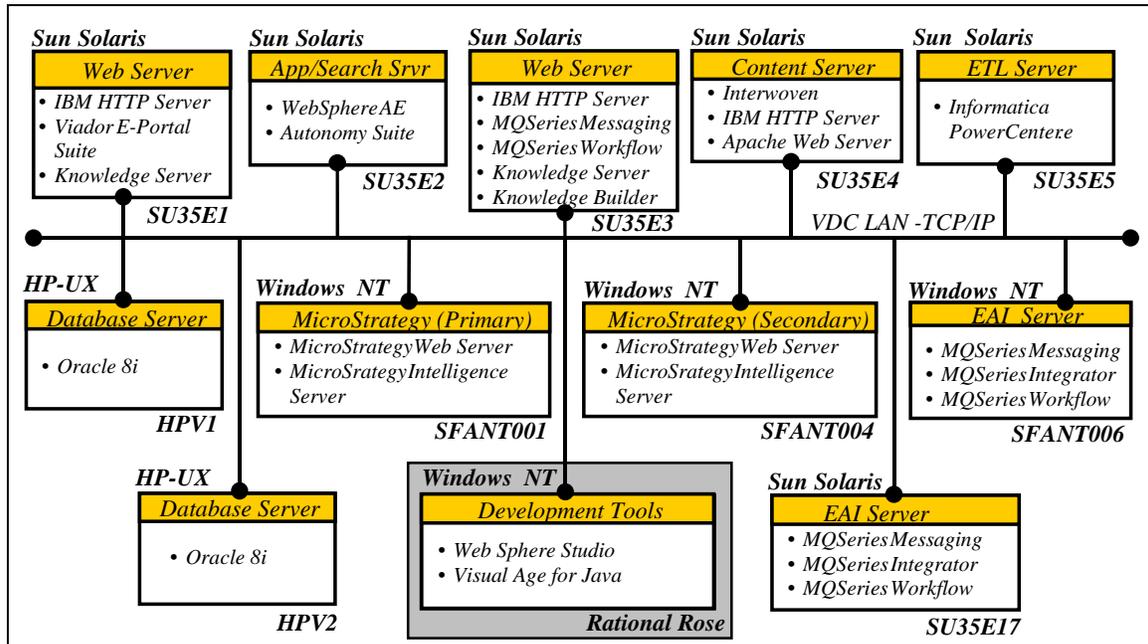


Figure 8 - IBM WebSphere Studio component.

9.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the WebSphere Studio installation and configuration:

- Windows NT 4.0 with Service Pack 3
- A minimum of 200 MB of disk space
- Microsoft Internet Explorer 4.0 or above

9.5. Workstation Requirements for Testing Installation

There are no additional workstation requirements for testing.

9.6. Users and Groups

The *websphere* login ID was created for the installation and configuration of WebSphere Studio. This login ID has systems administrator privileges.

9.7. Directory Structures

The following directories were created during the installation.

Table 36 – IBM WebSphere Studio Directory Structure

DIRECTORY	SIZE	CONTENTS
\WebSphere\Studio	~750 KB	Default directory for WebSphere Studio program files

9.8. Naming Conventions

There were no naming conventions used for the installation and configuration of WebSphere Studio. Defaults were used throughout the installation.

9.9. Installation Checklist

See the IBM WebSphere Studio Installation checklist in Appendix I.

9.10. Startup and Shutdown Procedures

There are no startup and shutdown procedures for this application. WebSphere Studio is a development tool that is started when the application is launched and is shutdown when the application is closed.

9.11. Backup Procedures

There are no backup procedures for this application.

9.12. Installation Gaps

There are no installation gaps for WebSphere Studio.

9.13. References

- ReadMe_en.txt file (English version) on the IBM Web Sphere Studio V3.0.2 CDROM
- gettingstarted.html file on the IBM Web Sphere Studio V3.0.2 CDROM
- IBM Web Sphere Studio V3.0.2 CDROM

10 Informatica PowerCenter.e

10.1. Product Overview

The Informatica PowerCenter.e product provides Extract, Transform, and Load (ETL) services for the Data Warehouse architecture. Informatica PowerCenter.e enables an organization to transform legacy, relational, and Enterprise Resource Planning (ERP) data into information for strategic business analysis.

PowerCenter.e will be used as an enterprise decision support solution, responsible for extracting data from operational sources, transforming it if necessary, cataloging it for use and re-use, and delivering it to business intelligence and analytic applications.

The PowerCenter client utilizes three modules to perform the development, administration, and session scheduling for PowerCenter services. The modules are the Designer, Server Manager, and Repository Manager. The Designer module allows developers to build the mappings, which are the cornerstone of the ETL process. The Server Manager module will be used in the SFA project to setup the ETL window, schedule ad hoc jobs, and manage the development and test loads. The Repository Manager module is used to gain access to the metadata stored in the repository. This module serves for creation and maintenance purposes.

10.2. Product Inventory

The following products were installed on the SU35E5 Sun server with the NAT'ED IP address of 4.20.14.135:

- PowerCenter 1.7
- PowerCenter.e 1.7

10.3. Development Environment Topology

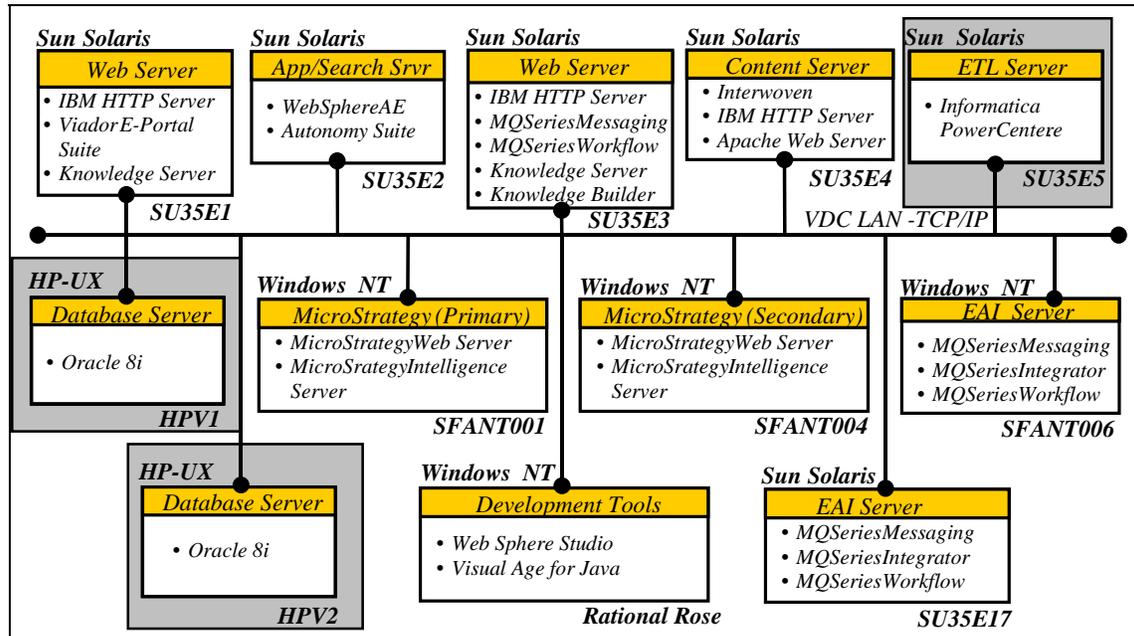


Figure 9 – Informatica PowerCenter component.

