Users Guide

Unified Agent and Agent Management Console

2.0.2

Windows and UNIX

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Contents

About This Book

Audience

The *Unified Agent and Agent Management Console User's Guide* is intended as a reference tool for Sybase™ database administrators.

How to use this book

- Chapter 1, "Overview" – provides an description of the Unified Agent.
- Chapter 2, "Installing and Configuring Unified Agent and Agent Management Console" – provides information about installing and configuring Unified Agent and the Agent Management Console.
- Chapter 3, "Security" – describes general security concepts for Unified Agent.
- Chapter 4, "Agent Management Console Features and Functionality" – provides information about Agent Management Console features and functionality
- Appendix A, "Password Encryption and Security Configuration" – provides information about encrypting passwords and configuring security.
- Appendix B, "SNMP Agent Plug-in" – provides information about using the plug-in to configure and use the Unified Agent.
- Appendix C, "Tabular Data Stream (TDS) Service" – provides information about using TDS protocol.

Related documents

The Adaptive Server® Enterprise documentation set consists of the following:

- The release bulletin for your platform – contains last-minute information that was too late to be included in the books.

  A more recent version of the release bulletin may be available on the World Wide Web. To check for critical product or document information that was added after the release of the product CD, use the Sybase Technical Library.
- The *Installation Guide* for your platform – describes installation, upgrade, and configuration procedures for all Adaptive Server and related Sybase products.

- *What’s New in Adaptive Server Enterprise?* – describes the new features in Adaptive Server version 15.0, the system changes added to support those features, and changes that may affect your existing applications.
- *ASE Replicator User’s Guide* – describes how to use the Adaptive Server Replicator feature of Adaptive Server to implement basic replication from a primary server to one or more remote Adaptive Servers.
- *Component Integration Services User’s Guide* – explains how to use the Adaptive Server Component Integration Services feature to connect remote Sybase and non-Sybase databases.
- The *Configuration Guide* for your platform – provides instructions for performing specific configuration tasks for Adaptive Server.
- *Enhanced Full-Text Search Specialty Data Store User’s Guide* – describes how to use the Full-Text Search feature with Verity to search Adaptive Server Enterprise data.
- *Glossary* – defines technical terms used in the Adaptive Server documentation.
- *Historical Server User’s Guide* – describes how to use Historical Server to obtain performance information for SQL Server® and Adaptive Server.
- *Java in Adaptive Server Enterprise* – describes how to install and use Java classes as datatypes, functions, and stored procedures in the Adaptive Server database.
- *Job Scheduler User's Guide* – provides instructions on how to install and configure, and create and schedule jobs on a local or remote Adaptive Server using the command line or a graphical user interface (GUI).
- *Messaging Service User’s Guide* – describes how to useReal Time Messaging Services to integrate TIBCO Java Message Service and IBM WebSphere MQ messaging services with all Adaptive Server database applications.
- *Monitor Client Library Programmer’s Guide* – describes how to write Monitor Client Library applications that access Adaptive Server performance data.
- *Monitor Server User’s Guide* – describes how to use Monitor Server to obtain performance statistics from SQL Server and Adaptive Server.
- *Performance and Tuning Series* – a series of books that explain how to tune Adaptive Server for maximum performance:

    - *Basics* – the basics for understanding and investigating performance questions in Adaptive Server.
    - *Locking and Concurrency Control* – describes how the various locking schemas can be used for improving performance in Adaptive Server, and how to select indexes to minimize concurrency.
    - *Query Processing and Abstract Plans* – describes how the optimizer processes queries and how abstract plans can be used to change some of the optimizer plans.
    - *Physical Database Tuning* – describes how to manage physical data placement, space allocated for data, and the temporary databases.
    - *Monitoring Adaptive Server with sp_sysmon* – describes how to monitor Adaptive Server's performance with sp_sysmon.
    - *Improving Performance with Statistical Analysis* – describes how Adaptive Server stores and displays statistics, and how to use the set statistics command to analyze server statistics.
    - *Using the Monitoring Tables* – describes how to query Adaptive Server's monitoring tables for statistical and diagnostic information.
- *Quick Reference Guide* – provides a comprehensive listing of the names and syntax for commands, functions, system procedures, extended system procedures, data types, and utilities in a pocket-sized book (regular size when viewed in PDF format).
- *Reference Manual* – is a series of four books that contains the following detailed Transact-SQL information:
    - *Building Blocks* – Transact-SQL datatypes, functions, global variables, expressions, identifiers and wildcards, and reserved words.
    - *Commands* – Transact-SQL commands.
    - *Procedures* – Transact-SQL system procedures, catalog stored procedures, system extended stored procedures, and dbcc stored procedures.
    - *Tables* – Transact-SQL system tables and dbcc tables.
- *System Administration Guide* –

