AVAYA

Avaya™ Operational Analyst
Release 6.0
Installation and Maintenance

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Version 6.0
Installation and Maintenance

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Introducing Avaya Operational Analyst

Avaya Operational Analyst (Avaya OA) is designed to address the data collection and management needs of the Customer Relationship Management (CRM) marketplace with reliability, availability, and scalability. The underlying structure of Operational Analyst is comprised of a set of scalable and customizable modules running in a Microsoft Windows or Solaris environment.

Avaya Operational Analyst allows businesses to perform operational reporting for a multimedia contact center, smoothly growing from single channel analysis, to full interaction, multi-channel analysis with a common data model and user interfaces across these systems. Operational Analyst is a required component of Interaction Center 6.0, functioning as its Operational Data Store and Contact Center Performance Analysis system, replacing and significantly upgrading the reporting capabilities of Interaction Center 5.6. Operational Analyst is also an optional, add-on to Avaya Call Management System (CMS) for extended, online historical data storage and multi-site analysis, pulling External Call History data from up to 30 CMS systems representing 240 MultiVantage ACDs.

This installation and maintenance guide is designed as a reference to help you install Operational Analyst and maintain smooth performance. The individual configuration of Operational Analyst is highly application-dependent and should be reviewed with your Avaya representative.

The database operations explained in this guide require the services of either a qualified database administrator or systems integrator who possesses in-depth knowledge of database fundamentals and of Windows or Solaris. It is recommended that you also have available the following reference materials:

For Oracle databases

- The Oracle backup and recovery guide
- The Oracle database administrator guide
- The Legato Storage Manager administrator guide

For Microsoft (MS) SQL databases

- MS SQL Server 2000 online books
- Microsoft database documentation

Topics

This chapter includes the following topics:

Avaya Operational Analyst features

Avaya Operational Analyst (Avaya OA) provides the following features:

- Integrated Avaya CRM logical data model of historical data for Avaya Interaction Center (Avaya IC) and Avaya Call Management System (Avaya CMS)
- Integrated browser-based historical reporting across Avaya IC and Avaya CMS
- Improved real-time monitoring of data consistency and presentation for Avaya IC
- Integrated browser-based real-time reporting for Avaya IC
- Pre-packaged summarization of Avaya IC data into Avaya OA repository
- Pre-packaged data import facilities for all Avaya CMS External Call History and some CMS summary data into Avaya OA repository
- Continued CMS operation, side by side with the Avaya OA repository for voice-only customers without blending agents
- Multi-platform and multi-vendor support
- Multi-switch and multi-site support
- Internationalized code base with localized reports

Avaya Operational Analyst and the contact center

Avaya Operational Analyst provides business intelligence for the contact center. Avaya Operational Analyst serves as the operational data store for customer interaction data and as the contact center performance analysis system. Operational Analyst provides data management and reporting for Interaction Center 6.0. It also adds integrated management and reporting for CMS. It provides basic visual and HTML reports, viewed using a web browser, on real-time and historical data. It also provides advanced, analytic reports based on Cognos tools.
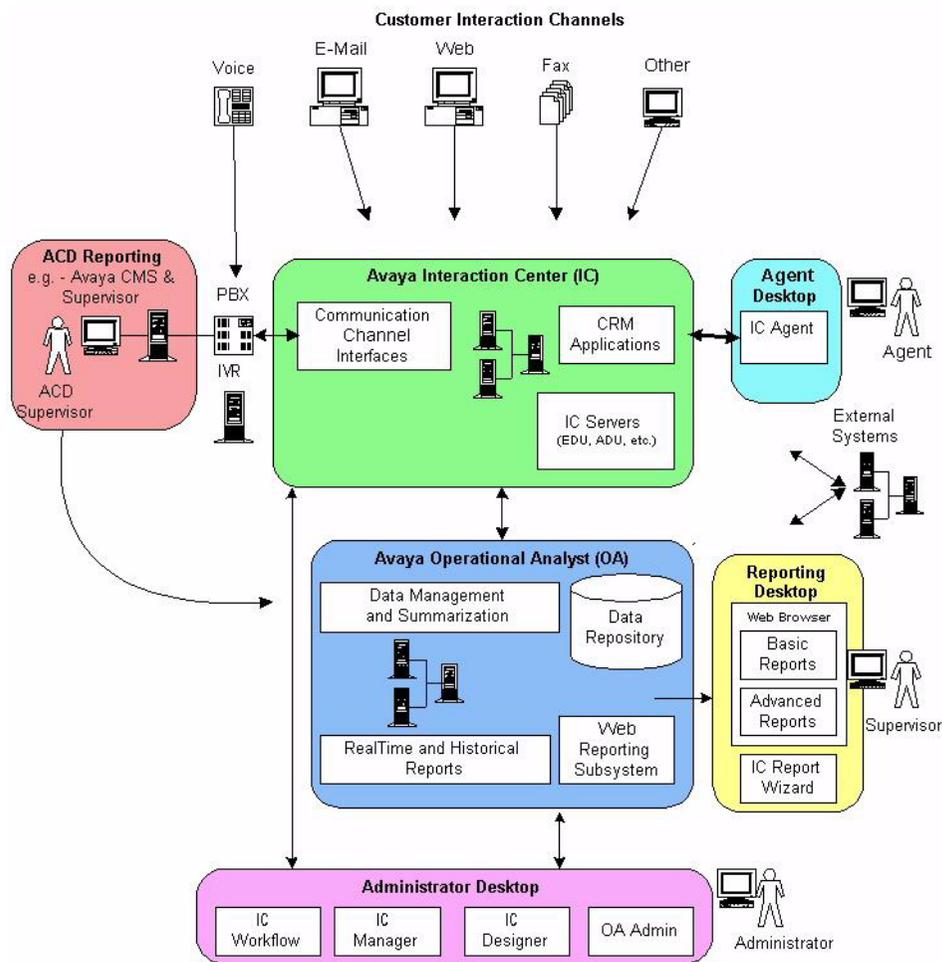
Installation tasks described in this guide

The following topics are covered in this guide.

Preparation for installation

- Chapter 1: Platform requirements on page 21 presents the hardware and software requirements for Avaya Operational Analyst and shows possible server configurations.

- Chapter 2: Installing an historical database on page 41 presents information about how to install and set up a database for use with Avaya Operational Analyst.

Avaya Operational Analyst Installation

- Chapter 3: Avaya Operational Analyst distribution media on page 95 presents information about the distribution media for Avaya Operational Analyst.

- Chapter 4: Installing Avaya Operational Analyst on page 101 presents instructions on how to install Avaya Operational Analyst and its supporting software.

- Chapter 5: Troubleshooting the installation on page 165 presents information about Operational Analyst installation troubleshooting tools.

Avaya Operational Analyst Maintenance

- Chapter 6: Modifying, repairing, and removing Avaya Operational Analyst on page 173 presents instructions for adding or removing features or repairing corrupted files.

- Chapter 7: Maintaining the historical database on page 197 presents information about procedures to keep Avaya Operational Analyst operating at maximum efficiency.

- Chapter 8: Starting and stopping processes on page 207 presents information about starting and stopping Avaya Operational Analyst processes for troubleshooting.

Database management

- Chapter 9: SQL Server 2000 database backup on page 217 presents information about how to back up your Microsoft SQL Server 2000 historical database.

- Chapter 10: Oracle database backup on page 229 presents information on how to back up your Oracle historical database data.

- Chapter 11: SQL Server 2000 filegroup management on page 247 presents information on managing SQL Server 2000 Filegroups.

- Chapter 12: Oracle tablespace management on page 255 presents some tips on how to manipulate the amount of available tablespace in an Oracle historical database.

- Chapter 13: Migrating schema on page 261 presents information about how to change the historical database table schema and to move data to the new tables.

Tasks you must perform after installation

Tasks that are administered using Avaya Operational Analyst Administration Client are not covered in this guide. These tasks include:

- Configuring data collection properties

- Determining data schema (Declaration)

- Setting data retention time (Max Capacity)

- Designing data containers

- Aggregating and archiving data

- Purging data

- Maintaining data consistency

These topics are described in the online Help system for Avaya Operational Analyst Administration Client. Avaya Professional Services can provide support with these database administration tasks.

For detailed information about how to install third-party software, such as Oracle, or Microsoft Windows, refer to the documentation that accompanies that software.

Related Documentation

In addition to this guide, there are two other files related to installation that are available on the installation media:

● *Release notes*. The release_notes.pdf file contains the latest notes about installation of Operational Analyst components. It is recommended that you read it before installation.

To access the release notes or the readme file, either click **Browse Contents** on the **Main Menu** screen and double-click the file you want to view, or just click the appropriate selection on the **Main Menu** screen.

You can also view this document after installation at

> *install directory*/doc/release_notes.pdf

Section I: Preparation for Installation

This section, *Preparation for Installation*, describes the tasks you must perform to prepare for installation. This section includes the following chapters:

- Chapter 1: Platform requirements on page 21 - Explains how to determine system size and configuration and how to plan for server configurations, identifies software requirements, and discusses time synchronization, networking, and security.

- Chapter 2: Installing an historical database on page 41 - Provides detailed instructions for installing Microsoft SQL and Oracle databases.

If you are collecting data from Avaya Interaction Center, you must also install it before you begin Avaya Operational Analyst installation.

■   ■   ■   ■   ■   ■

Chapter 1: Platform requirements

Avaya Operational Analyst is scalable to a wide range of work load specifications. Because Avaya Operational Analyst systems are customized for individual situations, use the installation instructions in this guide only as a reference. Specific hardware sizing and installation procedures should be determined with assistance from a member of Avaya Professional Services.

Avaya Operational Analyst is a set of applications running in a Microsoft Windows 2000, Microsoft NT Server 4.0, or Sun Solaris 8 environment. The Avaya Operational Analyst software can run on a single server co-resident with Avaya Interaction Center in small configurations, or it can be distributed across multiple server machines in larger configurations.

Topics

This chapter includes the following topics:

- Determining system size and configuration on page 22
- Avaya Operational Analyst server configurations on page 24
- Software requirements on page 27
- Time synchronization on page 33
- Networking on page 36
- Security on page 39

Determining system size and configuration

The number of servers, the deployment of application services among servers, and the amount of disk space needed are all factors that are influenced by the scope and activity of your business. It is very important that you estimate your projected maximum performance requirements before choosing a system configuration. The appropriate configuration for your system should be reviewed with your Avaya representative before making any purchasing decisions.

For example, a small business that receives data from only one type of customer contact, such as telephony, might be able to function with the one-server configuration. This machine would house all of the Avaya Operational Analyst features, including the databases, Administration Client, and Reporting subsystem.

This example configuration assumes that all real-time and historical data can be stored on one machine. If more channels of customer contact (such as Web or e-mail) are added, the example configuration could be quickly outgrown. In addition, modest storage space means that historical data must be archived to external storage media more frequently. The multi-server configurations are recommended for most business situations.

To help you more accurately determine your hardware requirements, plan your system with your Avaya representative.

Server hardware requirements

The Operational Analyst (OA) server software can run on Windows NT Server or Windows 2000 Server using Intel-compatible servers or on Solaris using Sun SPARC servers. OA client software runs on Windows using an Intel-compatible PC. The actual size configuration depends on whether you are running a single or multi-server configuration and on feature selection. Work with your Avaya representative to determine your requirements.

Windows hardware requirements

The minimum hardware requirements for a single server OA configuration running on Windows NT Server or Windows 2000 Server are listed below:

CPU	Intel-compatible, 500 MHz or faster
Number of CPUs	2
RAM	1 GB
Disk Space, not including database	9 GB

Solaris hardware requirements

The minimum hardware requirements for OA running on Solaris 8 are listed below:

CPU	Sun UltraSparc III, 750 MHz or faster
Number of CPUs	2
RAM	2 GB
Disk Space, not including database	9 GB

Client hardware and software requirements

The minimum hardware and software requirements for a desktop PC running OA reports are listed below:

Operating system	Windows NT 4.0 Workstation, Service Pack 6A Windows 2000 Professional, Service Pack 2 Windows XP Professional
Web browser	Internet Explorer 5.5 Service Pack 2 Internet Explorer 6.0
JRE	Java Plug-in or Java Runtime Environment 1.3.1_01
CPU	Intel-compatible 233 MHz or faster
RAM	256 MB
Video	A graphics card capable of displaying 1024 x 768 pixels and 32,768 colors, with at least 8MB of on-board RAM, and supporting 3D OpenGL acceleration
Virtual memory	700 MB or larger allocated to the paging file
Free Disk space	50 MB

Note:

For performance and different hardware and software requirement reasons, running the Basic reports on the report server is not supported.

Avaya Operational Analyst server configurations

Operational Analyst consists of sets of features that are deployed on one or more servers. There are a number of supported configurations for the Operational Analyst system, ranging from all features except Avaya Call Management System (CMS) co-resident on a single server, to separate servers for each feature. Since Interaction Center and Operational Analyst support multi-site configurations, some of the features are deployed in multiple instances to support the multiple sites.

The following figure illustrates a possible multi-server configuration with an IC server, a CMS server, an OA server, and a dedicated database server.
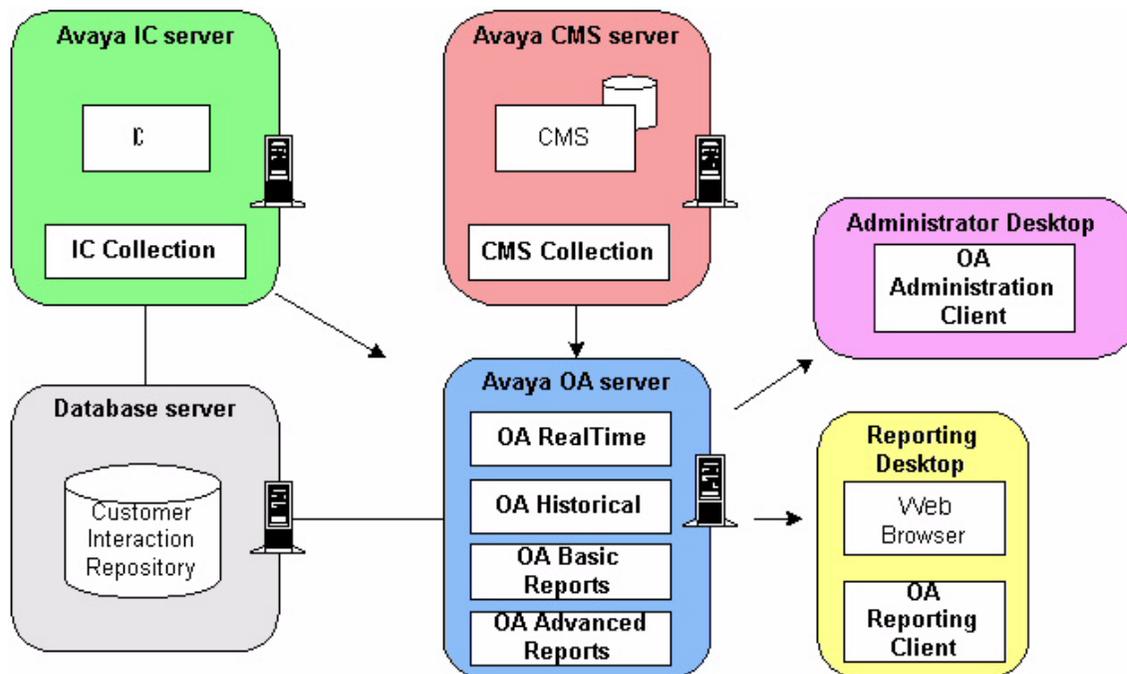
Historical server considerations

There is always a single Historical database in any installation of OA, regardless of how many sites are deployed. Data from all the IC and CMS sites feed into the historical database, which serves as the customer interaction repository of historical data for all sites.

The database instance used by OA is the same database instance used by IC. You do not need to purchase separate database licenses for OA and IC.

The OA Historical feature can be installed in either of two possible configurations:

● Co-resident with the database

● On a separate server

The co-resident configuration results in less network traffic. When the OA Historical feature is co-resident with the database, the network is not used for recording OA data or for database management tasks, such as purge and aggregation.

The dedicated database server may be preferable if you have a data center with many applications sharing a common database server. Manual database maintenance tasks may be simpler since your operations staff maintains the database servers separately from the applications.

Real-time server considerations

An OA installation can contain one or more real-time database systems. The general rule is that there must be one real-time server for each Agent Domain in the Interaction Center. The OA Event Collector feature serves as a connector between the ADU server and the real-time server, so there must also be an Event Collector for each ADU server.

The Event Collector should be installed on the same machine as the ADU server. The Real-Time feature can also be installed on the same machine, or it can be installed on a separate machine. It is desirable to install the Real-Time feature co-resident with IC if the machine is powerful enough. However, there can be only one Real-Time feature installed on any single machine. If you have multiple ADU servers on one machine, you must provide additional machines for each Real-Time feature.

If possible, you should administer your agents in IC so that each ADU server corresponds to a physical location.

The Real-Time feature can be co-resident with the Historical feature, the Reporting feature, or both features. However, if there are multiple Real-Time features deployed, they must each be deployed on a separate machine.

Reporting server considerations

The Reporting server is a Web server application that provides real-time and historical reports to Web browsers. The Reporting server relies on a commercial Web server to provide Web access.

The Reporting server can be co-resident with the Real-time or Historical features. In a multi-site environment a Reporting server should be deployed at each site where supervisors run real-time reports.

In a large installation, you may need to deploy multiple Reporting servers. A Reporting server can handle approximately 500 simultaneous real-time reports running at 5-second refresh rates. If the total number of real-time reports exceeds this capacity, you must deploy multiple Reporting servers.

> ⚠ **WARNING:**
>
> The Reporting server cannot be co-resident with the customer-facing Web server used for the IC Web channel. The IC Web server typically is available on the Internet outside your firewall, while the OA Reporting server typically is available only inside your firewall. There are other IC components that use Web server technology such as the license manager, the Knowledge base used by agents, and the e-mail letter generation capability used by supervisors and administrators. These components reside inside your firewall and can be co-resident with the OA Reporting server. However, because both Web servers use the default Web site of IIS, a new Web site needs to be created for OA. See Installing a co-resident Web server on page 104 for more information.

IC considerations

There are many considerations involved in designing a system where OA and IC functionality successfully works together. Please refer to *Avaya Interaction Center Release 6.0 Installation Prerequisites Guide* and your Avaya Professional Services representative for details.

CMS considerations

OA can collect historical data from one or more CMSs. Each CMS must have the OA data collection software installed. The collection software serves as the connector between the CMS and the OA Historical database.

Except for the collection software that must be installed on each CMS, OA software cannot be co-resident with the CMS software.

Software requirements

Software requirements outlines the generic software requirements for Avaya Operational Analyst. Every effort was made to ensure that this information was complete and accurate at the time of printing. The actual installation steps may vary depending upon the version of the software media being used and other site-specific factors. Because this information is dependent upon third party software, information is subject to change.

Avaya Operational Analyst processes and analyzes the data provided by Avaya Interaction Center. Therefore, it is recommended that you install IC on your network before you install Avaya Operational Analyst. In addition to IC, Avaya Operational Analyst requires other licensed (third-party) system-level software programs to be installed prior to starting installation of OA. IC components and licensed system-level supporting software packages are available on separate distribution media. The Avaya Operational Analyst distribution media includes internally developed features and associated software.

Contact center configurations

The following tables outline the Avaya Operational Analyst software infrastructure. These tables are intended only for reference. Deployment of software components may vary, depending on your system configuration and performance requirements. The version numbers associated with the supporting applications are specific to release 6.0 of Avaya Operational Analyst. .

Generic software requirements

Computer name/role	Required features	Supporting software (Windows NT)	Supporting software (Windows 2000)	Supporting software (Solaris)
Historical server (co-resident historical subsystem and historical database)	Historical	- Windows NT Server 4.0 with Service Pack 6a - Internet Explorer 5.5 - Microsoft SQL Server 2000 or Oracle 8.1.7 Standard or Enterprise Edition - Legato Storage Manager (comes with Oracle) - Time Synchronization (Tardis recommended) - Software bundled with Operational Analyst: — JRE 1.3.1_01 - Microsoft Directory Service Client[1] (DsClient.exe)	- Windows 2000 Server with Service Pack 2 - Microsoft SQL Server 2000 or Oracle 8.1.7 Standard or Enterprise Edition - Legato Storage Manager (comes with Oracle) - Time Synchronization (Tardis recommended) - Software bundled with Operational Analyst: — JRE 1.3.1_01	- Solaris 8 - Oracle 8.1.7 Standard or Enterprise Edition - Time Synchronization (ntpd recommended) - Software bundled with Operational Analyst: — JRE 1.3.1_01

Generic software requirements

Computer name/role	Required features	Supporting software (Windows NT)	Supporting software (Windows 2000)	Supporting software (Solaris)
Historical (historical subsystem only, no historical database)	Historical	• Windows NT Server 4.0 with Service Pack 6a • Internet Explorer 5.5 • Microsoft SQL Server 2000 or Oracle 8.1.7 Database client • Microsoft Directory Service Client[2] (DsClient.exe)	• Windows 2000 Server with Service Pack 2 • Microsoft SQL Server 2000 or Oracle 8.1.7 Database client	• Solaris 8 database client • Oracle 8.1.7 Database client

Real-time server	Real-Time	• Windows NT Server 4.0 with Service Pack 6a
		• Internet Explorer 5.5
		• Time Synchronization (Tardis recommended)
		• Software bundled with Operational Analyst:
		  — JRE 1.3.1_01
		  — TimesTen 4.3 Real-Time Database
			• Windows 2000 Server with Service Pack 2
			• Time Synchronization (Tardis recommended)
			• Software bundled with Operational Analyst:
			  — JRE 1.3.1_01
			  — TimesTen 4.3 Real-Time Database
				• Solaris 8
				• Time Synchronization (ntpd recommended)
				• TimesTen 4.3
				• Software bundled with Operational Analyst:
				  — JRE 1.3.1_01

Generic software requirements

Computer name/role	Required features	Supporting software (Windows NT)	Supporting software (Windows 2000)	Supporting software (Solaris)
Reporting server	Reporting Subsystem	• Windows NT Server 4.0 with Service Pack 6a • Internet Explorer 5.5 • NT Option Pack 4.0 • Microsoft IIS 4.0 • Time Synchronization (Tardis recommended) • Software bundled with Operational Analyst: — JRE 1.3.1_01	• Windows 2000 Server with Service Pack 2 • Microsoft IIS 5.0 • Time Synchronization (Tardis recommended) • Software bundled with Operational Analyst: — JRE 1.3.1_01	• Solaris 8 • iPlanet Web Server 6.0 • Time Synchronization (ntpd recommended) • Software bundled with Operational Analyst: — JRE 1.3.1_01
CMS	Source-CMS	• N/A	• N/A	• Solaris 8 • JRE 1.3.1_01
IC	Source-EC	• Windows NT Server 4.0 with Service Pack 6a • Time Synchronization (Tardis recommended)	• Windows 2000 Server with Service Pack 2 • Time Synchronization (Tardis recommended)	• Solaris 8 • Time Synchronization (ntpd recommended)

1. This file must be added to the Windows NT systems. You can get this file from http://www.microsoft.com/ntworkstation/downloads/Other/adclient.asp

2. This file must be added to the Windows NT systems. You can get this file from http://www.microsoft.com/ntworkstation/downloads/Other/adclient.asp

System-level software packages

The system-level software packages are purchased separately and must be installed before you install Avaya Operational Analyst.

Operating system

Depending on the hardware platform, one of the following operating systems is required for Operational Analyst:

● Windows 2000 Server or Advanced Server with Service Pack 2

● Windows NT Server 4.0 or Server Enterprise Edition 4.0 with Service Pack 6a

● Solaris 8

Internet Explorer 5.5 Service Pack 2 or Internet Explorer 6.0

Internet Explorer is a Web browser. Avaya Operational Analyst uses a Web browser to run the Administration Client and Reports. Internet Explorer is available from the Microsoft Web site: http://www.microsoft.com.

Web server software

The Reporting Subsystem feature requires a Web server software package. The following Web server software is supported, depending on the operating systems being used:

● Microsoft Internet Information Services (IIS) Version 4.0 for Windows NT

● Microsoft Internet Information Services (IIS) Version 5.0 for Windows 2000

● IPlanet Web Server FastTrack and Enterprise Edition 6.0 for Sun Solaris 8

Microsoft Internet Information Services (IIS) 4.0 is a server application, and is available through Option Pack 4.0 for Windows NT Server 4.0 or from the Microsoft Web site: http://www.microsoft.com.

Except for IIS, Web services encompass the add-on services found in the Windows Option Pack, such as Certificate Server and Index Server.

> ⚠ **Important:**
> If you are planning to have the IC Web server and the OA Web server co-resident, or if you have an existing Web site, you must follow the installation procedures on Installing a co-resident Web server on page 104. Failure to follow this special installation procedures will cause the OA Web server standard installation to not work co-resident with the IC server, or to modify the current settings of any existing Web site.

Microsoft SQL Server 2000 Standard or Enterprise Edition

SQL Server 2000 provides the database services needed by the Historical feature. Chapter 2: Installing an historical database on page 41 provides basic information about how to install SQL Server 2000 and set up an SQL Server 2000 database for Avaya Operational Analyst. Details about the packaging and configuration of SQL Server 2000 are included in the SQL Server 2000 installation instructions. Specific customer configurations should be set up by a qualified database administrator.

SQL Server 2000 is supported on Windows 2000 and Windows NT platforms.

Oracle Version 8i Standard or Enterprise Edition

Oracle also provides the database services needed by the Historical feature and is required only on the server where the Historical feature is present or on a backend database configuration. The determination of whether to use the Standard Edition or the Enterprise Edition is based on the expected size of your installation and your backup strategy. For smaller databases (50 - 85 GB), the backup capabilities of the Standard Edition are sufficient to allow use of this less expensive version. If you anticipate that your database will be larger than 85 GB, the Enterprise Edition allows you to take advantage of features like incremental backups.

Oracle 8i version 8.1.7 is supported on Windows 2000, Windows NT, and Solaris 8 platforms.

Legato Storage Manager

Legato Storage Manager is bundled on the Oracle distribution media and comes with its own instructions for installation and use. It provides a graphical user interface (GUI) for tape drive management. Legato Storage Manager is recommended to manage backups of the historical database. Some basic information about configuring Legato Storage Manager to integrate it with Avaya Operational Analyst is included in Chapter 10: Oracle database backup on page 229. Alternative backup mechanisms may be used by qualified database administrators.

Time synchronization

Avaya Operational Analyst requires accurate time synchronization of all the Avaya Operational Analyst and Interaction Center servers. It is critical that the clocks maintain an accuracy of 0.5 seconds or better. If this is not maintained, the calculated durations in the Avaya Operational Analyst database will be inaccurate, and data may be stored in the wrong interval in the historical database.

IC agent desktops do not need to be time synchronized with the IC and OA servers.

If you already have a time synchronization infrastructure that meets the requirements for Avaya Operational Analyst, have your system administrator include the OA servers in that framework.

To achieve time synchronization if you do not have an existing infrastructure, install NTP (Network Time Protocol) software on all the systems. For Windows 2000 and Windows NT systems, Tardis is one such package that has been tested successfully with Avaya Operational Analyst at Avaya labs. Tardis is shareware available at http://www.kaska.demon.co.uk. You are responsible for licensing this software if you choose to use it. For Sun Solaris systems, the `ntpd` process included with Solaris has been tested successfully.

> ⚠ **CAUTION:**
>
> Batch scripts that periodically set the time, or tools like the Windows NT Net Time tool, are not accurate enough for the Avaya Operational Analyst database.

Configuration tips for Tardis time synchronization (Windows)

Tardis is an SNTP (Simple Network Time Protocol) time synchronization package available from http://www.kaska.demon.co.uk/. Operational Analyst has been tested successfully using Tardis 2000 V1.4, which runs as a service on Windows 2000 or Windows NT.

To ensure accurate time synchronization, install Tardis on every source server (IC or CMS), and configure it on each system as follows:

- **Main**: Do not use the default time servers that are pre-configured in Tardis. Instead, do one of the following:

  - If your company already has a reliable NTP time server, delete the pre-configured servers from the **Main** tab in Tardis and add your server.

  - If your company does not currently use NTP, you should designate one or more machines as time servers, and synchronize all the rest to them. The machines you designate as time servers should synchronize to a small number of reliable external time servers on the Internet, or to a hardware source, such as a global positioning

> system (GPS) receiver. You will need to experiment to determine which Internet time servers are reliable from your location, and delete all but those servers from Tardis. For the machines that you do not designate as time servers, delete all of the pre-configured servers from Tardis and add your local time servers.

- **General**: Select **Automatically change servers on failure**.

- **Setting the time**: Set Tardis to set the time with a minimum correction of 50 milliseconds, and a maximum correction of **Anything goes**. Set **How often the time is set** to 10 minutes, and select the **Adjust automatically** option.

- **Information**: Select **Log information messages**.

- **HTTP Proxy settings**: If you configure Tardis to connect to an Internet time server, you may need to set these.

- **Broadcast NTP/NTP**: Disable NTP broadcasts.

- **GPS**: If you are using a GPS receiver as a clock source, you will need to change these settings.

Other versions of Tardis have not been tested with Operational Analyst. The K9 broadcast client that comes with Tardis has also not been tested.

If you choose to use other time synchronization software, please ensure that it has the following qualifications:

- NTP (Network Time Protocol) or SNTP (Simple NTP) capability is strongly recommended. NTP and SNTP are standard protocols supported by a number of software packages on nearly every operating system.

- The software must be capable of keeping clocks in sync to better than 0.5 second accuracy.

- Computer clocks can drift several seconds over a short period of time. The time synchronization software should be capable of adjusting its synchronization interval dynamically. If not, you must set it to synchronize every one or two minutes to ensure sufficient synchronization.

- The software should be able to log each adjustment to the clock to verify the installation. If you see adjustments larger than 0.5 second (500ms), the frequency of adjustment needs to be increased.

- NTP and SNTP are standard protocols so it is possible to mix and match different client and server software packages. However, if possible, you should use the same software package on all machines to simplify configuration.

Configuration tips for ntpd time synchronization (Solaris)

All Solaris 8 and above machines have the NTP software loaded, and are ready for being time synchronized within an NTP infrastructure.

Solaris comes with sample `ntp.conf` files (`/etc/inet/ntp.server`, `/etc/inet/ntp.client`), but with no `ntp.conf` file installed in `/etc/inet/ntp.conf`. Once the `ntp.conf` is in place (`/etc/inet/ntp.conf`) the script `/etc/init.d/xntpd` can be run to start the `xntpd` daemon. The `/etc/init.d/xntpd` is run when the machine boots, otherwise. The `xntpd` daemon runs continuously keeping your server time synchronized with the other machines within your NTP infrastructure.

If you already have an NTP infrastructure, the `ntp.conf` file provided by your system administrator should be installed in `/etc/inet/ntp.conf`. If you do not already have an NTP infrastructure, you will need to create one so that your Operational Analyst servers can be kept synchronized. A good source of information that should help you understand NTP and how to implement the infrastructure you need on Solaris can be found at: http://www.sun.com/blueprints (*Using NTP to Control and Synchronize System Clocks*, a three part series by Deeths and Brunette).

Our Recommendations For Setting up an NTP Infrastructure

Designate one or more machines on your network as local NTP servers and have the rest of the machines be NTP clients of these servers. The server `ntp.conf` file might look something like:

```
# Stratum 1 servers (at least 3 sources should be included)
  server <global company server>
  server <local gps server>
  server <global gps server>
  server <local company server>

# Stratum 2 peers (if any)
  peer <local ntp server1>
  peer <local ntp server2>
  peer <remote ntp server>

# Drift file. Put this in a directory that the daemon can write to.
  /etc/ntp.drift
```

The client `ntp.conf` file might look something like:

```
# Stratum 2 servers (from the server list above - again 3 sources
  should be included)
  server <local ntp server1>
  server <local ntp server2>
  server <remote ntp server>

# Watch for multicast packets
  multicastclient 224.0.1.1

# Drift file. Put this in a directory that the daemon can write to.
  /etc/ntp.drift
```

The Stratum 1 servers listed in the server `ntp.conf` file connect directly to a reference clock that provides an accurate time source. These could include public NTP time servers on the internet or a GPS receiver. For a list of hardware vendors for reference clocks as well as a list of public NTP servers see http://www.ntp.org.

NTP Security

NTP does have the capability to have NTP clients and servers authenticate each other using `keys.` Keys enable the `xntpd` daemon to authenticate who is sending NTP requests and only accept request from an authenticated source. Access to NTP services can also be restricted using the `restrict` directive in the `ntp.conf` file. Details about how to use these facilities to setup a secure NTP infrastructure can be found in: *Using NTP to Control and Synchronize System Clocks - Part II: Basic NTP Administration and Architecture,* by Deeths and Brunette (see http://www.sun.com/blueprints).

The command `/usr/sbin/ntptrace` can be run to check the time source for your machine, as well as its stratum and time offset from the local host.

Networking

You need to configure your network. To set up your network, perform the steps in the following sections:

- Enabling TCP/IP Networking on page 36
- Verifying DNS Resolution on page 37

To ensure that changing IP addresses do not contribute to networking failures, be sure to assign dedicated IP addresses to your Avaya Operational Analyst servers. Using DHCP may result in a different IP address each time a server is rebooted. If this happens, the Avaya Operational Analyst interface services and CORBA object interfaces may fail.

Enabling TCP/IP Networking

All Avaya IC/OA servers and client applications use TCP/IP to communicate. You need to enable TCP/IP networking on each machine in an Avaya IC/OA system.

By default, Windows and UNIX operating systems include TCP/IP networking on all machines with network cards. Typically, Avaya IC/OA uses the default TCP/IP settings applied during installation.

However, if you deploy Avaya IC/OA on an existing Novell NetWare network, you may need to take additional steps to configure the TCP/IP networking protocol. You can obtain information on how to install and configure TCP/IP networking on a NetWare network from your IT professionals.

Verifying DNS Resolution

Before you install software for Web Management or Email Management, you must verify the Domain Name System (DNS) resolution on each machine.

Each Web Management server and Email Management server must have a Fully Qualified Domain Name (FQDN) that:

- Has a minimum of three parts, separated with periods

  For example, `bsmith.com` only has two parts and would not qualify. `bsmith.domain.com` has three parts and would qualify.

- Does not contain special characters, except the dash (-)
- Has forward and reverse DNS mapping in public DNS records

Record the information after you verify each machine's DNS resolution.

Verifying DNS Resolution in Windows

The following procedure verifies that the FQDN is configured properly for Windows. Perform this procedure on every server machine that has a Windows operating system.

To verify DNS resolution in Windows:

1. Open a command prompt window.

2. Find the machine's IP address. Type the following command at the prompt:

   `ipconfig`

   The system returns information about the machine's IP configuration, including the IP address (`254.24.167.211`), as shown in the following example:

   ```
   Windows NT IP Configuration

   Ethernet adapter El70x1:

   IP Address. . . . . . . . . : 254.24.167.211
   Subnet Mask . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . :  254.24.167.1
   ```

3. Verify the *reverse* DNS mapping. Type the following command with the machine's IP address at the prompt:

   `nslookup <IP_address>`

   The system returns information about the machine's reverse DNS mapping, as shown in the following example:

   ```
   Server:   ns3.domain.com
   Address:  254.24.167.23
   Name:     bsmith.domain.com
   Address:  254.24.167.211
   ```

4. Verify the *forward* DNS mapping. Type the following command with the machine's FQDN at the prompt:

`nslookup <machine_name>.<domain_name>`

The system returns information about the machine's forward DNS mapping, including the machine's IP address and FQDN. The following example of forward DNS mapping indicates that the FQDN `bsmith.domain.com` is assigned to the IP address `254.24.167.211` in public DNS records.

```
Server:   ns3.domain.com
Address:  254.24.167.23
Name:     bsmith.domain.com
Address:  254.24.167.211
```

Verifying DNS Resolution on Solaris

The following procedure verifies that the FQDN is configured properly for Solaris. Perform this procedure on every Avaya IC server machine with a UNIX operating system.

To verify DNS resolution on Solaris:

1. Navigate to `<install_dir>/IC60/etc`.

2. Open the **hosts** file and locate the information about the machine's IP configuration, including the IP address (`254.24.167.211`).

3. Verify the *reverse* DNS mapping. Type the following command with the machine's IP address at the prompt:

`nslookup <IP_address>`

The system returns information about the machine's reverse DNS mapping, as shown in the following example:

```
Server:   ns3.domain.com
Address:  254.24.167.23
Name:     bsmith.domain.com
Address:  254.24.167.211
```

4. Verify the *forward* DNS mapping. Type the following command with the machine's FQDN at the prompt:

`nslookup <machine_name>.<domain_name>`

The system returns information about the machine's forward DNS mapping, including the machine's IP address and FQDN. The following example of forward DNS mapping indicates that the FQDN `bsmith.domain.com` is assigned to the IP address `254.24.167.211` in public DNS records.

```
Server:   ns3.domain.com
Address:  254.24.167.23
Name:     bsmith.domain.com
Address:  254.24.167.211
```

Troubleshooting an Unresolved DNS Entry

If a DNS entry is not set up for a Web Management or Email Management machine, you can temporarily use local host entries.

> **Note:**
>
> This workaround is only temporary. You must establish true DNS resolution as quickly as possible for an easier implementation.

To add local host entries for the servers:

1. Open the **hosts** file in a text editor.

   - Windows default location: `\WinNT\System32\Drivers\etc`

   - UNIX default location: `<install_dir>/IC60/etc` or `./inet/hosts`

2. In the **hosts** file, locate the IP entry and name for **localhost**.

   For example, the `localhost` line in the file might read:

   `127.0.0.1 localhost`

3. Add an entry for each Web Management or Email Management machine:

   a. At the end of the `localhost` line, press **Enter** to get a new line.

   b. Type the machine's IP address.

   c. Press **Tab** or type a few spaces, and type the machine's FQDN.

   d. Press **Tab** or type a few more spaces, and type the machine name.

   The machine name and the FQDN resolve to the specified address, as shown in the following example:

   `192.168.0.1<machine_name>.<domain_name>comhub`

   `192.168.0.2<machine_name>.<domain_name>sql`

4. Save the file under its original name (hosts).

> **Note:**
>
> If the IP address changes, you must update the `Hosts` file to reflect this change.

Security

Avaya Operational Analyst does not provide separate security. Security on all systems is maintained using security services provided by the operating system. Make sure all the accounts you use for installing, running, and administering Avaya Operational Analyst

have security settings that meet those required by your company. For more information on Avaya Operational Analyst security, refer to *Operational Analyst 6.0 Security Guide.*

■ ■ ■ ■ ■ ■
Chapter 2: Installing an historical database

This chapter provides general steps for installing and setting up your historical database. No one database layout is recommended. The examples presented here create a database that is useful in most situations. Use these instructions as a reference, and modify the steps based on your system requirements.

If your system contains Avaya Interaction Center (IC) and Avaya Operational Analyst (OA), you must refer to *Avaya Interaction Center Installation Prerequisites Guide* and *Avaya Interaction Center Installation and Configuration Guide* for information about installing the database software, creating the initial database instance, and using IC Database Designer to create IC tables before using this chapter to complete the installation of the historical database.

This illustration shows how IC data (and CMS data, if CMS is installed) and OA data share the same historical database instance but different tables:
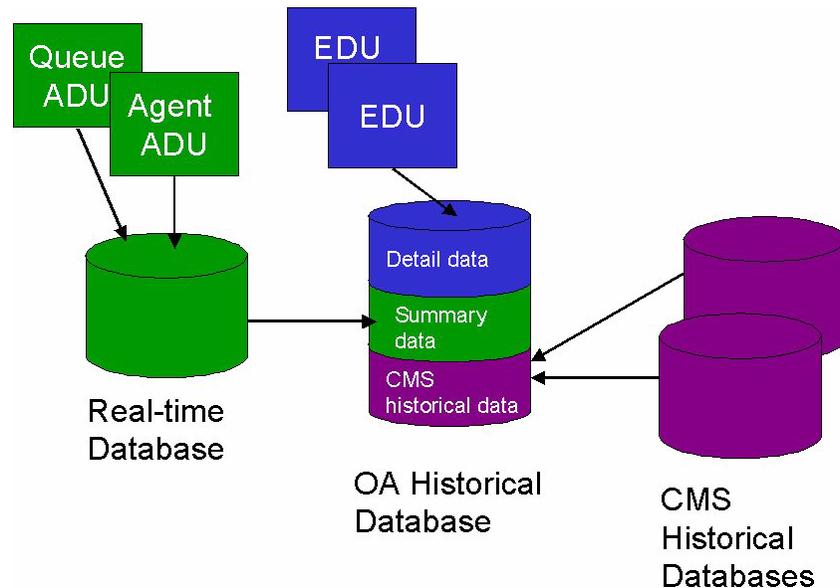
Whether you choose to install Oracle 8.1.7 or Microsoft SQL Server 2000 to be your historical database, consult the documentation from the manufacturer for more information about how to install and set up your database.

Topics

This chapter includes the following topics:

OA filegroups or tablespaces

There are three categories of filegroups (SQL Server 2000) or tablespaces (Oracle) in the Avaya Operational Analyst historical database. The following tables list the names and minimum sizes of each category of filegroups or tablespaces.

Common OA filegroups or tablespaces (Required for OA)

Name	Minimum size (MB)
HISTADMIN	200
HISTSTATUS	300
HISTIDMAP	1

OA with IC filegroups or tablespaces (Required with IC tables)

Name	Minimum size (MB)
HISTICAGENT	100
HISTICAGENTSTATE	50
HISTICSVCCLASS	100
HISTICSVCSTATE	100
HISTICDISPLAY	10

OA with CMS filegroups or tablespaces (Required with CMS tables)

Name	Minimum size (MB)
HISTCMSAGENT	500
HISTCMSCWC	50
HISTCMSSKILL	300
HISTCMSVDN	200
HISTCMSCALLHIST	500
HISTCMSSYNONYM	10

Avaya Operational Analyst Historical Database Configurations

There are three possible Avaya Operational Analyst historical database configurations:

- Avaya CMS historical data only

- Avaya IC historical data only

- Avaya CMS and Avaya IC historical data

The following table shows the required filegroup or tablespace categories for each configuration.