10.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the Informatica installation and configuration:

- Sun Solaris V2.6
- Minimum of 2 GB RAM
- 5-10 GB disk space recommended for file transfer from mainframe
- Oracle 8i Enterprise Edition (Release 8.1.5.0.0 for Sun SPARC Solaris 8) installed on Informatica PowerCenter.e server
- Port 4001 needs to be opened. This is Informatica’s default server port.
- Connection to VICDEV database instance through SQLNET
- SQL Plus
- Database instance or tablespace with 150 MB for the PowerCenter repository. For the development environment build, the schema was named pmrepo. The repository within the Informatica application was named pmdev.
- Database schema with 100 MB for the PowerCenter source data. The schema was named powermart.

- Login with select privileges to read source tables
- Login with privileges to execute stored procedures
- Database schema with 10 GB for the PowerCenter target. For the development environment build, the schema was named *powermart*.
- Oracle 8i Enterprise Edition (Release 8.1.5.0.0 for Sun SPARC Solaris 8) installed on PowerCenter target database server
- Login ID with create table privileges

10.5. Workstation Requirements for Testing Installation

The PowerCenter Client needs the following configuration for testing:

- Windows 95/98 or NT 4.0 with service pack 3
- 32 MB RAM
- 40 MB Disk space
- Login ID with administrator rights
- SQL PLUS
- Connection to VICDEV tablespace
- TCP/IP protocol configured to communicate with the PowerCenter Server
- The host file located on the Informatica client machine needs entries for the IP addresses of the Sun Server and the database server.

10.6. Users and Groups

The *pmrepo* and *oracle* login IDs were created on the SU35E5 Sun server for the PowerCenter Server installation. The *pmrepo* login ID has administrative rights.

The *administrator* login ID was created with administrative rights on the NPLUS1 server for the PowerCenter Client installation.

The *administrator* login ID was created for the PowerCenter Client Application (Designer, Server Manager, and Repository Manager modules).

The *pmrepo* login ID was created to access the repository schema *pmrepo*.

The *powermart* login ID was created to access the source and target sample data contained in the *powermart* schema.

10.7. Directory Structures

The following directories were created during the installation:

Table 37 – Informatica PowerCenter.e Directory Structure

DIRECTORY	SIZE	CONTENTS
/opt/oracle/product/8.1.5	400 MB	Oracle install, owned by oracle
/Informatica/PowerCenter		PowerCenter Server install, owned by pmrepo

10.8 Naming Conventions

There were no naming conventions used for the installation and configuration of Informatica. Defaults were used throughout the installation.

10.9 Installation Checklist

See the Informatica Installation Checklist in Appendix J.

10.10 Startup and Shutdown Procedures

To start the Informatica Server follow the steps in the table below:

Table 38 – Processes to Start the Informatica Server

Step	Description	Action	Comment
1.	Verify that the repository database is running.		
2.	Connect to the Unix machine on which the server is running.		
3.	Log on as the <i>pmrepo</i> user.		
4.	Change the directory to directory where the <i>pmserver.cfg</i> file is located.	<code>cd /Informatica/PowerCenter</code>	
5.	Start the Informatica Server	<code>pmserver</code>	The message "Server starting up...ok" is displayed.
6.	Verify that the server was started	<code>ps -ef grep pmserver.</code>	Two lines will be displayed if the server is running. If only one line is returned, open the <i>pmserver.log</i> file and review the error messages.

To stop the Informatica Server follow the steps in the table below:

Table 39 – Processes to Shutdown the Informatica Server

Step	Description	Action	Comment
1.	Log on to the Server Manager module with administrative privileges.		
2.	Select the server icon you wish to stop.		
3.	Stop the server.	From the Server Requests option, select Stop Server.	Review messages in the output window to confirm that the server has been shutdown properly.

10.11. Backup Procedures

No special procedures are needed to perform a backup of the repository. However, the backup procedures should be coordinated with the DBA and the appropriate staff members.

10.12. Installation Gaps

There are no installation gaps for Informatica.

10.13. References

- PowerCenter 1.7 Installation & Configuration Guide
- PowerCenter Administrator Guide

11 Interwoven TeamSite

11.1. Product Overview

Interwoven provides a content management application that will be used by SFA application developers and content authors to build the SFA Internet and Intranet web site.

Interwoven TeamSite enables web developers to work in an environment that supports versioning of file system and database assets. Control of the assets is accomplished by using a workflow engine that allows for customization. The product utilizes branch structures to organize workgroups and enforce security, provides developers with their own work area or sandbox to develop within, and will store all versions of the web site.

The TeamSite Templating product is an add-on package that provides the means to capture, edit, and store data input from content contributors. In addition, it is also used to define the appearance of displayed data and to integrate captured data with other Interwoven products.

The OpenDeploy utility will be used to transfer web-site content from the development environment to the production environment. It supports cross-platform deployment from the Solaris development servers to any Windows NT production servers, and vice versa, as well as allowing Solaris-to- Solaris or Windows NT-to-Windows NT deployments.

The DataDeploy utility will be used to transfer data between TeamSite and an external Oracle 8i database. For the TeamSite-to-database scenario, the DataDeploy Database Auto-Synchronization (DAS) module will be used to automate the entire deployment process for TeamSite Templating users.

11.2. Product Inventory

The following products were installed on the SU35E4 Sun server with the IP address of 4.20.14.134:

- TeamSite for UNIX 4.2.1:
 - TeamSite version 4.2.1
 - Templating version 4.2
- TeamSite Utilities:
 - OpenDeploy version 4.2.1
 - DataDeploy version 4.2.1

The OpenDeploy utility must also be installed on the server(s) that content will be pushed to. In the development environment, OpenDeploy was also installed on SU35E1 and SU35E3.