  - *Volume 1* – provides an introduction to the basics of system administration, including a description of configuration parameters, resource issues, character sets, sort orders, and diagnosing system problems. The second part of this book is an in-depth description of security administration.
  - *Volume 2* – includes instructions and guidelines for managing physical resources, mirroring devices, configuring memory and data caches, managing multiprocessor servers and user databases, mounting and unmounting databases, creating and using segments, using the reorg command, and checking database consistency. The second half of this book describes how to back up and restore system and user databases.
- *System Tables Diagram* – illustrates system tables and their entity relationships in a poster format. Full-size available only in print version; a compact version is available in PDF format.
- *Transact-SQL User's Guide* – documents Transact-SQL, the Sybase enhanced version of the relational database language. This manual serves as a textbook for beginning users of the database management system. This manual also contains descriptions of the pubs2 and pubs3 sample databases.
- *Troubleshooting Series* (for release 15.0) –
  - *Troubleshooting: Error Messages Advanced Resolutions* – contains troubleshooting procedures for problems that you may encounter when using Sybase® Adaptive Server® Enterprise. The problems addressed here are those which the Sybase Technical Support staff hear about most often
  - *Troubleshooting and Error Messages Guide* – contains detailed instructions on how to resolve the most frequently occurring Adaptive Server error messages. Most of the messages presented here contain error numbers (from the master..sysmessages table), but some error messages do not have error numbers, and occur only in Adaptive Server's error log.
- *User Guide for Encrypted Columns* – describes how configure and use encrypted columns with Adaptive Server
- *Using Adaptive Server Distributed Transaction Management Features* – explains how to configure, use, and troubleshoot Adaptive Server DTM features in distributed transaction processing environments.

- *Using Sybase Failover in a High Availability System* – provides instructions for using Sybase Failover to configure an Adaptive Server as a companion server in a high availability system.
- *Unified Agent and Agent Management Console* – describes the Unified Agent, which provides runtime services to manage, monitor and control distributed Sybase resources.
- *Utility Guide* – documents the Adaptive Server utility programs, such as isql and bcp, which are executed at the operating system level.
- *Web Services User's Guide* – explains how to configure, use, and troubleshoot Web Services for Adaptive Server.
- *XA Interface Integration Guide for CICS, Encina, and TUXEDO* – provides instructions for using the Sybase DTM XA interface with X/Open XA transaction managers.
- *XML Services in Adaptive Server Enterprise* – describes the Sybase native XML processor and the Sybase Java-based XML support, introduces XML in the database, and documents the query and mapping functions that comprise XML Services.

Other sources of information

Use the Sybase Getting Started CD, the SyBooks CD, and the Sybase Product Manuals Web site to learn more about your product:

- The Getting Started CD contains release bulletins and installation guides in PDF format, and may also contain other documents or updated information not included on the SyBooks CD. It is included with your software. To read or print documents on the Getting Started CD, you need Adobe Acrobat Reader, which you can download at no charge from the Adobe Web site using a link provided on the CD.
- The SyBooks CD contains product manuals and is included with your software. The Eclipse-based SyBooks browser allows you to access the manuals in an easy-to-use, HTML-based format.

  Some documentation may be provided in PDF format, which you can access through the PDF directory on the SyBooks CD. To read or print the PDF files, you need Adobe Acrobat Reader.

  Refer to the *SyBooks Installation Guide* on the Getting Started CD, or the *README.txt* file on the SyBooks CD for instructions on installing and starting SyBooks.

- The Sybase Product Manuals Web site is an online version of the SyBooks CD that you can access using a standard Web browser. In addition to product manuals, you will find links to EBFs/Maintenance, Technical Documents, Case Management, Solved Cases, newsgroups, and the Sybase Developer Network.

  To access the Sybase Product Manuals Web site, go to Product Manuals at http://www.sybase.com/support/manuals/.

Sybase certifications on the Web

Technical documentation at the Sybase Web site is updated frequently.