	Avaya CMS only	Avaya IC only	Avaya CMS and Avaya IC
Common OA filegroups or tablespaces	Required	Required	Required
OA with IC filegroups or tablespaces	Required		Required
OA with CMS filegroups or tablespaces		Required	Required

The only OA requirements are the following:

- There must be at least one datafile per filegroup or tablespace.

- The size of each filegroup or tablespace, including all datafiles, must be at least the minimum size specified on the filegroup or tablespace tables above.

● Depending on your OA configuration, the filegroup or tablespace can get very large. Ask the Avaya Professional Services Organization (PSO) personnel to get the output of the OA 6.0 sizing tool for the maximum size of each OA Historical database filegroup or tablespace.

● If you choose the size of the filegroup or tablespace to be larger than the single disk capacity and if it has to span on multiple disks, create that filegroup or tablespace manually before you install OA historical feature. See SQL Server 2000 filegroup management on page 247 and Oracle tablespace management on page 255 for information on how to create a filegroup or tablespace manually.

● If you want to have any filegroup or tablespace reside on multiple disks initially, create that filegroup or tablespace manually before you install the OA Historical feature. See SQL Server 2000 filegroup management on page 247 and Oracle tablespace management on page 255 for information on how to create a filegroup or tablespace manually.

Microsoft SQL Server 2000

When you install a Microsoft SQL Server 2000 historical database for Avaya OA with Avaya IC on a server co-resident with the Avaya OA historical server:

1. Install the SQL Server 2000 Server and Client tools, following the procedures in Installing SQL Server 2000 Server and Client tools on page 46.

2. Install Avaya IC and use IC Database Designer to create IC Repository tables.

   Refer to Avaya IC documentation for installation procedures.

3. Configure SQL Server 2000, following the guidelines included in Configuring SQL Server 2000 on page 49.

4. Install Avaya Operational Analyst, following the instructions in Installing Avaya Operational Analyst on page 101 to configure the OA historical database.

When you install a Microsoft SQL Server 2000 historical database for Avaya OA with Avaya IC on a backend server:

1. Install the SQL Server 2000 Server and Client tools on the backend server, following the procedures in Installing SQL Server 2000 Server and Client tools on page 46.

2. Install Avaya IC and use IC Database Designer to create IC Repository tables.

   Refer to Avaya IC documentation for installation procedures.

3. Configure SQL Server 2000, following the guidelines included in Configuring SQL Server 2000 on page 49.

4. Create the backend database, following the guidelines included in Creating an SQL Server 2000 backend database on page 53.

5. Install SQL Server 2000 Client tools on the historical server, following the procedures in Installing SQL Server 2000 Server and Client tools on page 46.

6. Install Avaya Operational Analyst, following the instructions in Installing Avaya Operational Analyst on page 101 to configure the OA historical database.

Microsoft SQL Server 2000 is a reference for installing and configuring SQL Server 2000.

Installing SQL Server 2000 Server and Client tools

The method for installing SQL Server 2000 outlined below is intended as a quick guide to installation. These instructions are not intended as a substitute for SQL Server 2000 documentation. For detailed information about SQL Server 2000 installation and setup, please refer to the SQL Server 2000 documentation. It is also recommended that you install the latest service packs for the SQL Server software.

1. Log in as an administrator.

2. Insert the SQL Server 2000 Server CD into your CD-ROM drive.

   Note:

   The Enterprise version is required for 8-CPU servers.

   If the installation program does not autorun, go to the **English/Ent** directory and click **autorun.exe**.

3. Select **Install Database Server** and click **Next**.

4. Select **Local Computer** and click **Next**.

5. Select **Create a new Instance of SQL Server** and click **Next**.

6. Type the appropriate user information and click **Next**.

7. Accept the License Agreement and click **Next**.

8. Select **Server and Client Tools** if you have a co-resident database or **Client Tools** if you have a backend database and click **Next**.

   Note:

   If you select only Client Tools, most of the following screens will not be displayed. Complete the screens that are displayed.

9. On the **Instance Name** screen, uncheck **Default**. Then type an **Instance Name**. Use the same instance name throughout.

   Note:

   Write down the instance name because you will need it when you install the Avaya Operational Analyst historical subsystem. If you choose the default option, the instance name is **MSSQLSERVER**.

10. On the **Setup Type** screen, select **Custom**. Then designate the location for **Destination Folders**.

    SQL Server 2000 software and Avaya Operational Analyst software can be on the same disk, however, data files, including transaction logs, should be placed on a separate disk. See Designing database layout on page 51 for more details.

11. On the **Select Components** screen, select all the components (you may have to scroll down to see all components) and click **Next**.

    The **Services Accounts** screen is displayed.

12. Complete the **Services Accounts** screen.

    a. Select **Use the same account for each service**.

    b. Type a **Domain user account**.

    c. Type the corresponding **Password**.

> **Note:**
>
> Write down the user account and password because you will need it when you install the Avaya Operational Analyst historical subsystem. Like all other passwords, keep this information in a safe place.

   d. Click **Next**.

   The **Collation Settings** screen is displayed.

13. Complete the **Collation Settings** screen.

   a. Click **collation designator**.

   b. Uncheck all under **sort order**.

   c. Select the appropriate locale.

   For example, you might select **Latin1 General** for Latin based languages.

   d. Click **Next**.

   The **Network Libraries** screen is displayed.

14. Under **TCP/IP sockets** type **1433** for the port number. Click **Next**.

> **Note:**
>
> Write down the port number because you will need it when you install the Avaya Operational Analyst historical subsystem.

> ⚠ **CAUTION:**
>
> If you do not enter a value or accept the default of 0, MSSQL may assign a different port. You will need to use the SQL Server 2000 Server Network Utility to determine the assigned port number.

   The **Licensing Mode** screen is displayed.

   Depending upon the SQL Server 2000 edition you are installing and the number of seats you anticipate, choose the most cost-effective option:

● For SQL Server 2000 Enterprise Edition, purchase processor licenses if you have:

   ● A one-processor computer with more than 80 seats

   ● A two-processor computer with more than 198 seats

   ● A four-processor computer with more than 435 seats

   ● An eight-processor computer with more than 909 seats

   With fewer seats than specified, purchase server licenses.

● For SQL Server 2000 Standard Edition, purchase processor licenses if you have:

   ● A one-processor computer with more than 24 seats

   ● A two-processor computer with more than 53 seats

   ● A four-processor computer with more than 112 seats

- An eight-processor computer with more than 229 seats

Note:

    The 1 processor system is not valid for Avaya Operational Analyst.

15. Type your choice and click **Next**.

16. Reboot your system.

    SQL Server 2000 Server and Client tools are now installed.

Note:

    If your configuration includes Avaya IC, install it now. Refer to the Avaya IC documentation.

Configuring SQL Server 2000

The following steps suggest a general configuration for your newly installed database. If your configuration includes Avaya IC, ensure that it is installed and that its tables are created before you configure SQL Server 2000.

1. Start the `SQL Server Agent$instance name` service, and set it to **automatic**.

2. Limit the amount of memory that the SQL Server can use:

   a. From Enterprise Manager, right-click your database instance.

      The **SQL Server Properties (Configure)** screen is displayed:
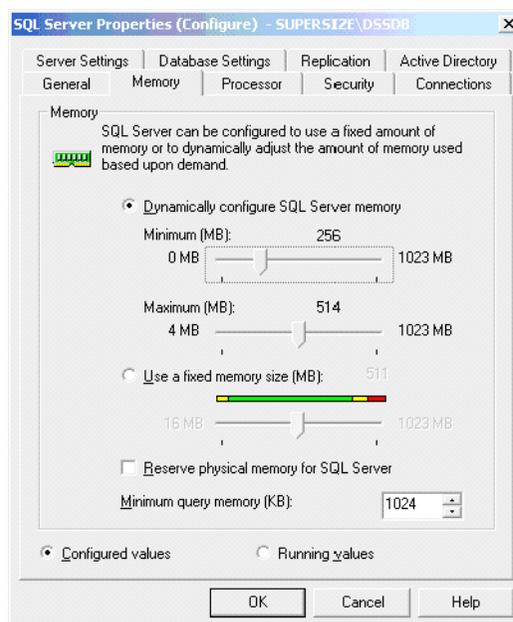
   b. Select the **Memory** tab.

   c. Choose **Dynamically configure SQL Server memory**.

   d. For **Minimum,** select ¼ of available RAM.

   e. For **Maximum,** select ½ of available RAM.

   f. Click **OK**.

Using the Query Analyzer to test the Installation

1. Launch the SQL Server Query Analyzer

2. Login using your System Administrator login (`sa`) and password, make sure you select the newly installed SQL server.

3. Make sure you can run some simple queries such as the following:

```
select * from sysdatabases
```

Configuration tips

The following tips come from *SQL Server Books Online* from Microsoft. You may find these recommendations helpful in setting up your database.

Optimizing tempdb performance

General recommendations for the physical placement and database options set for the **tempdb** database include:

- Allow the **tempdb** database to automatically expand as needed. This ensures that queries that generate larger than expected intermediate result sets stored in the `tempdb` database are not terminated before execution is complete.

- Set the original size of the **tempdb** database files to a reasonable size to prevent the files from automatically expanding as more space is needed. If the **tempdb** database expands too frequently, performance can be affected.

- Set the file growth increment percentage to a reasonable size to avoid the **tempdb** database files from growing by too small a value. If the file growth is too small compared to the amount of data being written to the **tempdb** database, then **tempdb** may need to constantly expand, thereby affecting performance.

- Place the **tempdb** database on a fast I/O subsystem to ensure good performance. Stripe the **tempdb** database across multiple disks for better performance. Use filegroups to place the **tempdb** database on disks different from those used by user databases.

Optimizing transaction log performance

- Create the transaction log on a physically separate disk or RAID (redundant array of independent disks) device. The transaction log file is written serially. Therefore, using a

separate, dedicated disk allows the disk heads to stay in place for the next write operation.

● Set the original size of the transaction log file to a reasonable size to prevent the file from automatically expanding as more transaction log space is needed. As the transaction log expands, a new virtual log file is created, and write operations to the transaction log wait while the transaction log is expanded. If the transaction log expands too frequently, performance can be affected.

● Set the file growth increment percentage to a reasonable size to prevent the file from growing by too small a value. If the file growth is too small compared to the number of log records being written to the transaction log, then the transaction log may need to expand constantly, affecting performance.

● Manually shrink the transaction log files rather than allowing Microsoft® SQL Server™ 2000 to shrink the files automatically. Shrinking the transaction log can affect performance on a busy system due to the movement and locking of data pages.

Designing database layout

You can create either a small or a large SQL Server 2000 database, depending on your particular needs. The sections below describe suggested physical disk layouts. It is recommended that you place logs on a separate disk and individual filegroups on different disks.

Small database layout

Here is an example physical disk layout for a small database:

Disk number	Drive letter	Contents
0	C	Windows 2000 system software
1	E	Avaya Operational Analyst software SQL Server 2000 software[1]

1. If possible, place transaction log files on a separate disk.

Large database layout

Here is an example physical disk layout for a large database:

Disk number	Drive letter	Contents
0	C	Windows 2000 system software
1	E	Avaya Operational Analyst Software SQL Server 2000 software
2	F	SQL Server 2000 data files[1] including: Master database datafiles Msdb database datafiles Tmpdb database datafiles
3	G	Transaction log files[2] including: Master database transaction log Msdb database transaction log Tmpdb database transaction log OA database Transaction log
4	H	**HISTSTATUS** filegroup **HISTICDISPLAY** filegroup **HISTCMSSYNONYM** filegroup
5	I	**HISTICAGENT** filegroup **HISTICAGENTSTATE** filegroup
6	J	**HISTICSVCCLASS** filegroup **HISTICSVCSTATE** filegroup
7	K	**HISTCMSAGENT** filegroup **HISTCMSVDN** filegroup
8	L	**HISTCMSCWC** filegroup **HISTCMSSKILL** filegroup
9	M	**HISTCMSCALLHIST** filegroup

1. SQL Server 2000 datafiles are installed in the locations you set during the SQL Server 2000 installation.

2. If possible, put transactions log files on a separate disk. You set the location of the log files during Avaya Operational Analyst installation, in the **Location of MSSQL DB Files** field of the **MS SQL Server 2000 Database Configuration** screen.

Each disk should be at least 9GB and not contain other components. The physical memory must be larger than 1GB. During the growth of the database, be sure that each disk has at least 100MB free space available at all times.

For transaction log destinations, you should reserve more than 4GB of free disk space (assuming you perform the recommended hourly transaction backup).

Creating an SQL Server 2000 backend database

To create a backend database for OA:

1. Create the database using the following commands:

```
USE MASTER

GO


CREATE DATABASE BACKEND DATABASE NAME

ON PRIMARY (NAME = BACKEND DATABASE NAMEfile1,

FILENAME = ' DRIVE LOCATION:\mssql\backenddbfile1.mdf ',

SIZE = 1MB,

MAXSIZE = UNLIMITED,

FILEGROWTH = 10%)


LOG ON

(NAME = BACKEND DATABASE NAMELog1,

FILENAME=' DRIVE LOCATION:\mssql\backenddbfile2.ndf ',

SIZE = 5MB,

MAXSIZE = UNLIMITED,

FILEGROWTH = 10%)

GO
```

Example

```
CREATE DATABASE SampleDatabase
ON PRIMARY (NAME = SampleDatabase_file1,
FILENAME = 'E:\mssql\SampleDatabase_file1.mdf ',
SIZE = 1MB,
MAXSIZE = UNLIMITED,
FILEGROWTH = 10%)


LOG ON
(NAME = SampleDatabase_log1,
FILENAME='E:\mssql\SampleDatabase_log1.ndf ',
SIZE = 5MB,
MAXSIZE = UNLIMITED,
FILEGROWTH = 10%)
GO
```

If an error is encountered, drop the database, correct the error, and recreate the database.

2. Add filegroups to the database using the following T_SQL commands from the query analyzer:

```
ALTER DATABASE BACKEND DATABASE NAME
ADD Filegroup FILEGROUP NAME
```

Example - Adding the HistAdmin filegroup

```
ALTER DATABASE SampleDatabase
ADD Filegroup HistAdmin
```

3. Add datafiles to the filegroups using the following commands.

```
ALTER DATABASE BACKEND DATABASE NAME

ADD FILE

(NAME = FILEGROUP NAME1,

FILENAME='E:\mssql\FILEGROUP NAME1.ndf ',

SIZE = SIZEMB,

MAXSIZE = UNLIMITED,

FILEGROWTH = 10%)

TO FILEGROUP FILEGROUP NAME
```

Example: Adding a data file to the HistAdmin filegroup

```
ALTER DATABASE SampleDatabase

ADD FILE

(NAME = HistAdmin_file1,

FILENAME='E:\mssql\HistAdmin_file1.ndf ',

SIZE = SIZEMB,

MAXSIZE = UNLIMITED,

FILEGROWTH = 10%)

TO FILEGROUP HistAdmin
```

> ⚠️ **WARNING:**
> Creating a virtual memory allocation creates a paging file of that size located on the system disk. Ensure that the system disk is created to support this need.

Make sure the virtual memory maximum size for your machine is set to at least as large as physical memory. You must also have enough free disk space in the transaction log destination to accommodate logs generated during the time that a full or incremental backup is running.

4. Space allocations for each of the filegroups should be as indicated by the output of the OA 6.0 sizing tool available from Avaya Professional Services Organization (PSO) personnel.

5. Make the **HistAdmin** filegroup the default filegroup using the following commands:

```
ALTER DATABASE BACKEND DATABASE NAME

MODIFY FILEGROUP HistAdmin DEFAULT
```

Example: Making HistAdmin the default filegroup

```
ALTER DATABASE SampleDatabase

MODIFY FILEGROUP HistAdmin DEFAULT
```

6. Reboot the system.

7. Log in and start the Query Analyzer application to verify that the installation is valid.

Now you can install the Operational Analyst software.

Deleting a prior SQL Server 2000 database

If an Avaya Operational Analyst historical database already exists, you must delete it before creating a new one.

To delete the database:

1. From the **SQL Server Enterprise Manager,** select **SQL Server Group**, then *local host\instance name*, then **Databases** as shown here:
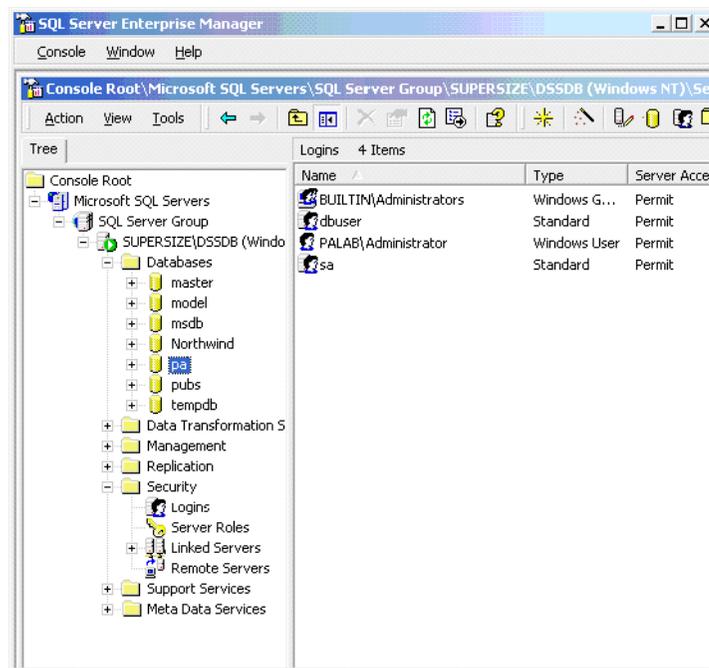
2. Right-click the desired database, for example: **oa**.

3. Select **Delete** from the menu bar.

> **Note:**
> You may have to stop the database before deleting it.

To delete database user login IDs:

1. From the **SQL Server Enterprise Manager** select **SQL Server Group**, then *local host\instance name*, then **Security**, then **Logins** as shown here:
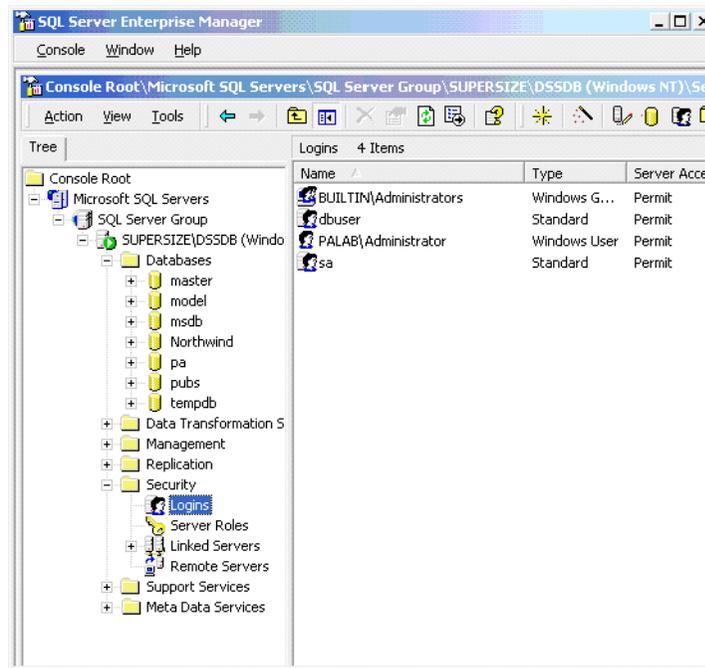
2. Right-click the desired login, for example **dbuser**.
3. Select **Delete** from the menu bar.

Oracle 8.1.7 on Windows

When you install an Oracle 8.1.7 historical database for Avaya OA with Avaya IC on a Windows database server co-resident with the historical server:

1. Install Oracle, following the instructions in Installing Oracle 8.1.7 database server on Windows on page 59.

2. Create the initial Oracle database instance, following the instructions in Creating an Oracle database instance on Windows on page 61.

3. Install Legato Storage Manager, if needed for backup, following the instructions in Installing Legato Storage Manager on Windows on page 68.

4. Install Avaya IC and use IC Designer to create IC tables.

    Refer to Avaya IC documentation for installation procedures.

5. Install Avaya Operational Analyst, following the instructions in Installing Avaya Operational Analyst on page 101

When you install an Oracle 8.1.7 historical database for Avaya OA with Avaya IC on a Windows backend server:

1. Install Oracle on the database server, following the instructions in Installing Oracle 8.1.7 database server on Windows on page 59.

2. Create the initial Oracle database instance on the database server, following the instructions in Creating an Oracle database instance on Windows on page 61.

3. Install Legato Storage Manager on the database server, if needed for backup, following the instructions in Installing Legato Storage Manager on Windows on page 68.

4. Install Avaya IC and use IC Designer to create IC tables.

    Refer to Avaya IC documentation for installation procedures.

5. Create the required OA tablespaces on the database server, following the instructions in Creating Avaya Operational Analyst tablespaces on Windows on page 69.

6. Install the Oracle database client on the historical server, following the instructions in Installing Oracle 8.1.7 database client on Windows on page 69.

7. Install Avaya Operational Analyst, following the instructions in Installing Avaya Operational Analyst on page 101

The method for installing Oracle outline in below is intended as a quick guide to installation, specific for this release of Avaya Operational Analyst and this release of Oracle. These instructions are not intended as a substitute for Oracle 8i documentation. For detailed information about Oracle installation and setup, consult the Oracle 8i documentation.

Installing Oracle 8.1.7 database server on Windows

The Oracle database server software should be installed only on the server that is to act as the OA Historical Database server.

1. Insert the Oracle 8.1.7 CD-ROM in your CD-ROM drive.

2. In the pop-up window, click **Install/Deinstall Products**.

3. In the **Oracle Universal Installer** window, click **Next**.

4. If you are prompted for the **Oracle Home** and its path, type the following:

   - **Oracle Home = OraHome81**

   - **Path** = *drive letter:*`\Oracle\Ora81`

   Click **Next**.

5. Select **Oracle Enterprise Edition**. Click **Next**.

6. Select **Custom Installation** for the installation type. Click **Next**.

7. In the **Available Components** window, uncheck the following:

   - **Oracle Product Options**

   - **Development tools**

   - **Oracle HTTP Server**

   - **Oracle Enterprise Manager Products**

   Click **Next**.

8. See the **Component Locations** window to verify that the Total Required Disk Space is smaller than the Available Disk Space.

   Note:

   > If this is not the case, click **Previous** on each window to return to the **File Location** window and choose a new location that has ample disk space. If you cannot find a disk with enough space, exit the Oracle installation, create more disk space, and reattempt installation.

9. Click **Next**.

10. In the **Create Database** window, select **No** and click **Next**.

11. In the **Summary** window, click **Install**.

    Note:

    > If the system displays the message: **Error in writing to file c:\winnt\system32\mfc42u.dll**, click **Ignore** in the Message window.

    a. In the **Net8 Configuration Assistant: Welcome** window, click **Next**.

    b. In the **Net8 Configuration Assistant: Directory Service Access** window, select **No** and click **Next**.

    c. In the **Listener Name** window, accept the default setting and click **Next**.

    d. In the **Select Protocols** window, accept the default setting and click **Next**.

    e. In the **TCP/IP Protocol** window, accept the default setting and click **Next**.

> **Note:**
>
> Write down the port number because you will need it when you install the Avaya Operational Analyst historical subsystem.

    f. In the **More Listener?** window, accept the default setting and click **Next**.

    g. In the **Listener Configuration Done** window, click **Next**.

    h. In the **Naming Methods Configuration** window, select **No** and click **Next**.

    i. In the **Done** window, click **Finish**.

> **Note:**
>
> If the detail message says **NullPointerException** and the Net8 configuration is hanging there, highlight the **Net8 Configuration** and click **Stop**. Refer to the Oracle documentation for complete information.

12. In the **Oracle Universal Installer** window, click **Exit**.

13. At the **Exit** prompt, click **Yes**.

The Oracle 8.1.7 database server is now installed.

Preventing Interactions between Oracle and Operational Analyst

Use the following steps to prevent interactions between Oracle and the Avaya Operational Analyst software.

1. Right-click **My Computer** or the *Machine Name* shortcut and open **Properties**.

2. In the **Environment** folder, find the variable **PATH**.

3. Remove **c:\Program Files\Oracle\jre\1.1.7\bin** from the path. Click **Set**. Click **OK**.

4. In the **Environment** folder, find the variable **CLASSPATH**.

5. Type *Oracle location*\jdbc\lib\classes12.zip in the variable. Click **Set**. Click **OK**.

Creating an Oracle database instance on Windows

The method outlined below explains how to create a generic Oracle database intended for use with the Avaya Operational Analyst Historical Database feature. The instructions in this guide are specific to this release of Avaya Operational Analyst and this release of Oracle. To determine the size of database your system requires, contact your Avaya Professional Services representative for use of the Avaya Operational Analyst sizing tool. If an Avaya Operational Analyst historical database already exists, you must delete it before creating a new one. For instructions on deleting a database, see Deleting a prior database on Windows on page 71.

> **Note:**
> All operating system users must exist in the ORA_DBA group to perform the following tasks.

Creating a compact historical database

The database created by the following method occupies only one disk in addition to the system disk. This database is the minimum size required to run the Avaya Operational Analyst applications. Creating the database will take about 10 to 15 minutes.

1. Open **Start > Programs > Oracle > OraHome81 > Database Administration > Database Configuration Assistant**.

2. Select **Create A Database** and click **Next**.

3. Select **Custom** and click **Next**.

4. Select **Multipurpose** and click **Next**.

5. Type **100** for **Concurrently Connected Users.** Click **Next**.

6. Select **Dedicated Server Mode.** Click **Next**.

7. Uncheck the following:

   - **Oracle JServer**

   - **Advanced Replication**

   Click **Next**.

8. Set the **Global Database Name** to be *instanceid.machinename.domainname* (for example, **mysid.machine1.denver.avaya.com**) .

9. Set the **SID** to be *instanceid* (this should be done automatically).

   > **Note:**
   > Write down the *instanceid* because you will need it when you install the Avaya Operational Analyst historical subsystem.

10. Click **Change Character Set**.

11. Change both the **Character Set** and **National Character Set** to be **UTF8**. Click **OK**.

12. Click **Next**.

13. Accept the default setting and click **Next**.

14. Accept the default setting but change the **%Increase of Storage in System Tablespace** to **0**. Click **Next**.

15. Accept the default setting and click **Next**.

16. Change **Checkpoint Interval** to **24**.

17. Change **Checkpoint Timeout** to **0**.

18. Enable the **Archive Log**.

19. Click **Next**.

20. Accept the default setting and click **Next**.

21. Accept the default setting and click **Next**.

22. Select **Create the Database Now** and click **Finish**.

23. In the **Alert** window, click **Yes**.

    Note:

    If Oracle cannot find enough free space, you must create more free space first and try to create the database again later.

24. After the database has been created, remember the password for the default database administrator user **sys** (should be **change_on_install**) displayed in the report screen. Click **OK**.

25. Open a command window and run **Oracle Server Manager** to change the password for **sys** to *newpassword* by entering the following commands:

    ```
    svrmgrl

    connect internal/oracle

    alter user sys identified by newpassword;

    exit
    ```

    Note:

    Write down the *newpassword* because you will need it when you install the Avaya Operational Analyst historical subsystem.

You can now install the Avaya IC software.

Creating a large historical database

The database created by this method occupies multiple disks. The following is an example of the basic requirements for physical disk layout.

Disk number	Drive letter	Contents
0	C	Windows system software
1	E	Oracle 8i software Avaya Operational Analyst software Oracle **SYSTEM** tablespace Oracle control file 1
2	F	Oracle redo log member 1 Oracle **USERS** tablespace Oracle **TOOLS** tablespace Oracle control file 2 Oracle archived log files OA **HISTADMIN** tablespace OA **HISTIDMAP** tablespace
3	G	Oracle rollback segments tablespace Oracle **TEMP** tablespace Oracle **INDX** tablespace Oracle redo log member 2 Oracle control file 3
4	H	**HISTSTATUS** tablespace **HISTICDISPLAY** tablespace **HISTCMSSYNONYM** tablespace
5	I	**HISTICAGENT** tablespace **HISTICAGENTSTATE** tablespace
6	J	**HISTICSVCCLASS** tablespace **HISTICSVCSTATE** tablespace
7	K	**HISTCMSAGENT** tablespace **HISTCMSVDN** tablespace
8	L	**HISTCMSCWC** tablespace **HISTCMSSKILL** tablespace
9	M	**HISTCMSCALLHIST** tablespace

Each disk should be at least 9GB and should not contain other components. The physical memory of the machine must be larger than 1GB. During the growth of the database, be sure that each disk has at least 100MB free space at all times.

For archive log destinations, you should reserve more than 4GB of free disk space (assuming you perform the recommended hourly archive backup). Refer to the Oracle documentation for further details.

> ⚠ **CAUTION:**
>
> If the database will be larger than 100 GB (the combined used space of all the OA tablespaces), please locate the Oracle rollback segments tablespace on one disk by itself and assign the Oracle archive log file destination to a disk by itself. Also, increase the **TEMP** tablespace to 5 GB.

The drive letter can be different from the default. However, the following steps use the default values as an example. The sizes shown in this example are representative only. Use the Avaya Operational Analyst sizing tool available from your Avaya Professional Services representative to determine exact size requirements.

1. On each disk from 2 to 9, create the directory

    ```
    Oracle/oradata
    ```

2. Open **Start > Programs > Oracle > OraHome81 > Database Administration > Database > Configuration Assistant**.

3. Select **Create A Database** and click **Next**.

4. Select **Custom** and click **Next**.

5. Select **Multipurpose** and click **Next**.

6. Type **500** for **Concurrently Connected Users** and click **Next**.

7. Select **Dedicated Server Mode** and click **Next**.

8. Uncheck the following and click Next:

    - **Oracle JServer**

    - **Advanced Replication**

    - **Oracle Spatial**

9. Set the **Global Database Name** to *instanceid.machinename.domainname* (for example, **mysid.machine1.denver.avaya.com**).

10. Set the **SID** to *instanceid* (this should be done automatically).

    Note:

    Write down the *instanceid* because you will need it when you install the Avaya Operational Analyst historical subsystem.

11. Click **Change Character Set**.

12. Change both **Character Set** and **National Character Set** to **UTF8**. Click **OK**.

13. Click **Next**.

14. Set the following:

    ● **Control File 1** = e:\Oracle\oradata\control01.ctl

    ● **Control File 2** = f:\Oracle\oradata\control02.ctl

    ● **Control File 3** = g:\Oracle\oradata\control03.ctl

    Click **Next**.

15. Click **System** folder. Set the following:

    ● **File = e:\Oracle\oradata\system01.dbf**

    ● **Size (MB) = 100**

    ● **% Increase of storage = 0**

16. Click **Tools** folder. Set the following:

    ● **File = f:\Oracle\oradata\tools01.dbf**

17. Click **User** folder. Set the following:

    ● **File = f:\Oracle\oradata\users01.dbf**

18. Click **Rollback** folder and set the following:

    ● **Name = RBS1**

    ● **Size (MB) = 4000**

    ● **File = g:\Oracle\oradata\rbs01.dbf**

    ● **Next (KB) of Extents = 10240**

    ● **Minimum Extent (KB) of Extents = 10240**

    ● **Initial (KB) of Storage = 10240**

    ● **Next (KB) of Storage = 10240**

    ● **Minimum Number (Min.) = 20**

    ● **%increase of Storage = 0**

    ● **Maximum Number = Unlimited**

19. Click **Index** folder. Set the following:

    ● **File = g:\Oracle\oradata\indx01.dbf**

20. Click **Temporary** folder and set the following:

    ● **File = g:\Oracle\oradata\temp01.dbf**

    ● **SIZE (MB) = 2000**

    Click **Next**.

21. Set the **Redo Log** files:

    - **Redo Log 1 File = f:\Oracle\oradata\redo0101.log**

    - **Redo Log 2 File = f:\Oracle\oradata\redo0201.log**

    - **Redo Log 3 File = f:\Oracle\oradata\redo0301.log**

    - **Redo Log 1 File Size (KB) = 51200**

    - **Redo Log 2 File Size (KB) = 51200**

    - **Redo Log 3 File Size (KB) = 51200**

    Click **Next**.

22. Change **Checkpoint Interval** to **24** and **Checkpoint Timeout** to **0**.

23. Enable **Archive Log**.

24. Set the **Archive Destination** to **f:\Oracle\oradata\archive**

25. Click **Next**.

26. Make sure the **Shared Pool Size (Bytes)** is equal to or larger than **104857600**. If it is not, change it to **104857600**.

27. Make sure that **Block Buffers** is equal to or larger than **38400**. If it is not, change it to **38400**.

28. Set **Processes** to **515**.

29. Make sure the **Block Size (Bytes)** is **8192**. Click **Next**.

30. Set **For User Processes** to **e:\Oracle\admin\udump**

31. Set **For Background Processes** to **e:\Oracle\admin\bdump**

32. Click **Next**.

33. Select **Create The Database Now** and click **Finish**.

34. In the **Alert** window, click **Yes**.

    Creation of the database will take about 10 to 15 minutes.

    > **Note:**
    >> If Oracle cannot find enough free space, you will receive a message to that effect. You will then need to create more free space and try to create the database again.

35. After the database has been created, make a note of the password for the default database administrator user **sys** (this should be **change_on_install**) that is displayed in the report screen. Click **OK**.

Change the password for the user sys, add the redo logfiles and shrink the rollback segments.

1. Open a command window and run Oracle Server Manager. Use the same **svrmgrl** session to accomplish these tasks:

2. Change the password for sys to *newpassword* by entering the following commands:

   ```
   svrmgrl

   connect internal/oracle

   alter user sys identified by newpassword;
   ```

   Note:

   > Write down the *newpassword* because you will need it when you install the Avaya Operational Analyst historical subsystem.

3. Add the redo logfiles:

   ```
   alter database add logfile member
     'g:\oracle\oradata\redo0102.log' to group 1;

   alter database add logfile member
     'g:\oracle\oradata\redo0202.log' to group 2;

   alter database add logfile member
     'g:\oracle\oradata\redo0302.log' to group 3;
   ```

4. Determine the number of public rollback segments in tablespace **RBS1**:

   ```
   select count(name) from v$rollname where name != 'SYSTEM';
   ```

5. If there are more than 20 public rollback segments, note the number above 20 and run the following command to find the names of the current inactive rollback segments. Note the names of the segments to drop later.

   ```
   select name from v$rollname, v$rollstat

    where v$rollname.usn = v$rollstat.usn

    and    v$rollstat.xacts = 0

    and    v$rollname.name != 'SYSTEM';
   ```

6. Drop the noted segments by running this command for each segment, where *seg name* represents the name you noted.

   ```
   alter rollback segment seg name offline;

   drop public rollback segment seg name;
   ```

   Tip:

   > Repeat the process of counting public rollback segments and dropping extra public rollback segments until you are sure there are only 20 public rollback segments remaining.

7. Complete the **svrmgrl** session with the following commands:

```
shutdown immediate

startup

exit
```

You can now install the Avaya IC software.

Installing Legato Storage Manager on Windows

Installing Legato Storage Manager (LSM) is optional. LSM should be installed only on a machine if the Avaya Operational Analyst historical database residing on that machine needs to be backed up. To get more information on LSM, see the Oracle document *Legato Storage Manager - Administrator's Guide*.

The following are the steps for installing LSM.

1. Create a **LSM** directory under the **ORACLE_HOME** directory.

2. Insert the Oracle CD-ROM into your CD-ROM drive.

3. Exit the **Oracle Autorun** window.

4. Unzip the Legato files from the **lsm** directory on the CD-ROM to the **LSM** directory you created.

5. Select **Start Menu > Run**.

6. From **Run**, click **Browse** and go to **LSM** directory.

7. Execute **setup**.

8. For the first setup option, click **Next**.

9. For the destination directory, select the **LSM** directory. Click **Next**.

10. For the server name, type *machinename.domainname.* Click **Next**.

11. Put the **LSM bin** directory in the **PATH** environment variable.

12. Register Legato Storage Manager.

    After LSM is installed, it shows up under **Start > Programs > NetWorkerGroup > NetWorker Administrator**.

Before you can use the Legato Storage Manager, you must configure it:

1. Configure the tape drive:

   a. In Media Management/Devices, right-click **Devices** and choose **Create...**

   b. Select the **Media Type** (for example, **8mm**).

   c. For the rest of the options, accept the default values.

2. Prepare a tape:

     a. In Media Management/Devices, right-click the device (for example, **\\.\Tape0**)

     b. Select **Operations**.

     c. Insert a blank or disposable tape. Click **Label**.

     d. LSM will suggest a name. Accept it or enter your own.

       The label process takes a few minutes.

Creating Avaya Operational Analyst tablespaces on Windows

After you install Avaya IC in a configuration with a backend database server, you manually configure the OA tablespaces on the database server.

1. Use Oracle tools to create tablespaces as defined by the output of the OA 6.0 sizing tool available from Avaya Professional Services Organization (PSO) personnel.

2. If any tablespace will be larger than the maximum size of one disk, add more datafiles to that tablespace.

3. Make sure the virtual memory maximum size for your Windows-based machine is larger than 2GB.

    ⚠ **WARNING:**

    Creating a virtual memory allocation creates a paging file of the same size on the system disk. Ensure that the system disk is created to support this need.

    You must also have sufficient free disk space in the archive log destination to accommodate generated logs during the time that a full or incremental backup is running.

You can now install the Avaya Operational Analyst software.

Installing Oracle 8.1.7 database client on Windows

The Oracle Client software should be installed on the OA historical server if the OA Historical Database server will be a backend database server.

1. Insert the Oracle 8.1.7 CD-ROM into your CD-ROM drive.

2. In the pop-up window, click **Install/Deinstall Products**.

3. In the **Oracle Universal Installer** window, click **Next**.

4. If you are prompted for the **Oracle Home** and its path, type the following:

- **Oracle Home** = **OraHome81**
- **Path** = *drive letter*:**\Oracle\Ora81**

Click **Next**.

5. Select **Oracle 8i Client**. Click **Next**.

6. Select **Custom Installation** for the installation type. Click **Next**.

7. In the **Available Components** window, uncheck the following:

   - **Oracle Programmer**

   - **Oracle Enterprise Manager Products**

   - **Oracle InterMedia Client Option**

   - **Oracle Visual Information Retrieval Client**

   - **Oracle Internet Directory Client**

   - **Oracle Workflow Client**

   Click **Next**.

8. See the **Component Locations** window to verify that the **Total Required Disk Space** is smaller than the **Available Disk Space.** Click **Next**.

9. In the **Oracle Protocol Support** window, click **Next**.

10. In the **Summary** window, click **Install**.

11. In the **Net8 Configuration Assistant: Welcome** window, click **Next**.

    a. In the **Net8 Configuration Assistant: Directory Service Access** window, select **No.** Click **Next**.

    b. In the **Select Naming Methods** window, click **Next**.

    c. In the **Net Service Name Configuration, Database Version** window, click **Next**.

    d. In the **Net Service Name Configuration, Service Name** window, type the global database name for the backend database (for example, **oracle_sid.hostname.domain**). Click **Next**.

    e. In the **Net Service Name Configuration, Select Protocols** window, accept the default setting. Click **Next**.

    f. In the **Net Service Name Configuration, TCP/IP Protocol** window, type the host name of the backend database server. Click **Next**.

    g. In the **Net Service Name Configuration, Test** window, click **Next**.

    h. In the **Net Service Name Configuration, Net Service Name** window, type *hostname of backend database server.oracle_sid* (for example, **myserver.mysid**). Click **Next**.

    i. In the **Net Service Name Configuration, Another Net Service Name?** window, click **Next**.

    j. In the **Net Service Name Configuration, Done** window, click **Next**.

    k. In the **Naming Methods Configuration, Done** window, click **Next**.

    l. In the **Done** window, click **Finish**.

12. In the **Oracle Universal Installer** window, click **Exit**.

13. At the **Exit** prompt, click **Yes**.

The Oracle 8.1.7 database client is now installed.

Preventing Interactions between Oracle and Operational Analyst

Use the following steps to prevent interactions between Oracle and the Avaya Operational Analyst software.

1. Right-click **My Computer** or the *Machine Name* shortcut and open **Properties**.

2. In the **Environment** folder, find the variable **PATH**.

3. Remove **c:\Program Files\Oracle\jre\1.1.7\bin** from the path. Click **Set**. Click **OK**.

4. In the **Environment** folder, find the variable **CLASSPATH**.

5. Type *Oracle location*`\jdbc\lib\classes12.zip` in the variable. Click **Set**. Click **OK**.

You can now install the Avaya Operational Analyst software.

Deleting a prior database on Windows

If a Avaya Operational Analyst historical database already exists, you must delete it before creating a new one.

To delete the database:

1. Open a command window and run Oracle SQLPLUS by typing `sqlplus /nolog.`

2. In Oracle SQLPLUS, run the following commands:

   connect SYS/oracle as sysdba

   shutdown immediate

   exit

3. Open the Database Configuration Assistant:

   ● Select **Start** > **Programs** > **Oracle** > **OraHome81** > **Database Administration** > **Database Configuration Assistant**.