11.3. Development Environment Topology

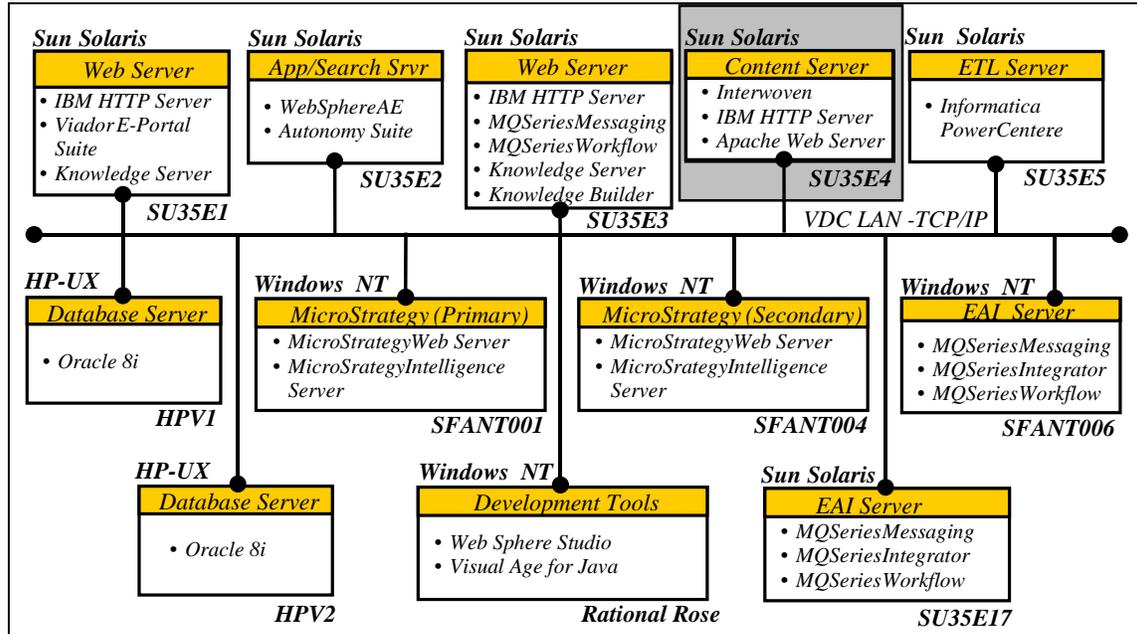


Figure 10 – Interoven TeamSite components.

11.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the Interoven installation and configuration:

- Sun Solaris V2.6
- Ports 80, 1080 and 1700 need to be opened from the SU35E4 server to any client machine needing access, such as a workstation on EDLAN
- Apache 1.3.6 (Minimum version required is 1.3.x)
- Ports for Samba mapping between NT and Solaris 138-139 need to be opened

11.5. Workstation Requirements for Testing Installation

Netscape 4.7 or Internet Explorer 5.0 is necessary to access the Interoven TeamSite built-in Graphical User Interface feature. The Graphical User Interface can be accessed through a web browser by typing the URL <http://su35e4/iw/>.

11.6. Users and Groups

The *root* login ID was used for the installation and configuration of Interoven. Once the Interoven products are installed and configured, it is recommended that the system administrator change the root password.

The *iwoven* user was created for testing the TeamSite installation and configuration.

11.7. Directory Structures

The following directories were created during the installation. The default owner is root and full permissions have been granted.

Table 40 – Interwoven Directory Structure

DIRECTORY	SIZE	CONTENTS
/iw-home	~760 MB	Default location of TeamSite program files
/iw-home/opendeploy	< 25 MB	Default location of OpenDeploy program files
/iw-home/datadeploy	< 25 MB	Default location of DataDeploy program files
/local/iw-store	~2 GB	Default location of the TeamSite backing store, i.e. the TeamSite storage of files and metadata for work areas and editions. This directory can consume large amounts of disk space and will grow with the amount of content. To find where this directory is located, use the command-line tool iwgetstore. <u>Note:</u> The contents of this directory should never be edited by hand in any way. Tampering with this directory can irreparably corrupt the data stored in TeamSite.
/iwsrvr	1 KB	Local file system mount projection directory. Can be used as a way for a Unix administrator to put content into TeamSite.
/iwmnt	1 KB	NFS server mount point. This directory is used to access web site data when working directly from the server. The location of this directory can be changed, however, web server aliases must be updated to reflect this. This is where content loading will be performed for this installation.
/.iwmnt	1 KB	NFS server mount point. This is a non-caching alias used by the web server. The location of this directory can be changed, however, web server aliases must be updated to reflect this.
/opt/apache-1.3.7	~2MB	Contains the apache program files.

11.8. Naming Conventions

There are no naming conventions used in the installation of Interwoven. Defaults were used throughout the installation.

11.9. Installation Checklist

See the Interwoven Installation Checklist in Appendix K.

11.10. Startup and Shutdown Procedures

The startup and shutdown scripts are installed with the product and are under `/etc/init.d` and linked to the appropriate startup and shutdown directories, `/etc/rc2.d` and `/etc/rc0.d`, respectively.

The following scripts are used for starting and stopping services under `/etc/init.d`:

- `iw.local`
- `iw.server`
- `iw.samba`
- `iw.deploy`
- `apache`

To manually start a service, at the system prompt, type the script above, followed by the keyword 'start'.

ex. `iw.local start`

To manually stop a service, at the system prompt, type the script above, followed by the keyword 'stop'.

ex. `iw.local stop`

For more information on the functionality of the scripts above, including options, view the scripts using a text editor such as `vi`.

11.11. Backup Procedures

Prior to backing up the `/local/iw-store` directory, the TeamSite backing store should be frozen using the `iwfreeze`` command. Once the backup is complete, the TeamSite backing store should be unfrozen using the `iwfreeze --`` command.

Detailed procedures on how to initiate TeamSite backup procedures can be found in the *Administering TeamSite 4.0 Manual*.

The following files and directories should be added to the backup schema:

- `/etc/defaultiwelog`
- `/etc/defaultiwhome`
- `/etc/defaultiwlog`
- `/etc/defaultiwmount`
- `/etc/defaultiwstore`
- `/etc/defaultiwtrace`
- `/etc/iw.cfg`

- /etc/iw.srm.conf
- /etc/init.d/
- /etc/init.d/iwatasgn
- /etc/init.d/iwatpub
- /etc/init.d/iwatsub
- /etc/init.d/iw.samba
- /etc/init.d/iw.server
- /etc/rc0.d/*iw.*
- /etc/rc2.d/*iw.*
- /kernel/fswfs
- /usr/bin/iwgethome
- /iwmnt
- /.iwmnt
- /iwserver
- /local/iw-store
- /iw-home

11.12. Installation Gaps

Listed in the table below are the installation gap for IHS.

Table 41 – Interwoven Installation Gaps

GAP	SHORT-TERM SOLUTION	LONG-TERM SOLUTION
The IBM HTTP Server (IHS) is yet to be supported by Interwoven. Due to the need to use Server Side Includes (SSIs), the Interwoven product is incompatible with the IHS server.	Apache will be installed and utilized as the web server.	A plug-in would need to be created that would allow Interwoven to work with the web server standard, IHS.

11.13. References

- Administering TeamSite 4.0 Manual
- DataDeploy Supplement Manual
- Administering OpenDeploy 4.2 Manual
- Using and Configuring TeamSite Templating 4.2 Manual

- TeamSite for UNIX 4.2.1 CDROM
- OpenDeploy 4.2.1 CDROM
- www.support.interwoven.com web site

12 MicroStrategy Suite

12.1. Product Overview

MicroStrategy will provide On-line Analytical Processing (OLAP) services for the Data Warehouse Architecture. Through the MicroStrategy Suite, users can receive analytical reports from the data warehouse through a client/server environment, the web, e-mail, or a wireless device.

The MicroStrategy Intelligence Server is the focal point of the MicroStrategy Platform. It is the middle-tier between the user applications and the data warehouse. The MicroStrategy Intelligence Server provides report cache management, advanced analytical functions, job prioritization, and thread management.

The MicroStrategy web server provides OLAP over the Internet through a web browser. It contains a majority of features including report drilling, pivoting, and report creation. The user interface provided by MicroStrategy web server is completely customizable.

12.2. Product Inventory

Two NT Servers were used in the development environment. The first server listed below, SFANT001, is the primary server and the second, SFANT004, is the secondary server.

The following products were installed on NT server, SFANT001, with the IP address of 4.20.14.244:

- MicroStrategy Intelligence Server 7.0
- MS Data Access Components 2.1 sp2 (packaged with above product)
- MicroStrategy Web 7.0

The following products were installed on NT server, SFANT004, with the IP address of 4.20.14.248:

- MicroStrategy Intelligence Server 7.0
- MS Data Access Components 2.1 sp2 (packaged with above product)
- MicroStrategy Web 7.0

12.3. Development Environment Topology

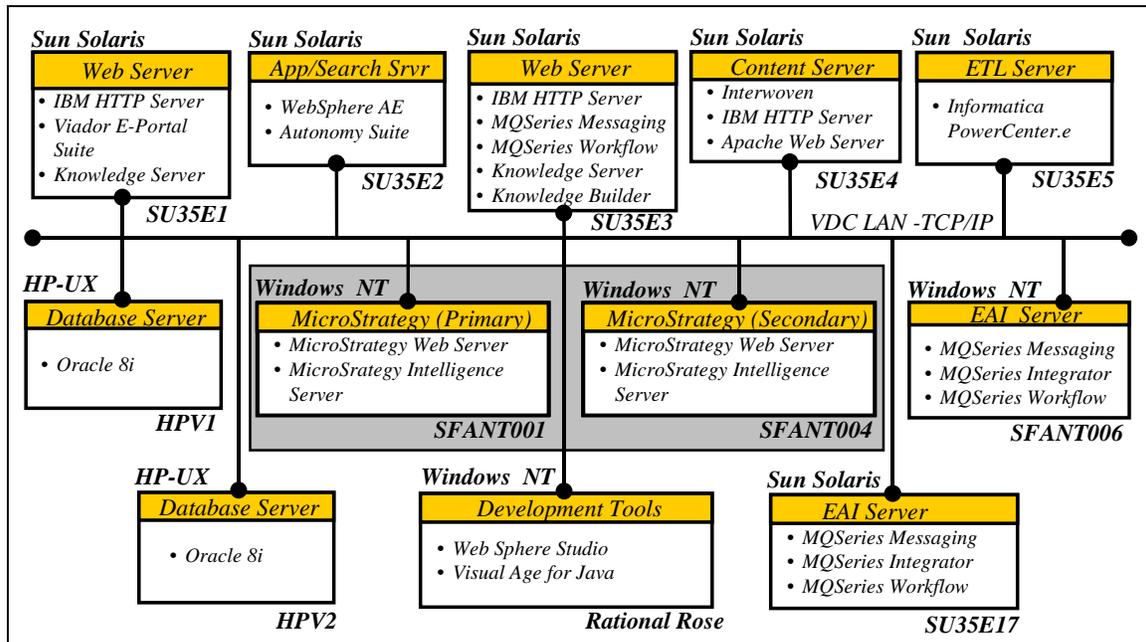


Figure 11 – MicroStrategy components.

12.4. Product Prerequisites for Installation

The following configuration is needed for the Server machine:

- Windows 95, 98, or NT 4.0 SP4
- TCP/IP network protocol
- MicroStrategy Agent 6.0
- MicroStrategy Architect 6.0
- MicroStrategy Administrator 6.0
- MicroStrategy Controls 16 bit 6.0
- MS ODBC Administrator 16 bit
- 16-bit Oracle73 ODBC Driver 2.5.3.1.6 SQL*NET 2.3.3.0.1 (Oracle)

12.5. Workstation Requirements for Testing Installation

The following configuration is needed for the client machine that will be utilized for testing and configuring the installation:

- Windows 95, 98, or NT 4.0 SP4

- MicroStrategy Desktop 7.0
- DCOM (packaged with Desktop product)

12.6. Users and Groups

The following login IDs are needed for the MicroStrategy installation:

- *pmrepo* login ID and password for accessing the metadata repository
- *powermart* login ID and password for accessing the data warehouse
- *microstrategy* system administrator login ID and password for each NT server
- *administrator* login ID and password for accessing MicroStrategy 7 products

12.7. Directory Structures

The following directories were created during the installation:

Table 42 – Microstrategy Suite Directory Structure

DIRECTORY	SIZE	CONTENTS
Main MicroStrategy Directories		
\Program Files\MicroStrategy\		Root MicroStrategy 7.0 directory
\Program Files\Common Files\MicroStrategy\	~71 MB	Common MicroStrategy 7.0 Files
MicroStrategy Intelligence Server 7.0		
\Program Files\MicroStrategy\Intelligence Server	~6 MB	Root MicroStrategy Intelligence Server directory
\Program Files\MicroStrategy\Intelligence Server\Inbox\		Report files for the MicroStrategy Intelligence Server 7.0
\Program Files\MicroStrategy\Intelligence Server\Log\		Log files MicroStrategy Intelligence Server 7.0
MicroStrategy Web Server 7.0		
\Program Files\MicroStrategy\Web\	~7 MB	Root MicroStrategy Web directory and Interface ASP files
\Program Files\MicroStrategy\Web\Admin\	~53 KB	MicroStrategy Web Administrator Directory
\Program Files\MicroStrategy\Web\Corelib\	~438 KB	MicroStrategy Web Core Library Files
\Program Files\MicroStrategy\Web\Customlib\	~1 MB	MicroStrategy Web Custom Library Files
\Program Files\MicroStrategy\Web\Help	~2 MB	MicroStrategy Web Help Files