4. Select **Delete A Database.** Click **Next**.

5. Select the *instanceid* to delete and type **oracle** as the password for **INTERNAL**. Click **Finish**.

6. In the **Alert** window, click **Yes**.

7. In the **Confirm** window, click **Yes**.

8. In the **Feedback** window, click **OK**.

9. Manually remove the directories and files:

- **%ORACLE_BASE%\Admin***instanceid*
- The contents in **%ORACLE_BASE%\oradata**

Oracle 8.1.7 on Solaris

When you install an Oracle 8.1.7 historical database for Avaya OA with Avaya IC on a Solaris database server co-resident with the historical server:

1. Install Oracle, following the instructions in Installing Oracle 8.1.7 database server on Solaris on page 74.

2. Create the initial Oracle database instance, following the instructions in Creating the initial Oracle database instance on Solaris on page 76.

3. Install Legato Storage Manager, if needed for backup, following the instructions in Installing Legato Storage Manager on Solaris on page 87.

4. Install Avaya IC and use IC Designer to create IC tables.

   Refer to Avaya IC documentation for installation procedures.

5. Install Avaya Operational Analyst, following the instructions in Installing Avaya Operational Analyst on page 101

When you install an Oracle 8.1.7 historical database for Avaya OA with Avaya IC on a Solaris backend server:

1. Install Oracle on the database server, following the instructions in Installing Oracle 8.1.7 database server on Solaris on page 74.

2. Create the initial Oracle database instance on the database server, following the instructions in Creating the initial Oracle database instance on Solaris on page 76.

3. Install Legato Storage Manager on the database server, if needed for backup, following the instructions in Installing Legato Storage Manager on Solaris on page 87.

4. Install Avaya IC and use IC Designer to create IC tables.

   Refer to Avaya IC documentation for installation procedures.

5. Create the required OA tablespace on the database server, following the instructions in Creating Avaya Operational Analyst tablespaces on Solaris on page 88.

6. Install the Oracle database client on the historical server, following the instructions in Installing Oracle 8.1.7 database client on Solaris on page 88.

7. Install Avaya Operational Analyst, following the instructions in Installing Avaya Operational Analyst on page 101

The method for installing Oracle outline in below is intended as a quick guide to installation, specific for this release of Avaya Operational Analyst and this release of Oracle. These instructions are not intended as a substitute for Oracle 8i documentation. For detailed information about Oracle installation and setup, consult the Oracle 8i documentation.

Installing Oracle 8.1.7 database server on Solaris

The Oracle database server software should be installed only on the server that is to act as the OA Historical Database server.

8. Mount **/oracle** to a disk partition that has a minimum of 8GB free disk space.

9. Log on as **root** and run the following commands to create the new password, *newpassword*, for the new user, *neworacleuser*:

   ```
   groupadd dba
   ```

   ```
   useadd -g dba -m -d /oracle neworacleuser
   ```

   ```
   passwd newpassword
   ```

10. Make sure that `/oracle` is accessible by the *neworacleuser*.

11. Log on as *neworacleuser*.

12. Edit .profile, adding the following:

    ```
    unmask 022
    ```

    ```
    ORACLE_BASE=/oracle
    ```

    ```
    ORACLE_HOME=$ORACLE_BASE/product/8.1.7
    ```

    ```
    ORACLE_TERM=xsun
    ```

    ```
    CLASSPATH=$CLASSPATH:$ORACLE_HOME/jdbc/lib/classes12.zip
    ```

    ```
    LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$ORACLE_HOME/lib:$ORACLE_HOME/
      jdbc/lib
    ```

    ```
    PATH=$PATH:$ORACLE_HOME/bin
    ```

    ```
    export ORACLE_BASE ORACLE_HOME ORACLE_TERM CLASSPATH
    ```

    ```
    LD_LIBRARY_PATH PATH
    ```

13. Enter the command:

    ```
    ..profile
    ```

14. Insert the Oracle 8.1.7 CD-ROM in your CD-ROM drive.

15. Enter the command:

    ```
    /cdrom/oracle/runInstaller
    ```

16. In the pop-up window, click **Next**.

17. In the File Locations window, set **Destination** to **/oracle/product/8.1.7**. Click **Next**.

18. Accept the default empty **Group Name**. Click **Next**.

19. Run the command:

    ```
    orainstRoot.sh
    ```

Note:

You must have root permissions to run this command.

20. Select **Oracle Enterprise Edition**. Click **Next**.

21. Select **Custom Installation** for the installation type. Click **Next**.

22. In the **Available Components** window, uncheck the following:

   ● **Oracle HTTP Server**

   ● **Oracle Enterprise Manager Products**

   ● **Development tools**

   ● **Legato Storage Manager** under **Oracle Product Options**

   Click **Next**.

23. In the **Component Locations** window, make sure that the Total Required Disk Space is smaller than the Available Disk Space. Click **Next**.

   Note:

   If this is not the case, click **Previous** on each window to return to the **File Location** window and choose a new location that has ample disk space. If you cannot find a disk with enough space, you must exit the Oracle installation, create more disk space, and reattempt installation.

24. In the **Privileged Operating System Groups** window, click **Next**.

25. In the **Authentication Methods** window, click **Next**.

26. In the **Create Database** window, select **No**. Click **Next**.

27. In the **Summary** window, click **Install**.

28. Follow the screen instructions and run the following command:

   `root.sh`

29. Follow the screen instructions to insert the second disk. Type **/cdrom/oracle#1** for the disk location.

30. In the **Configuration Assistant: Welcome** window, click **Next**.

   a. In the **Net8 Configuration Assistant: Directory Service Access** window, select **No** and click **Next**.

   b. In the **Listener Name** window, accept the default setting. Click **Next**.

   c. In the **Select Protocols** window, accept the default setting. Click **Next**.

   d. In the **TCP/IP Protocol** window, accept the default setting. Click **Next**.

   Note:

   Write down the port number because you will need it when you install the Avaya Operational Analyst historical subsystem.

   e. In the **More Listener?** window, accept the default setting. Click **Next**.

     f. In the **Listener Configuration Done** window, click **Next**.

     g. In the **Naming Methods Configuration** window, select **No**. Click **Next**.

     h. In the **Done** window, click **Finish**.

31. In the **Oracle Universal Installer** window, click **Exit**.

32. At the **Exit** prompt, click **Yes**.

The Oracle 8.1.7 database is now installed on the database server.

Creating the initial Oracle database instance on Solaris

The method outlined below explains how to create a generic Oracle database intended for use with the Avaya Operational Analyst Historical Database Feature. The instructions in this guide are specific to this release of Avaya Operational Analyst and this release of Oracle. To determine the size of database your system requires, contact your Avaya Professional Services representative for use of the Avaya Operational Analyst sizing tool. If an Avaya Operational Analyst historical database already exists, you must delete it before creating a new one. For instructions on deleting a database, see Deleting a prior database in Solaris on page 91.

Creating a compact historical database

The database created by this method occupies only one disk in addition to the system disk. This database is the minimum size required to run the Avaya Operational Analyst applications.

1. Log on as **root**.

2. Edit **/etc/system** to set the following parameters:

shmsys:shminfo_shmmax = *size of physical memory on machine* (for example **268435456** for 256 MB)

shmsys:shminfo_shmmni = **100**

shmsys:shminfo_shmseg = **10**

semsys:seminfo_semmni = **100**

semsys:seminfo_semmsl = **160**

semsys:seminfo_semmns = **310**

semsys:seminfo_semopm = **100**

semsys:seminfo_semvmx = **32767**

3. Reboot the machine.

4. Log on as *neworacleuser*.

5. Enter **dbassist** to open the **Database Configuration Assistant**.

6. Select **Create a Database**. Click **Next**.

7. Select **Custom** and click **Next**.

8. Select **Multipurpose** and click **Next**.

9. Type **100** for **Concurrently Connected Users**. Click **Next**.

10. Select **Dedicated Server Mode**. Click **Next**.

11. Uncheck the following:

    a. **Oracle JServer**

    b. **Advanced Replication**

    c. **Oracle Spatial**

12. Click **Next**.

13. Set the **Global Database Name** to be *instanceid.machinename.domainname* (for example, **mysid.machine1.denver.avaya.com**) .

14. Set the **SID** to be *instanceid*.

    Note:

    Write down the *instanceid* because you will need it when you install the Avaya Operational Analyst historical subsystem.

15. Click **Change Character Set**.

16. Change both the **Character Set** and **National Character Set** to be **UTF8**. Click **OK**.

17. Click **Next**.

18. Accept the default setting and click **Next**.

19. Accept the default setting but change the **%Increase of Storage in System Tablespace** to **0**. Click **Next**.

20. Accept the default setting. Click **Next**.

21. Change **Checkpoint Interval** to **24**.

22. Change **Checkpoint Timeout** to **0**.

23. Enable the **Archive Log**.

24. Click **Next**.

25. Accept the default setting. Click **Next**.

26. Accept the default setting. Click **Next**.

27. Select **Create the Database Now**. Click **Finish**.

28. In the Alert window, click **Yes**.

    Creating the database will take about 10 to 15 minutes.

> **Note:**
>
> > If Oracle cannot find enough free space, you must create more free space
> > first and try to create the database again later.

29. After the database has been created, remember the password for the default database
   administrator user **sys** (should be **change_on_install**) displayed in the report screen.
   Click **OK**.

30. Edit **$HOME/.profile** and add the following:

   ```
   ORACLE_SID=instanceid
   ```

   ```
   export ORACLE_SID
   ```

31. Enter **svrmgr1** to open **Oracle Server Manager**.

32. Change the password of the default user **sys** by running the following commands:

   ```
   connect internal/oracle
   ```

   ```
   alter user sys indenfied by newpassword;
   ```

   ```
   exit
   ```

   > **Note:**
   >
   > > Write down the `newpassword` because you will need it when you install the
   > > Avaya Operational Analyst historical subsystem.

33. Edit **$ORACLE_HOME/bin/dbshut**, and change **shutdown** to **shutdown immediate**.

Configure the system to automatically startup and shutdown the Oracle database during the reboot.

1. Log on as **root**.

2. Edit **/var/opt/oracle/oratab** and change *instanceid***:/oracle/product/8.1.7:N** to
   *instanceid***:/oracle/product/8.1.7:Y**.

   > **Note:**
   >
   > > Make sure there are two entries, ***:/oracle/product/8.1.7:N** and
   > > *instanceid***:/oracle/product/8.1.7:Y**. If the server has multiple instances,
   > > make sure they are all in 8.1.7 version.

3. Edit **/etc/init.d/dbora** as follows:

```
#!/bin/sh
# Set ORA_HOME to be equivalent to the ORACLE_HOME
# from which you wish to execute dbstart and
# dbshut
# set ORA_OWNER to the user id of the owner of the
# Oracle database in ORA_HOME
ORA_HOME=/oracle/product/8.1.7
ORA_OWNER=neworacleuser
case "$1" in
'start')
# Start the Oracle databases:
# The following command assumes that the oracle login will not
  prompt the
# user for any values
su - $ORA_OWNER -c $ORA_HOME/bin/dbstart &
su - $ORA_OWNER -c $ORA_HOME/bin/tnslsnr &
;;
'stop')
# Stop the Oracle databases:
# The following command assumes that the oracle login will not
  prompt the
# user for any values
su - $ORA_OWNER -c $ORA_HOME/bin/dbshut &
;;
esac
```

4. Create two links by entering the following commands:

```
ln -s /etc/init.d/dbora /etc/rc0.d/K10dbora
ln -s /etc/init.d/dbora /etc/rc2.d/S99dbora
```

5. Make sure that **$ORACLE_HOME/dbs/init**_instanceid_**.ora** is an existing file that contains the single line that follows:

```
ifile = /oracle/admin/instanceid/pfile/init.ora
```

6. Reboot the machine.

7. Log on as *neworacleuser*.

8. Make sure the database is open after the reboot by running the following commands:

   ```
   sqlplus sys/newpassword
   ```

   ```
   exit
   ```

   The database is now ready for you to install the Avaya IC software.

Creating a large historical database

The database created by this method occupies multiple disks. The following is an example of the basic requirements for physical disk layout.

Disk number	Mount point	Contents
1	/oracle	Oracle 8i software Avaya Operational Analyst software Oracle **SYSTEM** tablespace Oracle control file 1
2	/oracle_data1	Oracle redo log member 1 Oracle **USERS** tablespace Oracle **TOOLS** tablespace Oracle control file 2 Oracle archived log files OA **HISTADMIN** tablespace OA **HISTIDMAP** tablespace
3	/oracle_data2	Oracle rollback segments tablespace Oracle **TEMP** tablespace Oracle **INDX** tablespace Oracle redo log member 2 Oracle control file 3
4	/oracle_data3	**HISTSTATUS** tablespace **HISTICDISPLAY** tablespace **HISTCMSSYNONYM** tablespace
5	/oracle_data4	**HISTICAGENT** tablespace **HISTICAGENTSTATE** tablespace
6	/oracle_data5	**HISTICSVCCLASS** tablespace **HISTICSVCSTATE** tablespace

Disk number	Mount point	Contents
7	/oracle_data6	**HISTCMSAGENT** tablespace **HISTCMSVDN** tablespace
8	/oracle_data7	**HISTCMSCWC** tablespace **HISTCMSSKILL** tablespace
9	/oracle_data8	**HISTCMSCALLHIST** tablespace

Each disk should be at least 9GB and should not contain other components. The physical memory of the machine must be larger than 1GB. During the growth of the database, be sure that each disk has at least 100MB free space at all times.

For archive log destinations, you should reserve more than 4GB of free disk space (assuming you perform the recommended hourly archive backup). Refer to the Oracle documentation for further details.

> ⚠ **CAUTION:**
> If the database will be larger than 100 GB (the combined used space of all the OA tablespaces), please locate the Oracle rollback segments tablespace on one disk by itself and assign the Oracle archive log file destination to a disk by itself. Also, increase the **TEMP** tablespace to 5 GB.

The mount point can be different from the default. However, the following steps use the default values as an example. The sizes shown in this example are representative only. Use the Avaya Operational Analyst sizing tool available from your Avaya Professional Services representative to determine exact size requirements.

1. Log on as **root**.

2. Edit **/etc/system** to set the following parameters:

   shmsys:shminfo_shmmax = *size of physical memory on machine* (for example **268435456** for 256 MB)

   shmsys:shminfo_shmmni = **100**

   shmsys:shminfo_shmseg = **10**

   semsys:seminfo_semmni = **100**

   semsys:seminfo_semmsl = **160**

   semsys:seminfo_semmns = **310**

   semsys:seminfo_semopm = **100**

   semsys:seminfo_semvmx = **32767**

3. Reboot the machine.

4. Log on as *neworacleuser*.

5. Enter **dbassist** to open the **Database Configuration Assistant**.

6. Select **Create a Database** and click **Next**.

7. Select **Custom** and click **Next**.

8. Select **Multipurpose** and click **Next**.

9. Type **100** for **Concurrently Connected Users** and click **Next**.

10. Select **Dedicated Server Mode** and click **Next**.

11. Uncheck the following and click **Next**:

   - **Oracle JServer**

   - **Advanced Replication**

12. Set the **Global Database Name** to be *instanceid.machinename.domainname* (for example, **mysid.machine1.denver.avaya.com**) .

13. Set the **SID** to be *instanceid*.

   Note:

   > Write down the *instanceid* because you will need it when you install the Avaya Operational Analyst historical subsystem.

14. Click **Change Character Set**.

15. Change both the **Character Set** and **National Character Set** to be **UTF8**. Click **OK**.

16. Click **Next**.

17. Set the following files:

   - **Control File 1 = /oracle/oradata/control01.ctl**

   - **Control File 2 = /oracle_data1/control02.ctl**

   - **Control File 3 = /oracle_data2/control03.ctl**

   Click **Next**.

18. In the **System** folder, set the following:

   - **File = /oracle/oradata/system01.dbf**

   - **Size (MB) = 100**

   - **% Increase of Storage = 0**

19. In the Tools folder, set the following:

   - **File = /oracle_data1/tools01.dbf**

20. In the **User** folder, set the following:

   - **File = /oracle_data1/users01.dbf**

21. In the **Rollback** folder, set the following:
    - **Name = RBS1**
    - **Size (MB) = 4000**
    - **File = /oracle_data2/rbs01.dbf**
    - **Next (KB) of Extents = 10240**
    - **Minimum Extent (KB) of Extents = 10240**
    - **Initial (KB) of Storage = 10240**
    - **Next (KB) of Storage = 10240**
    - **Minimum Number (Min.) = 20**
    - **%increase of Storage = 0**
    - **Maximum Number = Unlimited**

22. In the **Index** folder, set the following:
    - **File = /oracle_data2/indx01.dbf**

23. in the **Temporary** folder, set the following:
    - **File = /oracle_data2/temp01.dbf**
    - **SIZE (MB) = 2000**

    Click **Next**.

24. Set the **Redo Log** files:
    - **Redo Log 1 File = /oracle_data1/redo0101.log**
    - **Redo Log 2 File = /oracle_data1/redo0201.log**
    - **Redo Log 3 File = /oracle_data1/redo0301.log**
    - **Redo Log 1 File Size (KB) = 51200**
    - **Redo Log 2 File Size (KB) = 51200**
    - **Redo Log 3 File Size (KB) = 51200**

    Click **Next**.

25. Change **Checkpoint Interval** to **24** and **Checkpoint Timeout** to **0.**

26. Enable **Archive Log**.

27. Set the **Archive Destination** to be:
    - **/oracle_data1/archive**

28. Click **Next**.

29. Make sure the **Shared Pool Size (Bytes)** is equal to or larger than **104857600**. If it is not, change it to **104857600**.

30. Make sure that **Block Buffers** is equal to or larger than **38400**. If it is not, change it to **38400**.

31. Set **Processes** to **515**.

32. Make sure the **Block Size (Bytes)** is **8192**. Click **Next**.

33. Set **For User Processes** to be:

   - **/oracle/admin/dssdb/udump**

34. Set **For Background Processes** to **/oracle/admin/bdump**

35. Click **Next**.

36. Select **Create The Database Now** and click **Finish**.

37. In the **Alert** window, click **Yes**. Creation of the database will take about 10 to 15 minutes.

   Note:

   If Oracle cannot find enough free space, you will receive a message to that effect. You will then need to create more free space and try to create the database again.

38. After the database has been created, make a note of the password for the default database administrator user **sys** (this should be **change_on_install**) that is displayed in the report screen. Click **OK**.

39. Open **/oracle/admin/*instanceid*/pfile/init.ora**.

   a. Append **log_checkpoints_to_alert = true**.

   b. Make sure that **remote_login_passwordfile = exclusive**.

   c. Change to **sort_area_retained_size = 0**.

40. Edit **$HOME/.profile** to add the following:

   ```
   ORACLE_SID=instanceid
   
   export ORACLE_SID
   ```

Change the password for the user sys, add the redo logfiles, and shrink the rollback segments

1. Enter `svrmgrl` to run Oracle Server Manager. Use the same `svrmgrl` session to accomplish these tasks.

2. Change the password for **sys** to *newpassword* using the following commands:

   ```
   connect internal/oracle
   
   alter user sys identified by newpassword;
   ```

   Note:

   Write down the *newpassword* because you will need it when you install the Avaya Operational Analyst historical subsystem.

3. Add the redo logfiles:

```
alter database add logfile member '/oracle_data2/redo0102.log'
  to group 1;

alter database add logfile member '/oracle_data2/redo0202.log'
  to group 2;

alter database add logfile member '/oracle_data2/redo0302.log'
  to group 3;
```

4. Determine the number of public rollback segments in tablespace RBS1:

```
select count(name) from v$rollname where name != 'SYSTEM';
```

5. If there are more than 20 public rollback segments, note the number above 20 and run the following command to find the names of the current inactive rollback segments. Note the names of the segments to drop later.

```
select name from v$rollname, v$rollstat

 where v$rollname.usn = v$rollstat.usn

 and   v$rollstat.xacts = 0

 and   v$rollname.name != 'SYSTEM';
```

6. Drop the noted segments by running this command for each segment, where *seg name* represents the name you noted.

```
alter rollback segment seg name offline;

drop public rollback segment seg name;
```

  Tip:

  Repeat the process of counting public rollback segments and dropping extra public rollback segments until you are sure there are only 20 public rollback segments remaining.

7. Complete the svrmgrl session with the following commands:

```
shutdown immediate

startup

exit
```

Configure the system to automatically startup and shutdown the Oracle database during the reboot.

1. Log on as **root**.

2. Edit **/var/opt/oracle/oratab** and change *instanceid*:**/oracle/product/8.1.7:N** to *instanceid*:**/oracle/product/8.1.7:Y**.

   Make sure there are two entries, ***:/oracle/product/8.1.7:N** and *instanceid*:**/oracle/product/8.1.7:Y**. If the server has multiple instances, make sure they are all in 8.1.7 version.

3. Edit **/etc/init.d/dbora** as follows:

```
#!/bin/sh
# Set ORA_HOME to be equivalent to the ORACLE_HOME
# from which you wish to execute dbstart and
# dbshut
# set ORA_OWNER to the user id of the owner of the
# Oracle database in ORA_HOME
ORA_HOME=/oracle/product/8.1.7
ORA_OWNER=neworacleuser
case "$1" in
'start')
# Start the Oracle databases:
# The following command assumes that the oracle login will not
  prompt the
# user for any values
su - $ORA_OWNER -c $ORA_HOME/bin/dbstart &
su - $ORA_OWNER -c $ORA_HOME/bin/tnslsnr &
;;
'stop')
# Stop the Oracle databases:
# The following command assumes that the oracle login will not
  prompt the
# user for any values
su - $ORA_OWNER -c $ORA_HOME/bin/dbshut &
;;
esac
```

4. Create two links by entering the following commands:

```
ln -s /etc/init.d/dbora /etc/rc0.d/K10dbora
ln -s /etc/init.d/dbora /etc/rc2.d/S99dbora
```

5. Make sure that **$ORACLE_HOME/dbs/***initinstanceid*.**ora** is an existing file that contains the single line that follows:

```
ifile = /oracle/admin/instanceid/pfile/init.ora
```

6. Reboot the machine.

7. Log on as *neworacleuser*.

8. Make sure the database is open after the reboot by running the following commands:

```
sqlplus sys/newpassword

exit
```

You can now install the Avaya IC software.

Installing Legato Storage Manager on Solaris

Installing Legato Storage Manager (LSM) is optional. LSM should be installed on a machine only if the Avaya Operational Analyst historical database residing on that machine needs to be backed up. To get more information on LSM, see the Oracle document *Legato Storage Manager - Administrator's Guide*.

The following are the steps for installing LSM.

1. Create a **LSM** directory under the **ORACLE_HOME** directory.

2. Insert the Oracle CD-ROM into your CD-ROM drive.

3. Exit the **Oracle Autorun** window.

4. Run **lsminst** from the **lsm** directory on the CD-ROM.

5. For the first setup option, click **Next**.

6. For the destination directory, select the **LSM** directory. Click **Next**.

7. For the server name, type *machinename.domainname*. Click **Next**.

8. Put the **LSM bin** directory in the **PATH** environment variable.

9. Register Legato Storage Manager.

Before you can use the Legato Storage Manager, you must configure it:

1. Configure the tape drive:

   a. In Media Management/Devices, right-click **Devices** and choose **Create...**

   b. Select the **Media Type** (for example, **8mm**).

   c. For the rest of the options, accept the default values.

2. Prepare a tape:

   a. In Media Management/Devices, right-click the device (for example, **\\.\Tape0**)

   b. Select **Operations**.

    c. Insert a blank or disposable tape and click **Label**.

    d. LSM will suggest a name. Accept it or enter your own.

       The label process takes a few minutes.

Creating Avaya Operational Analyst tablespaces on Solaris

After you install Avaya IC in a configuration with a backend database server, you manually configure the OA tablespaces on the database server.

1. Use Oracle tools to create tablespaces as defined by the output of the OA 6.0 sizing tool available from Avaya Professional Services Organization (PSO) personnel.

2. If any tablespace will be larger than the maximum size of one disk, add more datafiles to that tablespace.

You can now install the Avaya Operational Analyst software.

Installing Oracle 8.1.7 database client on Solaris

The Oracle Client software should be installed on the OA historical server if the OA Historical Database server will be a backend database server.

1. Mount `/oracle` to a disk partition that has a minimum of 2GB free disk space.

2. Log on as **root**.

3. Run the following commands to create the new password, *newpassword*, for the new user, *neworacleuser*:

   groupadd dba

   useadd -g dba -m -d /oracle *neworacleuser*

   passwd *newpassword*

4. Make sure that `/oracle` is accessible by the *neworacleuser*.

5. Log on as *neworacleuser*.

6. Edit .profile, adding the following:

   ```
   unmask 022

   ORACLE_BASE=/oracle

   ORACLE_HOME=$ORACLE_BASE/product/8.1.7

   ORACLE_TERM=xsun

   CLASSPATH=$CLASSPATH:$ORACLE_HOME/jdbc/lib/classes12.zip

   LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$ORACLE_HOME/lib:$ORACLE_HOME/
     jdbc/lib

   PATH=$PATH:$ORACLE_HOME/bin

   export ORACLE_BASE ORACLE_HOME ORACLE_TERM CLASSPATH

   LD_LIBRARY_PATH PATH
   ```

7. Enter the command:

   ```
   ..profile
   ```

8. Insert the Oracle 8.1.7 CD-ROM into your CD-ROM drive.

9. Enter the command:

   ```
   /cdrom/oracle/runInstaller
   ```

10. In the pop-up window, click **Next**.

11. In the File Locations window, set Destination to **/oracle/product/8.1.7** and click **Next**.

12. Accept the default empty **Group Name** and click **Next**.

13. Run the command:

    ```
    orainstRoot.sh
    ```

    Note:
       You must have root permissions to run this command.

14. Select **Oracle 8i Client**. Click **Next**.

15. Select **Custom Installation** for the installation type. Click **Next**.

16. In the **Available Components** window, uncheck the following:

    - **Oracle Programmer**
    - **Oracle Enterprise Manager Products**
    - **Oracle InterMedia Client Option**
    - **Oracle Visual Information Retrieval Client**
    - **Oracle Internet Directory Client**
    - **Oracle Workflow Client**

    Click **Next**.

17. In the **Component Locations** window, make sure that the Total Required Disk Space is smaller than the Available Disk Space and click **Next**.

> **Note:**
>
>> If this is not the case, click **Previous** on each window to return to the **File Location** window and choose a new location that has ample disk space. If you cannot find a disk with enough space, exit the Oracle installation, create more disk space, and reattempt installation.

18. In the **Oracle Protocol Support** window, click **Next**.

19. In the **Summary** window, click **Install**.

20. Follow the screen instructions and run the following command: `root.sh`

21. Follow the screen instructions to insert the second disk. Type **/cdrom/oracle#1** for the disk location.

22. In the **Net8 Configuration Assistant: Welcome** window, click **Next**.

    a. In the **Net8 Configuration Assistant: Directory Service Access** window, select **No**. Click **Next**.

    b. In the **Select Naming Methods** window, click **Next**.

    c. In the **Net Service Name Configuration, Database Version** window, click **Next**.

    d. In the **Net Service Name Configuration, Service Name** window, type the global database name for the backend database (for example, **oracle_sid.hostname.domain**). Click **Next**.

    e. In the **Net Service Name Configuration, Select Protocols** window, accept the default setting. Click **Next**.

    f. In the **Net Service Name Configuration, TCP/IP Protocol** window, type the host name of the backend database server. Click **Next**.

    g. In the **Net Service Name Configuration, Test** window, click **Next**.

    h. In the **Net Service Name Configuration, Net Service Name** window, type *hostname of backend database server*.*oracle_sid* (for example, **myserver.mysid**). Click **Next**.

    i. In the **Net Service Name Configuration, Another Net Service Name?** window, click **Next**.

    j. In the **Net Service Name Configuration, Done** window, click **Next**.

    k. In the **Naming Methods Configuration, Done** window, click **Next**.

    l. In the **Done** window, click **Finish**.

23. In the **Oracle Universal Installer** window, click **Exit**.

24. At the **Exit** prompt, click **Yes**.

    The Oracle 8.1.7 database client is now installed.

Deleting a prior database in Solaris

If a Avaya Operational Analyst historical database already exists, you must delete it before creating a new one.

To delete the database:

1. Log on as *neworacleuser*.

2. Run Oracle SQLPLUS by entering `sqlplus /nolog`.

3. In Oracle SQLPLUS, run the following commands:

   ```
   connect SYS/newpassword as sysdba

   shutdown immediate

   exit
   ```

4. Enter `dbca` to open the **Database Configuration Assistant**.

5. Select **Delete A Database** and click **Next**.

6. Select the *instanceid* to delete and type **oracle** as the password for **INTERNAL**. Click **Finish**.

7. In the **Alert** window, click **Yes**.

8. In the **Confirm** window, click **Yes**.

9. In the **Feedback** window, click **OK**.

Installing an historical database

Section II: Avaya Operational Analyst Installation

This section, *Avaya Operational Analyst Installation*, provides instructions for installing Avaya Operational Analyst. This section includes the following chapters:

- Chapter 3: Avaya Operational Analyst distribution media on page 95 -Identifies the applications that are distributed with Avaya Operational Analyst.

- Chapter 4: Installing Avaya Operational Analyst on page 101 - Provides detailed instructions for installing Avaya Operational Analyst on the range of required platforms.

- Chapter 5: Troubleshooting the installation on page 165 - Includes guidelines for troubleshooting problems that may arise during installation.

Chapter 3: Avaya Operational Analyst distribution media

Avaya Operational Analyst comes bundled with third-party software packages. The Avaya Operational Analyst distribution media includes the following:

- Avaya Operational Analyst server components
    - Historical Subsystem
    - Real-Time Subsystem
    - Reporting Subsystem
- Avaya Operational Analyst Client components
    - Administration
    - Basic Reporting
- Advanced Reporting
- Avaya Operational Analyst collection applications
    - CMS Source
    - EC Source
- Required third-party software packages
    - Java Runtime Environment (JRE)
    - TimesTen Database

Topics

This chapter includes the following topics:

Avaya Operational Analyst server applications

Avaya Operational Analyst server features consist of core (common) software applications. This core is automatically and transparently installed when required, based on which features of Avaya Operational Analyst are installed.

Historical Subsystem

The Historical Subsystem feature analyzes the data in the historical database. This release of Avaya Operational Analyst requires Oracle 8.1.7 or SQL Server 2000 to create and operate the historical database.

Real-Time Subsystem

The Real-Time Subsystem feature processes the active work items in the real-time database. This release of Avaya Operational Analyst requires the TimesTen Real-Time Database software.

Reporting Subsystem

The Reporting Subsystem feature provides the web-based report framework necessary to run the Basic Reports.

Avaya Operational Analyst client applications

Avaya Operational Analyst client features are applications that are active on clients to help you manage many of the Avaya Operational Analyst functions.

Administration

Administration is a Avaya Operational Analyst utility that allows you to manage many of the Avaya Operational Analyst features and operations using a graphical user interface running under Internet Explorer 5.5.

Administration can be installed on any or all of the Windows-based Avaya Operational Analyst or Avaya Interaction Center servers or on a standalone workstation. This includes installation on Windows platforms including

● Windows NT Server or Workstation

● Windows 2000 Professional or Server

● Windows XP

Basic Reporting

Basic Reporting allows you to view the Avaya Operational Analyst Basic reports. Basic Reporting can be installed on Windows platforms including:

● Windows NT Server or Workstation

● Windows 2000 Professional or Server

● Windows XP

The Basic Reporting Client platform also requires:

● JRE 1.3.1_01

● Internet Explorer 5.5 or higher

> **Note:**
> For performance and different hardware and software requirement reasons, running the Basic reports on the report server is not supported.

Advanced Reporting

Advanced Reporting requires Cognos Impromptu Administrator 6.0 and PowerPlay Transformation Server 6.61 to view non-web-based reports. If you want to view the web version of the reports, you must also install Cognos Impromptu Web Reports 6.61 and Cognos PowerPlay Enterprise Server 6.61. You can install these applications from a Cognos CD-ROM. Refer to the Cognos documentation for more information on which Cognos components must be installed and where they are installed. Advanced Reporting must be installed on the same server as the Cognos Impromptu Administrator.

- Impromptu connects directly to the database from the machine running Cognos, and requires the appropriate database client.
- PowerPlay requires access to pre-defined PowerPlay cubes. If you do not install the cubes on the same machine as PowerPlay, you need LAN access from the PowerPlay machine through a mapped drive to the location of the PowerPlay cubes.

Avaya Operational Analyst collection applications

Avaya Operational Analyst collection applications must be loaded on Avaya Interaction Center or Avaya Call Management System machines from which data will be collected for reporting through Avaya Operational Analyst.

CMS Source

The CMS Source application is loaded on the CMS machine to collect data to send to OA.

EC Source

The EC Source application is loaded on the Interaction Center machine to collect data to send to OA.

Required third-party applications

Java Runtime Environment (JRE)

JRE is required for Java-based applications, such as Avaya Operational Analyst Administration Client. JRE provides the environment that enables these applications to run. JRE must be installed on all Avaya Operational Analyst servers. Avaya Operational Analyst uses the Java Runtime Environment 1.3.1_01, which is automatically installed during initial Avaya Operational Analyst installation. This version of JRE could impact customer applications if they require a different version.

TimesTen Real-Time Database

This software provides the memory-resident database used by the Avaya Operational Analyst Real-Time feature to store real-time operational information about the contact center. If the correct version of the TimesTen software is not present, TimesTen is automatically installed on the Real-Time server.

Avaya Operational Analyst distribution media

■ ■ ■ ■ ■ ■

Chapter 4: Installing Avaya Operational Analyst

This chapter explains how to install Avaya Operational Analyst software. Avaya Operational Analyst installation is highly application-dependent, and the procedure outlined here is intended only as a reference.

For questions regarding your specific Avaya Operational Analyst system, contact Avaya Customer Support. You can access Avaya contact information on the Avaya Operational Analyst CD-ROM.

Topics

This chapter includes the following topics:

Installation preparations

Pre-installation checklist

Before you install Avaya Operational Analyst, follow these important steps and recommendations:

1. Install the operating system and any needed service packs or option packs.

2. Verify that the monitor is set to 1024x768 resolution and 65536 colors.

3. Do not define a User Classpath other than what is created under normal software package installations.

4. Set the Maximum Log Size of the Application Event Log to al least 2MB, and consider setting the logs to automatically roll over. See the *Error messages* section of the *Avaya Operational Analyst Release 6.0 Troubleshooting Guide* for more information.

5. Review your Internet Information Services (IIS) logging strategy to be sure you allocate enough disk space to prevent message loss and/or OA performance impact. Refer to the *Internet Information Services log* section of the *Avaya Operational Analyst Release 6.0 Troubleshooting Guide* for details.

6. Make sure that the minimum amount of recommended disk space and memory is available. Avaya support personnel have tools to determine engineering specifications for individual Avaya Operational Analyst systems, and you should determine your disk space, memory, and configuration specifications in collaboration with Avaya personnel.

7. Verify that there is a minimum of 250 megabytes of free space in `C:\Temp` for Windows or in `/var/tmp` for Solaris. If this space is not available, the installer may not run successfully.

8. Obtain the hardware you need for the desired configuration.

9. Plan where the features will reside. This information will be required during installation.

   - Plan to install Avaya Operational Analyst on a drive other than the physical drive on which your operating system or database software resides. This is required to improve performance.

   - Please note that while one or more Avaya Operational Analyst features can be installed on a given server, a specific feature cannot be split among multiple servers.

10. For NT 4.0 platforms, install Active Directory Client (`dsclient.exe`) with the defaults, and reboot the system.

11. Verify that time synchronization software is installed and operating correctly on all servers. Be sure that the clocks are synchronized.

12. *Critical step.* Verify that the servers are networked and communicating properly using dedicated IP addresses (DHCP may result in a different IP address each time a server is rebooted, resulting in networking failures). This includes validating or creating appropriate domain administrative accounts for Avaya IC and Operational Analyst.

13. Install SQL Server 2000 or Oracle 8i. Refer to Chapter 2: Installing an historical database on page 41, and *Avaya Interaction Center Installation and Configuration Guide* for more information.

    Note:

    If Oracle is installed on a backend server, verify that matching version database client software is already installed and running on the historical server. Refer to Installing Oracle 8.1.7 database client on Windows on page 69 for details.

14. Verify the connection between the Oracle client and the Oracle server. Refer to the Oracle Net8 configuration and Oracle client configuration documentation for details.

15. If you are collecting data from Avaya Interaction Center, install and configure it. Refer to *Avaya Interaction Center Installation and Configuration* for more information.

16. Create OA user IDs. Refer to Creating user IDs on page 110 for more information.

17. Verify that a user ID exists on the IC Repository database that has read permission on the IC Repository database. If one does not exist, create one.

18. Verify that the correct video drivers and software are installed for the reporting client. Refer to Client hardware and software requirements on page 23 for details.

Installing Prerequisite software

The following table identifies the pre-requisite software:

	Windows	**Solaris**
Historical	Oracle 8.1.7 or MSSQL 2000	Oracle 8.1.7
Real-Time	Times Ten 4.3	Times Ten 4.3
Basic Reporting	Microsoft IIS	iPlanet
Advanced Reporting	Cognos	N/A
Administration Client	IE 5.5, SP2 or later	N/A

JRE is required on all servers and the Administration Client PC. It is automatically installed on all except the Basic Reporting workstation.

Installing a co-resident Web server

> ⚠ **WARNING:**
> If the IC WebServer components that reside inside your firewall are not physically located on the same machine where the OA Report Server is located, you *must not* execute the following co-resident Web server installation steps.

Co-resident Web server configuration is necessary when:

● The OA Report Server is located on the same server machine that contains the IC Web Server components, and the IC and OA systems share the same commercial Web Server. Refer to Reporting server considerations on page 26 for information about which IC Web Server components may be co-resident with the OA Report Server.

● Other applications with another type of servlet container are using the Default Web Site on IIS. In this case, the default port number is already occupied by these applications. You must assign another port number to the OA Report Server by manually configuring a new Web Site on the same Web Server.

● Other applications using the Default Web Site on IIS cannot share the same HTTP security settings as the OA Report server.

For the OA Report Server to be co-resident with the IC Web Server component or other applications, it must meet the maximum runtime requirements specified in Reporting server considerations on page 26.

Co-locating the OA Report Server with the IC Web Server

> ⚠ **Important:**
> Failure to create the OA Web site with the order indicated below, if this situation is encountered, will cause the OA Web server standard installation to not work co-resident with the IC WebServer.

1. Install OA. See Installing Avaya Operational Analyst on page 101 and follow the appropriate OA installation procedure for your platform.

2. Create the new OA Web site. See Creating the OA Web site on page 105.

Using the Default Web Site of IIS with other applications

If you are already using the Default Web Site of IIS with other applications, you must follow the steps indicated below to prevent the deletion of the settings of your existing Web site:

> ⚠ **Important:**
> Failure to create the OA Web site with the order indicated below, if this situation is encountered, will cause the OA Web server standard installation to modify the settings of any existing default Web site.

1. Record the security settings of your existing Web site. See Recording the security settings of an existing Web site on page 105.

2. Install OA. See Installing Avaya Operational Analyst on page 101 and follow the appropriate OA installation procedure for your platform.

3. Create the new OA Web site. See Creating the OA Web site on page 105.

Recording the security settings of an existing Web site

To record the security settings of an existing Web site on Windows 2000:

1. Choose **Start > Programs > Administrative Tools > Internet Services Manager**.

2. Expand the tree view: **server-name > Default Web Site** and right click on **Default Web Site > Properties**

3. Choose the **Directory Security** tab.

4. Click on the **Edit** button under the Anonymous access and authentication control section.

5. If **Anonymous access** is checked, click the **Edit** button next to **Account used for anonymous access** and record the information in the resulting window for later use.

To record the security settings of an existing Web site on Windows NT:

1. Choose **Start > Programs > Windows NT 4.0 Option Pack > Microsoft Internet Information Server > Internet Service Manager**.

2. Expand the tree-view: **Internet Information Server > server-name > Default Web Site** and right click on **Default Web Site > Properties**.

3. Choose the **Directory Security** tab.

4. Click on the **Edit** button under the Anonymous access and authentication control section.

5. If **Allow Anonymous access** is checked, click the **Edit** button next to **Account used for anonymous access** and record the information in the resulting window for later use.

Creating the OA Web site

To create the OA Web site on Windows 2000:

1. Stop Stumbras-Tomcat service (via Services, as described in Chapter 8).

2. Delete the folder at:

   c:\Program Files\Avaya\BI\stumbras\tomcat\work\localhost_8080

   Use other drive letters accordingly.

3. Right click on the Internet Explorer located on your desktop.

4. Click **Delete Files**.

5. Check the **Delete all offline content** box.

6. Click OK.

7. Choose **Start > Programs > Administrative Tools > Internet Services Manager**.

8. Expand the tree view: **server-name > Default Web Site** and right click on the **server name > New > Web Site**.

9. Click **Next** to continue.

   a. Enter **Stumbras** for description.

   b. Enter an unused port number. For example: **81** for the TCP port. Leave **IP Address** set to **All Unassigned**. No Host Header is needed.

   c. Enter **C:\Inetpub\wwwroot** for the home directory path and leave the rest of the default settings for the Web Site Home Directory page.

   d. Check the **Execute** box and accept the rest of the default settings for the Web Site Access Permissions page.

   e. Click **Next**. Then click **Finish**.

10. Right click on the new Web site **Stumbras > New > Virtual Directory**.

11. Click **Next** to continue.

   a. Enter **jakarta** for the Alias in the **Virtual Directory Alias** page.

   b. Enter the *Disk*:**\Program Files\Avaya\BI\stumbras\tomcat\bin** if you have Stumbras installed in the default directory, or wherever you have installed stumbras\tomcat\bin for the path to the directory that has the content.

   c. Check the **Execute** box and accept the rest of the default settings for the **Access Permissions** page.