DIRECTORY	SIZE	CONTENTS
\Program Files\MicroStrategy\Web\Images\	~1 MB	MicroStrategy Web Image Files
\Program Files\MicroStrategy\Web\Styles\	~100 KB	MicroStrategy Web CSS Files
\Program Files\MicroStrategy\Web\Internationalization\	~321 KB	MicroStrategy Web International Files
MicroStrategy Desktop 7.0		
\Program Files\MicroStrategy\Desktop	~76 MB	MicroStrategy Desktop root directory
\Program Files\MicroStrategy\Desktop\Images	~335 KB	Images used in the Desktop Homepage
\Program Files\MicroStrategy\Desktop\Log		Log directory, for Diagnostics output
\Program Files\MicroStrategy\Desktop\XSLs\Grids2	~721 KB	Autostyles for grids2

12.8. Naming Conventions

The MicroStrategy installation and configuration requires that the ODBC Data Name Source (DSN) connections are governed by the following naming conventions:

- ODBC DSN connection to the development data warehouse:
 - EDU_DEV_WH
- ODBC DSN connection to the development metadata repository:
 - EDU_DEV_MD

12.9. Installation Checklist

See the MicroStrategy Installation Checklists contained in Appendices L through T.

12.10. Startup and Shutdown Procedures

12.10.1. General Startup Procedures for MicroStrategy products

MicroStrategy server products run as Windows NT services. Thus, start up and shutdown of the services from a remote machine is possible. In addition, it is recommended that a developer configure the service to start automatically when the machine on which it is running starts up.

When shutting down the data warehouse or MicroStrategy Intelligence Server, the following products should be restarted in the following order:

1. Data warehouse RDBMS

2. MicroStrategy metadata repository RDBMS
3. MicroStrategy Intelligence Server
4. MicroStrategy Web
5. MicroStrategy Desktop

12.10.2. MicroStrategy Intelligence Server Startup Procedures

The MicroStrategy Intelligence Server may be started via the Services GUI accessed from the NT Server desktop, Start->Settings->Control Panel->Services Icon.

If pending jobs exist in a queue when the MicroStrategy Intelligence Server is shutdown with the “Shutdown Server” option, the queue is restored when MicroStrategy Intelligence Server is started. Old jobs continue to execute and new jobs are accepted. If MicroStrategy Intelligence Server is not shutdown properly, then jobs in a queue will be lost and only new jobs will be executed.

12.10.3. MicroStrategy Intelligence Server Shutdown Procedures

The MicroStrategy Intelligence Server may be stopped via the Services GUI accessed from the NT Server desktop, Start->Settings->Control Panel->Services Icon.

When the MicroStrategy Intelligence Server shuts down, all projects are idled immediately. The Server stops accepting new client requests and cancels all currently executing jobs. These canceled jobs are saved and will be executed when MicroStrategy Intelligence Server starts up again.

During the shutdown process, the MicroStrategy Intelligence Server service is stopped and all projects are unloaded from the server. The current server state is captured and saved to disk so it can be restored when the server starts again.

12.10.4. MicroStrategy Intelligence Server Backup

All information concerning the operating state of MicroStrategy Intelligence Server is backed up periodically, so that the current state can be restored the next time MicroStrategy Intelligence Server is started. The MicroStrategy Intelligence Server state information includes:

- Run time configuration
- Any open jobs and their corresponding users
- Any projects that are loaded

The MicroStrategy Intelligence Server stores the backup of state information in:

- Metadata/registry - All run time configuration parameters are stored in the machine’s registry and in the metadata.

- Transaction log - Records a history of client transactions with MicroStrategy Intelligence Server that required the creation of a job.
- Snapshot backup - Represents the state of MicroStrategy Intelligence Server frozen at a particular point in time.

12.11. Backup Procedures

It is recommended that the hard drive containing the MicroStrategy component software be backed up daily.

In addition, it is recommended to have the MicroStrategy metadata database backed up daily. This schedule is dependent upon the application use and how often the ad-hoc reports are modified.

12.12. Installation Gaps

There are no installation gaps for MicroStrategy.

12.13. References

- MicroStrategy 7 Administrator Guide
- MicroStrategy 7 Analyst Guide
- MicroStrategy 7 Getting Started Guide
- MicroStrategy 7 Installation and Configuration Guide
- MicroStrategy 7 Software Development Kit
- MicroStrategy 7 Project Designer Guide
- MicroStrategy 7 Report Design Guide
- MicroStrategy 7 Web Customization Guide

13 Viador E-Portal Suite

13.1. Product Overview

Viador's Enterprise Information Portal is the engine that provides the horsepower to integrate and distribute information and services in a secure, web-enabled environment. Viador's E-Portal provides the following functionality:

- An authentication process for intranet and extranet users. The authentication can be passed if it is performed elsewhere.
- Links to favorite web sites and other content sites.
- Repository for storing portal information and documents.
- A Channels/Publish/Subscribe model to facilitate distribution of information.

The Viador E-Portal Suite is based on the concept of portlets. Portlets are content or application services that are registered with the Viador Information Center (VIC) server. These services can be controlled and displayed by any Viador portal interface. A developer can write a Viador portlet to provide special information to the user and use the Viador Portal to launch it.