12. Right click on the new website **Stumbras > Properties**.

   a. Click on the **ISAPI Filters** tab.

   b. Click **Add**.

   c. In the **Filter Name** box enter: `isapi`

   d. Enter

   `Disk:\ProgramFiles\Avaya\BI\stumbras\tomcat\bin\isapi_redirect.dll` in the executable if you have installed Stumbras on the default directory, or wherever you have installed isapi_redirect.dll.

   e. Click on the **OK** button. Then click on the **Apply** button.

   f. Click on the **Directory Security** tab.

   g. Click on the **Edit** button under the Anonymous access and authentication control section.

  h. Verify that only the **Anonymous access** box checked in the first section and the **Integrated Windows authentication** box is checked in the **Authenticated access** section.

  i. Click on the **OK** button. Then click on the **Apply** button.

13. Expand **Stumbras** in the tree-view.

14. Right click on **jakarta > Properties**.

  a. Click on the **Directory Security** tab.

  b. Click on the **Edit** button under the **Anonymous access** and **Authentication control** section.

  c. Verify that only the **Anonymous access** box is checked in the first section.

  d. Click the **Edit** button next to **Account used for anonymous access**.

  e. In the **Anonymous User Account** window, enter the OA User ID entered during installation, along with the domain, into the **Username** box. For example: `domain\oauser`. Make sure the **Allow IIS to control password** is checked. Click **OK**, **Apply**, and **OK**.

15. Start the Stumbras-Tomcat service (via Services, as described in Chapter 8)

16. Start the browser report from `http://<servername>:<port number>/reports1`

  where *port number* is the port number entered above.

17. At this point, if previous authentication settings were noted, go back into the Default Web site and reset back the authentication settings. See Recording the security settings of an existing Web site on page 105 for more information on how to change these settings.

To create the OA Web site on Windows NT:

1. Stop Stumbras-Tomcat NT service (via Services, as described in Chapter 8).

2. Delete the folder at:

   c:\Program Files\Avaya\BI\stumbras\tomcat\work\localhost_8080

   Use other drive letters accordingly.

3. Right click on the Internet Explorer located on your desktop.

4. Click **Delete Files**.

5. Check the **Delete all offline content** box.

6. Click OK.

7. Choose **Start > Programs > Windows NT 4.0 Option Pack > Microsoft Internet Information Server > Internet Service Manager**.

8. Expand the tree view: **Internet Information Server > server-name > Default Web Site** and right click on **server name > New > Web Site**.

9. Click **Next** to continue.

    a. Enter **Stumbras** for Description.

    b. Enter an unused port number. For example: **81** for the TCP port. Leave **IP Address** set to **All Unassigned**.

    c. Enter **C:\Inetpub\wwwroot** for the home directory path and leave the rest of the default settings for the **Web Site Home Directory** page.

    d. Check the **Execute** box and accept the rest of the default settings for the **Web Site Access Permissions** page.

    e. Click **Next**. Then click **Finish**.

10. Right click on the new website **Stumbras > New > Virtual Directory**.

11. Click **Next** to continue.

    a. Enter **jakarta** for the Alias in the Virtual Directory Alias page.

    b. Enter the *Disk*:**\Program Files\Avaya\BI\stumbras\tomcat\bin** if you have Stumbras installed in the default directory, or wherever you have installed stumbras\tomcat\bin for the path to the directory that has the content.

    c. Check the **Execute** box and accept the rest of the default settings for the Access Permissions page.

12. Right click on the new website **Stumbras > Properties**.

    a. Click on the **ISAPI Filters** tab.

    b. Click **Add**.

    c. In the **Filter Name** box enter: `isapi`

    d. Enter

    `Disk:\ProgramFiles\Avaya\BI\stumbras\tomcat\bin\isapi_redirect.dll` in the Executable if you have installed Stumbras on the default directory, or wherever you have installed isapi_redirect.dll.

    e. Click on the **OK** button. Then click on the **Apply** button.

    f. Click on the **Directory Security** tab.

    g. Click on the **Edit** button under the **Anonymous access and Authentication control** section.

    h. Verify that only the **Allow Anonymous Access** and **Windows NT Challenge/Response** boxes are checked.

    i. Click on the **OK** button. Then click on the **Apply** button.

13. Expand **Stumbras** in the tree-view.

14. Right click on **jakarta > Properties**.

    a. Click on the **Directory Security** tab.

    b. Click on the **Edit** button under the **Anonymous access and Authentication control** section.

c. Verify that only the **Allow Anonymous Access** box checked.

d. Click the **Edit** button next to **Account used for anonymous access**.

e. In the **Anonymous User Account** window, enter the OA User ID entered during installation, along with the domain, into the **Username** box. For example: `domain\oauser`. Make sure the **Enable Automatic Password Synchronization** is checked. Click **OK**, **Apply**, and **OK**.

15. Start the Stumbras-Tomcat service (via Services, as described in Chapter 8)

16. Start the browser report from `http://<servername>:<port number>/reports1`

    where *port number* is the port number entered above.

17. At this point, if previous authentication settings were noted, go back into the Default Web site and reset back the authentication settings. See Recording the security settings of an existing Web site on page 105 for more information on how to change these settings.

Installing and configuring iPlanet on Solaris server

Before you can begin iPlanet installation on a Solaris server, you must create user and group IDs:

1. Use Admin Tool to create a user ID and password:

   - **user ID** = *userID* with **home path** = `/usr/iplanet/servers`

   - **group ID** = *groupID* with *userID* as a group member

Download and run the setup program for iPlanet Web Server Enterprise Edition 6.0 sp2:

1. Log in as `root`.

2. Download the software.

3. Type `./setup` to run the setup program from the location where you placed the downloaded software.

4. Select **Typical** as the type of installation.

5. Set the following:

   - **Installation location** = `/usr/iplnet/server` (default)

   - **Components to install** = `[1,2,3,4,5]` (default)

   - **Domain name** = *server domain name* (default)

   - **Sys user** = `ipuser`

   - **Sys group** = `ipgrp`

   - **IWS Admin Server** = `ipuser`

   - **IWS Admin Server User Name** = `admin` (default)

- **IWS Admin Server Password** = *select password*
- **IWS Admin Server Port** = `8888` (default)
- **Web Server Port** = *available port number* (1024 to 65535)
- **Docs Location** = *location* (default)

6. Install the JRE and JDK that come with iPlanet.

7. Open a window and go to `/usr/iplanet/server`.

8. Type `./startconsole` to bring up the iPlanet console.

9. Login as `admin` with the password you entered for **IWS Admin Server Password**.

Creating user IDs

The Avaya Operational Analyst service and the Report Framework require a domain user ID and password. The user ID is the account under which the OA server process will be running. It is an administrative account that can be used to look at files such as the logs and properties file under the **%PABASE%/data/admin** directory.

Although possible, it is not recommended to use the **root** (on Solaris) or **Administrator** (on Windows) user ID for this account. Using these IDs would create a security risk because all of the OA processes and jobs would run as a privileged user and have access to the whole system. The user ID must be created on the host before installing OA.

Avaya requires the following groups:

- For an Oracle historical database, `ORA_DBA` (required name) for Windows or the group of the user who installed Oracle for Solaris. The database group is used to identify users who can access the historical database.

- For administration, `aoaadmin` (default, recommended name). The administration group is used to identify users who can use the Administration Client.

- For reports, `aoarpt`(default, recommended name). The report groups is used to identify members who can use the OA reports.

Before you can begin Avaya Operational Analyst installation, you must create user and group IDs. Users can be added to or removed from these groups using the operating system management tools.

- For Windows, create or use a preexisting login ID and password in one of these groups. This may be a domain login.

- For Solaris, Avaya recommends creating the following ID to use when installing Avaya OA:

  - user id = `biadmin`
  - group id = `aoaadmin`

  This login can be administered via NIS.

Installing Avaya Operational Analyst subsystems

This topic describes how to install the following Avaya Operational Analyst subsystems:

● Historical

● Real-Time

● Reporting Subsystem

● Advanced Reporting

● Administration

● CMS Source

● EC Source

Installation of each of these subsystems is basically the same. Only the Avaya Operational Analyst input panels change. The Historical, Real-Time and Reporting Subsystems may be installed on any combination of one, two, or three Windows or Solaris servers. The Administration and Advanced Reporting Subsystems must be installed on Windows platforms. The CMS and EC Source subsystems are installed on servers for the related systems.

The Administration Client and Basic Reporting client are typically installed on Windows machines separate from the OA servers.

Installing and modifying or repairing are essentially the same procedure, with most information obtained from the earlier version during these operations so you can preserve configuration settings. For more information about modifying or repairing Avaya Operational Analyst, see Chapter 6: Modifying, repairing, and removing Avaya Operational Analyst on page 173.

> ⚠ **CAUTION:**
>
> Before performing any Operational Analyst installation, modification, repair, or removal, we strongly recommend that you perform a backup of the database and file systems.

Before you proceed, please be sure that you have:

● Backed up your database.

● Closed all other applications.

● Verified that the database services (`Oracle`*instance name* for Oracle or `MSSQL$`*instance name* and `SQLAgent$`*instance name* for SQL) are started and automatic. This allows the database to be configured during installation. If this is not done, the installation will terminate and remove installed packages.

Install Avaya Operational Analyst on a Windows platform

## Begin Avaya Operational Analyst installation

To start the Avaya Operational Analyst Installation Process on Windows platforms:

1. Place the Avaya Operational Analyst CD in the drive and run `WinSetup.exe`.

   ⚠ CAUTION:

   Only install from a CD drive that is local to the server where you are installing OA. Installing from a networked CD drive is not recommended because it may cause errors.

   Avaya Operational Analyst Installation begins with this **InstallShield Wizard** screen.
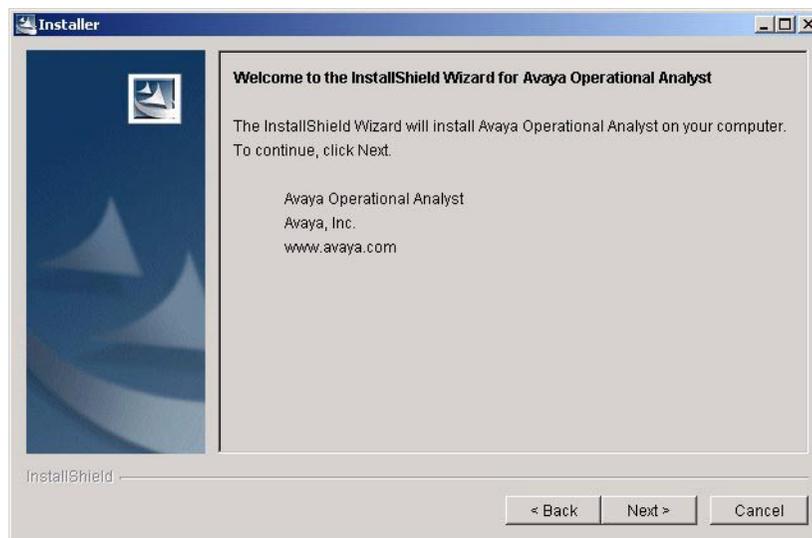
   Note:

   You can stop installation at any time by clicking **Cancel**. If you do so, you will be asked to confirm your intention to cancel. If you cancel, the installation is terminated and the system is restored to its previous state.

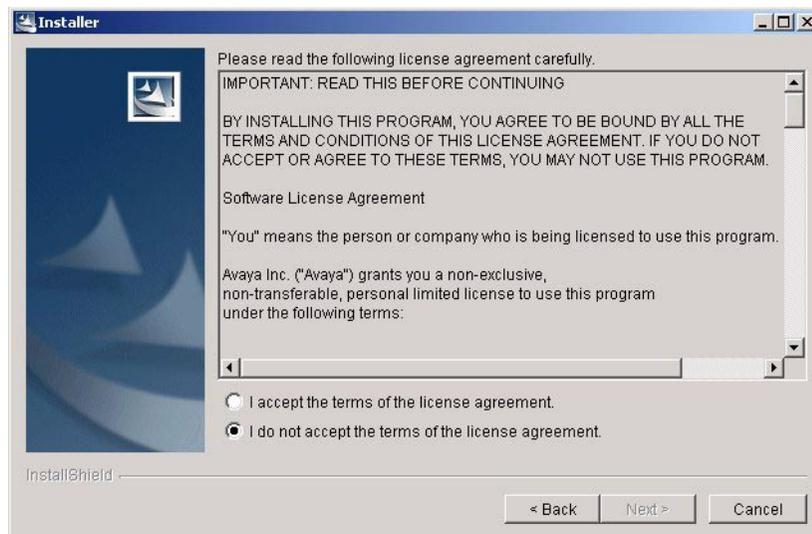2. When you are ready to proceed, click **Next**.

Complete licensing information

In the **Operational Analyst License Key**, shown below:

1. Type the provided **License key** for the features purchased.
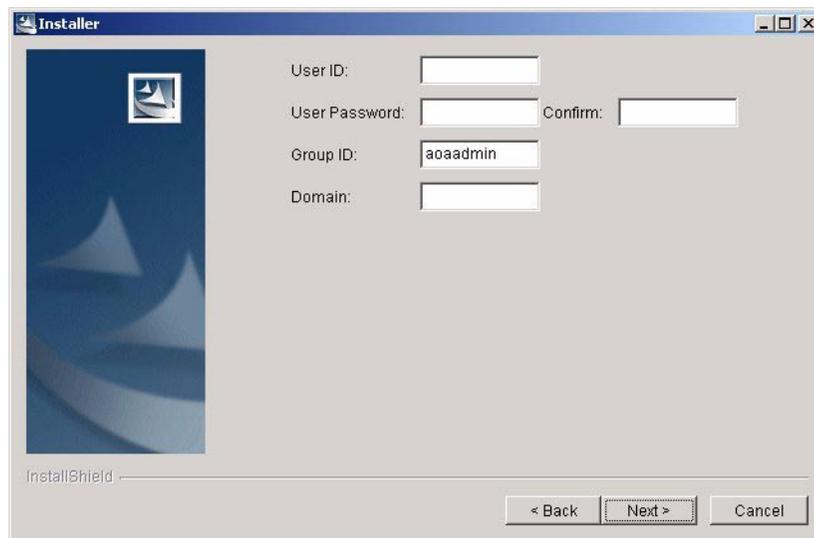
2. Click **Next**.

   You must accept the terms of the license, shown below, in order to proceed with installation. If you do not accept the terms of the license, installation cannot proceed.

3. Choose **I accept the terms in the license agreement**.

4. Click **Next**.

Provide user information

The **User Panel**, shown below**,** prompts you for ID and Password information.

1. Type the **User ID**, **User Password**, **Group ID**, and **Domain**.

   ● Use a login ID and password, as discussed in Creating user IDs on page 110. This assigns an owner for all OA files and folders.

   ● If the User ID is on a domain, enter the domain name in the **Domain** field. If the user ID is local to this server, enter the server name in the **Domain** field.

2. Click **Next**.

Specify destination

The **Destination** screen, shown below, allows you to specify the destination for installation of the Operational Analyst software.
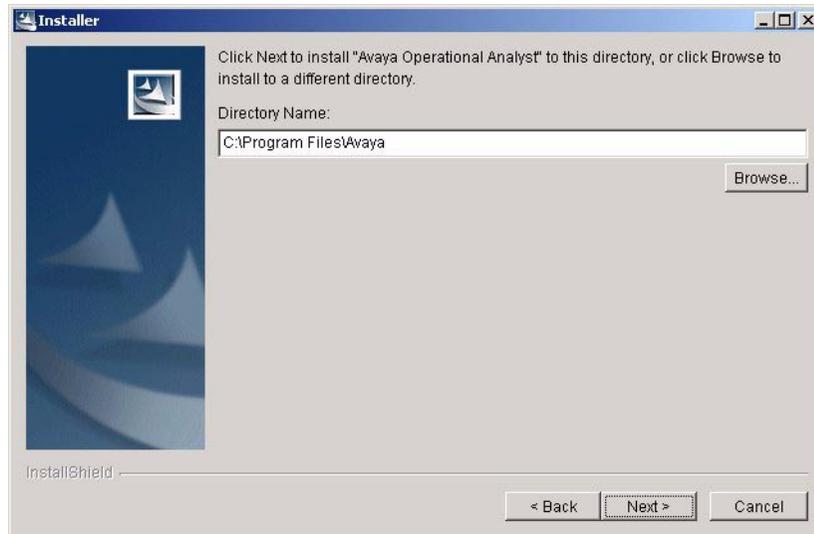
1. Accept the default directory or change the directory.

   To change the location where you want the features installed

   a. Click **Browse**.

   b. Select the directory.

      The selected directory must have sufficient disk space to accommodate the installed features.

2. Click **Next**.

   There may be a long delay before the next screen is displayed.

   > **Note:**
   >
   > The destination is validated to ensure that it is on a local fixed disk for performance reasons.

Select features

The **Avaya Operational Analyst Feature** screen, shown below, lets you select the features to install. the features on this screen may vary, depending on the system on which you are installing Avaya OA.
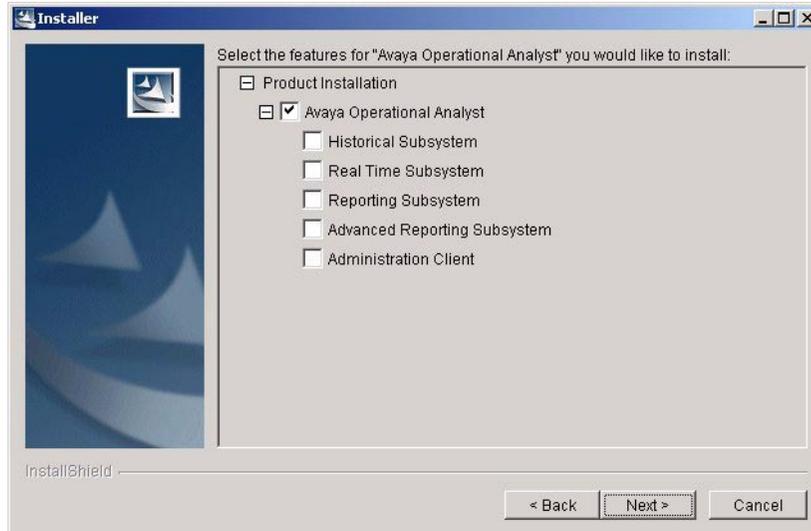
1. Select the feature or features to install by clicking those features.

   Note:
   There may be a delay before a check mark is displayed or before you can check another box.

   You can install features individually or in combination.

   - For a single server OA system, select **Historical**, **Real-Time**, **Reporting Subsystem**, **Advanced Reporting**, and **Administration**.

   - For an historical server in a multi-server OA system, select **Historical**.

   - For a Real-Time server in a multi-server OA system, select **Real-Time**.

   - For a Reporting Subsystem server in a multi-server OA system, select **Reporting Subsystem**.

   - For an Advanced Reporting server in a multi-server OA system, select **Advanced Reporting**.

   - For an Administration Client workstation in a multi-server OA system, select **Administration**.

   It is possible to use one administration client to administer multiple OAs. When the client is installed, the HTML files that are used to launch it are set at installation with the name of the historical server to which the client should connect. If there are multiple OAs that you want to access from a single client install, you need to edit the appropriate HTML file to point the client to the historical server for each OA install. If

signed jar files are being used, edit the `%PABASE%\AdminSig.html` file. If java policy files are being used, edit the `%PABASE%\AdminPol.html` file. `%PABASE%` is where the client is installed, typically `C:\Program Files\Avaya\BI`. By default java policy files are used. The following line in the HTML file needs to be altered:

`<PARAM NAME="SERVER_NAME" VALUE=xxxxx>`

Replace *xxxxx* with the fully qualified domain name for the historical server of the OA to be administered from this client. The next time the client is launched, it will connect to the new historical server. This file is found on the client server.

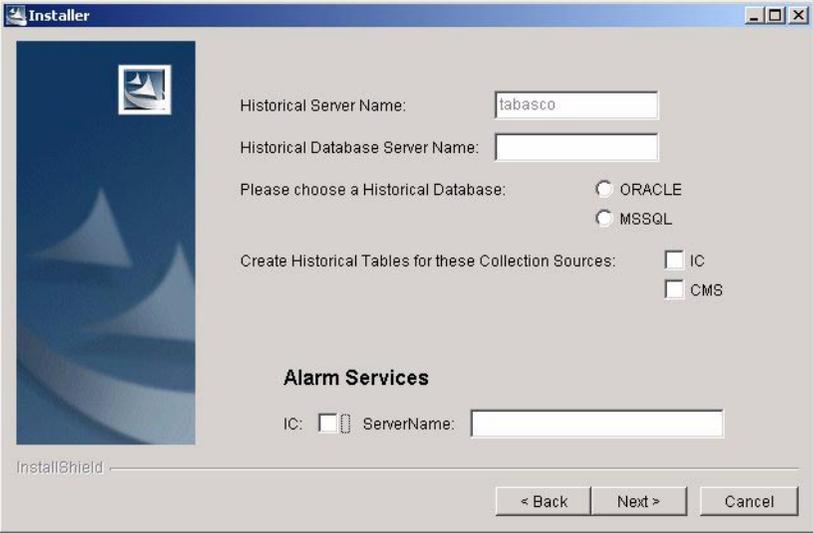2. Click **Next**.

Identify Reports group ID

If you selected **Reporting Subsystem**, the **Operational Analyst Reports Group ID** screen, shown below, is displayed.
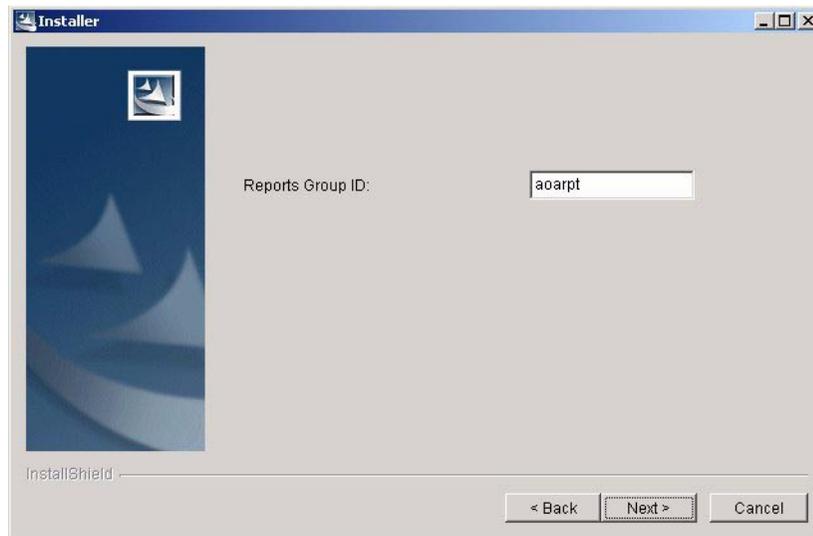
1. Accept the default **Reports Group ID** or change it.

   This ID must have been previously administered on the system.

2. Click **Next**.

Configure historical database

In the **Historical Database Configuration Information** screen, shown below, you begin to specify the historical database configuration.
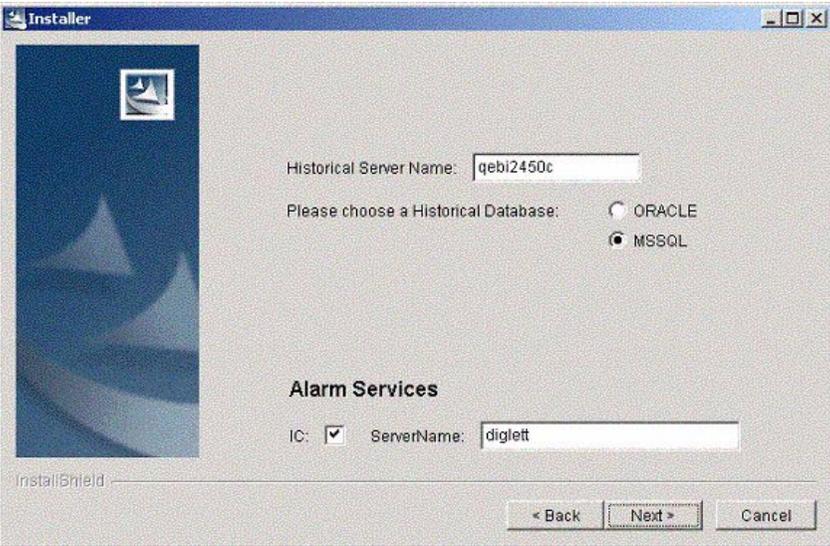

The fields that appear on the **Historical Database Configuration Information** screen vary, depending on your selections. For example, if you did not select **Historical**, the screen appears like this:

Complete the appropriate fields.

1. If this machine is not the historical server, type the name of the historical server.

   If you selected **Historical** for this server, the name of this server is displayed and cannot be changed.

2. Type the **Historical Database Server Name**.

   If you are using a Back End Database, type the name for that server. The file groups and data files must be manually created on that server before this installation may continue.

3. Select the appropriate Historical Database type: **Oracle** or **MSSQL**.

   If the system can identify the database type available on this server, it will be the only type listed.

4. Select the **Collection Sources** for the historical tables.

   You can collect data from IC, CMS, or both. You must create file groups for IC, CMS or both prior to selecting collection sources.

   > **Note:**
   > You cannot remove these collection sources by modifying OA.

5. If you wish to send alarm data to the IC server, click the **IC** box under **Alarm Services**, and type the **Server Name** of the IC Alarm server.

6. Click **Next**.

Specify database IDs and passwords

If you selected **Historical** or **Reporting Subsystem**, the **Database Configuration** screen is displayed. The fields displayed on the screen will vary depending on selected features and the type of database selected. The screen below illustrates the fields that are displayed for an MSSQL database. Fewer fields will display for an Oracle database. Only

the **DB Instance Name** field is displayed if the **Reporting Subsystem** is the only feature selected.

⚠ **Important:**

If you are installing the historical subsystem on a remote database configuration, you must first install the database client software on your server.

1. Use the following information to complete the screen. Use the values from your database installation. Some of the fields may include default values.

Field	Oracle	MSSQL
DB Administration Password	sys password	sa password
DB User ID	User ID for OA database (OA creates this User ID during a new installation.)	User ID for OA database (OA creates this User ID during a new installation.)
DB User Password	User password for OA database	User password for OA database
IC DB User ID	User ID for IC Repository database (This must be an existing IC User ID.)	User ID for IC Repository database (This must be an existing IC User ID.)
IC DB User Password	User password for IC Repository database	User password for IC Repository database

Field	Oracle	MSSQL
IC SQL Server Database Name	IC Repository database name	IC Repository database name
DB Instance Name	IC/OA database instance name	IC/OA database instance name (`MSSQLSERVER` if you used the default database instance)
TNS Port Number	`1521` (if using the default configuration, otherwise the port number you specified)	`1433` (if using the default configuration, otherwise the port number you specified)
SQL Server DataBase Name	N/A	OA/IC database instance name

Note:

DB User ID and DB User password are selectable the by the user on this screen. The other fields include values that have been previously administered.

2. Click **Next**.

3. Click **OK** to acknowledge the warning.

Configure tablespaces

If you selected **Historical**, the next step is to configure tablespaces. In the **OA Common TableSpaces** screen, shown below:

⚠ **Important:**
If the historical database is remote, this screen is not displayed.

1. Type in the correct location and size for each filegroup or tablespace. For more information on how to set these values see Avaya Operational Analyst Historical Database Configurations on page 44.

2. Click **Next**.

   If the tablespaces or file groups do not already exist, the **Use Existing** checkboxes will not operate and the **Location** and **Size** input fields will include editable default values. If the tablespaces or file groups do already exist, the **Use Existing** checkboxes will be checked. You can uncheck the checkboxes and enter new values.

   Note:
   The fields at the top of this screen are displayed only for MSSQL databases.

If data will be collected from both CMS and IC, the **OA CMS & IC Specific** screen, shown below, is displayed.

⚠ Important:

If the historical database is remote, this screen is not displayed.

If data will be collected from only CMS, the **OA CMS Specific** screen is displayed. If data will be collected from only IC, the **OA IC Specific** screen is displayed. These screens contain subsets of the fields on the **OA CMS & IC Specific** screen. For MSSQL databases, the left column will be File Groups instead of Table Spaces. The locations will be different.
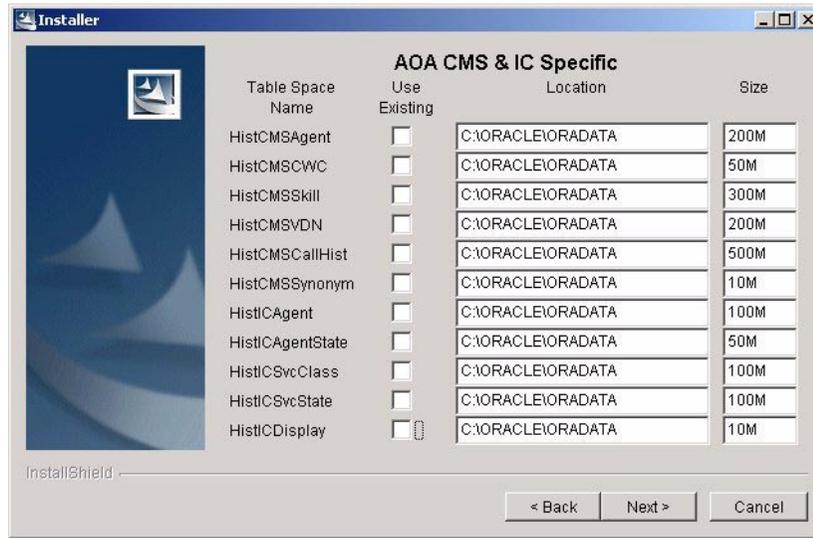
1. Type in the correct location and size for each filegroup or tablespace. For more information on how to set these values see Avaya Operational Analyst Historical Database Configurations on page 44.

2. Click **Next**.

3. Click **OK** to acknowledge the warning.

Configure real-time database

If you selected **Real-Time**, the **Real-Time Configuration** screen, shown below, is displayed.
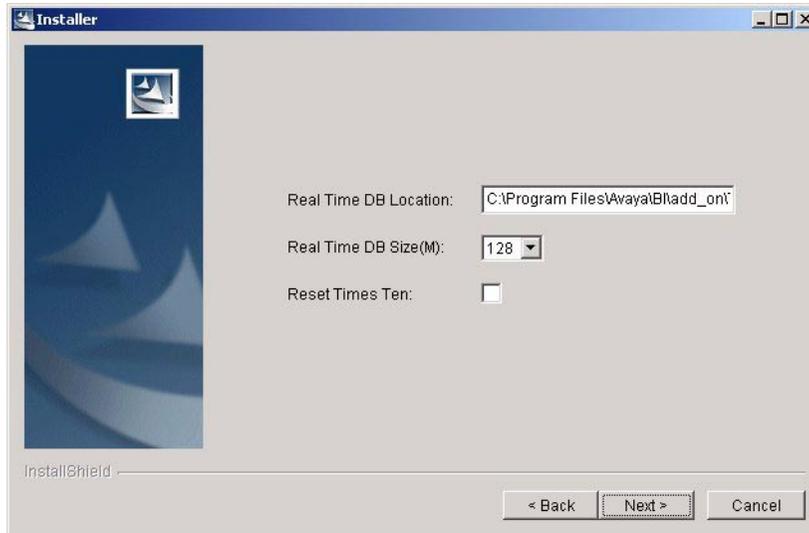
1. Accept the default or type the pathname for the TimesTen installation location. This path must be on the local file system with at least 2 GB of free disk space.

   Note:

   The **Reset TimesTen** box does not apply to new installations. For more information, refer to Modifying or Repairing Avaya Operational Analyst on page 174.

2. Click **Next**.

Verify features and start installation

The **Feature Preview** screen, shown below, lists the features you have selected.
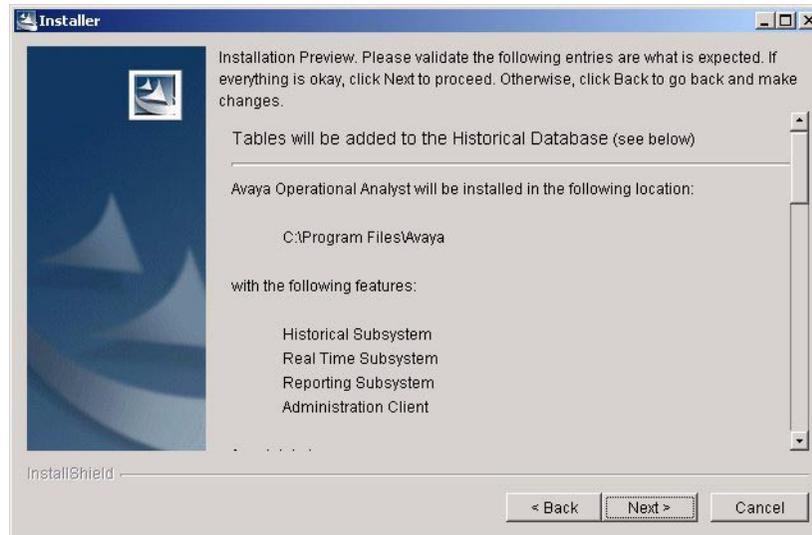
1. Scroll through the preview screen to verify the selected features and configuration data.

2. Click **Next** to start the Installation.
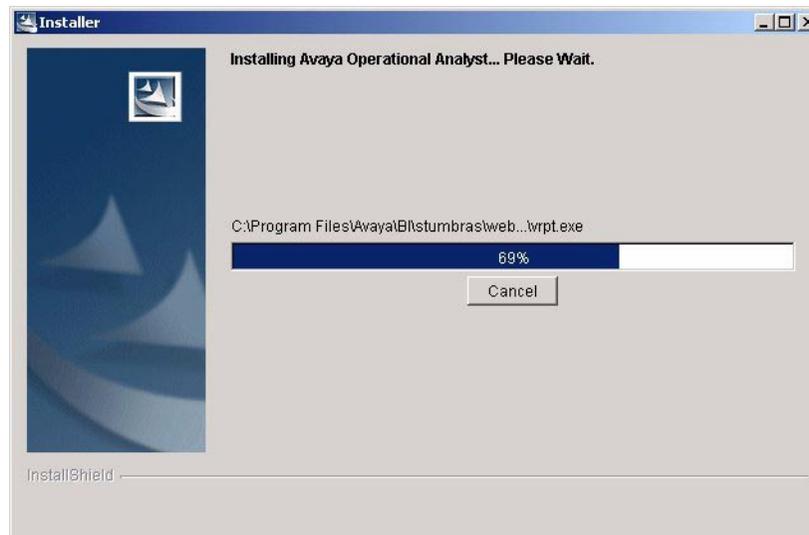
The **Progress** screen, shown below, is displayed.

⚠ **WARNING:**

If you cancel installation from this point forward, you will need to uninstall and reinstall the system to correct system registry entries.

The **Historical Database** status screen is displayed. Then the **InstallShield Wizard** completes

3. Click **Finish**.

Depending on the feature selection and the system environment, the **Restart** screen, shown below, may be displayed.
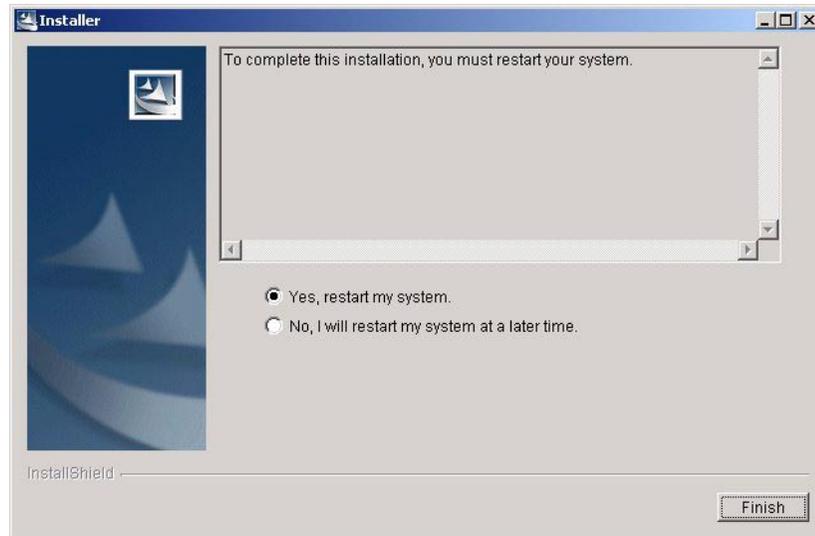
4. If the **Restart** screen is displayed, select the option to restart your system now and click **Finish**.

Install Avaya Operational Analyst on a Solaris platform

Begin Avaya Operational Analyst installation

To start the Avaya Operational Analyst Installation Process on Solaris platforms:

1. Place the Avaya Operational Analyst CD-ROM in the drive.

> ⚠ **CAUTION:**
>
> Only install from a CD drive that is local to the server where you are installing OA. Installing from a networked CD drive is not recommended because it may cause errors.

2. Run SolSetup from the CD-ROM mount point.

Avaya Operational Analyst Installation begins with this **InstallShield Wizard** screen, shown below.
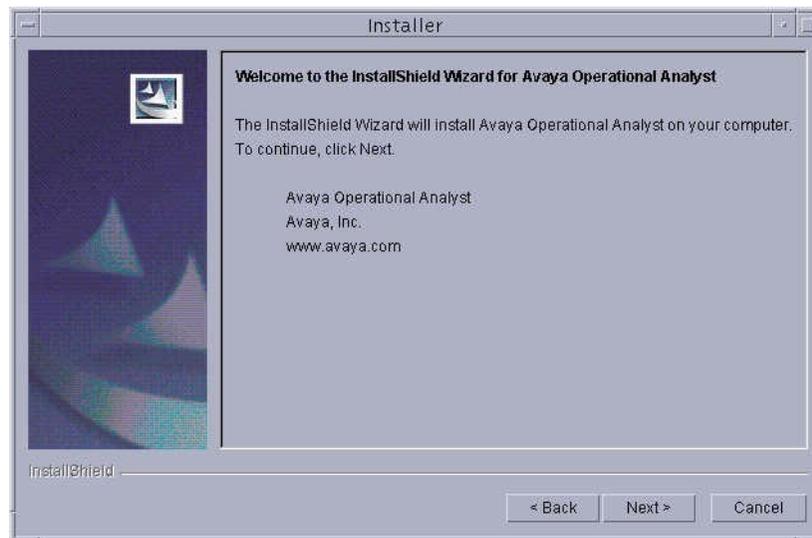
> **Note:**
>
> You can stop installation at any time by clicking **Cancel**. If you do so, you will be asked to confirm your intention to cancel. If you cancel, the installation is terminated and the system is restored to its previous state.

3. When you are ready to proceed, click **Next**.

Complete licensing information

In the **Operational Analyst License Key**, shown below:

1. Type the provided **License key** for the features purchased.

2. Click **Next**.

You must accept the terms of the license, shown below, in order to proceed with installation. If you do not accept the terms of the license, installation cannot proceed.
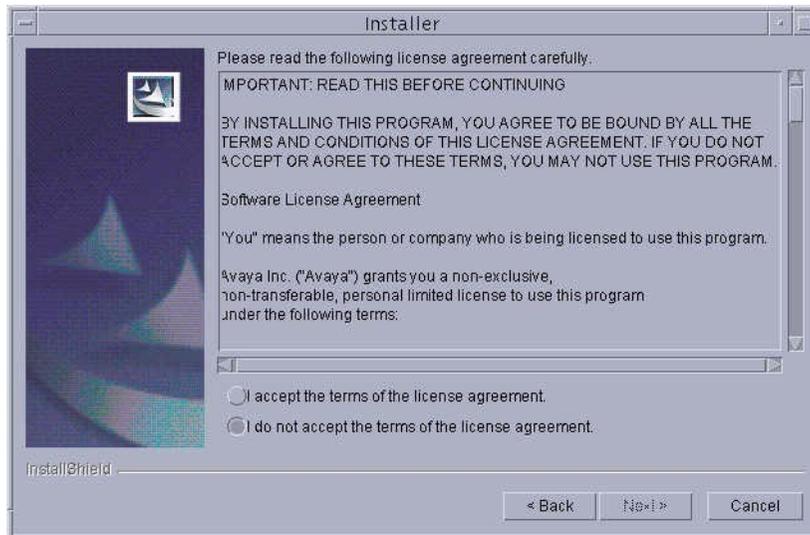
1. Choose **I accept the terms in the license agreement**.

2. Click **Next**.

Provide user information

The **User Panel**, shown below, prompts you for ID and Password information.

1. Type the **User ID**, **User Password**, and **Group ID**.

   - Use a login ID and password, as discussed in Creating user IDs on page 110. This assigns an owner for all OA files and folders.

2. Click **Next**.

Specify destination

The **Destination** screen, shown below, allows you to specify the destination for installation of the Operational Analyst software. This defaults to the directory defined for the User ID.
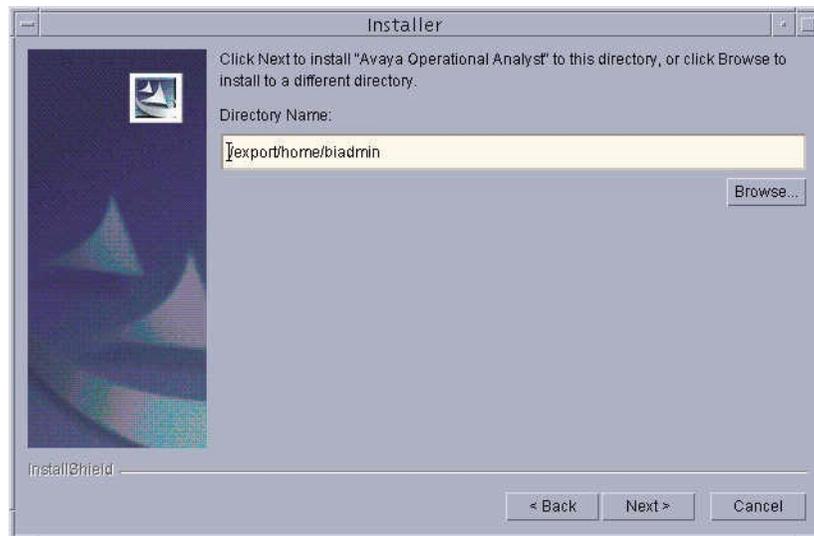
1. Accept the default directory or change the directory, if needed.