13.2. Product Inventory

The following products were installed on the Sun server SU35E1 (IP: 4.20.14.131) for the Development, Test, and Staging Environments:

Development (DEV)

- Viador E-Portal 6.1.1 build #47
- JRun 2.3.3 Build 153 (packaged with Viador product)
- JRun 2.3.3 Build 157 Patch (Allaire's)

Test (TST)

- Viador E-Portal 6.1.1 build #47
- JRun 2.3.3 Build 153 (packaged with Viador product)
- JRun 2.3.3 Build 157 Patch (Allaire's)

Staging (STG)

- Viador E-Portal 6.1.1 build #47
- JRun 2.3.3 Build 153 (packaged with Viador product)

- JRun 2.3.3 Build 157 Patch (Allaire's)

The three environments share the same installation of JDK 1.1.8 Production Release

13.3. Development Environment Topology

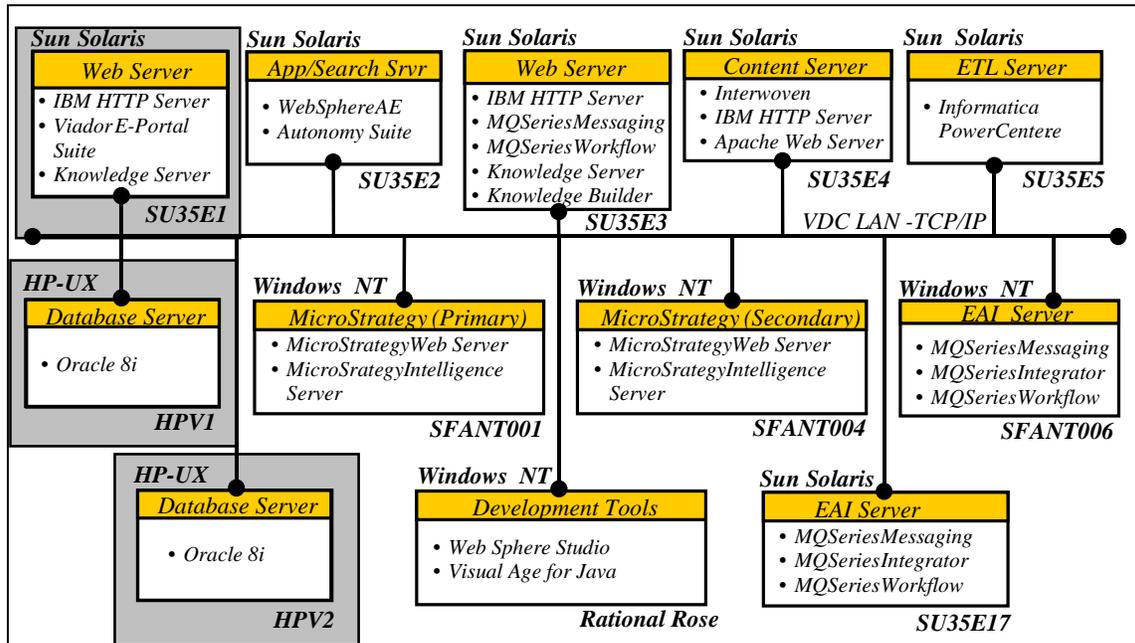


Figure 12 – Viador E-Portal component.

13.4. Product Prerequisites for Installation

The following hardware and software prerequisites were required prior to the Viador installation and configuration:

- Sun Solaris V2.6
- Minimum of 300 MB of disk space and 1GB of memory per install of Viador.
- IBM HTTP Server 1.3.6.3 installed for each install of Viador.
- JDK 1.1.8 Production Release installed – one install for all installations of Viador.
- Client/server middleware SQLNET needs to be installed to connect to database repository – one installation for all installations of Viador. A database account must be created to perform this install. The viad_ora user was created for this purpose.
- An Oracle 8i database instance with at least 90 MB of disk space.
 - Development Oracle 8i Database: VICDEV on HPV1

- Test Oracle 8i Database: VICTST on HPV2
- Staging Oracle 8i Database: VICSTG on HPV2
- The DBA must create a database account with privileges to create and populate tables within the Oracle Databases. The comm user was created in each database for this purpose.

13.4.1. Viador TCPIP Socket Port Numbers

The Viador Product requires specification of three unused ports for its service to run. The three ports are the Viador info port, the Viador FTP port, and the Viador FTP-Data Port.

Table 43 – Viador TCP/IP Socket Ports on SU35E1

Environment	Viador Info Port	Viador FTP Port	Viador FTP-Data Port
Development	6888	2002	2003
Test	6887	2001	2000
Staging	6889	21	20

13.4.2. JRUN TCPIP Socket Port Numbers

The JRUN product uses multiple ports for regular operation. The ports used are shown below for each environment.

Table 44 – JRUN TCP/IP Socket Ports on SU35E1

Environment	JRUN Proxy Port	JRUN jsn port	JRUN info Port	JRUN Admin Port
Development	8884	6998	7001	56000
Test	8883	6997	7002	56491
Staging	8081	6996	7000	57860

13.5. Workstation Requirements for Testing Installation

A Java-enabled web browser, such as Microsoft Internet Explorer 4.01 and above, or Netscape Navigator 4.7 and above, is needed to access the login screen at the following URLs:

Development (DEV)

<http://dev.schoolsportal.ed.gov:8181/infospc/index.html>

Test (TST)

http://actest.schoolsportal.ed.gov:8182/infospc/index.html.

Staging (STG)

http://test.schoolsportal.ed.gov/infospc/index.html.

13.6. Users and Groups

Viador recommends creating a user account to install the Viador product. This user account must have the privilege to install software under the web server document root directory and the ability to access all databases. The user account also needs to be able to write files under the web server cgi-bin directory.

Viador UNIX IDs were created for each environment in which Viador was installed. Each login ID serves as the portal user and enables the testing of the installation and configuration of the Viador product. The Viador UNIX user for each environment is as follows:

- Development (DEV) – username: viaddev
- Test (TST) – username: viadtst
- Staging (STG) – username: viadstg

In order to run the Oracle client software SQLPLUS, a Viador Oracle account *viad_ora* was created on the Sun server. This login ID had the same profile and environment settings as the *oracle* login ID.

The owner of the Viador tables in Oracle is comm. This user was created in VICDEV, VICTST, and VICSTG.

13.7. Directory Structures

The directories in the following table were created during the installation for Development.

Table 45 – Viador Directory Structure for Development Environment

DIRECTORY	SIZE	CONTENTS
/opt/dev/IBMHTTPD/htdocs/infospc	~300 MB	Holds the Viador Portal application. This directory also holds all user information and will grow with the number of users.
/opt/dev/IBMHTTPD/htdocs/infospc/websqlbr		Contains the data folders for the portal users.
/opt/dev/disk2/jrun	32 MB	Holds the JRun application

The directories in the following table were created during the installation for Test.

Table 46 – Viador Directory Structure for Test Environment

DIRECTORY	SIZE	CONTENTS
/opt/tst/IBMHTTPD/htdocs/infospc	~300 MB	Holds the Viador Portal application. This directory also holds all user information and will grow with the number of users.
/opt/tst/IBMHTTPD/htdocs/infospc/websqlbr		Contains the data folders for the portal users.
/opt/tst/disk2/jrun	32 MB	Holds the JRun application

The directories in the following table were created during the installation for Staging.