   To change the location where you want the features installed

   a. Click **Browse**.

   b. Select the directory.

   The selected directory must have sufficient disk space to accommodate the installed features. It should be on a local disk, not a remote file system.

2. Click **Next**.

   There may be a long delay before the next screen is displayed.

Select features

The **Avaya Operational Analyst Feature** screen, shown below, lets you select the features to install or not install.
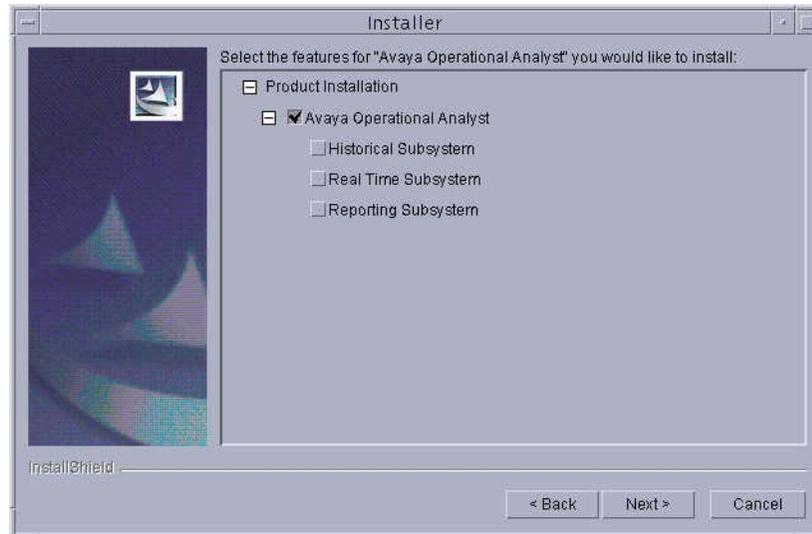
1. Select the features to install by clicking those features.

   Note:
   > There may be a delay before a check mark is displayed or before you can check another box.

   You can install features individually or in combination.

   - For an historical server, select **Historical**.

   - For a Real-Time server, select **Real-Time**.

   - For a Reporting server, select **Reporting Subsystem**.

   Note:
   > Administration and Advanced Reporting do not appear as feature options on this screen because they must be installed on Windows platforms.

2. Click **Next**.

Identify Reports Group ID

If you selected **Reporting Subsystem**, the **Operational Analyst Reports Group ID** screen, shown below, is displayed.

1. Provide the following:

   - **Group ID = `ipgrp`**

   - **iPlanet Root Location** = **`/usr/iplanet/servers`**

   - **Fully Qualified Reports Server Name** = *`name of reports server`*

   - **Stumbras Port Number** = *`available port number`* (use any port from 1024 through 65535, 11000 is recommended)

2. Click **Next**.

Configure historical database

In the **Historical Database Configuration Information** screen, shown below, you begin to specify the historical database configuration.

The fields that appear on this screen vary, depending on your selections. Complete the appropriate fields.

1. If this machine is not the historical server, type the name of the historical server.

   If you selected **Historical** for this server, the name of this server is displayed and cannot be changed.

2. Type the **Historical Database Server Name**.

   If you are using a Back End Database, type the name for that server. The file groups and data files must be manually created on that server before this installation may continue.

3. Select the **Collection Sources** for the historical tables. You must create file groups for IC, CMS or both prior to selecting collection sources.

   You can collect data from IC, CMS, or both.

   Note:
   > You cannot remove these collection sources by modifying OA.

4. If you wish to send alarm data to the IC server, click the **IC** box under **Alarm Services**, and type the **Server Name** of the IC Alarm server.

5. Click **Next**.

Specify database IDs and passwords

If you selected **Historical** or **Reporting Subsystem**, the **Database Configuration** screen is displayed. The fields displayed on the screen vary depending on selected features and database. Only the **DB Instance Name** field is displayed if the **Reporting Subsystem** is the only selected feature. This is the screen that is displayed if SQL Server is the selected database.

1. Use the following information to complete the screen or screens.

   ⚠ **Important:**

   If you are installing the historical subsystem on a remote database configuration, you must first install the database client software on your server.

Field	Value
DB Administrator Password	sys password
DB User ID	User ID for OA database
DB User Password	User password for OA database
IC DB User ID	User ID for IC Repository database (This must be an existing IC User ID.)
IC DB User Password	IC Repository database password
IC SQL Server DataBase Name	IC Repository SQL Server database name
DB Instance Name	Instance name from database setup

Field	Value
TNS Port Number	`1521` (if using the default configuration, otherwise the port number you specified)
SQL Server DataBase Name	OA/IC database instance name

2. Click **Next**.

3. Click **OK** to acknowledge the **Warning**.

Configure tablespaces

If you selected **Historical**, the next step is to configure tablespaces. In the **OA Common Table Spaces** screen, shown below:

⚠ **Important:**

If the historical database is remote, this screen is not displayed.

1. Type in the correct location and size for each filegroup or tablespace. For more information on how to set these values see Avaya Operational Analyst Historical Database Configurations on page 44.

2. Click **Next**.

If data will be collected from both CMS and IC, the **OA CMS & IC Specific** screen, shown below, is displayed.

⚠️ **Important:**
  If the historical database is remote, this screen is not displayed.

If data will be collected from only CMS, the **OA CMS Specific** screen is displayed. If data will be collected from only IC, the **OA IC Specific** screen is displayed. These screens contain subsets of the fields on the **OA CMS & IC Specific** screen.

1. Type in the correct location and size for each filegroup or tablespace. For more information on how to set these values see Avaya Operational Analyst Historical Database Configurations on page 44.

2. Click **Next**.

3. Click **OK** to acknowledge the warning.

Configure real-time database

If you selected **Real-Time**, the **Real-Time Configuration** screen, shown below, is displayed.
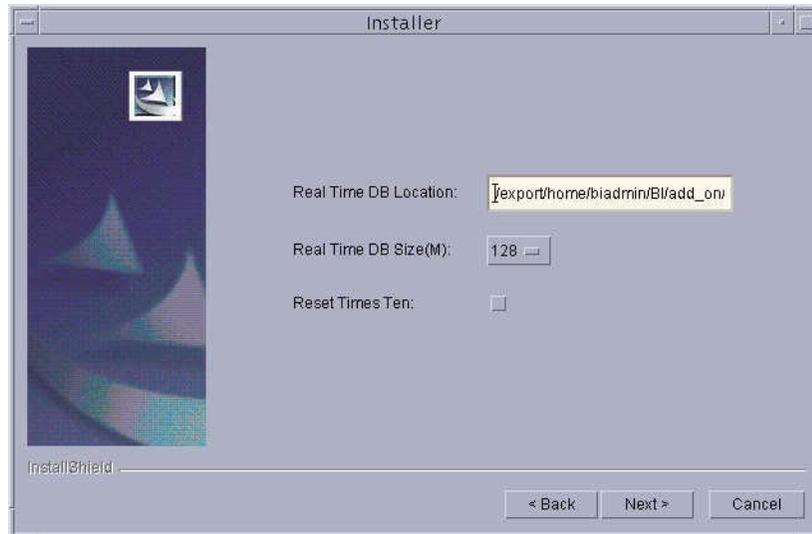
1. Accept the default or type the pathname for the TimesTen installation location. This path must be on the local file system with at least 2 GB of free disk space.

2. Click **Next**.

Verify features and start installation

The **Feature Preview** screen, shown below, lists the features you have selected.
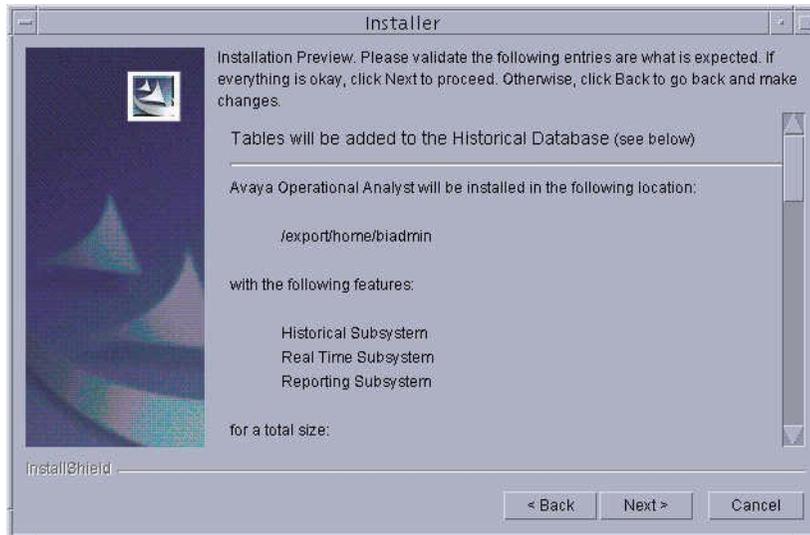
1. Scroll through the preview screen to verify the features you selected.

2. Click **Next** to start the Installation.

   The **Progress** screen, shown below, is displayed until installation completes.
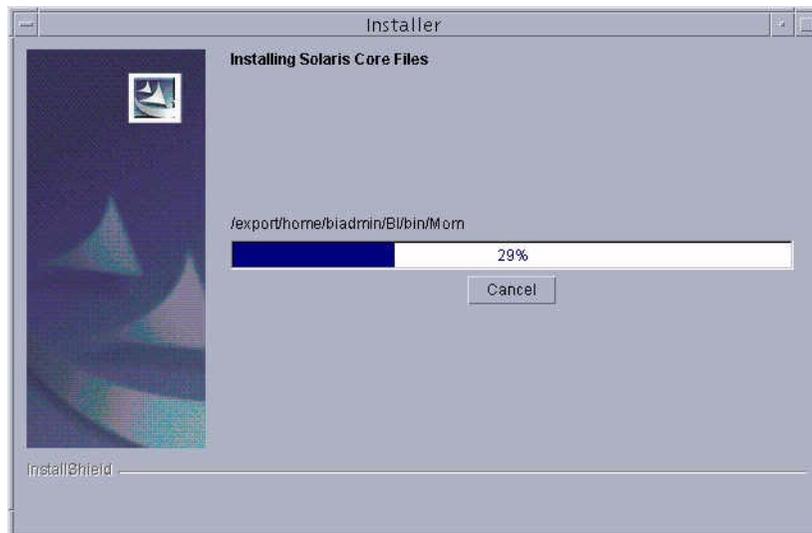
⚠ WARNING:

If you cancel installation from this point forward, you will need to uninstall and reinstall the system to correct system registry entries.

3. Click **Finish**.

Install data collection software on a CMS platform

If you will collect data from CMS, you must install the Avaya Operational Analyst data collection software module on the CMS platform.

> **Note:**
>
> You may install CMS data collection software remotely. See Remote installation of CMS data collection software on page 273 for details.

Begin installation

Follow the instructions under Install Avaya Operational Analyst on a Solaris platform on page 127 to:

1. Begin Operational Analyst Installation on the CMS platform.

2. Complete licensing information.

3. Provide user information.

4. Specify the destination for installation.

Select Features

The **Operational Analyst Feature** screen, shown below, displays only one feature, Source-CMS.
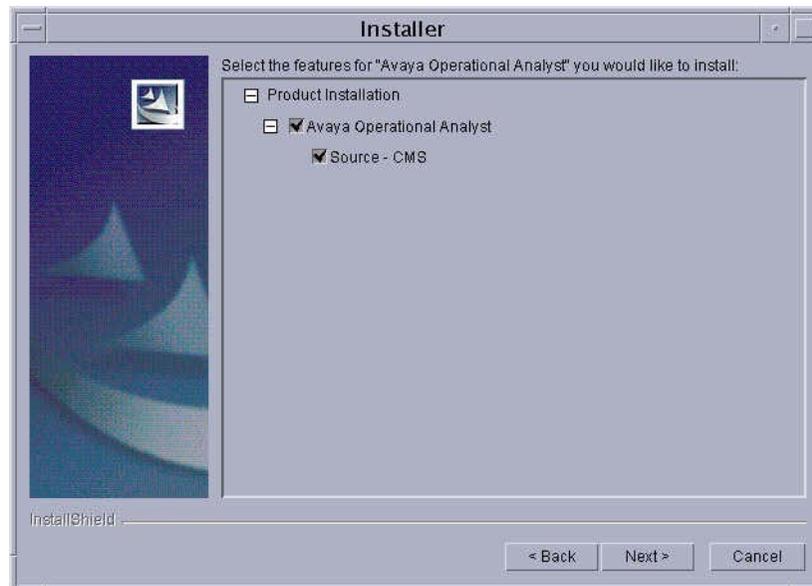
1. Select **Source-CMS**.

2. Click **Next** to install Source - CMS.

Configure the historical database

In the **Historical Database Configuration Informatio**n screen, shown below, specify the historical database.
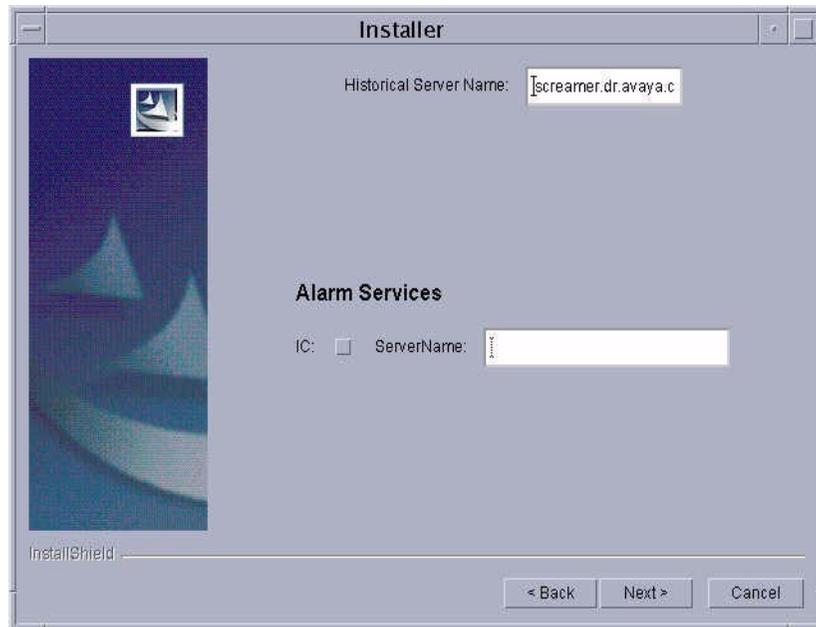
1. Type the **Historical Database Server Name**.

2. If you wish to send alarms to the IC server, click the **IC** box under **Alarm Services**, and type the **Server Name** of the IC Alarm server.

3. Click **Next**.

The **CMS Database Configuration** screen, shown below, is displayed.

4. Complete the screen with the Informix user ID and password from CMS.

Verify features and start installation

The **Feature Preview** screen lists the features you have selected.

1. Scroll through the preview screen to verify the features you selected.

2. Click **Next** to start the Installation.

The **Progress** screen is displayed until installation completes.

3. Click **Finish**.

Install data collection software on an IC platform

If you will collect data from IC, you must install the Avaya Operational Analyst data collection software module on the IC platform. Refer to *Avaya Interaction Center Release 6.0 Installation Prerequisites Guide* to determine where data collection software must be installed.

Begin installation

Follow the instructions under to:

1. Begin Operational Analyst Installation on the IC platform.

2. Complete licensing information.

3. Provide user information.

4. Specify the destination for installation.

Select Features

The **Operational Analyst Feature** screen, shown below, displays the available features.
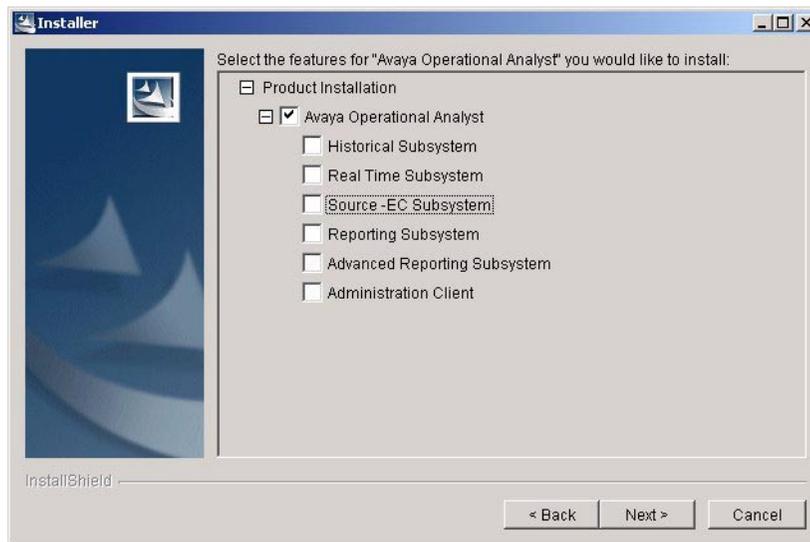
Note:

Depending on the server configuration, some choices may not be present.

1. Select Source-EC Subsystem.

You can also install the Administration Client on the IC platform, if you choose.

2. Click **Next**.

Verify features and start installation

The **Feature Preview** screen lists the features you have selected.

1. Scroll through the preview screen to verify the features you selected.

2. Click **Next** to start the Installation.

   The **Progress** screen is displayed until the installation completes.

3. Click **Finish**.

Validating Avaya Operational Analyst installation and configuration

After the installation is complete, validate the Avaya Operational Analyst operation.

Validate Service Operations in Windows

To validate service operation in Windows:

1. Start the Service applet from the control panel (go to **Start Menu > Settings > Control Panel > Services**).

2. Validate that the following services are set to start automatically and are running.

   - If Historical feature is installed:
     - Avaya Business Intelligence Service
     - ORBacus Naming Service
     - TimesTen Data Manager 4.3
   - If Real-Time feature is installed:
     - Avaya Business Intelligence Service
     - ORBacus Naming Service
   - If Reporting Subsystem installed
     - Stumbras-Tomcat

Validate Service Operations in Solaris

To validate service operation in Solaris:

1. Validate that the Avaya Business Intelligence and ORBacus services are set to start automatically and are running:

   - If Historical feature is installed:

     - Avaya Business Intelligence Service

     - ORBacus Naming Service

   - If Real-Time feature is installed:

     - Avaya Business Intelligence Service

     - ORBacus Naming Service

     - TimesTen Data Manager 4.3

   Use the following commands:

   ```
   ps -ef | grep initserv
   ps -ef | grep nameserv
   ps -ef | grep timesten
   ```

   - If the Reporting feature is installed:

     - Avaya Business Intelligence Service

     - ORBacus Naming Service

     - Stumbras-Tomcat

   Use the following command:

   ```
   ps -ef | grep https-stumbras
   ```

Starting Avaya Operational Analyst

After installation, start Avaya Operational Analyst on each of the servers.

Start Avaya Operational Analyst on Windows

Verify that OA has started on Historical, Real-Time, Reporting Subsystem, and IC servers

OA starts automatically on the Historical, Real-Time, Reporting Subsystem, and IC servers. To verify that OA has started:

1. Log in using the appropriate User ID and password.

2. Open a command window.

3. Enter the following command to show all processes that are running:

   ```
   pa list
   ```

If OA has not started:

1. Enter the following commands to start MOM and to show all processes that are running:

   ```
   pa start all
   ```

   ```
   pa list
   ```

Start Avaya Operational Analyst Administration Client

For details on User ID and group creation and guidelines, please refer to *Operational Analyst 6.0 Security Guide*.

To start OA Administration Client:

1. Go to the directory where you installed the Administration feature.

2. Click `AdminPol.html` in the `BI` directory.

The **Administration Login** dialog box, shown below, is displayed.

3. Type the User ID and password. Click **OK**.

   Note:

   If the User ID is on a domain, enter the domain name and the User ID. For example: **domain1\user1**. If the user ID is local to this server, enter the server name and the User ID: **server1\user1**.

The Avaya Operational Analyst **Welcome** screen, shown below, is displayed.
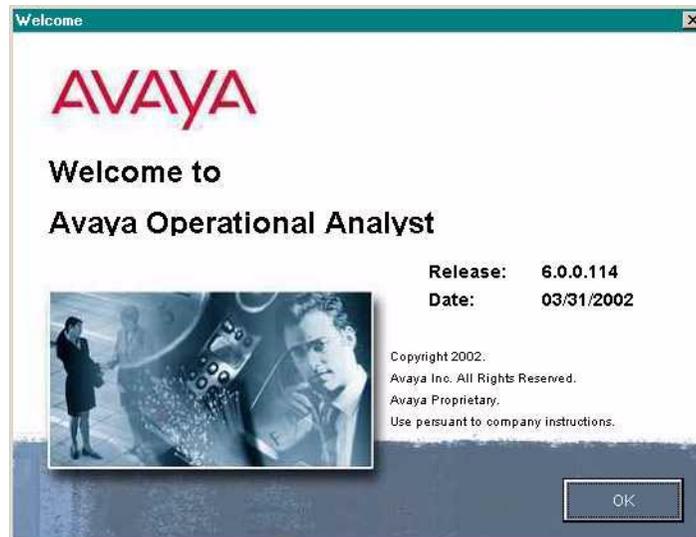
4. Click **OK**.

   The **Administration Client** screen, shown below, is displayed.

Administration Client - Microsoft Internet Explorer

File   Edit   View   Favorites   Tools   Help

Back | Search   Favorites   History

Address   C:\Program Files\Avaya\BI\AdminPol.html

Administration Client

File   Edit   View   Help

OA Administration
  Container Status
  Scheduled Jobs
  Interface Services
  Subsystems
  Container Profiles
  Schemas
  Retention Periods
  Daily Intervals
  Container Limits

Avaya Operational Analyst (OA) is the application that allows you to manage your real-time and historical databases and oversee the collection of data for reporting.

Tips

Getting Started

To configure Avaya Operational Analyst, click Help for instructions. Configure Avaya Operational Analyst in the following order.

1. Subsystems: Configure historical, report, real-time, CMS, and source subsystems.
2. Daily Intervals: Define the intervals for reporting.
3. Schemas: Define schemas for all historical stores.
4. Container Limits: Specify the maximum number of containers and select archival options.
5. Container Profiles: Specify data to be aggregated and archived.
6. Retention Periods: Define how long data will be stored.
7. Interface Services: Enable or disable services for data collection and reporting.

Maintaining Avaya Operational Analyst

To monitor the status of Avaya Operational Analyst, view the following screens daily:

1. Container Status: View the status of your container data.
2. Scheduled Jobs: Verify jobs are executing successfully.
3. Interface Services: Verify required services are enabled and responding.

For more information on administration capabilities access screen help.   Connected to server

Applet started.   My Computer

5. Administer the appropriate subsystems.

   Refer to the *Administration Client Help* for more information.

Start Avaya Operational Analyst on Solaris

Start OA on Historical, Real-Time, and Reporting Subsystem servers

To start OA:

1. Log in using the appropriate User ID and password.

2. Enter the following commands to show all processes that are running:

```
cd /opt/BI
. ./.profile
pa list
```

If OA has not started:

1. Enter the following commands to start MOM and to show all processes that are running:

```
pa start all
pa list
```

Saving the installation image

After you have installed Avaya Operational Analyst, and before you have entered any data into it, make an emergency repair disk or ghost image of the "clean" installation. You can use this image to recover from system failures or data corruption.

Administering Avaya Operational Analyst

At this point, the Operational Analyst software is ready to be administered to permit data collection and reporting. Before you can configure the Event Collector (EC) server for Avaya IC, you must administer the Real-Time subsystem, and create a corresponding IC source subsystem in Avaya OA.

If your installation includes CMS (whether or not it includes IC) you must add CMS and ACD source subsystems.

Add the Real-Time Subsystem

To add a Real-Time Subsystem:

1. In the **OA Administration** tree, select **Subsystems**.

   The **Subsystems** administration screen, shown below, is displayed in the right pane.
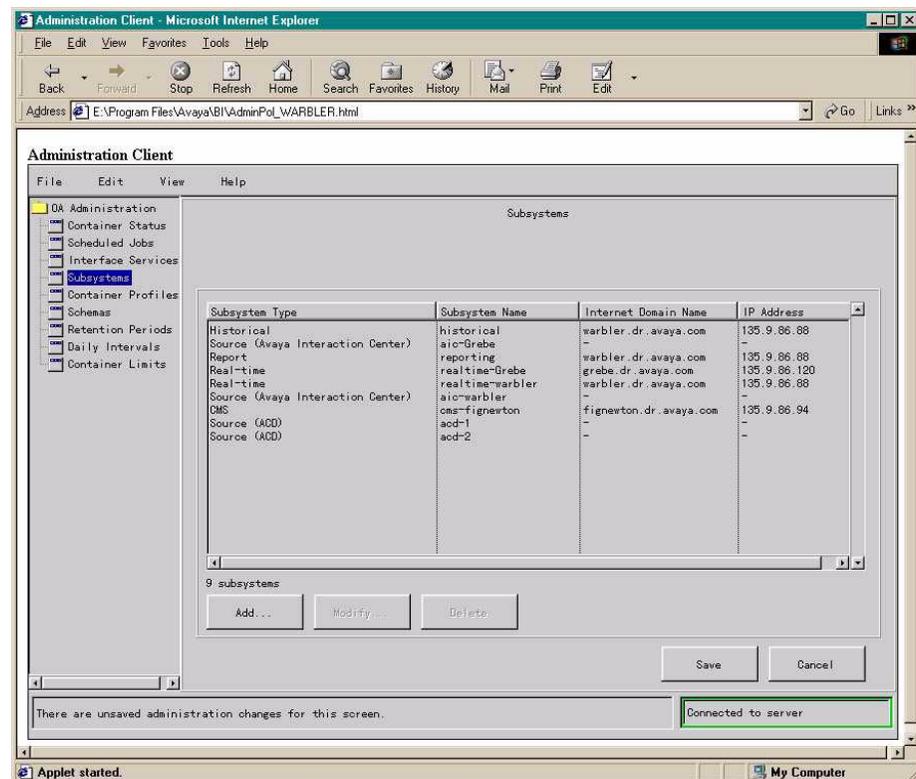
2. Click **Add**.

The **Add Subsystem** screen, shown below, is displayed.

3. Select the **Real-Time** option under **Type.**

4. Provide the **Name** and **Location** of the Real-Time Subsystem.

You can use the Internet domain name or the IP address.

5. Click **OK**.

The new subsystem is added to the table in the subsystems screen, as shown below.
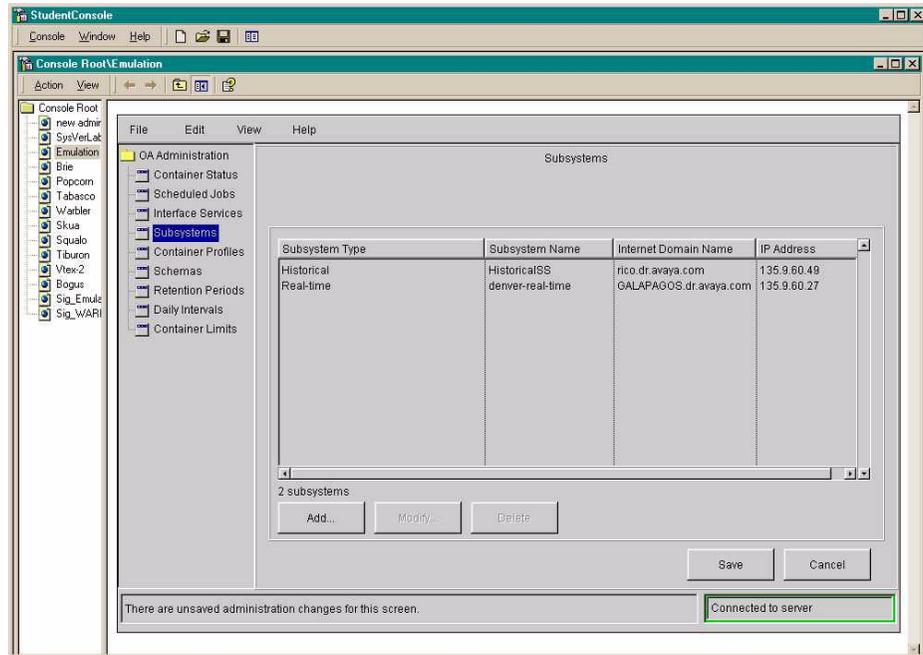
6. Click **Save**.

The add request is submitted to the historical server.

Add the IC Source subsystem

You add an IC Source subsystem for each ADU real-time subsystem pair. To add an IC Source subsystem:

1. In the **OA Administration** tree, select **Subsystems**.

The **Subsystems** administration screen is displayed in the right pane.

2. Click **Add**.

The **Add Subsystem** screen is displayed.

3. Select the **Source** subsystem you want to install: **Avaya Interaction Center**.

4. In **Name**, type a unique subsystem name.

> **Note:**
> Choose a name that indicates which real-time subsystem this IC source subsystem is associated with. This helps reduce confusion if your installation contains several real-time subsystems and several IC source subsystems.

5. Select **Automatic generation** to allow Avaya OA to generate a **Source ID**.

You will need this Source ID to configure the EC server.

> ⚠ **WARNING:**
> The Source ID is stored with the historical data in the database. If you delete and re-add the source subsystem for any reason, you should select **Manual generation** and enter the Source ID that was previously assigned to this source subsystem. Otherwise, the previously stored historical data will no longer be associated with this source, and it may not be possible to display the data in reports.

6. Select the name of the **Real-time subsystem** to which to send the data.

7. Click the checkbox next to the appropriate **Historical Store** and select the appropriate historical subsystem.

8. Click **OK** to return to the **Subsystems** administration screen.

9. Click **Save** to apply the changes.

> **Tip:**
>> If you leave the **Subsystems** screen without saving the changes, they will be lost.

10. Repeat this procedure for each ADU real-time subsystem pair.

Add the CMS subsystem

To add a CMS subsystem:

1. In the **OA Administration** tree, select **Subsystems**.

   The **Subsystems** administration screen is displayed in the right pane.

2. Click **Add**.

   The **Add Subsystem** screen is displayed.

3. Select the **CMS** option under **Type**.

4. Provide a unique subsystem **Name**.

5. Provide a **Location**, either Internet domain or IP address.

6. Click **OK** to return to the **Subsystems** administration screen.

7. Click **Save**.

The subsystem add request is submitted to the historical server.

Add the ACD Source subsystem

To start the flow of ACD data, you must first create a CMS subsystem, then add an ACD Source subsystem to link them together.

1. In the **OA Administration** tree, select **Subsystems**.

The **Subsystems Administration** screen is displayed in the right pane.

2. Click **Add**.

The **Add Subsystem** screen is displayed.

3. Select **ACD** from the **Source Type** drop down list.

4. Leave the Source ID **Automatic generation** option enabled.

> ⚠ **WARNING:**
>
> The Source ID is stored with the historical data in the database. If you delete and re-add the source subsystem for any reason, you should select **Manual generation** and enter the Source ID that was previously assigned to this source subsystem. Otherwise, the previously stored historical data will no longer be associated with this source, and it may not be possible to display the data in reports.

5. Enter a name for the subsystem.

6. Select the associated CMS subsystem from the **CMS subsystem** drop down list.

7. Type the **ACD number** (1-8) for this ACD.

8. Select the types of data that should be kept in the historical subsystem.

9. Type a name for the static data collection job that will be created.

10. Click **OK** to return to the **Subsystems** administration screen.

Up to eight ACDs can be added for each CMS. Up to 30 CMSs can be handled by OA, for a total of up to 240 ACDs. After the CMS and ACD subsystems are added, the subsystem screen will look as follows:
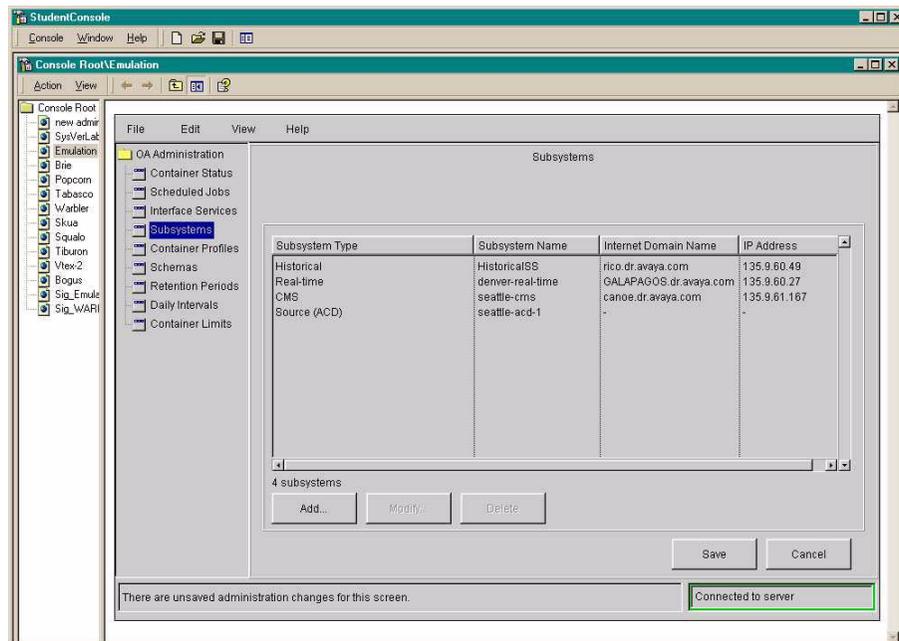
11. Click **Save**.

The subsystem add request is submitted to the historical server.

Add the Report subsystem

To generate reports about the data you have collected, you must add a Report subsystem:

1. In the **OA Administration** tree, select **Subsystems**.

   The **Subsystems** administration screen is displayed in the right pane.

2. Click **Add**.

   The **Add Subsystem** screen is displayed.

3. Select the **Report** option under **Type**.

4. Provide a unique subsystem **Name**.

5. Provide a **Location**, either Internet domain or IP address.

6. Click **OK** to return to the **Subsystems** administration screen.

7. Click **Save**.

   The subsystem add request is submitted to the historical server.

   Note:

   You must restart the Windows Stumbras-Tomcat service on the Report
   server after administering the Report subsystem.

Complete initial administration

You must also activate the remaining subsystems and interface services, define daily intervals, configure schemas and containers for each historical store, and set limits as part of your initial administration. Please refer to the online Help for the Administration Client for information about these procedures.

Administering the EC server

After you have created an EC Source subsystem, you can configure the ECserver. The EC server is the bridge between the ADU and its associated real-time subsystem. You repeat this procedure for every ADU real-time subsystem pair.

Before you administer the EC Server, you must know the Real-Time System ID (Source ID) of the Real-Time system that will receive data from the EC server. You must also configure the ADU and DS servers as using GMT.

To administer the EC Server:

1. In **IC Manager** administration screen, select the **Server** tab.

   The **Server** tab displays information on each of the servers.
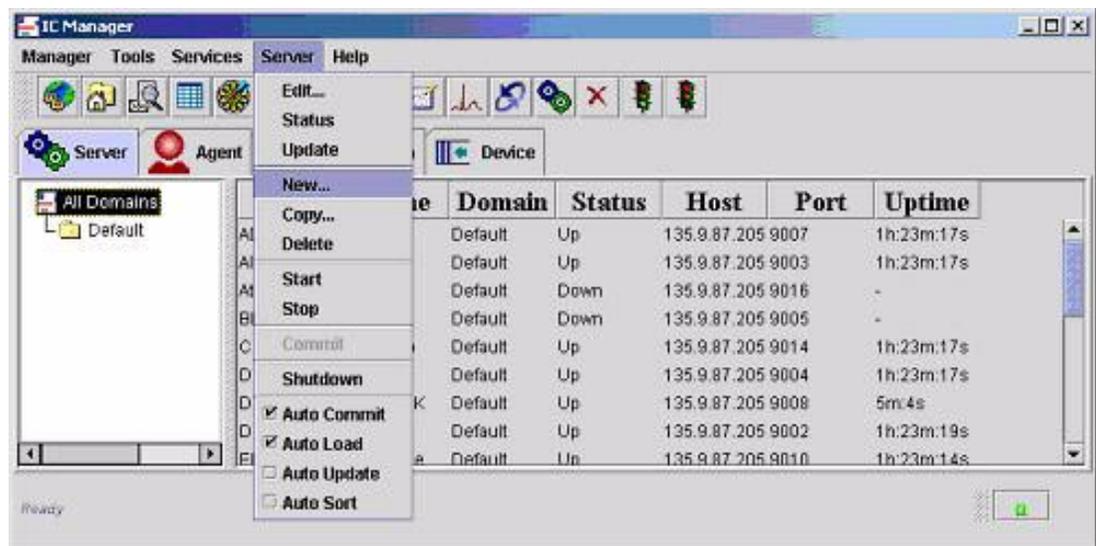
2. Select **Server** > **New...**

The **Select or enter server type** dialog box is displayed.
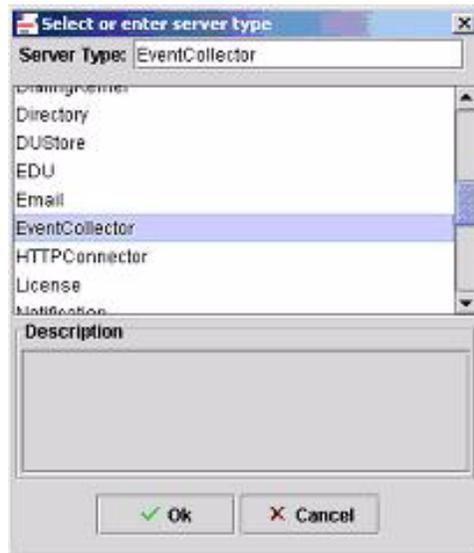
3. Choose **EventCollector** from the **Server Type** list and click **OK**.

The **Server Editor** screen, shown below, is displayed.
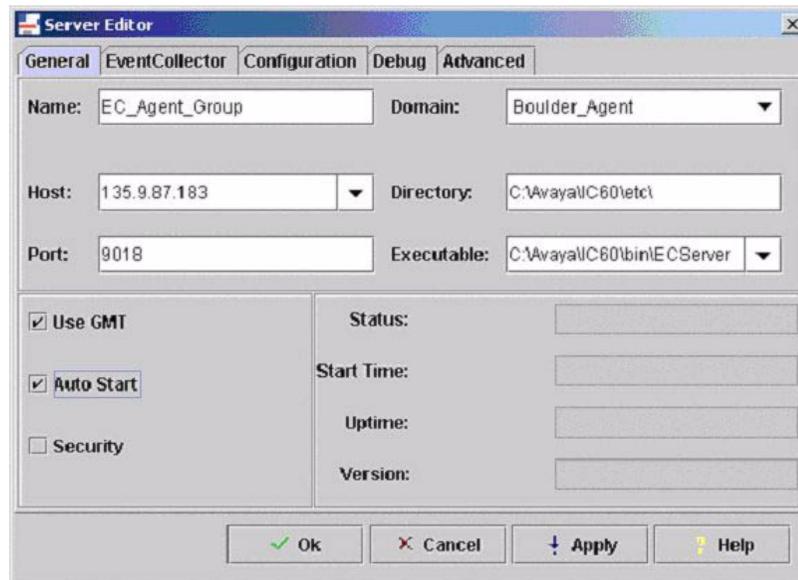
4. Type the **Name** of the EC server.

Select a meaningful name. If you will define multiple EC servers, use a unique name for each.

5. Select the IP address of the **Host** where the EC server will run.

   The EC server should run on the same host as the agent ADU server. If there is more than one agent ADU server, configure a separate instance of the EC server for each agent ADU server.

6. Accept the default **Port** number.

7. Select the IC **Domain** within which this instance will run.

   This must be the same domain as the domain of the local agent ADU server.

8. Accept the default directory where Avaya IC will execute.

   This directory will be:

   ● For Windows, *install directory\etc*

   ● For Solaris, *install directory/etc*

9. Accept the path and filename for the executable:

   ● For Windows, *install directory\bin\ECServer*

   ● For Solaris, *install directory/bin/ECServer*

10. Select the **GMT** and **Auto start** checkboxes.

11. Select the **Event Collector** tab, shown below.

12. Choose the Site associated with this instance of EC server from the **Site** drop down list.

> **Note:**
>> This value must always match the site configured for the Telephony Queue Statistics Server (or Servers) from which the EC server will collect Telephony Server Queue statistics.

13. Enter the **Real-Time System ID** associated with the real time system that will receive data from this EC server instance.

> **Note:**
>> Real-Time System IDs are identical to Source ID values that a system administrator assigns and associates with an OA Real-Time subsystem during OA subsystem administration. Refer to Determining Real-Time System ID and Data Manager Host for information on obtaining the Source ID.

14. Enter the **Data Manager Host** for this EC server instance. This is the name or IP address of the system hosting the OA Real-Time system that will receive data from this EC server instance. The OA Real-Time system can be co-located on the same system as the EC server. If this is the case, then use the name or IP address of system hosting both IC and the OA real-time subsystem.

15. Choose the **Agent Availability Algorithm** to be used for this EC server instance. The choices are either **AGENT_LOAD_BASED** (for agent load) or **CHANNEL_LOAD_BASED** (for media channel load). Interaction Center blending logic can be customized to enforce overall agent load or channel-specific load. When agent load is used, it imposes an upper limit on the total contacts that an agent can receive across all channels. Refer to Avaya Interaction Center documentation for more information.

16. Click **Ok** to complete the EC server administration.

For troubleshooting information see the *Event Collector* section in the *OA Troubleshooting Guide*.

Determining Real-Time System ID and Data Manager Host

The **Real-Time System ID** and **Data Manager Host** values are required to administer the EC Server. You input these values on the **Event Collector** tab of the EC **Server Editor** screen in Step 13 of Administering the EC server.

Follow these steps to determine the values of Real-Time System ID and Data Manager Host from the **Subsystems** screen of the OA Administration Client:

1. On the Subsystems screen, locate the real-time subsystem that is communicating with this EC instance. Its row displays the host name and IP address information in the appropriate columns of the table.

2. Select the Interaction Center data source associated with the selected real-time subsystem.

Note:

> If you do not know the subsystem name of the Interaction Center data source, you may have to select several data sources until you locate the correct one.

3. Press **Modify**.

4. The **Modify Subsystem** dialog is displayed.

5. Verify the **Real-time subsystem** field matches the real-time subsystem you selected in Step 1.

6. The Real-time System ID is the value displayed in the **Data Source ID** field.

Installing Reporting Client support files

The Reporting Client workstation requires JRE and the Reporting Client support files.

To install JRE and the Reporting Client:

1. Open MS Internet Explorer at the following URL:

   http://*reporting server name*/reports1

2. Click **Operational Reports** to expand the report tree, as shown below.
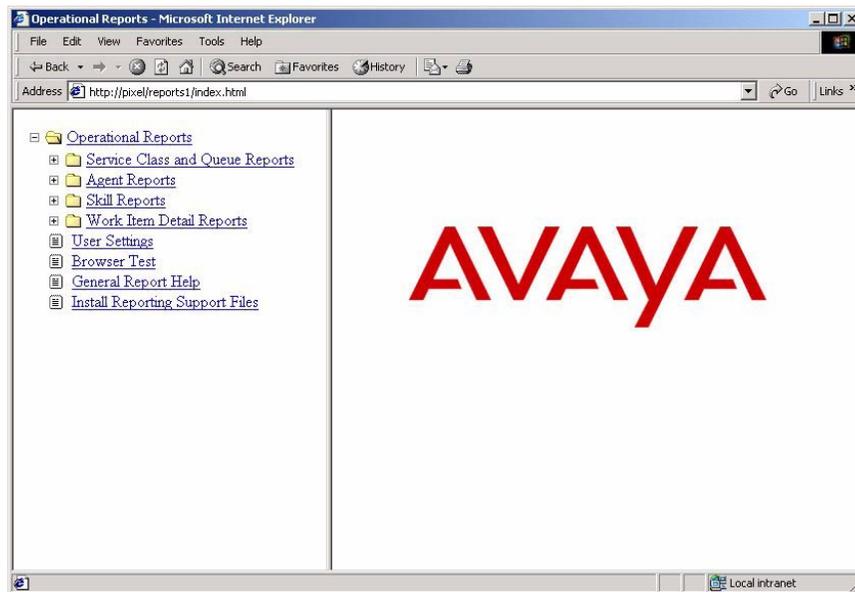
3. Click **Install Reporting Support Files**.

   Installation instructions are displayed in the right pane as shown.
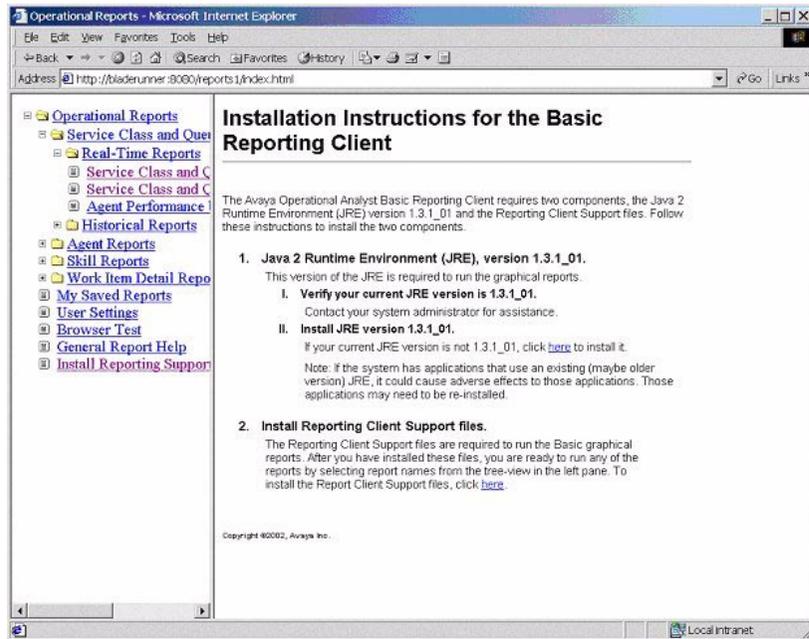
4. Follow the instructions to:

   a. Check the current version of JRE installed on your computer.

   b. Install JRE version 1.3.1_01 (if necessary).

   c. Install the Reporting Client support files.

Chapter 5: Troubleshooting the installation

This chapter provides some troubleshooting hints to help you get Avaya Operational Analyst installed and running. You may do some troubleshooting using the Administration Client interface. To do so, please refer to the online Help for Administration Client.

While this chapter does not present an exhaustive list of troubleshooting procedures and tools, following the suggestions will usually pinpoint the problem areas you need to work on. For more help, contact Avaya Customer Support or your Avaya Professional Services representative.

Topics

This chapter includes the following topics:

- Installation Troubleshooting on page 166
- SQL Server 2000 installation on page 169

Installation Troubleshooting

One of the most common causes of installation failure is improper setup of the operating system environment before attempting to install Avaya Operational Analyst. Be sure to verify that you have followed the steps outlined in Chapter 4: Installing Avaya Operational Analyst on page 101. It is critical that all the supporting environmental software is installed, in the proper order.

Avaya Operational Analyst installation

Installation failure

If the Avaya Operational Analyst installation fails and you get an error message:

1. Correct the situation that caused the error.

2. Rerun installation.

   When you reinstall, the process may appear as a new install or as a repair, depending on the error.

Missing DLLs

On Windows, if when attempting to run Operational Analyst a window pops up indicating that DLLs are missing, a repair of Operational Analyst is necessary. Please follow the instructions regarding repair in Modifying or Repairing Avaya Operational Analyst on page 174.

> **Note:**
> All of the features previously installed must be selected on the feature panel for re-installation.

Diagnosing installation problems

If you encounter difficulties with the Avaya Operational Analyst installation, following these steps may help you pinpoint the cause of the trouble:

1. Access the **AOAlog.txt** file in the installation directory.

2. View the **AOAlog.txt** file. This log file reports:
   - Installed components
   - Component IDs
   - Component registry values

- Errors encountered during installation
- Rollbacks due to installation errors

If the log file reports do not lead to a resolution of the difficulty, contact Avaya Customer Support or your Professional Services representative.

Report access failure

If you try to access reports and receive a **Page Not Found** or other error, it may be that the reporting subsystem has not been administered.

To verify that the report subsystem has been administered:

1. Start the Administration Client.

2. Access the Subsystems page.

3. Verify that there is an entry for a reporting subsystem on the subsystem where you are attempting to run reports.

Refer to the Administration Client help for more information on how to administer the reporting subsystem, and *Operational Analyst 6.0 Security Guide* for details on User ID and group creation and guidelines.

Administration Client authorization failures

If you cannot access the OA Administration Client due to authorization failures, please refer to *Operational Analyst 6.0 Security Guide* for details on User ID and group creation and guidelines.

Password changes

If you change database passwords external to Avaya Operational Analyst, you may need to repair Avaya Operational Analyst to reset the passwords. See Chapter 6: Modifying, repairing, and removing Avaya Operational Analyst on page 173 for more information.

SQL Server 2000 installation

If you encounter difficulty installing the Avaya Operational Analyst software due to SQL Server 2000 database issues, it is possible the initial SQL configuration is incorrect. Check the following items:

Port number

The port number, which is usually **1433**, must match the entry in the file `%PABASE%/data/admin/db.properties`. To verify the port number:

1. Select **Start** > **Program Files** > **Microsoft SQL Server** > **Server Network Utility**.
2. Choose the **General** tab.
3. Select **TCP/IP**.
4. Click **Properties**.
5. Adjust the port number if necessary.

SQL server services

The SQL server services must be running and set to start automatically.

1. Select **Control Panel** > **Administrative Tools** > **Services**.
2. Verify that these services are running and are set to start automatically. Adjust as necessary:
   - `SQLAgent$`*`instance name`* (not automatic by default)
   - `MSSQL$`*`instance name`*

Memory usage

You should limit the amount of memory SQL Server can use. To verify this:

1. Open Enterprise Manager.
2. Click the **SQL Server Group**.
3. Right-click *local host/instance name*.
4. Select **Properties**.
5. Select the **Memory** tab.
6. Select **Dynamically configure SQL Server memory**.
7. Set **Minimum** to be `1/4` of available memory.
8. Set **Maximum** to be `1/2` of available memory.

Authentication

If Avaya Operational Analyst refuses the password you enter during installation, make sure the password is correct. To verify the password:

1. Use the SQL Query Analyzer tool.
2. Try to login using the `sa` login ID and password in question.
3. If your password is blank, change it to a non-blank value.

Section III: Avaya Operational Analyst Maintenance

This section, *Avaya Operational Analyst Maintenance*, provides information on some basic maintenance tasks. This section includes the following chapters:

- Chapter 6: Modifying, repairing, and removing Avaya Operational Analyst on page 173 - Explains how to add or repair features.

- Chapter 7: Maintaining the historical database on page 197 - Provides guidelines for some routine maintenance tasks.

- Chapter 8: Starting and stopping processes on page 207 - Explains processes and `pa` utility.

Chapter 6: Modifying, repairing, and removing Avaya Operational Analyst

You can modify your Avaya Operational Analyst by adding features that were not previously installed or removing features that were previously installed or the entire software package. You can also move subsystems between servers.

If you have previously installed Avaya Operational Analyst, you can also repair corrupted files by reinstalling features that were previously installed, thereby replacing the corrupted files. The repair process returns portions of the software to a working state by reinstalling the features that are not working.

> **Note:**
> During the repair process, some directories and files are not repaired because they have been previously been modified during the running of Avaya Operational Analyst. The components located under the `%PABASE%\data` directory are not touched. Therefore, it is critical to have a valid backup of this area in case file system problems develop and this directory needs to be restored after the repair.
>
> Further, the repair process does not repair the contents of the historical or real-time database. Problems with databases must be resolved by the database administrator.

Topics

This chapter includes the following topics:

Preparation checklist

Before you start a modify or repair operation, follow these important steps and recommendations.

1. Have the original installation media available for use during the process.

> ⚠ **WARNING:**
>
> Before performing any Operational Analyst modification or repair, Avaya strongly recommends that you perform a backup of the database and file systems.

2. Verify that there is a minimum of 250 megabytes of free space in `C:\Temp` for Windows or in `/var/tmp` for Solaris. If this space is not available, the modification or repair operation may not run successfully.

Modifying or Repairing Avaya Operational Analyst

To modify or repair the Avaya Operational Analyst software:

Follow the instructions under Install Avaya Operational Analyst on a Windows platform on page 112 or under Install Avaya Operational Analyst on a Solaris platform on page 127 to:

1. Begin Operational Analyst Installation.

2. Complete licensing information.

3. Provide user information.

   The **Feature** screen, shown below, indicates the features that were previously installed.
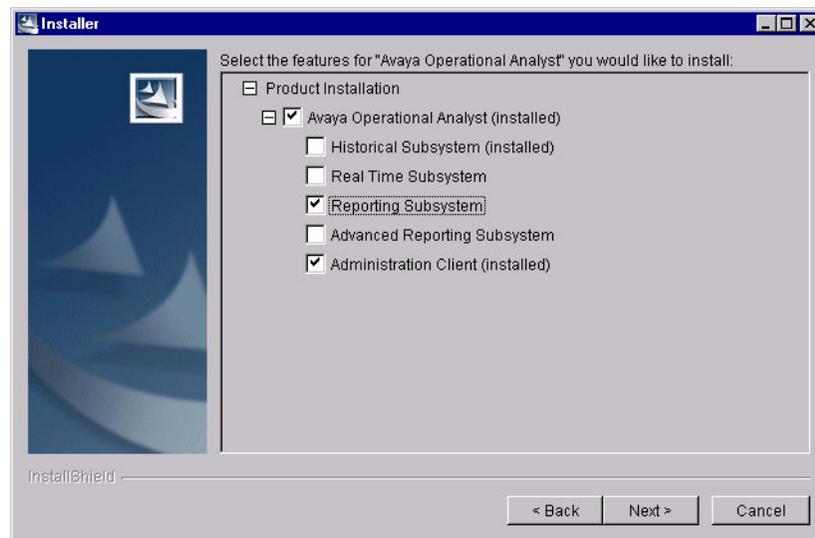
4. Select the features to add or to repair

   In this example, you are modifying Avaya Operational Analyst by adding the Reporting Subsystem and repairing the Administration Client, which was previously installed.

5. Click **Next**.

   If the Reports feature is being installed, the **Reports Group ID** screen, shown below, is displayed.
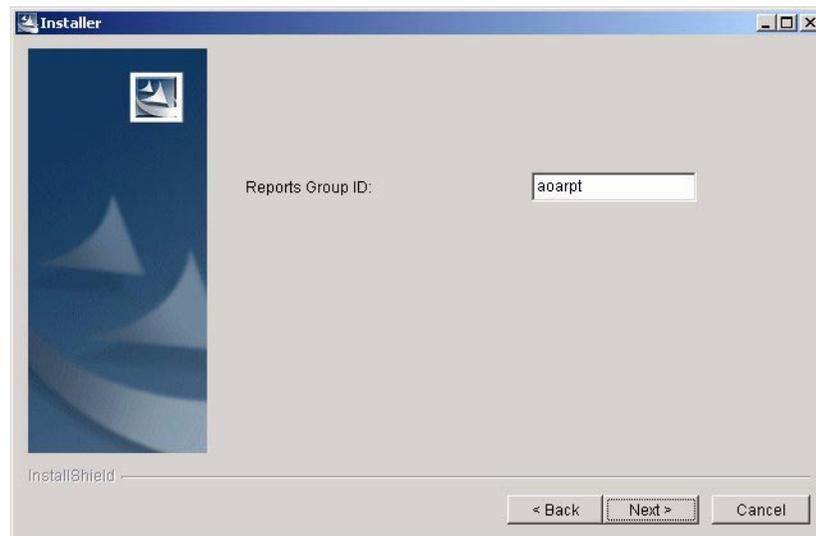
6. Edit the **Reports Group ID**, if needed, and click **Next**.

If the Historical subsystem is being installed, the **Historical Database** screen, shown below, is displayed with the appropriate data. If you are repairing a feature, most of the fields for that feature will not be editable. If you are adding the feature, you can edit the fields.
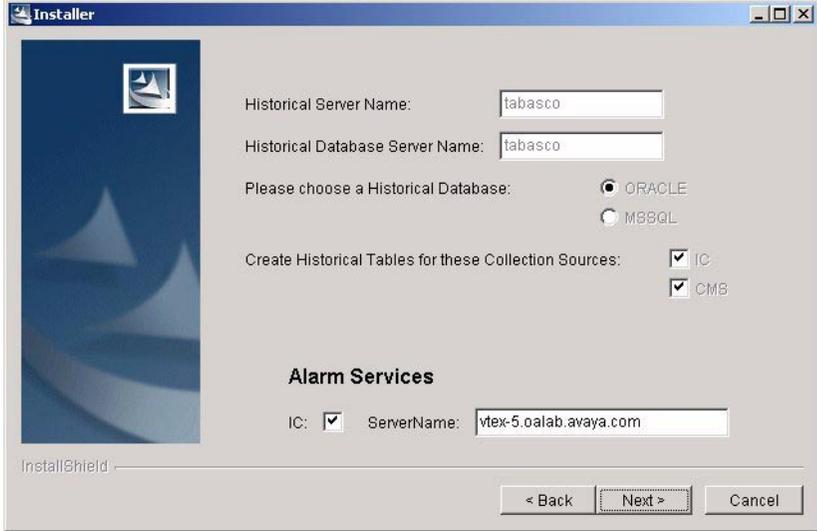
7. Complete the fields, as needed, and click **Next**.

The **Database ID and Password** screen, shown below, is displayed.

8. Complete the fields, as needed, and click **Next**.

   If the Real-Time subsystem is being installed, the **Real-Time Database** screen, shown below, is displayed.
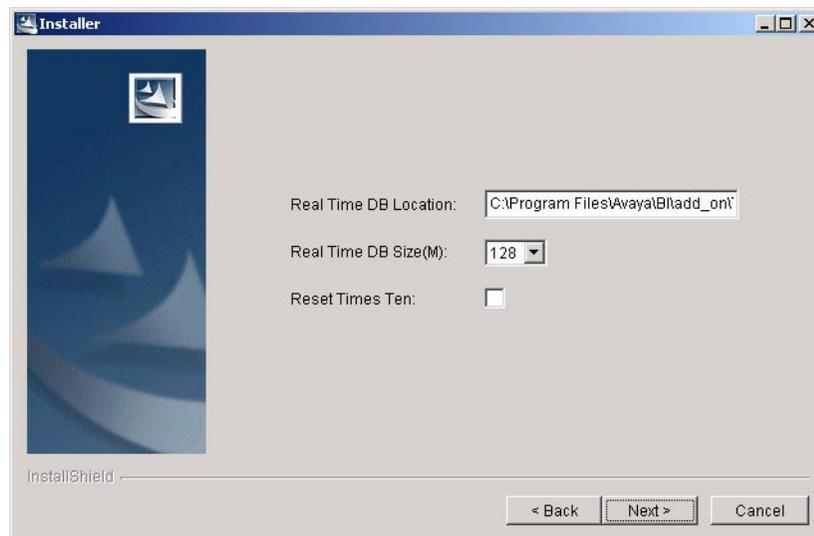
9. Complete the fields, as needed, and click **Next**.

   ### ⚠ CAUTION:

   If you check the **Reset TimesTen** box, the TimesTen database is not preserved over the modify or repair. To retain your TimesTen data, do not check this box.

10. The **Feature Preview** screen lists the features you have selected.

    Scroll through the preview screen to verify the features you selected.

11. Click **Next** to start the modify or repair.

12. Click **Finish** when the modify or repair is complete.

Validating Avaya Operational Analyst modification or repair

To validate the modification or repair, follow the procedures in Validating Avaya Operational Analyst installation and configuration on page 143.

Removing Avaya Operational Analyst software

You can remove the complete Avaya Operational Analyst software or individual features at any time. When you remove Avaya Operational Analyst, third party applications that are automatically installed with Avaya Operational Analyst are not automatically removed. You can leave JRE installed, but it is important to remove TimesTen from the real-time server unless you are reinstalling a new version of Avaya Operational Analyst. TimesTen is only licensed for use with Avaya Operational Analyst.

> ⚠ **WARNING:**
>
> Before performing any Avaya Operational Analyst installation, update, repair, or remove, we strongly recommend that you perform a backup of the database and file systems.

Access the Uninstaller

To remove Avaya Operational Analyst software on Windows, access the Uninstaller:

For Windows:

1. Go to **Start Menu** > **Settings** > **Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Select **Avaya Operational Analyst**.
4. Click **Add/Remove**.
5. Select **Remove**.

For Solaris:

1. Change to the `biadmin` (install home) directory to run the uninstaller component.

2. Run `_uninst/AOARemove.bin`.

   The **Welcome** screen, shown below, is displayed. You can cancel the process at this point by clicking **Cancel**.
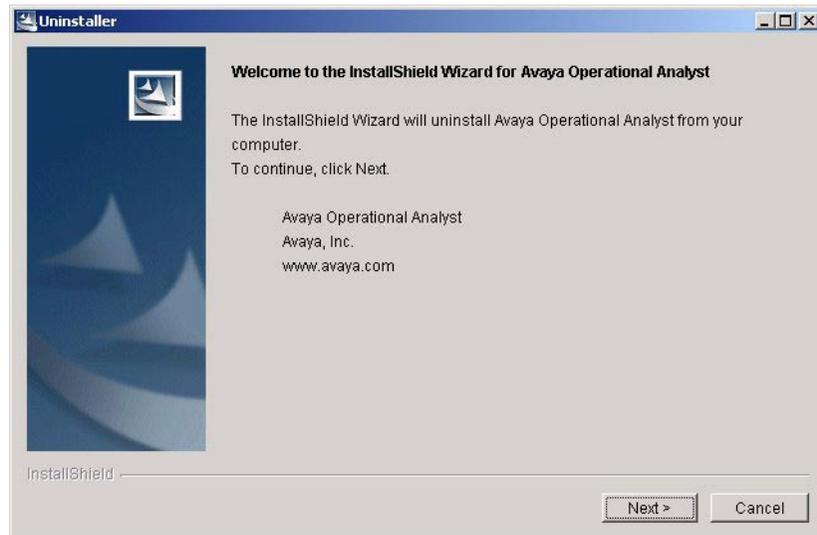
If errors appear on this screen, the uninstall process has failed and you must remove the software manually. Contact support for help.

Remove features

You can remove individual features or all of Avaya Operational Analyst.

1. On the **Uninstaller Welcome** screen, shown below, click **Next.**

   The **Feature Selection** screen is displayed. The features listed on this screen vary depending on the installed features.
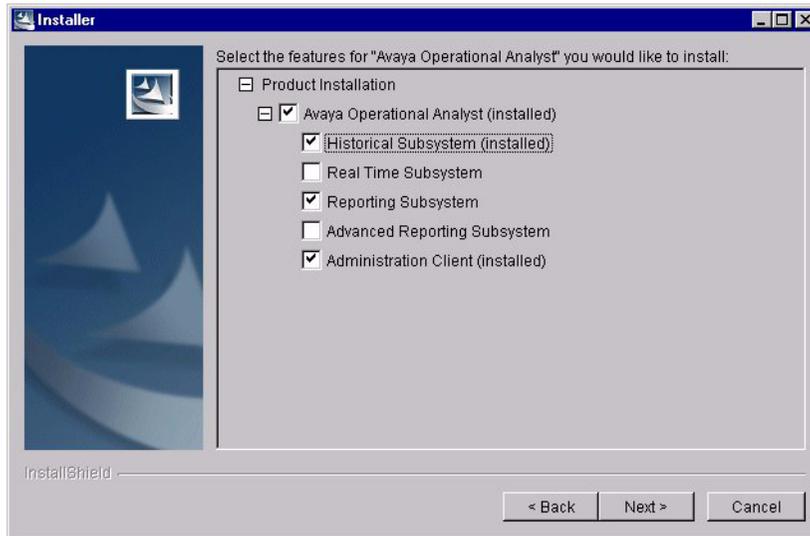
2. Select the features you want to remove and click **Next**.

   Any feature that is selected will be removed. If you want to remove only some features, make sure that the features to remain are not checked.

   A confirmation screen, shown below, that lists the features to be removed is displayed.
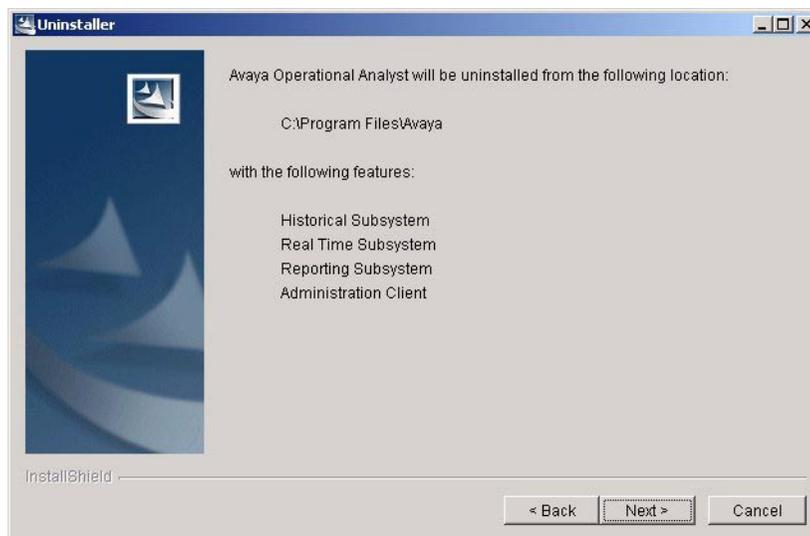
3. Click **Next**.

> ⚠ **WARNING:**
>
> You cannot cancel the Remove process once it has started.

4. For Windows only, when the uninstall process completes, reboot the system.

Moving Subsystems

You may find that you need to move subsystems between servers.

> **Note:**
>
> There is a prerequisite TCP/IP and Domain Name Service (DNS) administration that must be set up for each machine in an OA configuration. See Networking on page 36 for more information on the TCP/IP administration and DNS resolution prerequisites.

Some examples of situations that would require moving subsystems include the following:

- An existing machine in the OA configuration needs to be replaced with a faster machine in order to handle more traffic or more users.

- A single server OA configuration needs to grow to accommodate more traffic or more users. One or more of the OA subsystems are moved from the server to another machine. See the section titled Example: Single Server OA becomes a Two Server OA on page 182.

- A machine may need to be replaced because of a hardware failure.

- You may want to consolidate multiple CMS systems into one CMS system.

- The network is changing in such a way that the Fully Qualified Domain Name (FQDN) for one or more machines changes. See *Example: Changing a Domain Name* for more information.

Example: Single Server OA becomes a Two Server OA

For example, assume that the following subsystems in a single server system are all on server A:

- Historical

- Real-time

- IC

- Reporting

If you want to move the Real-Time and Reporting subsystems to server B:

1. Install the OA real-time and reporting subsystems to the new server, B:

   The standard OA installation program installs the software needed for these subsystems, including the real-time database.

2. Move the Real-time subsystem, following the instructions in Moving the Real-time Subsystem on page 190.

3. Move the Reporting subsystem, following the instructions in <u>Moving the Report Subsystem</u> on page 195

Example: Changing the Domain Name

For example, if the following subsystems are on the following servers:

- Historical subsystem on server A

- Real-time subsystem on server B

- IC subsystem on server A

- Reporting subsystem on server B

If you want to change the FQDN for the subsystems on server A:

1. Refer to <u>Networking</u> on page 36 for more information on the TCP/IP administration and DNS resolution prerequisites that are required on OA machines.

2. Change the FQDN for the IC subsystem. Follow the instructions in *Changing the FQDN for the IC subsystem*.

3. Change the FQDN for the Historical subsystem. Follow the instructions in *Changing the FQDN for the Historical subsystem*.

If you want to change the FQDN for the subsystems on server B:

1. Refer to <u>Networking</u> on page 36 for more information on the TCP/IP administration and DNS resolution prerequisites that are required on OA machines.

2. Change the FQDN for the Real-Time subsystem. Following the instructions in *Changing the FQDN for the Real-Time subsystem*.

3. Change the FQDN for the Report subsystem. *Following the instructions in Changing the FQDN for the Report subsystem*.

General Guidelines

Follow these general guidelines when moving subsystems:

- Install no more than one of the same type of subsystem on a physical machine. For example there can only be one historical, one real-time, one report, or one CMS subsystem per machine. Some subsystems can be co-resident. CMS is the only subsystem that must reside on a separate physical machine from the other subsystems.

- Choose a low- or no-traffic time to move subsystem. Many subsystem changes require significant changes in data flow.

- Moving the Historical database is not supported. Doing so impacts a significant amount of OA and IC administration.

- Do not move the real-time database. Because real-time data is transient, you can install the real-time subsystem on a new machine. This installs the real-time database on that machine as well. The system forces a pump-up (that is, administration copy from IC to OA). Change IC to point to the new real-time subsystem, and the data flows from IC to the new machine. See Moving the Real-time Subsystem on page 190.

- If communication between the historical subsystem and any of the subsystems containing interfaces is failing, attempting to delete those subsystems results in an Admin Client error message. You can stop the delete and work to re-establish the communication or you can proceed with the delete. If you proceed with the delete, the OA database will be updated, but you leave obsolete but functioning interface services on the original server. Use the system console on the original server to stop the services (see Chapter 6: Modifying, repairing, and removing Avaya Operational Analyst on page 173. Then remove the original subsystem, following the instructions in Removing Avaya Operational Analyst software on page 178.

Removing an OA Subsystem

To remove OA software from a machine where the subsystem has been moved to another machine:

Removing an OA subsystem on Windows

To remove an OA subsystem on Windows:

1. Find the **Add/Remove Programs** icon on the Control Panel.

2. Select the Avaya Operational Analyst entry.

3. Press the **Change/Remove** button to remove the subsystem. A new Window will ask which subsystems to remove.

4. Check the boxes that apply and proceed with the remove.

Removing an OA system on Solaris

To remove an OA subsystem and Solaris:

1. Change to the **/export/home/biadmin/_uninst** directory.

2. Execute the file AOARemove.bin

3. Navigate through the wizard to remove the desired subsystems.

Moving the Historical Subsystem

OA does not support moving the Historical subsystem nor the historical database from one physical machine to another.

> ⚠ **Important:**
> Moving the Historical subsystem or the historical database from one physical machine to another in an effective manner entails uninstalling OA from the first machine, and installing it on a new machine. Any salvage of data is not guaranteed and would require manual changes to the database.

Changing the Historical machine name or IP address

You may want to change the machine name or IP address of the historical server without physically moving the subsystem to another machine. These changes are made only to the administration of the machine. The steps are as follows:

> **Note:**
> These steps assume that the historical database was installed using the Administrator login that is local to the current machine. If a different login was used during the installation, there may be issues with the database administration that must be resolved according to the database manufacturer's instructions.

1. Stop all traffic to OA from every CMS and IC. For CMS, go to the Interface Services screen and highlight each of the forwarders for each CMS. That is, the Subsystem column contains the name of the CMS. Press "View Status." Highlight them again and press "Disable" and Save. For IC, go to the IC Manager for each IC. In the **Server** tab, highlight the EC and disable it.

2. Follow the operating system instructions for changing a fully qualified domain name or IP address. This includes using Control Panel to change the system's domain, and making necessary changes to the DNS server IP addresses.

   > **Note:**
   > Do not use the `hosts` file to resolve hostnames to IP addresses in OA configurations. Be sure DNS administration resolves all machine names in the same way.

3. Restart Windows systems.

4. Log into the new domain.

5. On the Historical server, update the following files manually:

   The files path on Windows is **$PABASE/data/admin/**

   The files path on Solaris is **%PABASE%\data\admin**

● Change the hostname and service properties on the `db.properties` file (Solaris and Windows) from:

`hostname=<old-machine-name>`

`service =<old-machine-name>.<db-instance-name>`

to:

`hostname=<new-machine-name>`

`service =<new-machine-name>.< db-instance-name>`

● Change the REPORT_GROUP and ADMIN_GROUP properties on the **autserver.properties** file (Windows) from:

`ADMIN_GROUP  =[old-domain-name]\\<admin-client-user-group>`

`REPORT_GROUP =[old-domain-name]\\<report-servr-user-group>`

to:

`ADMIN_GROUP  =[new-domain-name]\\<admin-client-user-group>`

`REPORT_GROUP =[new-domain-name]\\<report-servr-user-group>`

● Change the REPORT_GROUP and ADMIN_GROUP properties of the **autserver.properties** file (Solaris) from:

`ADMIN_GROUP  =[old-machine-name]\<admin-client-user-group>`

`REPORT_GROUP =[old-machine-name]\<report-servr-user-group>`

to:

`ADMIN_GROUP  =[new-machine-name]\<admin-client-user-group>`

`REPORT_GROUP =[new-machine-name]\<report-servr-user-group>`

6. Stop OA.

On Windows:

● Click on **Programs > Administrative Tools > Services**

● Select **Avaya Business Intelligence Service**

● Click on **Action > Stop**

On Solaris:

● In a command window, enter: **pa stop all**

7. Change the domain property in the **server.properties** file from:

`<old-domain-name>`

to:

`<new-domain-name>`

8. Stop and start Orbacus Naming Service.

   On Windows:

   ● Click on **Programs > Administrative Tools > Services**

   ● Select **ORBacus Naming Service**

   ● Click **Action > Stop**

   ● Click **Action > Start**

   On Solaris:

   ● In a command window, open **/etc/inittab** and change the following lines from:

   ```
   in:234:respawn:/opt/BI/bin/initsrv.sh

   nm:234:respawn:/opt/BI/bin/nameserv.sh
   ```
   to:
   ```
   in:234:off:/opt/BI/bin/initsrv.sh

   nm:234:off:/opt/BI/bin/nameserv.sh
   ```

   ● From root, at a shell prompt, enter:

   ```
   init q
   ```

   This turns these deamons off. To turn them on change the same lines back to `respawn` and enter the **init q** command again.

9. Stop and start Stumbras-Tomcat service.

   On Windows:

   ● Click on **Programs > Administrative Tools > Services**

   ● Select **Stumbras-Tomcat**

   ● Click **Action > Stop**

   ● Click **Action > Start**

   On Solaris:

   ● In a command window, at the shell prompt of the server, enter:

   cd /usr/iplanet/servers/https-stumbras

   ./stop

   ./start

10. Start OA:

    On Windows:

    ● Click on **Programs > Administrative Tools > Services**

    ● Select **Avaya Business Intelligence Service**

- Click on **Action > Start**

On Solaris:

- In a command window, enter: **pa start all**

11. On every server that is *not* a Historical server, manually update the following files:

   $PABASE/data/admin/server.properties (Solaris)

   %PABASE%\data\admin\server.properties (Windows)

   Change the `histserver` property from:

   ```
   histserver=<old-machine-name>
   ```

   to:

   ```
   histserver=<new-machine-name>
   ```

12. On every server that is *not* a Historical server, use the console to stop and start OA:

   On windows or Solaris enter:

   pa stop all

   pa start all

   ⚠ **Important:**
   Stopping and starting all OA processes forces to restart and re-read the
   server.properties file. OA will not function correctly if this step is not
   performed.

13. On every OA Administration client, edit the **AdminPol.html** and **AdminSig.html**
    files that are installed in the OA directory. The server name should be changed to the
    new historical subsystem name. Then restart the clients.

   Edit the following files:

   $PABASE/data/admin/AdminPol.properties (Solaris)

   $PABASE/data/admin/AdminPol.properties (Windows)

   %PABASE%\data\admin\AdminSig.properties (Solaris)

   %PABASE%\data\admin\AdminSig.properties (Windows)

   Change the SERVER_NAME property from:

   ```
   <PARAM NAME="SERVER_NAME" VALUE="OLD-NAME">
   SERVER_NAME="OLD-NAME"
   ```

   to:

   ```
   <PARAM NAME="SERVER_NAME" VALUE="NEW-NAME">
   SERVER_NAME="NEW-NAME"
   ```

14. Open the **Subsystems** screen of the OA Administration Client. An asterisk (*****) is
    displayed next to the historical subsystem, indicating that the hostname and IP

address are no longer in sync. Change the domain name to the new domain, then click **Ok** and **Save**.

15. Enable the forwarders for CMS.

16. Start the event controllers for IC using IC Manager.

Moving the Real-time Subsystem

Move an existing real-time subsystem to another physical machine by following these steps:

1. Install the OA real-time subsystem software on the new server using the OA installation CD.

2. Stop all traffic from IC to OA by stopping the EC server in the IC Manager.

3. On the subsystem screen, modify the real-time subsystem and change the location to be the domain name or IP address for the new machine.

   The admin client will present a list of any interface services that must be disabled before proceeding. Access the Interface Services screen and select the services in the list. View the current status for each service, then disable each service.

4. Return to the subsystem screen and change the server location to that of the new machine.

5. For each IC subsystem, click **Modify...** to verify that its real-time subsystem drop-down box reflects the correct real-time subsystem.

6. Access **IC Administration** and change the Event Controller administration properties to point to the new real-time machine.

   In the IC Manager:

a. Go to the **Server** tab, shown below.
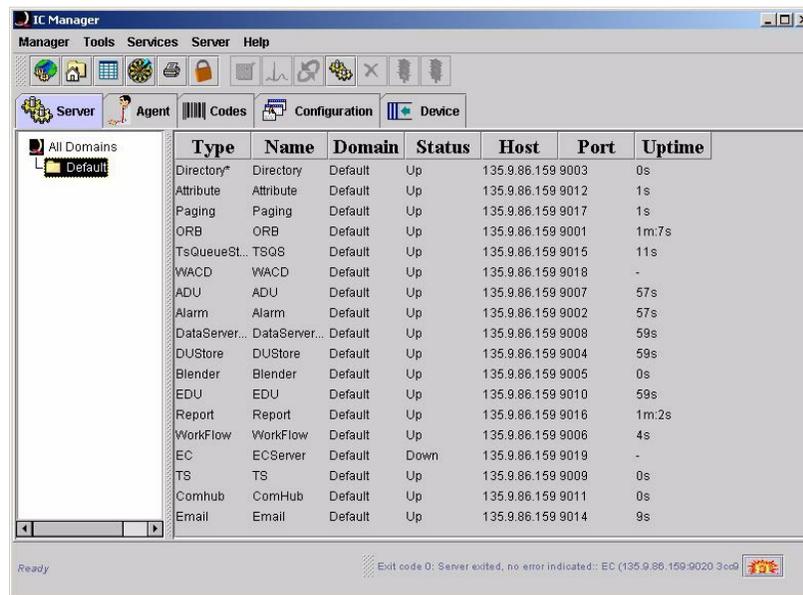
b. Select the Event Controller that corresponds to the real-time subsystem that is being moved. In this case, its name is ECServer.

c. Double-click to access the **Modification** dialog.

d. Select the **Event Collector** tab, shown below.
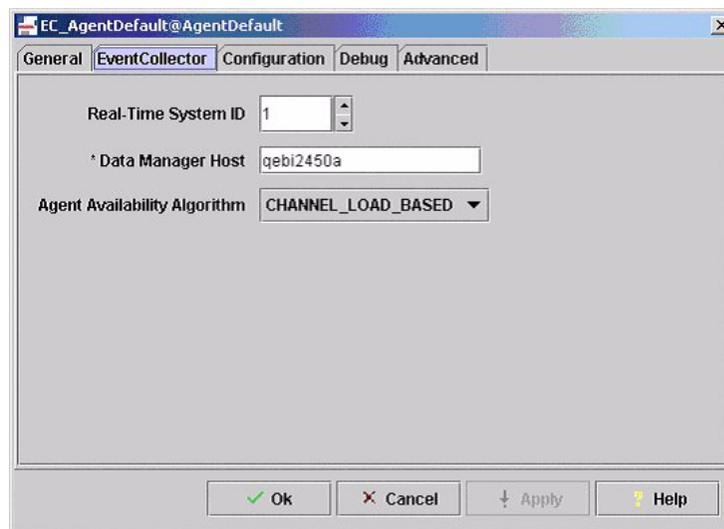
e. Change the **Data Manager Host** name for the new real-time server.

f. Click **Apply** and click **OK**.

7. Return to the main IC Manager page and view the Services tab. Highlight the EC Server. Stop it and start it. Use the buttons with the red and green stoplights.

   The IC and new real-time should be communicating at this point. Traffic can be restarted. The change in data flow will force a pump-up (copy of administration data) from the IC to OA when the new database comes up.

8. Remove the original real-time subsystem. See Removing Avaya Operational Analyst software on page 178.

Moving the IC Subsystem

To move the IC subsystem:

1. Install the IC software on the new server using the IC installation CD.

2. Install the IC subsystem on the new server using the OA installation CD.

3. On the new server, configure the Event Controller (EC) so that its properties, Data Manager Host and Real-Time System ID, are correctly set. See Determining Real-Time System ID and Data Manager Host on page 160 for more details.

   ● Data Manager Host should refer to the host for the real-time subsystem.

   ● Real-Time System ID should match the Source ID for this IC subsystem in the OA administration client.

   Note:

   There are no changes in OA administration for the IC. OA does not store location data (i.e., host name or IP address) for the IC subsystem. In OA, IC exists as a logical subsystem with a source ID and an associated real-time subsystem only.

4. Remove the original subsystem. See Removing Avaya Operational Analyst software on page 178.

Moving the CMS Subsystem

To move the CMS subsystem:

1. Install the CMS software on the new server using the CMS installation CD.

2. Install the CMS subsystem on the new server using the OA installation CD.

3. On the subsystem screen, highlight the CMS subsystem and click **Modify…**

4. Change the location (domain name or IP address) to location of the new machine.

   The Administration Client presents a list of interface services that must be disabled before proceeding.

5. Access the **Interface Services** screen and select the services in the list. Get the current status for each service, then disable each service.

6. Return to the subsystem screen and execute the change of the location of the CMS.

7. If necessary, enable the interface services on the new CMS. On the interface services screen, select the CMS forwarders that reside on the new server and click **Enable**.

8. Remove the original CMS subsystem. See [Removing Avaya Operational Analyst software](#) on page 178.

   Note:

   > Do not use the above procedure to merge two CMSs. Successful handling of CMS data requires that all display names be retrieved and that containers be created that use the desired display names. For example, assume CMS-A was collecting data from ACDs 1 and 2, and CMS-B was collecting data from ACDs 3 and 4. Now, the customer wants to use CMS-A to collect data for ACDs 1, 2, 3, and 4, and eliminate CMS-B. The user should configure CMS-A to add support for ACDs 3 and 4. Then the user should move those ACDs to CMS-A by accessing their **Modify…** dialog and changing their CMS Subsystem Name to be CMS-A. Finally, the user should delete CMS-B.

9. For each ACD that was moved, schedule a data collection job to retrieve its display names.

   a. Access the scheduled jobs screen.

   b. Select **data collection** from the Job Type drop-down list. Then click **Add…**

   c. In the add dialog, select the correct source subsystem and the Historical store of c**ms display names**. Set the time parameters for the job such that it runs **Now**

   d. Click **OK** then **Save**.

10. On the Scheduled Jobs screen, click the **Job Status** button.

    This displays the **Job Status** dialog.

11. Select a Job Type of **data collection** and verify that the job has successfully completed.

    The job name should display in the table with a status of **Successful**.