Table 47 – Viador Directory Structure for Staging Environment

DIRECTORY	SIZE	CONTENTS
/opt/stg/IBMHTTPD/htdocs/infospc	~300 MB	Holds the Viador Portal application. This directory also holds all user information and will grow with the number of users.
/opt/stg/IBMHTTPD/htdocs/infospc/websqlbr		Contains the data folders for the portal users.
/opt/stg/disk2/jrun	32 MB	Holds the JRun application

The users, groups, and permissions of the directory structures are presented below for each environment.

Development:	Owner: viaddev	Group: portdev	permissions: 775
Test:	Owner: viadtst	Group: porttst	permissions: 775
Staging:	Owner: viador	Group: portstg	permissions: 775

13.8 Naming Conventions

In each of the following sections, the keyword **system** in the text below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

The installation of Viador in the three environments was performed using the following naming convention listed below.

/opt/**system**/IBMHTTPD/htdocs/infospc

Default Oracle Environment Variables

These files are configured with the appropriate information once the installation of the Viador product is complete.

`/opt/system/IBMHTTPD/htdocs/infospc/server/infosrvorg`

Oracle environment Variables

- ORACLE_HOME=/opt/oracle/product/8.1.5
- export ORACLE_HOME
- ORACLE_SID=VIC**system**
- export ORACLE_SID

Default Viador Server Root Directory

`/opt/system/IBMHTTPD/htdocs/infospc/server/infosrvorg`

These files are configured with the appropriate information once the installation of the Viador products is complete.

Viador Server Root Directory Variables

- INFOHOME="/opt/**system**/IBMHTTPD/htdocs/infospc"
- SHLIB_PATH=.:\$INFOHOME/bin:\$SHLIB_PATH
- LIBPATH=.:\$INFOHOME/bin:\$LIBPATH
- LD_LIBRARY_PATH=.:\$INFOHOME/bin:\$LD_LIBRARY_PATH
- PATH=.:\$INFOHOME/bin:\$PATH

Default Viador Document Root Directory

`/opt/system/IBMHTTPD/htdocs/infospc/server/infosrvorg`

These files are configured with the appropriate information once the installation of the Viador products is complete.

Document Root Directory

`DOCHOME | /opt/system/IBMHTTPD/htdocs/infospc`

13.9. Installation Checklist

See the Viador Installation Checklist in Appendix U.

13.10. Startup and Shutdown Procedures

13.10.1. Starting the Viador Information Center

The Viador Information Center Server Administrator portlet is used to start and stop the Viador Information Center (VIC) servers. The Server Administrator portlet also enables the monitoring of user sessions.

The Viador Administration Server must be started before anyone can access the Server Administrator portlet. The keyword **system** in the text below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

From the Command Line

Dev

To start the server directly from the command prompt in the development environment, perform the following steps:

1. Run the infosrv file from the \$INFOHOME directory as **viadev** user.
2. From the Unix prompt type:

```
UNIX> /opt/dev/IBMHTTPD/htdocs/infospc/server/infosrvX
```

TST

To start the server directly from the command prompt in the development environment, perform the following steps:

1. Run the infosrv file from the \$INFOHOME directory as **viatst** user.
2. From the Unix prompt type:

```
UNIX> /opt/tst/IBMHTTPD/htdocs/infospc/server/infosrvX
```

STG

To start the server directly from the command prompt in the development environment, perform the following steps:

3. Run the infosrv file from the \$INFOHOME directory as **viadstg** user.
4. From the Unix prompt type:

```
UNIX> /opt/stg/IBMHTTPD/htdocs/infospc/server/infosrvX
```

From a Web Browser

To start the server from a web browser with the VIC running, perform the following steps:

1. Start the Viador E-Portal Suite by starting your Web browser and typing the URL where your Viador E-Portal Suite is installed.
2. Launch the Server Administrator ([http:// 4.20.14.131/infospc/index.html](http://4.20.14.131/infospc/index.html)) and log on with a user name that belongs to the Administrator role.
3. After logging on to the Viador E-Portal Suite, launch the Server Administrator in one of two ways:
 - In Portal Page View, click on the Server Administrator icon in the row of portlet icons.
 - In Portal Explorer View, click the Portlets tab above the tree control on the left side of the window. The portlets that can be launched will appear in the tree control. Click the node () next to My Portlets to expand the tree. Click the Server Admin name or icon to launch Server Administrator.

13.10.2. Stopping the Viador Information Center

Use the following commands to stop the VIC.

DEV

To stop the server for the development environment, , perform the following steps:

1. Run the infoshutdown file from the \$INFOHOME directory as **viaddev** user.
2. From the Unix prompt type:
UNIX> /opt/dev/IBMHTTPD/htdocs/infospc/server/infoshutdown

TST

To stop the server for the test environment, , perform the following steps:

1. Run the infoshutdown file from the \$INFOHOME directory as **viadtst** user.
2. From the Unix prompt type:
UNIX> /opt/tst/IBMHTTPD/htdocs/infospc/server/infoshutdown

STG

To stop the server for the staging environment, , perform the following steps

1. Run the infoshutdown file from the \$INFOHOME directory as **viadstg** user.
2. From the Unix prompt type:
UNIX> /opt/stg/IBMHTTPD/htdocs/infospc/server/infoshutdown

13.10.3. Infomanager Server Utility

The Infomanager server utility sends commands to the server. This utility will start a process and attach to the server so it can send commands to the server via the TCP/IP socket connection. The keyword **system** in the text below should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

The infomanager script is located in the /opt/**system**/IBMHTTPD/htdocs/infospc/server directory.

Invoke the Infomanager utility with the following statement:

```
InfoManager [-confFile confFileName] [-instance instId] -commands
```

The configuration file name (confFileName) and the Viador Information Center (VIC) instance ID (instId) are optional parameters.

The commands and their purpose include:

- about Displays version/configuration information about VIC
- start Start VIC
- shutdown Shutdowns the VIC
- summary Displays VIC activity summary
- sessions Displays detailed portal session information
- logout sessionId Logs out a portal session
- setloglevel logLevel Sets log level

13.11. Backup Procedures

The file systems /opt/**system**/IBMHTTPD/htdocs/infospc/websqlbr, should be added to the backup schema. The websqlbr directory contains the data folders for the portal users. To backup this file system, the VIC Server needs to be shutdown. The keyword **system** in the statement above should be replaced with dev, tst, or stg for the respective environment: development, testing or staging.

The database should also be added to the backup schema. To backup the database, the VIC Server needs to be shutdown to prevent user errors.

13.12. Installation Gaps

Listed in the table below are the installation gap for Viador.