12. Access the **Container Profiles** screen to update or add any containers that should now include data for the new ACDs.

Moving the ACD Subsystem

Every ACD subsystem has an associated CMS subsystem name. To move an ACD, the CMS subsystem name should be changed on the ACD subsystem dialog.

1. Access the subsystem screen.

2. Highlight the ACD to be moved, and click **Modify…**

3. Change the CMS Subsystem Name drop-down list box to specify a different CMS.

4. Click **OK.** Then click **Save**.

   The administration client will return a list of interface services that must be disabled before the ACD can be moved.

5. Access the **Interface Services** screen and highlight the interface services from the list. View status for each service, then highlight each service and click **Disable**.

6. Return to the subsystem screen and modify the ACD again.

7. Change the CMS Subsystem Name. Click **OK** and **Save**.

   Forwarders will now exist on the new CMS subsystem for that ACD.

8. Access the **Interface Services** screen, and if they are not enabled, enable the forwarders in order to begin the data collection for the ACD.

Moving the Report Subsystem

The report subsystem can be moved by changing the location field in its subsystem dialog.

1. Install the report subsystem on the new server suing the OA installation CD.

2. On the subsystem screen, highlight the report subsystem, and click **Modify...**

3. Change the location (domain name or IP address) to the name of the new machine.

4. Click **OK**. Then click **Save**.

Note:

Moving the report subsystem changes the URL to the reports screen. For example, if you had been using the URL http://pixel/reports1, the new URL would be http://squalo/reports1 if you moved the report subsystem to squalo.

Modifying, repairing, and removing Avaya Operational Analyst

Chapter 7: Maintaining the historical database

To keep Avaya Operational Analyst running smoothly, follow the procedures outlined in this chapter to maintain the historical database.

Topics

This chapter includes the following topics:

Changing the user or system administration password

If you want to change the password of the SQL Server or Oracle database user or system admin user in the historical database, do not modify it in the database directly. Use the Avaya Operational Analyst command line utility `ChangeDBPWD (%PABASE%\bin\ChangeDBPWD.bat)`.

Run the following command from a command window to change the password of the database user login:

> `ChangeDBPWD -s`

Run the following command from a command window to change the password of the system admin user login.

> `ChangeDBSYSPWD -s`

The command asks you type in the new password in the historical database and to confirm it. After successfully running this command, you can use the new password to connect to the database.

On SQL Server, you can confirm that you changed the password correctly by logging into SQL Server using the Query Analyzer and the new password.

On Oracle, you can use the sqlplus command to verify your passwords.

Maintaining an SQL Server 2000 historical database

Included here are some suggestions for maintaining your MS SQL Server2000 historical database to minimize problems during consistent use.

Checking SQL Server log files

Part of routine maintenance should be checking the SQL Server logs files to make sure they are not getting too large. To check log files:

1. Open **Enterprise Manager**.

2. Click **SQL Server Group**.

3. Click *local host\instance name*.

4. Click **Management**.

5. Click **SQL Server Logs**.

Backing up the SQL Server database

You should back up your Avaya Operational Analyst historical database regularly. You should perform a full SQL Server backup once a week, and an incremental backup every day. SQL Server transaction logs should be backed up every half hour. You can use SQL Server Enterprise Manager, or you can create your own backup strategy with scripts or other third party software.

Do not schedule your incremental backup or full backup to run while system-scheduled jobs (such as Purge or Aggregation recovery) are running. You should run the backups during non-business hours. If your business runs 24 x 7, schedule your backups to run in the least busy hours.

Please refer to Chapter 9: SQL Server 2000 database backup on page 217 for more detailed information.

Restoring the SQL Server database

Please refer to Chapter 9: SQL Server 2000 database backup on page 217 for more detailed information on restoring your database.

Checking the integrity of the SQL Server database.

Use the Query Analyzer tool to execute the `DBCC` command SQL Server database server to check the consistency of the database and database objects. If you need to correct or repair errors you must put the database into single user mode.

Refer to SQL Server Books Online for more information on using the `DBCC` command before performing any of the following tasks.

Example - check database and repair

```
DBCC CHECKDB  (SampleDatabase, NOINDEX)

DBCC CHECKDB(SampleDatabase, REPAIR_REBUILD)
```

Example - check table consistency and repair

```
DBCC CHECKTABLE (SampleDatabaseTable)

DBCC CHECKTABLE (SampleDatabaseTable, REPAIR_REBUILD)
```

Example - check consistency of system tables

```
DBCC CHECKCATALOG (SampleDatabase)
```

DBCheck

`DBCheck` is an audit process that runs once a day. `DBCheck` can be called by other components or run independently. It logs all of its actions into an activity log (`%PABASE%\data\log\dbcheck\dbchecktrc.log`). You can set the start time for `DBCheck` using the Administration Client. The default time to run is after the system backup.

`DBCheck` performs the following actions:

1. Establish database connection as the owner of the Avaya Operational Analyst database.
2. Call `MetadataSanityRun` to check the inconsistent metadata.
3. Scan the SQL Server Logs for noteworthy events.

`DBCheck` does not initiate alarms. DBCheck runs as userid administrator.

Periodic maintenance

Some periodic maintenance tasks are run by DBCheck nightly. You should perform the others as instructed below.

- Run `MetadataSanityRun` for a report on the inconsistent metadata.

- Look at the NT Event Log and SQL Server Logs to see if any errors have been detected by `DBCheck` or SQL Server.

- In general, the indexes on the Avaya Operational Analyst historical table should be rebuilt after you delete more than 30% of the records in the table. If you do so, you should watch the growth of the `Tempdb` database.

- Maintain a clean transaction log destination for optimum Avaya Operational Analyst operation. If the transaction log destination becomes full, SQL Server issues a warning and the database hangs until you free up some space in the destination log location. View SQL Server Books online for details about transaction log maintenance.

- Back up the transaction logs to tape every 30 minutes. Then clean the destination so it can receive more transaction log files. You may SQL Server Enterprise Manager Backup or write your own scripts to accomplish this task.

- Monitor the Avaya Operational Analyst historical filegroup on a weekly basis. As the historical database tables grow, you must add more datafiles to a filegroup whenever they have less than 20% free space. Make sure each filegroup has at least 30% free space for growth for the next week. Use Enterprise Manger to determine/calculate free space.

Maintaining an Oracle historical database

Included here are some suggestions for maintaining your Oracle historical database to minimize problems during consistent use.

Backing up the Oracle database

You should back up your Avaya Operational Analyst historical database regularly. You should perform a full Oracle backup once a week, and an incremental backup every day. Oracle archived logs should be backed up every half hour. You can use the tool `PABACKUP` (located in `%PABASE%/data/admin/backup`) to complete the backup tasks, or you can create your own backup strategy.

Do not schedule your incremental backup or full backup to run while system-scheduled jobs (such as Purge or Aggregation recovery) are running. You should run the backups during your non-business hours. If your business runs 24 x 7, schedule your backups to run in the least busy hours.

Please refer to [Chapter 10: Oracle database backup](#) on page 229 for details about creating a backup strategy for your production Oracle database.

DBCheck

`DBCheck` is an audit process that runs once a day. `DBCheck` can be called by other components or run independently. It logs all of its actions into an activity log (`%PABASE%\data\log\dbcheck\dbchecktrc.log`). You can set the start time for `DBCheck` using the Administration Client. The default time to run is after the system backup.

`DBCheck` performs the following actions:

1. Establish database connection as the owner of the Avaya Operational Analyst database.

2. Run `Analyze Table` on Avaya Operational Analyst database tables.

3. Call `MetadataSanityRun` to check the inconsistent metadata.

4. Run `RecordTableSizes` to record the growth of Avaya Operational Analyst database tablespaces and tables associated with each historical store. Record results in the `tablespace_growth and historical_store_growth` tables, respectively.

5. Scan the Oracle Alert Log for noteworthy events.

6. If the Oracle Alert Log is too large, roll it over for backup.

`DBCheck` does not initiate alarms. `DBCheck` runs as userid administrator.

Periodic maintenance

Some periodic maintenance tasks are run by `DBCheck` nightly. You should perform the others as instructed below.

● Run `MetadataSanityRun` for a report on the inconsistent metadata.

● Look at the NT Event Log to see if any errors have been detected by `DBCheck`.

● Scan the Oracle Alert Log (`%ORACLE_BASE%\admin\dssdb\bdump\dssdbalrt.log`) and the Oracle trace files (`%ORACLE_BASE%\admin\dssdb\udump\`) for error messages or warnings from Oracle. Refer to the Oracle error messages documentation for the cause and corrective action information.

● Analyze the data in the `tablespace_growth` and `historical_store_growth` tables to monitor the growth of the database. Make appropriate adjustments based on the amount of space that you have used and the amount of free space available.

● Monitor Oracle performance statistics and tablespace sizes, as recommended by Oracle.

● Monitor the size of the Oracle control files, and make sure the disks holding them have at least 10MB of free space at all times. Keep the backup of the control file (`%PABASE%\data\admin\backup\sys\BACKUP_CF.BK` if you are using `PABACKUP`) in a safe place after every full or incremental backup.

● In general, the indexes on the Avaya Operational Analyst historical table should be rebuilt after you delete more than 30% of the records in the table. If you do so, you should watch the growth of the Oracle `TEMP` tablespace. If the used space in the `TEMP` tablespace is greater than 95%, extend the `TEMP` tablespace. For details about extending the `TEMP` tablespace, refer to the *Oracle Administrator Guide*.

● Monitor the Oracle rollback segment tablespace daily to be sure it has at least 30% free space. Purging many records will cause the rollback segment to grow rapidly. For example, purging over a million rows from the table can cause a rollback segment to reach up to 4 GB.

● Remove inactive Oracle rollback segments so that no more than 20 rollback segments exist at any time. Refer to the *Oracle Administrator Guide* for details about removing inactive rollback segments.

● Tune your redo logfiles. Avaya Operational Analyst requires 50MB for each Oracle redo logfile to make sure checkpoints occur normally. If the checkpoint interval becomes less than 30 seconds, increase the logfile size to 100MB. An Oracle warning that Oracle failed to allocate redo logs indicates that heavy database activity requires more redo logs. Add more redo log groups to the Oracle database to resolve this problem. Please refer to the *Oracle Administrator Guide* and *Oracle Tuning* documentation for details on these tasks.

● Maintain a "clean" archive log destination for optimum Avaya Operational Analyst operation. If the archive log destination becomes full, Oracle issues a warning and the

database will hang until you free up some space in the archive log destination. The *Oracle Administrator Guide* contains details about archive log destination maintenance.

- Back up the archived logs to tape every 30 minutes. Then clean the destination so it can receive more archived log files. You may use `PABACKUP` or write your own scripts to accomplish this task. Refer to the *Oracle Backup and Recovery* documentation for details about writing a backup script.

- Monitor the Avaya Operational Analyst historical tablespace on a weekly basis. As the historical database tables grow, you must extend the tablespaces whenever they have less than 20% free space. Make sure each tablespace has at least 30% free space for growth for the next week. Follow the instructions in the *Oracle Administrator Guide* to extend the tablespaces.

Routine maintenance type issues

The following monitoring tools should be used daily to verify that the system is running properly and to verify that the data is being collected and archived as expected.

Container Status

Use the Container Status screen of the Administration Client to verify that the OA historical system is receiving the expected data. Status for aggregated and archived data can be viewed from this screen. Therefore, this is the screen that would be accessed to view the status of daily archived data each day, weekly archived data each week, and monthly archived data each month. In addition, the status of base interval data can be viewed daily as well.

Scheduled Jobs

Use the Scheduled Jobs screen of the Administration Client to view the status of jobs. These status views can be views of system scheduled jobs, as well as on-demand and external jobs that may have been added. These status views can be used to determine if particular processes, such as aggregation or purge, have completed successfully.

Interface Services

The Interface Services screen of the Administration Client can be used to view the status of OA services such as Data manager, Forwarder, Recorder, Forwarder-Recorder, Report data server, and the Report framework. This screen indicates whether a process is currently enabled or not. If data is missing, then possibly the associated service has become disabled and needs to be enabled again. These services can be enabled from the Interface Services screen as well.

Refer to the Administration Client online help for more detailed information on monitoring and maintaining the system through these screens. From the Administration Client choose Help > Screen Help.

The Event Log

Monitor the Application Event Log on Windows and the CentralErrorLog.log file on Solaris every day in order to keep informed of error conditions that may have occurred.

IC Alarm Monitor

Critical alarm conditions can be monitored and detected with the IC Alarm Monitor. See *OA Features* of the Operation Analyst 6.0 Administration and Troubleshooting Guide for further information.

Maintaining the historical database

Chapter 8: Starting and stopping processes

Under most circumstances, Avaya Operational Analyst processes running on the historical and real-time servers are controlled behind the scenes or from the Administration Client. When troubleshooting, it may be necessary to start and stop these processes directly. A utility, `pa`, is provided that allows access to these processes.

Topics

This chapter includes the following topics:

Overview

The Master Operations Manager (MOM), shown below, is the behind-the-scenes controller of Avaya Operational Analyst processes. On Windows, the MOM is started by the Avaya Operational Analyst Service, under the control of the Service Control Manager (for Windows NT, see the Services icon in the Start > Settings > Control Panel menu; for Windows 2000 see the Services icon in the Computer Management menu under Start > Settings > Control Panel > Administrative Tools menu). On Solaris, the MOM is started during system boot up via the /etc/inittab file. The Avaya Operational Analyst Service is always running and does not need to be stopped or restarted.

A user may start and stop processes using either the Administration Client or the `pa` utility. Both of these provide access to the MOM, which performs the actual work. The configuration of processes varies depending on your system configuration. The diagram below shows the Avaya Operational Analyst startup and shutdown interaction.

The MOM receives input from an Administration Client graphical user interface or from the command line utility `pa`. From the **Administration Client Interface Services** screen, you can elect to disable or enable the forwarder, data manager, and data server processes on an Avaya Operational Analyst real-time server, the recorder on an Avaya Operational Analyst historical server, and the forwarder-recorder on a coresident server (historical and real-time). Using the `pa` command, you can elect to enable or disable these and other Avaya Operational Analyst processes, or stop and start all Avaya Operational Analyst processes.
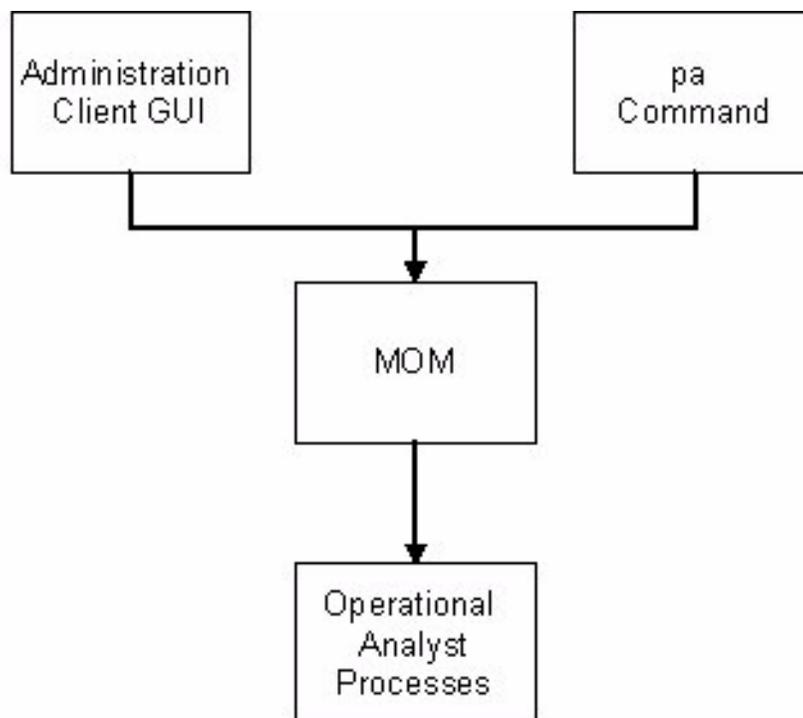
The MOM maintains a list of all processes under MOM control. Upon stopping and re-starting the Avaya Operational Analyst service (as during a reboot), the MOM remembers which processes where disabled and does not restart those processes.

Avaya Operational Analyst processes

This table shows the processes controlled by the MOM and the respective servers they run on.

Process	MOM process ID	Avaya Operational Analyst server			
		Historical	**Real-time**	**Reporting**	**CMS**
MOM	N/A	x	x	x	x
recorder	reccmscallhistory	x			
	reccmssynonyms	x			
	reccmsagent	x			
	reccmsskill	x			
	reccmsvdn	x			
	reccmscwc	x			
	recworkitem	x			
	recdisplaynames	x			
	recagentstate	x			
	recagent	x			
	recservicestate	x			
	recserviceclass	x			
	recprocess	x			
	recivrport	x			
scheduler	schd	x			
forwarder	fwdworkitem		x		
	fwddisplaynames		x		
	fwdagentstate		x		
	fwdagent		x		
	fwdservicestate		x		
	fwdserviceclass		x		

Process	MOM process ID	Avaya Operational Analyst server			
		Historical	**Real-time**	**Reporting**	**CMS**
	fwdprocess		x		
	fwdivrport		x		
	fwdcmscallhistory				x
	fwdcmssynonyms				x
	fwdcmsagent				x
	fwdcmsskill				x
	fwdcmsvdn				x
	fwdcmscwc				x
application management server	ams	x	x	x	x
security	aut	x	x	x	x
admin mgr	admb	x	x	x	x
	adm0	x	x	x	x
data manager	dm		x		
data server	dsvr		x		
report framework*				x	

* Started and stopped via the NT Services panel.

Note:

The MOM process does not have a process ID as do the other processes.

Process state definitions

Processes may be enabled or disabled individually and all processes (including MOM itself) may be started and stopped together. If the MOM is stopped, processes may not be started from the Administration Client.

Enable

You may enable any Avaya Operational Analyst process using the `pa` command line utility. From the **Administration Client Interface Services** screen, you can elect to enable the recorder, forwarder, recorder-forwarder, data manager, and data server. Each request to enable a process is logged. To enable `scheduler`, type the following at a command prompt:

```
pa enable schd
```

Disable

You may disable any Avaya Operational Analyst process using the `pa` command line utility. You can disable the recorder, forwarder, forwarder-recorder, data manager, and data server, from the Administration Client. Each request to disable a process is logged. To disable the first administration manager on an historical server, type the following at a command prompt:

```
pa disable adm1
```

Start

You may request to start all processes. This also starts the MOM. To start all of the processes, type the following at a command prompt:

```
pa start all
```

Stop

You may request to stop all processes. This also stops the MOM. Therefore, once `pa stop` is executed, Administration Client requests to enable individual processes will fail. To stop all of the processes, type the following at a command prompt:

```
pa stop all
```

The `pa` utility

Permissions

On Windows NT, only members of the administrator group may execute `pa`.

Command line options

The `pa` utility allows the enabling, starting, and stopping of Avaya Operational Analyst processes. This interface allows a user with the proper permissions to shut down all processes at once or start all Avaya Operational Analyst processes. Commands for use of `pa` are described below. Once executed, all commands indicate whether or not they executed successfully.

Note:

The process IDs are the MOM process IDs listed in the table in Avaya Operational Analyst processes on page 210. They are not the operating system process ids.

`pa start all`

Start the MOM and all the processes.

`pa stop all`

Stop the MOM and all the processes.

`pa enable `*`processId`*

Enable a process.

`pa disable `*`processId`*

Disable a process.

`pa active `*`processId`*

Find out if a process is currently running.

`pa state `*`processId`*

Display whether the process is enabled or disabled.

`pa cat`

Display the MOM list of processes and their characteristics as contained in the `momtab` file. The output of the command for a historical server is shown:

```
id:4:initdefault:
admb:234:respawn:java
com.avaya.cc.cvx.adminmgr.AdminMgrSrv.AdminMgrSrvBaseServer -v 30
adm0:234:respawn:java com.avaya.cc.cvx.adminmgr.AdminMgrSrv.AdminMgrSrvServer -i
0 -v 30
ams:1234:respawn:java com.avaya.cc.cvx.appmanserver.AppManServer -v 0
aut:234:respawn:java com.avaya.cc.cvx.autserver.main
schd:34:respawn:java com.avaya.cc.cvx.scheduler.Scheduler -v 30
reccmscallhistory:34:respawn:$PABASE/bin/recorder -n cmscallhistory -v 10
reccmssynonyms:34:off:$PABASE/bin/recorder -n cmssynonyms -v 10
reccmsagent:34:off:$PABASE/bin/recorder -n cmsagent -v 10
reccmsskill:34:off:$PABASE/bin/recorder -n cmsskill -v 10
reccmsvdn:34:off:$PABASE/bin/recorder -n cmsvdn -v 10
reccmscwc:34:off:$PABASE/bin/recorder -n cmscwc -v 10
recworkitem:34:off:$PABASE/bin/recorder -n workitem -v 10
recdisplaynames:34:respawn:$PABASE/bin/recorder -n displaynames -v 10
recagentstate:34:respawn:$PABASE/bin/recorder -n agentstate -v 10
recagent:34:respawn:$PABASE/bin/recorder -n agent -v 10
recservicestate:34:respawn:$PABASE/bin/recorder -n servicestate -v 10
recserviceclass:34:respawn:$PABASE/bin/recorder -n serviceclass -v 10
recprocess:34:off:$PABASE/bin/recorder -n process -v 10
recivrport:34:off:$PABASE/bin/recorder -n ivrport -v 10
<< END OF INITTAB >>
```

This file should not normally be edited. If it is edited, the only field that should be changed is the `-v 10` field.

`pa list`

Display the list of processes activated by the MOM and their current state. The output shown in the following figure, is for an historical server. The date indicates when an individual process was started. The last column shows its process ID as tracked by the MOM. The second to the last column shows its process ID as tracked by NT.

```
         .      system boot  Mar 01 16:41
         .      run-level 4  Mar 01 16:41        4     0      3
java              .          Mar 01 16:41        .   615   id=ams
java              .          Mar 01 16:41        .   675   id=admb
java              .          Mar 05 13:47        .    68   id=adm0
java              .          Mar 01 16:41        .   637   id=aut
java              .          Mar 01 16:41        .   564   id=schd
recorder          .          Mar 01 16:41        .   594   id=reccmscallhistory
recorder          .          Mar 01 16:41        .   432   id=recdisplaynames
recorder          .          Mar 01 16:41        .   234   id=recagentstate
recorder          .          Mar 01 16:41        .   643   id=recagent
recorder          .          Mar 01 16:41        .   527   id=recservicestate
recorder          .          Mar 01 16:41        .   669   id=recserviceclass
```

Section IV: Database Management

This section, *Database Management*, explains some key database management functions. This section includes the following chapters:

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■   ■   ■   ■   ■   ■

Chapter 9: SQL Server 2000 database backup

It is critical that you back up your data frequently so you can retrieve it in the event of a system failure. Making a plan for backup of your data should be one of your top priorities. This chapter describes an approach for backing up your Microsoft SQL Server 2000 database.

Topics

This chapter includes the following topics:

SQL Server 2000 databases

There are four databases you must back up in order to assure the safety of your data:

- The Avaya Operational Analyst database, called the OA database.
- The Interaction Center databases, called Customer Interaction (CI) repository and CCQ.

    Note:
    > It is recommended that the IC databases be backed up by a database administrator, using their backup strategies.

- The Master database.
- The Msdb database

Responsibilities of the database administrator

A trained database administrator or other qualified person should be available to customize and perform all of your backup operations. This includes management of tape backups, so that the tapes for both historical and system data are backed up and labeled correctly.

Recommended backup strategies

Depending on the amount of database activity your installation requires, select one of a variety of backup strategies. The following table summarizes these strategies:

Database activity	Type and frequency of backup
Small amount	● Full backups of OA, IC, Master, and Msdb databases daily ● Transaction log backups every hour
Medium amount	● Full backups of OA, IC, Master and Msdb databases weekly ● Incremental or Differential backups of OA and IC databases daily ● Transition log backups every hour
Large amount	● Full backups of OA, IC, Master, and Msdb databases weekly ● Incremental/Differential backups of OA and IC databases daily ● Transition log backups every hour *or* ● Backup of detailed data first night ● Backup of other filegroups second night ● Incremental backups of all data the rest of the week ● Transaction log backups every hour

You should analyze your particular business situation and design an appropriate backup strategy that affords your data the greatest protection from loss. A minimum strategy requires weekly full backup of OA, IC, Master, and MSDB databases and hourly transaction log backup.

> **Note:**
> Whenever the Master database is backed up, the Msdb database should also be backed up.

Types of backup

Part of your backup strategy should be defining the type of backup to be done, either complete or differential. A complete backup captures a snapshot of a database at a point in time. It provides a copy of the entire data structure from which the database could be restored in the event the database is lost or corrupted.

A differential, or incremental, backup captures only the changes that have occurred in the data since the last backup, either complete or differential. To restore from a differential backup requires a complete backup and all prior differential backups since the complete backup.

Since a complete backup captures the entire data structure, it takes considerably more time to perform than a differential backup, especially on large databases. Therefore, your backup strategy will likely include both types of backup.

Preparing to back up SQL Server 2000 data

You should perform the following tasks prior to attempting a backup of your SQL Server 2000 data:

Validate your data

Before attempting to back up your databases, you should make sure that the data is valid. You can do so by running the following commands against each database:

dbcc checkdb

dbcc checkalloc or newalloc

dbcc checkcatalog

The results of these commands will show any abnormalities in the databases.

For convenience, you may want to schedule these commands to run prior to a scheduled database backup.

Verify your system setup

You should setup and test the communication between your backup devices, tape drives, tape libraries and whatever other components you plan to use. Do this by executing simple tasks outside of SQL Server, like attempting to back up a file or directory to tape.

Set up your backup devices

To set up backup devices, go to **SQL Server Enterprise Manager** then:

1. Open **SQL Server Group**.

2. Open *local host\instance name*.

3. Open **Management**.

4. Right-click **Backup**.

5. Select **New backup device**.

   The **Backup Device Properties - New Device** screen is displayed. On this screen you can set the device you wish to use for backup. You can also set a device name for convenience.

   Note:

   Backing up to a disk drive is not the preferred method of performing a backup. You should back up to tape if at all possible.

Intelligent backup devices

Backup and restore operations using a tape library involves the use of a third party media manager, such as Legato Networker. These operations are beyond the scope of this document. Please refer to the manufacturer documentation for the use of these devices.

Errors

If you attempt to use an incompatible tape when executing a backup, an error message will display.

Executing a backup on demand

You must use the SQL Server Enterprise Manager to execute a backup. Enterprise Manager allows you to set backup devices, choose which databases to back up, set the type of backup to perform, and verify the integrity of your backups. The next sections illustrate how to perform complete backups, differential backups and transaction log backups on demand.

Complete backup

To perform a complete backup:

1. Go to **Enterprise Manager**.

2. Open **SQL Server Group**.

3. Open *local host\instance name*.

4. Open **Management**.

5. Right-click **Backup**.

6. Select **Backup a Database**.

7. Select the appropriate database, and the **SQL Server Backup** screen is displayed. In the following figure, the `OA` database has been selected.
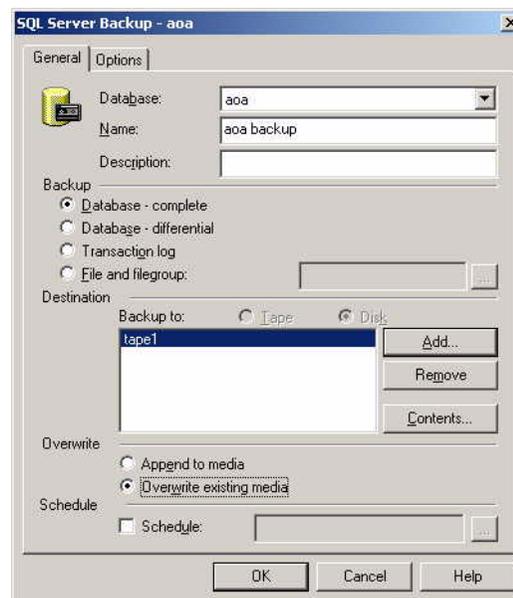
8. Enter a **Description** of the backup being performed. It is recommended that you indicate that this is a complete backup and include the backup date.

9. Select **Database - complete** under **Backup**.

10. Select **Backup to: Tape**

11. Select the **Destination** backup device.

    If no devices are shown, you may add one by pressing **Add...**. The **Select Backup Destination** screen is displayed where you can set the backup device.

12. Select the **Options** tab. Here you can select **Verify backup upon completion**. We highly recommend choosing this option.

13. Click **OK**.

    The progress of the backup is displayed.

14. Upon completion of the backup process, verify the contents of the tape by clicking **Contents...** on the **General** tab. The **View Backup Media Contents** screen is displayed:

15. When you are satisfied with the contents of the backup tape, choose **Initialize and label media** from the **Options** tab to erase the previous contents of the media. Give the new media set a label and description.

Differential backup

Only a user database like the OA database supports a differential, or incremental, backup. The process for performing a differential backup on demand is the same as that for a complete backup, except that you choose **Database - differential** under **Backup** on the **General** tab of the **SQL Server Backup** screen.

Remember to provide an appropriate **Description** indicating that this is a differential backup.

Transaction log backup

Transaction logs contain a history of database activity, and should be backed up regularly to facilitate effective restoration of data. Microsoft recommends that the transaction logs be placed on a drive other than the one containing the associated database.

If the transaction logs are not backed up regularly, they could fill up and prevent further updating or modification of any database activity. If this occurs, you may see an error message similar to this:

```
Can't allocate space for object syslogs in the database OA
   because the logsegment is full...
```

Transaction log backup is accomplished in the same manner as any other backup, except that the **Transaction log** selection is chosen in the **Backup** section of the **SQL Server Backup** screen.

Be sure your **Description** identifies this as a transaction log backup.

Scheduling backups

Depending on the activity of your database, it may be more practical to schedule backups than to perform them manually. You can schedule any type of backup for any database by following these steps:

1. Select the **Schedule** checkbox on the **SQL Server Backup** screen, shown below, to activate scheduled backups.

2. Click **...** to change the schedule. When the **Edit Schedule** screen is displayed you can set how you prefer to have your backups run.

3. To schedule recurring backups, select **Recurring** then click **Change...** .

4. The **Edit Recurring Job Schedule** screen is displayed. Set the parameters to define the schedule you prefer and click **OK** to set the schedule.

   Note:

   For maximum protection of your data, you should schedule transaction log backups to occur every hour.

5. The **Edit Schedule** screen shows the new schedule:. Click **OK** to accept the new schedule.

Checking the status of scheduled backup jobs

You can check the status of scheduled backup jobs from **Enterprise Manager** by opening **SQL Server Group** > *local host\instance name* > **Management** > **SQL Server Agent** > **Jobs**.

Restoring a database

A database may be restored from:

- A complete backup.
- A complete backup and all subsequent differential backups.
- Transaction log backups.

Restoring from a complete backup is the simplest task because there is only one backup file to manage. Restoring from transaction log backups is the most robust task because you must handle the complete backup file, differential backup files, and transaction log files.

Fortunately, Enterprise Manager keeps information about which backups must be restored, and the order in which the restore operations must be performed. All you have to do is follow the suggested steps from Enterprise Manager.

Beginning the restore operation

To start a restore operation:

1. Stop Avaya Operational Analyst.

2. Take the database off line:

   a. From Enterprise Manager open **SQL Server Group**.

   b. Open *local host\instance name*.

   c. Open **Databases.**

   d. Right-click the database, for example `OA`.

   e. Select **All tasks**.

   f. Select **Take offline**.

3. If you are restoring a database from transaction log backups:

   Back up the current active transaction log, using the SQL Query Analyzer. Type:

   ```
   BACKUP LOG OA

   TO BACKUP_DEV

   WITH

   NO_TRUNCATE

   GO
   ```

   where `BACKUP_DEV` is the backup device you specified in <u>Set up your backup devices</u> on page 221.

4. Select the database to be restored:

   a. From Enterprise Manager open **SQL Server Group**.

   b. Open *local host\instance name*.

   c. Open **Databases.**

   d. Right-click the database, for example OA.

   e. Select **Restore Databases**.

   The **Restore database** screen is displayed. It is possible to restore from filegroups (individually or together), but you should note that differential backup does not apply to filegroups.

Completing the restore operation

From a complete backup

Follow the suggested steps from Enterprise Manager.

From differential backups

Follow the suggested steps from Enterprise Manager to restore from all differential backups, in the order they were created.

> ⚠ **WARNING:**
> Restore from the last complete backup.

Transaction log backups

Follow the suggested steps from Enterprise Manager to:

> ⚠ **WARNING:**
> Restore from the latest complete backup.

1. Restore any differential backups.

2. Restore from all the transaction log backups since the last differential backup.

3. Restore the transaction log backup created in step 3 in

Checking status

Be sure to check on the status of backups and restores, and the database status by viewing the SQL Server log files. To check log files:

1. Open Enterprise Manager.
2. Open **SQL Server Group**.
3. Open *local host\instance name*.
4. Select **Management**.
5. Select **SQL Server Logs**.

Chapter 10: Oracle database backup

It is critical that you back up your data frequently so you can retrieve it in the event of a system failure. Making a plan for backup of your data should be one of your top priorities. The Avaya Operational Analyst Backup Strategy provides full backup capabilities. This Strategy employs OA Backup Utility scripts, and uses the Oracle Recovery Manager (RMAN), and the Legato Storage Manager.

Topics

This chapter includes the following topics:

Recommended backup strategy

While methods recommended in this guide are collectively referred to as the Avaya Operational Analyst backup strategy, Avaya does not mandate any one strategy for backup operations. Avaya has tested the strategy presented here, but other methods may be equally effective in your situation. This strategy is offered for your reference so that you can customize a backup routine using the Oracle and Windows tools provided.

The Avaya Operational Analyst backup strategy requires that the database be put in Archive Log Mode. This allows you to perform backups of the database while it is online. (This type of backup is referred to as an inconsistent backup in the Oracle documentation.) Both incremental and full database backups may be performed. Using Archive Log Mode also allows you to recover your database up to the point of database failure.

Putting the database in Archive Log Mode causes Oracle to automatically create archive log files. These files record changes to the database and may grow rapidly. The archive log files must be backed up frequently (hourly on systems with heavy database activity). A tape device should be dedicated to this backup activity and the tapes should be changed as they fill up. Some customers may want to purchase a robotic tape library and Storage Manager software capable of changing tapes to automate this process.

> ⚠ **Important:**
> If the database is not in Archive Log Mode, the database must be shut down before database backups are performed. (This type of backup is referred to as a consistent backup in the Oracle documentation.) Only full database backups may be performed. A backup utility such as the Microsoft Windows Backup tool should be used to perform the database backup. Recovery is limited to a full restore of the database from the last backup. Recovery of data up to the point of database failure is not possible because no archive log files are available. This mode of operation is not recommended because of the potential for losing data when database failures occur.

Responsibilities of the database administrator

A trained database administrator or other qualified person should be available to customize and perform all of your backup operations. This includes management of tape backups, so that the tapes for both historical and system data are backed up and labeled correctly.

We also recommend that you have the following guides available for reference:

- *Oracle Backup and Recovery Guide*

- *Oracle Database Administrator Guide*

- *Legato Storage Manager Administrator Guide*

Required software configurations

During software installation, database setup must initialize the historical database parameter files with the parameters that the backup strategy needs if it is to operate.

In addition, in order to use the Avaya Operational Analyst backup strategy, you must do the following:

- Install and configure Oracle Enterprise Edition Version 8.1.7 and Legato Storage Manager on the Avaya Operational Analyst historical server.

- Put the historical database in ARCHIVELOG mode.

- Set the Oracle Recovery Manager (RMAN) environment variables. The environment variables are:

    `NLS_LANG = AMERICAN_AMERICA.UTF8`

    `NLS_DATE_FORMAT = 'Mon DD YYYY HH24:MI:SS'`

    Note:

    > The `NLS_LANG` variable shown here is the default. For other languages see the Oracle documentation.

Overview of backup

The Avaya Operational Analyst backup strategy allows database backups to be performed while the database is online. This is referred to as a *hot* backup. The Avaya Operational Analyst backup strategy supports both full and incremental backups. Backups are scheduled through the Administration Client. We suggest that full backups be performed once a week, and incremental backups be performed nightly. Backups are done to a tape device. The backup strategy uses the Legato Storage Manager to manage the tape device for backup.

Types of failures

The following are the types of failures that can occur in the Avaya Operational Analyst historical database:

- Statement
- Process
- Instance
- User-application
- Media

Recoveries due to statement, process, or instance failures are handled by the Oracle application on restart of the database. The Oracle application uses the online redo logs and rollback segments to recover the database in these cases. Only committed transactions are recovered.

You will need the need the backup sets from the Avaya Operational Analyst backup strategy to recover a database from a user-application failure or a media failure.

Types of backups

There are two types of database backups: consistent and inconsistent.

- A consistent backup is a backup of the entire database. For a consistent backup, the database must be shut down.
- An inconsistent backup is made while the database is open. For an inconsistent backup, tablespaces can be in different states.

The Avaya Operational Analyst Backup Strategy uses the Oracle Recovery Manager (RMAN) for backup of the historical database, and performs inconsistent backups. The historical database does not need to be shut down during an inconsistent backup.

Backup operations

The backup priorities for an Oracle database are:

- Maintain multiple identical copies of your online redo logs on different media.

- Archive your redo logs to multiple locations and make frequent backups of your archived redo logs.

- Maintain multiple, concurrent copies of your control files.

- Make frequent backups of your data files and control files and store them in a safe place.

You set up some of the functions above when you set up the Oracle Database. Some are set up by the Avaya Operational Analyst backup strategy, which is discussed in this chapter. An Oracle Database Administrator should manage the control file, redo log files, and archive redo log files. The Oracle initialization parameter file controls:

- Creation of multiple copies of the online redo log

- Setup of archive redo logs

- Maintenance of multiple concurrent copies of the control files

Setting the automatic archive mode

The database administrator or other qualified person must put the database in ARCHIVELOG mode after creating the database. The database administrator should also use Automatic Archive Mode. Automatic Archive Mode causes the ARCH process in the Oracle instance to copy a full online redo log file to the archive log backup destination. If the database is not set up in Automatic Archive Mode, the database halts when the current redo log file is full and ready to be switched. The database will restart only after the full redo log file has been archived. Also, if the archive log backup destination fills up, the database will halt. Therefore, the archive log should always have enough free space to hold the archive log files. The database administrator puts the database into Automatic Archive Mode by setting the **LOG_ARCHIVE_START** flag to **true** in the parameter file. The database administrator also specifies the archive log backup destination in the parameter file.

In the Avaya Operational Analyst backup strategy, the database (data files), archived redo log files, and current control file are backed up. The current control file must be backed up to disk instead of tape, and must be backed up again as part of the system data. This will be discussed in the next section, Control-file metadata on page 240.

Using RMAN

The Avaya Operational Analyst backup strategy uses the Oracle Recovery Manager (RMAN) to back up the database. You schedule RMAN to do incremental backups of the database. An incremental backup is a backup that backs up only the data files with blocks that have changed since the last full or incremental backup. Incremental backups allow for faster recovery of the database.

RMAN allows you to create multi-level incremental backups. Incremental backups require an incremental level 0 backup to serve as a baseline. An incremental level 0 backup is a full backup of the database.

The Avaya Operational Analyst backup strategy suggests that you schedule an incremental level 0 backup once a week, and an incremental level 1 backup operation nightly. This backup schedule is only a recommended schedule. You are free to change it, or to develop your own. Backups of the historical database can also be performed manually. This is done by executing the scripts associated with backup of the historical database from a command window.

Nightly backups

In addition to doing a nightly incremental 1 backup, the Avaya Operational Analyst backup strategy recommends an hourly backup of the archive redo log. Before the archived redo files are backed up, the current redo log file is archived. Doing an hourly backup of the archive redo log allows for an incomplete recovery of the database. By default, archive redo logs are deleted after they are backed up.

Backup using `PABACKUP`

The following are the steps for doing a full and incremental backup of the OA Oracle historical database using `PABACKUP`. Before the database can be backed up, the Legato Storage Manager (LSM) must be installed.

1. Bring up the LSM and insure a tape drive has been configured and a tape has been labeled.

   - For Windows, select **Start -> Programs-> NetWorkerGroup -> NetWorker Administrator**
   - For Solaris, type `nwadmin`.

2. Change to the directory containing the backup scripts: **$PABASE/data/admin/backup**

3. Execute the backup command:

   - `pabackup –f reg` for a full backup
   - `pabackup –i reg` for an incremental backup

> **Note:**
>> An incremental backup can be performed only if a full backup has already been made at some pervious time.

4. Monitor the backup with the LSM by selecting the **Monitor** tab for the server that is performing the backup.

   The **Messages** window indicates what is being backed up and when the backup is finished. A backup of the database can take several hours, depending on the amount of data to back up and the type of tape device to which the backup is being made.

5. Check the backup logfile.

   If a backup seems to fail, or seems to be taking to long, the status of the backup, from Oracle's point of view, can be seen in the logfile. The backup logfile can be found in **$PABASE/data/log/backup**. For a full backup, the Oracle log file is **backup_db_level_0.log**. For an incremental backup, the Oracle log file is **backup_db_level_1.log**.

6. Validate the backup using Oracle's RMAN.

   a. Log on to RMAN using the command: **rman target internal/oracle nocatalog**

   b. Run a validation request using the command: **run { allocate channel t1 type 'SBT_TAPE'; validate backupset ####; }**

   where #### is the backup set number on which to run the validation. The backup set number can be obtained from the Oracle backup log file.

After the database has been backed up, all archivelog files are automatically deleted. In addition, a copy of the database control file is sent to **$PABASE/data/admin/backup/sys/BACKUP_CF.BK**. This file should be saved to a permanent place if a point-in-time restore of the database is required in the future.

Script examples: RMAN command files

The following are examples of command files for doing a level 0 incremental backup and a level 1 incremental backup. The examples include doing a backup of the archive redo log files and the online control file. These examples are used by the Avaya Operational Analyst backup strategy. Command files are executed with OA Backup Utility scripts. The `%PABASE%` environment variable is replaced with the true path by the OA Backup Utility script.

> ⚠ **WARNING:**
>> The `%PABASE%` variable is used differently in the RMAN backup and recovery context. This is necessary for integration between Avaya Operational Analyst and RMAN. Please note that there is no backslash after `%PABASE%` when used in this context.

Example 1: Complete (Level 0) backup of the historical database

```
# This command file backs up the whole database. This backup #
  is part of an incremental strategy. The database is backed #
  up into backup-sets. After the backup is complete, the

# script archives the redo logs and backs up the archive logs.

run {

# Allocate a channel to write data to tape
  allocate channel t1 type 'SBT_TAPE';

# Make an incremental level 0 backup of the database. The skip
  # inaccessible clause below ensures the backup will

continue # if any of the datafiles are inaccessible.
  backup

        incremental level 0

        skip inaccessible

        tag backup_db_level_0

        filesperset 3

        format 'df_t%t_s%s_p%p'

        database;

# Cause the current redo log to be archived.
  sql 'alter system archive log current';

# Backup the archive logs
  backup

filesperset 20

        format 'al_t%t_s%s_p%p'

        archivelog all

            delete input;

# Make a backup of the current control file that knows about
  # this backup. This control file will be needed for doing
  # point-in-time recoveries of the database.
  sql "alter database backup controlfile to
  ''%PABASE%data\admin\backup\sys\backup_cf.bk'' reuse";

# Release the tape.
  release channel t1;

}
```

Example 2: Incremental (Level 1) backup of the historical database

```
# This command file only backs up the parts of the database
  # that have changed since the last backup. This backup is
  part # of an incremental strategy. The database is backed up
into # backup-sets. After the backup is complete, the script
  # archives the redo logs and backs up the archive logs.
run {
# Allocate a channel to write data to tape
  allocate channel t1 type 'SBT_TAPE';
# Make an incremental level 1 backup of the database. The
skip # inaccessible clause below ensures the backup will
  continue # if any of the datafiue are inaccessible.
    backup
        incremental level 1
        skip inaccessible
        tag backup_db_level_1
        filesperset 3
        format 'df_t%t_s%s_p%p'
        database;
# Cause the current redo log to be archived.
  sql 'alter system archive log current';
# Backup the archive redo logs and delete them.
  backup
filesperset 20
        format 'al_t%t_s%s_p%p'
        archivelog all
            delete input;
# Make a backup of the current control file that knows about
  # this backup. This control file will be needed for doing
  # point-in-time recoveries of the database.
  sql "alter database backup controlfile to
  ''%PABASE%data\admin\backup\sys\backup_cf.bk'' reuse";
# Release the tape.
  release channel t1;
}
```

Recovering the Oracle database

If you use the **PABACKUP** tool to back up the historical database, the following instructions will help you recover the database if it crashes. Otherwise, refer to the *Oracle Backup and Recovery Guide* to recover the database.

> **Note:**
>
> To recover to a point that is earlier than the latest full backup, you must have a copy of the Oracle database control file earlier than the full backup.

To recover the historical database to a point just before the failure, refer to the Oracle RMAN sample script `restore_db_cp.rcv` in `%PABASE%\data\admin\backup`. Be sure you also have all the incremental backups until the failure point and the redo logfiles generated after the latest incremental backup. For other kinds of Oracle recoveries (for example, system tablespace recovery or open database recovery), please refer to the *Oracle Backup and Recovery Guide*.

The following are the steps for doing a complete restore of the OA historical database.

1. Bring up the LSM and insure that the tape that contains the backup of the database to be restored is mounted.

   - For Windows, select **Start -> Programs-> NetWorkerGroup -> NetWorker Administrator**.

   - For Solaris, type `nwadmin`.

2. Change to the directory containing the restore scripts: **$PABASE/data/admin/backup**

3. Open a command window and run:

   - On Windows, `set NLS_LANG=`*`NLS_LANGUAGE_NLS_TERRITORY.NLS_CHARACTERSET`*

   - On Solaris, `export NLS_LANG=`*`NLS_LANGUAGE_NLS_TERRITORY.NLS_CHARACTERSET`*

   For example: `AMERICAN_AMERICA.UTF8` is the correct value for `NLS_LANG` in the English version of OA.

4. If the Oracle control file is available, run the following commands in the command window:

   - `rman target sys/`*`sys password`* `nocatalog cmdfile "\"%PABASE%\data\admin\backup\restore_db_cp.rcv"\" log "\"%PABASE%\data\log\backup\restore_db.log"\"` on Windows

   - `rman target sys/`*`sys password`* `nocatalog cmdfile "$PABASE/data/admin/backup/restore_db_cp.rcv" log "$PABASE/data/log/backup/restore_db.log"` on Solaris

5. Monitor the restore with the LSM by selecting the **Monitor** tab for the server that is performing the restore.

   The **Messages** window indicates when a restore is finished. A restore of the database can take several hours, depending on the amount of data to restore and the type of tape device from which the restore is being made.

6. Check the restore logfile.

   If a restore seems to fail, or seems to be taking to long, the status of the restore, from Oracle's point of view, can be seen in the logfile. The restore logfile can be found in **$PABASE/data/log/backup**. For a complete restore, the Oracle log file is **restore_db_cp.log**.

Control-file metadata

The Avaya Operational Analyst Backup Strategy uses the control file for the database to store backup information. If the control file is lost and there is no backup of the control file, all information about RMAN backups and copies contained in the control file is lost.

Because the control file is so critical, the control file should be mirrored and multiplexed to separate disks. If the current control file is mirrored and multiplexed, it should never be lost.

It is critical to back up the control file for incomplete recoveries. The control file used for an incomplete recovery must contain the information contained in the database at the point-in-time targeted by the incomplete recovery operation.

After the database, control file, and archive redo log files are backed up to tape, a copy backup of the control file is made to disk. The control file is backed up to `%PABASE%data\admin\backup\sys\backup_cfbk`. The following SQL statement backs up a database's control file:

```
ALTER DATABASE BACKUP CONTROLFILE TO

'%PABASE%data\admin\backup\sys\backup_cf.bk' REUSE;
```

The `REUSE` option allows you to have the new control file overwrite a control file that currently exists. The control file will be backed up as part of the system data backup.

Legato Storage Manager

To use tape storage for a database backup, RMAN requires a media manager. A media manager is a utility that loads, labels, and unloads sequential media, such as tape drives, for the purpose of backing up and recovering data. To use RMAN to make backups to sequential media, such as tape, the media management software must be integrated with the Oracle software. Once a media manager has been integrated with the Oracle software, RMAN can read and write data to tape. The Avaya Operational Analyst Backup Strategy uses the Legato Storage Manager for the media manager.

NetWorker (Legato Storage Manager) Administrator

The Legato Storage Manager Administrator is a graphical user interface that you use to access the Legato Storage Manager server and its resources. You can run the Legato Storage Manager Administrator GUI to connect to and configure the Legato Storage Manager Server, Legato Storage Manager Client, storage devices, and storage volumes. You can also use the Legato Storage Manager Administrator GUI to monitor the status of Oracle backup and restore operations.

Installing Legato Storage Manager

As part of an overall Oracle backup and recovery system, Legato Storage Manager provides:

- Complete storage-device and volume-management services

- Convenient tracking of Oracle backup data on storage volumes

- Management of Oracle backup data throughout a complete data life cycle

- Complete disaster recovery protection for Oracle databases

Legato Storage Manager is included on the Oracle Enterprise Edition distribution media, and is a subset of Legato NetWorker Storage Management System. You must install the Legato Storage Manager server on the same machine as the Oracle server. You must also connect the Oracle backup devices to the Oracle server machine. The Legato Storage Manager Administrator GUI can run on the Oracle server machine. You install both the Legato Storage Manager server and Legato Storage Manager Administrator GUI components during the Legato Storage Manager installation procedure on the Oracle server machine.

For more information about installing the Legato Storage Manager, see the *Legato Storage Manager Administrator Guide*.

Configuration

Legato Storage Manager must be configured to communicate with the Oracle server about the historical database and the tape device that it uses. As part of the installation process, the Legato Storage Manager automatically configures the Oracle server as a storage-management client of the Legato Storage Manager server. You use the Legato Storage Manager Administrator GUI to configure the necessary backup devices and label backup volumes. See the *Legato Storage Manager Administrator Guide*, "Configuration Roadmap," for the configuration procedure.

> ⚠ **Important:**
> When you are installing the Legato Storage Manager and an ID number is requested, leave the field blank and click **Next**. Entering an ID number causes the Legato Storage Manager to be registered incorrectly. If an invalid ID number is entered, the Legato Storage Manager assumes that it is being used as a demo and will expire after 30 days.

The Legato Storage Manager server

Each configured Oracle backup device attached to the Legato Storage Manager server must have a labeled storage volume mounted in the backup device before the Legato Storage Manager server can use it for backup and restore operations. See the *Legato Storage Manager Administrator Guide* for instructions on how to perform labeling and mounting of storage volumes.

The Legato Storage Manager server can support at most four concurrent storage devices, and four simultaneous data streams. When you configure the Legato Storage Manager server, you determine the number of storage devices supported by the Legato Storage Manager server.

The Legato Storage Manager server does not support the following features that are supported by the Legato NetWorker storage management system: autochangers, cloning, and scheduled backups. If you wish to support tape libraries or other features of a more extensive media manager, buy either an upgraded version of NetWorker or another media-manager tool that supports the RMAN interface.

Backing up Legato Storage Manager

At the end of the Oracle backup process, the Legato Storage Manager server updates the online client and media indexes with information about the backup media used and the Oracle data stored on the backup media. These indexes are stored in the Legato Storage Manager server bootstrap.

You should back up the Legato Storage Manager server bootstrap in case a disaster recovery has to be performed. The backup of the Legato Storage Manager server bootstrap can be done automatically or manually. For the Avaya Operational Analyst

system, you should disable automatic backup and perform manual backups. The backup application that performs the backup of the database also performs the backup of the Legato Storage Manager server bootstrap. The command for doing a backup of the Legato Storage Manager server bootstrap is:

```
savegrp -O -l full -c server_name
```

The data kept in the bootstrap determines how long the Legato Storage Manager server maintains information about an Oracle backup. The *browse policy* determines how long the client index file on the Legato Storage Manager server maintains the information about an Oracle backup. The *retention policy* determines the minimum period of time that the media index file maintains information about an Oracle backup. These policies have default values set when the client resource information is set. See the Legato Storage Manager Administrator Guide, section 2, "Configuring Legato Storage Manager Resources," for information on how to change these default values.

The default for the browse policy is a year and the default for the retention policy is ten years. Once this information is lost, the Legato Storage Manager cannot be used to restore backups from tape. If you must perform a restore operation of a database for which either of the policies have been lost, the Legato Storage Manager tool has a utility for restoring policies from tape.

Legato Storage Manager server command line interface

You use this interface to recover the Legato Storage Manager server bootstrap information when performing disaster recovery.

Tape maintenance

A trained database administrator or tape administrator should be responsible for the management of tapes. The tape administrator must ensure that tapes are ready when it is time for a scheduled backup to occur.

The guidelines for using the Legato Storage Manager to do tape management for the backup and restore of the historical database can be found in the Legato Storage Manager manual.

An Avaya Operational Analyst server that supports both the historical database and system data should be configured with two tape devices. Two tape devices are needed because different tools are used to do backup and restore of information. The tools do not support the storage of different types of backups on the same tape. If the Avaya Operational Analyst server does not have two tape drives, the tape administrator must ensure that tapes are changed between the backing up of the historical database and the backing up of system data.

The tape administrator determines the management of storage volumes. Historical database backup data for one week should map to a single volume. Data for one week is one full backup of the database and six incremental backups of the database. See the Legato Storage Manager Administrator Guide for more details.

Location of files

The Avaya Operational Analyst Backup Strategy writes its log files to `%PABASE%data\log\backup`. It writes the backup of the database control file to `%PABASE%data\admin\backup\sys`.

All of the Avaya Operational Analyst Backup Strategy RMAN command files are stored in `%PABASE%data\admin\backup`.

The Backup application for the historical database uses the **db.properties** file to get information on the database server and the database user id.

The Backup application for the historical database uses the historical database to get information on the tablespace names.

Scheduling backups

You can schedule the following tasks using Avaya Operational Analyst Administration Client:

● Full backups of the historical database

● Incremental backups of the historical database

For information about how to schedule tasks, see the Administration Client documentation.

Audits, monitoring, and error recovery

You can monitor the backup of the historical database using the Legato Storage Manager Administrator. RMAN will generate the log files. Review the log files to determine if a backup of the historical database has failed. If a backup fails, you can reschedule the backup.

You should also monitor the database alert log to determine if the database has failure, and if it needs to be restored. The alert log contains information you may need to perform an incomplete recovery of the database.

Oracle database backup

■   ■   ■   ■   ■   ■

Chapter 11: SQL Server 2000 filegroup management

You can add, move, or remove SQL Server 2000 filegroups and datafiles. The following is intended as a quick reference for use with the Avaya Operational Analyst historical database. You should use the SQL Server Books Online for detailed information on when to perform each of the tasks described in this chapter.

The examples included here are for illustrative purposes. They may need to be adapted to work in your environment.

> ⚠ **Important:**
> It is highly recommended that you perform a backup before altering the database.

Topics

This chapter includes the following topics:

Adding a new filegroup

A filegroup enables grouping of datafiles for data placement purposes. To add a filegroup execute the following SQL Server statement from the Query Analyzer.

```
ALTER DATABASE BACKEND DATABASE NAME

ADD Filegroup FILEGROUP NAME
```

Example: Adding a filegroup to a database

```
ALTER DATABASE SampleDatabase

ADD Filegroup SampleFilegroup
```

A filegroup can be empty, but it is not usable until datafiles are added. To add files to a filegroup see

Adding Datafiles

Use the following commands to add a datafile to a filegroup.

Example1

To add one datafile to an existing filegroup, assuming that all drives and directories exist, and disk space is available:

```
ALTER DATABASE SampleDatabase

ADD FILE

( NAME = HistAdminfile1,

  FILENAME='E:\mssql\HistAdminfile1.ndf ',

  SIZE = 100MB,

  MAXSIZE = UNLIMITED,

  FILEGROWTH = 10%)

 TO FILEGROUP HistAdmin
```

Example2

To add two datafiles to an existing filegroup:

```
ALTER DATABASE SampleDatabase
ADD FILE
( NAME = HistAdminfile3,
  FILENAME='E:\mssql\HistAdminfile3.ndf ',
  SIZE = 100MB,
  MAXSIZE = UNLIMITED,
  FILEGROWTH = 10%),
( NAME = HistAdminfile4,
  FILENAME='E:\mssql\HistAdminfile4.ndf ',
  SIZE = 100MB,
  MAXSIZE = UNLIMITED,
  FILEGROWTH = 10%)
TO FILEGROUP HistAdmin
```

Adding a transaction log

To add a transaction log to an existing database:

```
USE master
GO
ALTER DATABASE SampleDatabase
ADD LOG FILE
( NAME = SampleDatabase_log2,
  FILENAME = 'E:\MSSQL\SampleDatabase_log3.ldf',
  SIZE = 5MB,
  MAXSIZE = 100MB,
  FILEGROWTH = 5MB),
( NAME = SampleDatabase_log3,
  FILENAME = 'E:\MSSQL\SampleDatabase_log4.ldf',
  SIZE = 5MB,
  MAXSIZE = 100MB,
  FILEGROWTH = 5MB)
GO
```

Moving a filegroup

The SQL Server filegroup is a logical entity that is composed of datafiles. Please see Moving datafiles and transaction log files on page 251 for more information on moving datafiles.

Moving datafiles and transaction log files

Moving datafiles or transaction logs is sometimes a convenient way to resolve performance or space concerns. To move datafiles or transaction logs to a different disk location follow these steps:

1. Record the original location of the datafile or transaction log:

    a. Open **Enterprise Manager**.

    b. Click **SQL Server Group**.

    c. Click *local host\instance name*.

    d. Click **Databases**.

    e. Right-click *OA database name*.

    f. Select **All Properties**.

    g. Record the current file locations.

2. Detach the database

    a. Open Enterprise Manager.

    b. Click **SQL Server Group**.

    c. Click *local host\instance name*.

    d. Click **Databases**.

    e. Right-click *OA database name*.

    f. Select **All Properties**.

    g. Click **Detach Database**.

3. Manually move the files:

    a. Copy the files to their new locations.

    b. Rename the old files.

    Note:
    > Do not delete the old files until you are sure there are no problems caused by the move.

4. Attach the Database

    a. Open Enterprise Manager.

    b. Click **SQL Server Group**.

    c. Click *local host\instance name*.

    d. Click **Databases**.

e. Right-click *OA database name*.

f. Select **All Properties**.

g. Click **Attach Database**.

h. The **Attach Database** screen is displayed.

5. Browse for the location of the database primary `mdf` file, in this case **PA_Primary.mdf**, by clicking **...**. After you find this file, the associated datafiles and transaction log files are displayed.
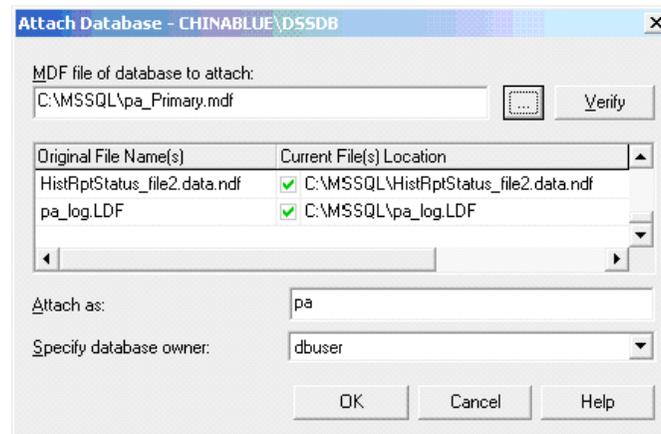
6. Edit the locations of the datafiles or transaction logs you are moving.

7. Verify that the locations of the files you are moving are correct:

a. Select a file you are moving.

b. Click **Verify**.

c. If the red **X** changes to a green **checkmark**, move to the next file that you are moving. If the green checkmark does not appear, recheck the location and file name to be sure you copied the correct file.

8. When all the red **X**s are replaced by green **checkmark**s on the files you are moving, click **OK**. The following screen is displayed:

9. Verify proper operation of the database.

10. Delete the old files.

Removing a filegroup

Only empty filegroups can be removed. Before a filegroup can be removed database objects, such as tables, and datafiles must be removed from the filegroup.

To remove an empty filegroup from the database execute the following commands:

```
ALTER DATABASE SampleDatabase

REMOVE FILEGROUP HistAdmin
```

To remove a datafile from a filegroup execute the following commands:

```
ALTER DATABASE SampleDatabase

REMOVE FILE HistAdmin_file3
```

To drop a table from the database execute the following commands:

```
USE SampleDatabase

GO

DROP TABLE Table1
```

Use SQL Server Books Online for more examples on removing or dropping database objects.

Chapter 12: Oracle tablespace management

You can create, remove, add, drop, and change Oracle tablespaces, depending on your needs. The following is intended as a quick reference for use with the Avaya Operational Analyst historical database. You should have the *Oracle Database Administrator Guide* available for detailed information.

Data containers are managed through the Administration Client interface. For information about how to manage data storage and containers, see the Administration Client documentation.

For detailed instructions about how to setup a new Oracle database, see the Oracle documentation.

For detailed instructions about Oracle databases, see the Oracle Database Administrators Reference.

Topics

This chapter includes the following topics:

- Determining the Initial Size of the Existing Tablespace on page 256
- Arranging Tablespaces in Non-default Locations on page 257
- Adding a Datafile on page 257
- Moving a Tablespace on page 258
- Adding a New Tablespace on page 258
- Dropping a Tablespace on page 259
- Determining the Free Space in a Tablespace on page 259
- Recovering from Errors on page 260
- Alarms and Logs on page 260
- DBCheck on page 260

Determining the Initial Size of the Existing Tablespace

If you cannot find 5 GB of free space in `%ORACLE_BASE%\oradata`, follow these steps to look for existing tablespaces and their sizes.

In a command window enter:

```
SQLPLUS sys/sys password

Select t.name tablespace, sum(d.create_bytes)
  initial_size from v$tablespace t, v$datafile d
  where t.ts# = d.ts# group by t.name;
```

When the query is finished, open the configuration file:

```
%PABASE%\data\admin\install\oracle\dbtbs.cfg
```

which contains the result of the query. If the tablespace listed in `dbtbs.cfg` is an existing one, compare the initial size of this tablespace with the default size for this tablespace (the result should be at least two times the size of each datafile).

If all of the tablespaces listed in `dbtbs.cfg` exist already, and their initial sizes are larger than their default sizes, you can reuse these tablespaces when you run `dbsetup`. In interactive mode, choose to reuse the existing tablespace when prompted. In non-interactive mode, dbsetup reuses all existing tablespaces by default.

If the tablespaces are not large enough, drop them (see "Dropping a Tablespace" on page 259) and check to see if `%ORACLE_BASE%\oradata` has 5 GB or more of free space. If it still does not, put the tablespaces in non-default locations. See the next section, Arranging Tablespaces in Non-default Locations on page 257 for details.

Arranging Tablespaces in Non-default Locations

If you cannot find 5 GB free space in the default locations (`%ORACLE_BASE%\oradata`) and tablespaces do not exist in the Oracle database, follow these steps:

1. Select **Start** > **Programs** > **Administrative Tools** > **Disk Administrator**.

2. Select a drive that has more than 5 GB free space, or select several drives that have more than 5 GB free space total, with each drive holding at least 2 GB of free space.

3. Use Explorer to see if there is a directory called `oracle\oradata\`*`oracle_sid`* on one of the drives. If not, create that directory under the root directory.

4. Based on the amount of free space on each drive, decide which tablespace to put on that drive. After you put the tablespaces on a drive, the drive should still have at least 10% of its original free space.

   For example, if you have three drives and each drive has 2 GB free space or more, you should put `dssadmin` and `container2` on one drive, `dssdetail1` on another drive, `container1` and `container3` on the remaining drive.

5. After you determine the new locations of the tablespaces, modify the location of the tablespace through the installation program.

Adding a Datafile

To add a datafile in the existing tablespace:

1. In a command window, enter:

   ```
   SQLPLUS /nolog

   connect sys/sys password

   select tablespace_name, status from dba_tablespaces;
   ```

2. Make sure the tablespace exists and its status is `online`. If it is `offline`, make it online by running this SQL command:

   ```
   alter tablespace tablespace name online;
   ```

3. Add the datafile by entering:

   ```
   alter tablespace tablespace name add datafile 'new datafile
     path and name' size new size reuse;
   ```

Moving a Tablespace

Please note that only non-system tablespaces can be relocated.

⚠ **WARNING:**

The sequence of this instruction is critical. Please make sure you follow it step by step.

To move the datafiles of a tablespace:

1. In a command window, enter:

   ```
   SQLPLUS /nolog
   ```

   ```
   connect sys/sys password
   ```

   ```
   select file_name, tablespace_name, status from dba_data_files;
   ```

2. Write down the path and names of the datafiles of a tablespace you want to move.

3. Enter:

   ```
   alter tablespace tablespace name offline;
   ```

4. Use the operating-system commands to copy the datafiles to the new file location.

5. Enter:

   ```
   alter tablespace tablespace name rename datafile 'old datafile
     path and name' to 'new datafile path and name';
   ```

   ```
   alter tablespace tablespace name online;
   ```

   ```
   exit
   ```

6. Use the operating-system commands to remove the old datafiles.

Adding a New Tablespace

To create a new tablespace without running `dbsetup`, run the following SQL command in a command window:

```
SQLPLUS /nolog
```

```
connect sys/sys password
```

```
create tablespace new tablespace name datafile 'datafile path
  and name' size datafile size reuse;
```

Dropping a Tablespace

Only Avaya Operational Analyst tablespaces listed in
`%PABASE%\data\admin\install\oracle\dbtbs.cfg` can be dropped.

To drop a tablespace:

1. Make sure the tablespace you want to drop exists. Then, in a command window, enter:

   ```
   SQLPLUS /nolog

   connect sys/sys password

   select tablespace_name, status from dba_tablespaces;

   select file_name, status from dba_data_files where
     tablespace_name = 'UPPER CASE OF THE TABLESPACE NAME';
   ```

2. Write down the path and names of the datafiles of a tablespace you want to drop.

3. Enter:

   ```
   select owner from all_tables where tablespace_name = 'UPPER
     CASE OF THE TABLESPACE NAME' and partitioned = 'YES' group
     by owner;
   ```

   If the result is not empty, write down the owner names and run:

   ```
   'drop user owner name cascade;'
   ```

   for each record.

4. Enter:

   ```
   drop tablespace tablespace name including contents cascade
     constraints;

   exit
   ```

5. Use operating-system commands to remove the datafiles you wrote down above.

Determining the Free Space in a Tablespace

To assess the free space in a tablespace, use the following SQL script:

```
SQLPLUS /nolog

connect sys/sys password

select sum(bytes), tablespace_name from dba_free_space group
  by tablespace_name;
```

Recovering from Errors

Disaster recovery from a database crash is described in the *Oracle Database Administrator Guide*.

`DBSetup` must be re-run from the start if it detects an error condition. `DBCheck` goes on to the next step if it encounters an error. All errors are logged. If an error occurs while `DBSetup` or `DBCheck` are running, you can run them again after correcting the error.

Alarms and Logs

The Avaya Operational Analyst database uses the ARCHIVE LOG feature of Oracle for backup and restore operations. ARCHIVE LOG mode enables complete recovery from disk failure and instance failure because all changes made to the database are permanently saved in archived redo logs. For more details, see the *Oracle Database Administrator Guide*.

For rollback transactions, the Avaya Operational Analyst database uses the ROLLBACK SEGMENT feature of Oracle. You should create and maintain the rollback segments based on the Oracle DBA guide.

The database error log in Oracle is called Alert Log. This is a chronological log of messages and errors for the Oracle database. The Alert Log location is defined by the Oracle system parameter, `background_dump_dest`. For details about the Alert Log, see the Oracle documentation.

DBCheck

`DBCheck` is an audit process that runs once a day, logging all of its actions into an activity log (`%PABASE%\data\log\dbcheck\dbchecktrc`).

■ ■ ■ ■ ■ ■

Chapter 13: Migrating schema

Avaya Operational Analyst allows you to redefine an historical store by requesting changes to a schema, recreating the tables with the new schema, and restoring saved data into the new tables. This process is called *schema migration*. The need for a schema migration is triggered when a column is dropped from or added to a table, or when the default value of a column is changed.

> **Note:**
>
> A qualified database administrator should perform all data backup and schema migration activities.

Migration is not required unless a schema *declaration phase* (where you record desired changes to an historical store using Administration Client) is completed prior to executing schema migration. This chapter does not cover declaration. Schema declaration is explained in the online Help for Avaya Operational Analyst Administration Client.

Topics

This chapter includes the following topics:

Phases of schema migration

Schema migration takes place in four broad phases: declaration, pre-migration, schema migration, and assignment.

You should always do a full backup of your data prior to performing this procedure.

Declaration

Using the Administration Client, you record changes to an historical store:

- Select a set of columns from those defined in Avaya Operational Analyst, and use the selected set of columns to define the historical store.

- Set any default value changes and aggregation behavior changes for these columns.

The new specifications are referred to as the "pending" or "declared" schema of the historical store.

Pre-migration (export)

During pre-migration:

- The `premigration` utility performs up-front validation to verify that OA has been turned off and that a migration is pending for the specified historical store.

- The `migrationexport` utility exports the data from the old schema to files that can subsequently be moved to tape or another off-line storage device.

Schema migration

The schema migration utility, `SchemaMigration`, creates new database tables based on the modified historical store. Any existing tables and indexes are dropped. Views using the dropped tables are disabled.

Assignment

Using the Oracle `SQL*LOADER` utility or the Microsoft SQL Server Data Transformation Services Import utility, you reload the database with the files produced during pre-migration. During assignment you can also define table partitions, store prior table data, create indexes, and analyze indexes and tables.

Data collection can resume as soon as the migration is finished and you have completed any manual tasks. Aggregation and archiving can resume as soon as the data for the aggregation interval or archive period has been moved.

Preparing for schema migration

Prior to performing schema migration, take the following precautions:

● Plan to do schema migration during Avaya Operational Analyst downtime.

Schema migration must be done when the Avaya Operational Analyst system is shut down and unavailable for production. Off hours or low usage periods are a good time for schema migration. The process is lengthy, requiring you to plan, schedule, and execute the schema modification, and allow adequate recovery time to ensure that the system is safely returned to production without data loss.

● Do a complete system backup before making any schema changes.

● Include temporary data storage in your schema change plan.

Performing schema migration

Schema migration involves the following procedures. This process applies specifically to a single historical store migration, but may be done in parallel over several historical stores if necessary.

Note:

A qualified database administrator should perform all data backup and schema migration activities. If problems arise that cannot be resolved locally, contact Avaya Customer Support or your Avaya Operational Analyst Professional Services representative for assistance.

Declaring migration

Use the Avaya Operational Analyst Administration Client schemas page to declare a new (pending) schema. This may result in immediate completion of the migration process if the changes do not require modification of the database table itself.

Avaya Operational Analyst backup #1

Perform a full backup of the Avaya Operational Analyst historical database. For information about full backups, see Chapter 9: SQL Server 2000 database backup on page 217 or Chapter 10: Oracle database backup on page 229.

Pre-migration

The pre-migration procedure is guided by the `migrationexport` utility. The utility exports all of the data from the affected tables to a format that can be read back into the database following schema migration (see the **Assignment** step below).

The `migrationexport` utility makes a rough worst-case scenario estimate of the amount of data currently contained within the tables that are being migrated. It then combines available disk space values that you provide and the amount of storage available on tape or other off-line media, and provides you with feedback about how much space will be required for the migration. You must then decide to continue the process or stop. If you stop at this point, no changes are made to your datatables.

As the `migrationexport` utility exports data from the database tables to files on the disk, it monitors the amount of storage space used on the disk. When the disk storage allocated (indicated by the -s option) is reached, the utility prompts you to save the files to tape and delete the old images to make room for more files.

Follow these steps:

1. In the command window, run the `premigration` utility to verify that OA has been turned off and that a migration is pending.

   The utility accepts the command-line options shown in the following table:

Option syntax	Option description
`-v 10|20|30`	Optional. This argument specifies the logging level at which the utility should execute. Setting 30 results in the most verbose output.
`-d historical store`	Required. This argument specifies the name of the historical store which is being migrated. The historical stores are: agent agentstate serviceclass servicestate ivrport process workitem displaynames

2. In the command window, run one of the following utilities to verify that OA has been turned off and that a migration is pending.

   ● For Oracle databases use the **`migrationOra8export`** utility.

   ● For the SQL Server database use the **`migrationMSSqlexport`** utility.

   If you are using the remote database configuration, copy the matching version of the migrationexport executable file and the output files from 'premigration' ($PABASE/data/runtime/migration/*.pro or ./*.pro) to the remote database server machine and run **`migrationexport`** there.

   The utility accepts the command line options shown below.

Option syntax	Option description
-s *disk space*	Required. This argument specifies the amount of disk space (in MB) that the database administrator will allow the `migrationexport` utility to use to store exported data files.
-t *tape space*	This argument specifies the amount of storage (in GB) available on each tape or other type of off-line storage media used to store exported data files.
-p *path*	Required. This argument specifies a directory path to which the database administrator would like the export files to be written.

3. If you select **y** to continue when prompted with the amount of storage space required, you are prompted to shut down Avaya Operational Analyst using the **`pa stop all`** command in another **Command Prompt** window.

4. After stopping Avaya Operational Analyst, return to the original window and select **y** to continue.

Schema migration

The schema migration activity is guided by the **`SchemaMigration`** utility. Its purpose is to apply the declared schema changes to the database. The **`SchemaMigration`** utility reads information about the current and pending schemas, and drops and recreates tables as necessary. It is because data is removed from the appropriate tables during this process that the pre-migration activity is necessary. This utility executes fairly quickly and requires no user interaction.

The `SchemaMigration` utility accepts the following command line options:

Options	Option syntax
`-v 10|20|30`	Optional. This argument specifies the logging level at which the utility should execute.
`-d historical store`	Required. This argument specifies the name of the historical store which is being migrated. The historical stores are: agent agentstate serviceclass servicestate ivrport process workitem displaynames

Table partitioning *(optional)*

The Table Partitioning procedure is an optional process. You can use database-specific techniques to create partitions on the migrated tables prior to re-populating them with data.

Assignment

If you are using the remote database configuration, perform the procedure shown below on your remote database server machine. Oracle and SQL Server require two different procedures.

Assignment using Oracle

During assignment, the data that was exported from the old schema during pre-migration is imported back into the new schema.

The `migrationexport` utility has already constructed the exported data files in a format that allows them to be imported directly into the new versions of the tables using the Oracle `SQL*LOADER` utility.

Tip:

We strongly recommend that you disable redo-log archiving during the assignment procedure. In addition, if the migration did not involve the addition of a non-null column to the migrating historical store, you may add the `DIRECT=TRUE` option to the OPTIONS list at the beginning of each data file (see Oracle `SQL*LOADER` documentation for details on how to edit control files). Following these steps dramatically decreases the time and resources required to perform the assignment.

If you are using the remote database configuration, copy the Oracle SQL*PLUS script file `%PABASE%\data\admin\migration\disablearchive.ora` (`$PABASE/data/admin/migration/disablearchive.ora` on Solaris) to your remote database server machine. Then, run the Oracle SQL*PLUS command, shown below, from where you put that script file.

To turn off redo-log archiving, execute the SQL script `%PABASE%\data\admin\migration\disablearchive.ora` by entering the following command in a command window:

> `sqlplus internal/internal password @disablearchive.ora`

Perform the following steps for each file generated during the pre-migration procedure:

1. If necessary, transfer the file from tape to the local disk.

2. Enter the command:

   > `sqlldr USERID=username/password CONTROL=filename`

   where `username` is the Avaya Operational Analyst application database user name (for example, oracle), `password` is the Avaya Operational Analyst application database user password (for example, oracle), and `filename` is the name of the data file previously exported during pre-migration (for example, `hagent.0.mig`).

3. Check the `sqlldr` log-file (the same name as the file, minus the "mig" suffix), and the `sqlldr` bad-file (the same name as the file, plus a "bad" suffix), if either one is present, for indications of import failure.

   If you are using the remote database configuration, copy the Oracle SQL*PLUS script file `%PABASE%\data\admin\migration\enablearchive.ora` (`$PABASE/data/admin/migration/enablearchive.ora` on Solaris) to your remote database server machine. Then, run the Oracle SQL*PLUS command, shown below, from where you put that script file.

   Once all of the data files have been loaded using `sqlldr`, redo-log archiving can be reactivated by executing the SQL script `%PABASE%\data\admin\migration\enablearchive.ora` using the following command:

   > `sqlplus internal/internal password @enablearchive.ora`

> **Note:**
>
> If you intend to add indexes in the Indexing procedure, you may postpone reactivating the redo-log archiving until that process is complete. You can also run the `ANALYZE` command on the migrated tables after you have reactivated redo-archiving.

Run the `MetadataSanityRun` utility following this assignment procedure to ensure that Avaya Operational Analyst historical database is sane and that the database has been successfully restored to "archivelog" mode.

If you are using the remote database configuration, run the `MetadataSanityRun` utility on your OA historical server.

Assignment using SQL Server

During assignment, the data that was exported from the old schema during pre-migration is imported back into the new schema.

> **Note:**
>
> If you are using the remote database configuration, perform the steps shown below on your remote database server machine.

The `migrationexport` utility has already constructed the exported data files in a format that allows them to be imported directly into the new versions of the tables using the Microsoft SQL Server Data Transformation Services Import utility.

Perform the following steps for each file generated during the pre-migration procedure:

1. If necessary, transfer the file from tape to the local disk.

2. Select **Start** > **Programs** > **Microsoft SQL Server** > **Import and Export Data**

   The **Data Transformation Services, Import/Export Wizard** screen is displayed.

3. Select **Next**.

   The **Choose a Data Source** window is displayed.

4. In the **Data Source** field, select **Text File** from the drop down list. Then in the **File Name** field, browse to the file generated during the pre-migration step. Select **Next**.

   The **Select File Format** screen is displayed.

5. The fields should have the following values:

   Delimited: selected

   File type: ANSI

   Row delimiter: {CR}{LF}

   Text qualifier: Double quotes {"}

   Skip rows: 0

   First row has column names: selected

   Select **Next**.

6. In the **Set Column Delimiter** screen, type **127** on the numeric keypad while holding down the **ALT** key, then select **Next**.

   Note:

   The Import/Export Wizard will not recognize the keystrokes "ALT 127" directly. One way to enter this character into the wizard is to copy it and paste it from the Windows Character Map. Another way to enter this character is to open Windows Notepad, type "127" on the numeric keypad while holding down the ALT key, then copying and pasting the character into the "Other" delimiter text box in the Set Column Delimiter screen.

   The **Choose a Destination** screen is displayed.

7. For the **Destination** field, select **Microsoft OLE DB Provider for SQL Server** from the drop-down list. In the **Server** field select the name of the server from the drop-down list. Select **SQL Server authentication** and enter the username and password for the Avaya Operational Analyst database. The **Database** field should be set to `oadb`. Select **Next**.

   The **Select Source Tables and Views** screen is displayed.

8. Check that **Destination** is set to the table the data is to be imported to, prefixed by database name and owner. Select **Next**.

9. In the **Save, Schedule, and Replicate Package** screen, select **Run immediately** and select **Next**.

   The **Completing the DTS Import/Export Wizard** screen is displayed.

10. Select **Finish**.

   The **Executing Package** window is displayed with the status of the import.

Run the **MetadataSanityRun** utility following this assignment procedure to ensure that Avaya Operational Analyst historical database is sane and that the database has been successfully restored to "archivelog" mode.

Indexing *(optional)*

The indexing procedure, like table partitioning, is optional. This procedure involves establishing additional indexes on the migrated tables. For Oracle databases you must reactivate redo-log archiving.

Restarting Avaya Operational Analyst

This brings the Avaya Operational Analyst software back online. You can restart Avaya Operational Analyst by executing the command

```
pa start all
```

Avaya Operational Analyst backup #2

Perform a full backup of the Avaya Operational Analyst database after migration is complete. For information about backups, see Chapter 9: SQL Server 2000 database backup on page 217 or Chapter 10: Oracle database backup on page 229.

Restoring Avaya Operational Analyst

This operation is performed only as a recourse from failures that may have corrupted the database. Contact Avaya Customer Support or your Avaya Operational Analyst Professional Services representative for assistance.

Concurrency and sequencing

Two instances of a definition event will not execute at the same time. If this is attempted, the second execution will fail. A migration lock, which is set in the historical store that is being migrated, prevents conflict. The second migration attempt will not be able to get the lock, and it will fail.

Table lock conflicts cannot occur because the `SchemaMigration` utility has exclusive access to the database. Avaya Operational Analyst is shut down for schema migration.

Shutdown

It is not optimal to shut down migration while it is happening. However, if shut down is necessary, it may occur at any phase of migration.

If the system is shut down or an unrecoverable error occurs during the definition phase, the `SchemaMigration` utility will attempt to resume and complete the declared migration from where the previous execution was terminated. `SchemaMigration` will recover from previously failed SchemaMigration executions if at all possible.

Migration resumption

It is up to you to start another migration when the system becomes available.

Database-related issues

There are some database issues you will want to take into account when you perform schema migration.

- Creating, moving, and deleting tables require the appropriate permission levels. Permissions are the same as the ones used for the other Avaya Operational Analyst applications and are determined at the time of Avaya Operational Analyst configuration.

- Partition sizing is not an issue, since you export and import table data manually. Whether you use the table partitions or not is optional and outside the scope of this document.

Avaya Operational Analyst upgrades

Upgrades may not be done in the middle of a migration. Any changes to data tables require migrations after the upgrade is finished.

Appendix A: Remote installation of CMS data collection software

It is common for Contact Center configurations to include many CMS systems in geographically disperse locations. This appendix describes a process that allows you to remotely install the CMS data collection software from a central location where Operation Analyst is installed.

Follow these steps:

1. As `root`, log into the CDE on the local CMS machine.

2. `Telnet` (or `rlogin`) to the remote CMS machine.

3. Create a temporary user account on the remote machine, for example **oainstall**.

4. Assign a home directory (for example: **/export/home/oainstall**) or simply create a temporary directory where the OA setup files will be copied.

5. Open an `xterm` window on the local CMS machine.

6. Use `FTP` to connect to the remote CMS machine.

7. Copy the **SolSetup** and **setup.jar** files from the OA installation CD to the desired directory on the remote machine.

8. Terminate the `FTP` session.

9. On the local machine, execute `xhost +remote-CMS` where `remote-CMS` is either a host name as defined in **/etc/hosts**, or the IP address of the remote CMS machine.

10. On the local machine, execute `rlogin remote-CMS` where `remote-CMS` is either a host name as defined in **/etc/hosts**, or the IP address of the remote CMS machine.

11. Enter the commands:

    `DISPLAY=local-machine:0.0`

    `export DISPLAY`

    where `local-machine` is either a host name of the local CMS machine as defined in **/etc/hosts**, or the IP address of the local CMS machine.

12. `cd` to the directory where SolSetup and setup.jar were copied.

13. Enter the command `./SolSetup`

14. The Java virtual machine initializes and the OA installation screen appears.

15. Follow the instructions in <u>Install data collection software on a CMS platform</u> on page 139.

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