Table 48 – Viador Installation Gaps

GAP	SHORT-TERM SOLUTION	LONG-TERM SOLUTION
The Viador product operates using its own internal Java Virtual Machine (JVM), JRun. The WebSphere application server uses its own JVM and the two are incompatible.	The initial release of the Integrated Technical Architecture is based on using JRun as the servlet engine for Viador.	Throughout the installation and configuration task, a parallel effort was underway by Viador to remove JRun and integrate with WebSphere's JVM, providing a single servlet engine across the Integrated Technical Architecture. This integration effort is target for completion by 7/31/2000. A migration strategy to reinstall Viador with the updated servlet engine will be scheduled after testing and validating the solution in the lab.

13.13. References

- Viador E-Portal Suite 6.1.1 Installation Guide for UNIX
- Viador E-Portal Suite 6.1.1 Administrator's Guide

14 Next Steps

Additional tasks will be required to allow the current ITA development environment to meet the target Release 1.0 Integrated Technical Architecture development environment. Figure 2 below illustrates the target development environment.

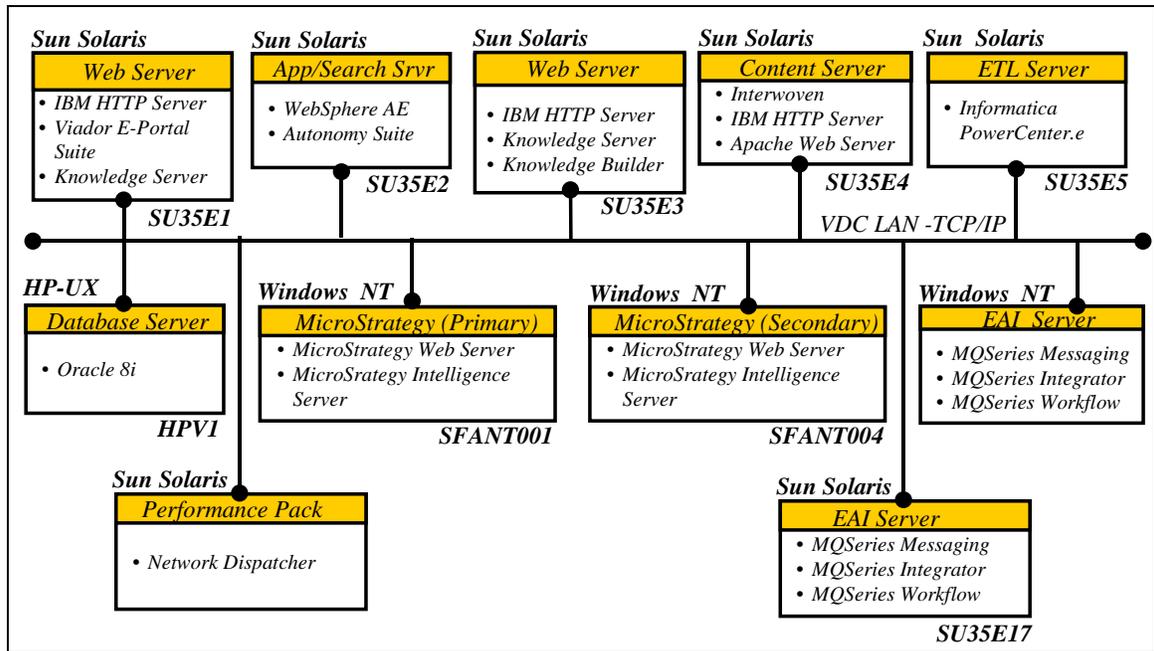


Figure 13 - Integrated Technical Architecture Target Development Environment.

The remaining steps that need to occur in order to meet the Release 1.0 target architecture are listed below:

- **Migration of schemas within the VICDEV database** – Schemas within the VICDEV database instance will need to be migrated to another database instance. Currently, Microstrategy and Informatica schemas reside in the VICDEV database instance.
- **Migration of non-production database instances on the HPV2 server** – Development, testing, and staging database instances that reside on the production database server, HPV2, will need to be migrated to the development database server, HPV1.
- **Configure IHS to Serve Multiple Applications** – Virtual Hosts must be configured in the development web server to support multiple applications. There are no virtual hosts configured in development at this time.
- **Procure Sun servers** – The Sun servers for Network Dispatcher have not been procured. Once the servers are delivered, the servers must be prepared for the installation and configuration of Network Dispatcher.

15 Acronyms

Acronym	Description
AE	Advanced Edition
CGI	Common Gateway Interface
DAS	Database Auto-Synchronization
DRE	Dynamic Reasoning Engine
EJB	Enterprise Java Bean
ERP	Enterprise Resource Planning
HP	Hewlett-Packard
HTTP	Hypertext Transfer Protocol
IBM	International Business Machines
IFAP	Information for Financial Aid Professionals
IHS	IBM HTTP Server
IP	Internet Protocol
JDK	Java Development Kit
JSP	Java Server Pages
MB	Megabyte
MQ	Message Queuing
ND	Network Dispatcher
NIC	Network Interface Cards
NT	New Technology
OLAP	On-line Analytical Processing
OS	Operating System
RAM	Random Access Memory
SFA	Student Financial Assistance
SSI	Server Side Includes
SSL	Secure Socket Layer
TCP	Transmission Control Protocol
VDC	Virtual Data Center

Acronym	Description
VIC	Viador Information Center
WAS	WebSphere Application Server
XML	Extensible Markup Language

Appendix A – Autonomy Installation Checklist

Appendix B – IBM HTTP Server Installation Checklist

Appendix C – IBM MQSeries Integrator Installation Checklist

Appendix D – IBM MQSeries Messaging Installation Checklist

Appendix E – IBM MQSeries Workflow Installation Checklist

Appendix F – IBM Network Dispatcher Installation Checklist

Appendix G - IBM VisualAge for Java Installation Checklist

Appendix H – IBM WebSphere Advanced Edition Installation Checklist

Appendix I - IBM WebSphere Studio Installation Checklist

Appendix J – Informatica Installation Checklist

Appendix K – Interwoven Installation Checklist

Appendix L - MicroStrategy Administrator Installation Checklist

Appendix M - MicroStrategy Agent Installation Checklist

Appendix N - MicroStrategy Architect Installation Checklist

Appendix O - MicroStrategy Broadcaster Installation Checklist

Appendix P - MicroStrategy Desktop Installation Checklist

Appendix Q - MicroStrategy InfoCenter Installation Checklist

Appendix R - MicroStrategy Intelligence Server 6.0 Installation Checklist

Appendix S - MicroStrategy Intelligence Server 7.0 Installation Checklist

Appendix T - MicroStrategy Web Server Installation Checklist

Appendix U - Viador Installation Checklist