❖ Finding the latest information on product certifications

1. Point your Web browser to Technical Documents at http://www.sybase.com/support/techdocs/.
2. Click Certification Report.
3. In the Certification Report filter select a product, platform, and timeframe and then click Go.
4. Click a Certification Report title to display the report.

❖ Finding the latest information on component certifications

1. Point your Web browser to Availability and Certification Reports at http://certification.sybase.com/.
2. Either select the product family and product under Search by Base Product; or select the platform and product under Search by Platform.
3. Select Search to display the availability and certification report for the selection.

❖ Creating a personalized view of the Sybase Web site (including support pages)

Set up a MySybase profile. MySybase is a free service that allows you to create a personalized view of Sybase Web pages.

1. Point your Web browser to Technical Documents at http://www.sybase.com/support/techdocs/.
2. Click MySybase and create a MySybase profile.

Sybase EBFs and software maintenance

❖ Finding the latest information on EBFs and software maintenance

1. Point your Web browser to the Sybase Support Page at http://www.sybase.com/support.
2. Select EBFs/Maintenance. If prompted, enter your MySybase user name and password.
3. Select a product.
4. Specify a time frame and click Go. A list of EBF/Maintenance releases is displayed.

   Padlock icons indicate that you do not have download authorization for certain EBF/Maintenance releases because you are not registered as a Technical Support Contact. If you have not registered, but have valid information provided by your Sybase representative or through your support contract, click Edit Roles to add the “Technical Support Contact” role to your MySybase profile.
5. Click the Info icon to display the EBF/Maintenance report, or click the product description to download the software.

Conventions

The following sections describe conventions used in this manual.

SQL is a free-form language. There are no rules about the number of words you can put on a line or where you must break a line. However, for readability, all examples and most syntax statements in this manual are formatted so that each clause of a statement begins on a new line. Clauses that have more than one part extend to additional lines, which are indented. Complex commands are formatted using modified Backus Naur Form (BNF) notation.

Table 1 shows the conventions for syntax statements that appear in this manual:

Table 1: Font and syntax conventions for this manual

Element	Example
Command names,procedure names, utility names, and other keywords display in sans serif font.	select sp_configure
Database names and datatypes are in sans serif font.	master database
Book names, file names, variables, and path names are in italics.	*System Administration Guide* *sql.ini* file *column_name* *$SYBASE/ASE* directory

Element	Example

Variables—or words that stand for values that you fill in—when they are part of a query or statement, are in italics in Courier font.	`select` *`column_name`*
	`    from` *`table_name`*
	`    where` *`search_conditions`*

Type parentheses as part of the command.	compute *row_aggregate* (*column_name*)
Double colon, equals sign indicates that the syntax is written in BNF notation. Do not type this symbol. Indicates "is defined as".	`::=`
Curly braces mean that you must choose at least one of the enclosed options. Do not type the braces.	`{cash, check, credit}`
Brackets mean that to choose one or more of the enclosed options is optional. Do not type the brackets.	`[cash | check | credit]`
The comma means you may choose as many of the options shown as you want. Separate your choices with commas as part of the command.	`cash, check, credit`
The pipe or vertical bar(|) means you may select only one of the options shown.	`cash | check | credit`

An ellipsis (...) means that you can *repeat* the last unit as many times as you like.	`buy thing = price [cash | check | credit]`
	`[, thing = price [cash | check | credit]]...`
	You must buy at least one thing and give its price. You may choose a method of payment: one of the items enclosed in square brackets. You may also choose to buy additional things: as many of them as you like. For each thing you buy, give its name, its price, and (optionally) a method of payment.

- Syntax statements (displaying the syntax and all options for a command) appear as follows:

  sp_dropdevice [*device_name*]

  For a command with more options:

  select *column_name*
     from *table_name*
     where *search_conditions*

  In syntax statements, keywords (commands) are in normal font and identifiers are in lowercase. Italic font shows user-supplied words.

- Examples showing the use of Transact-SQL commands are printed like this:

  ```
  select * from publishers
  ```

- Examples of output from the computer appear as follows:

```
pub_id     pub_name                 city          state
-------    ---------------------    -----------   -----
0736       New Age Books            Boston        MA
0877       Binnet & Hardley         Washington    DC
1389       Algodata Infosystems     Berkeley      CA

(3 rows affected)
```

In this manual, most of the examples are in lowercase. However, you can disregard case when typing Transact-SQL keywords. For example, SELECT, Select, and select are the same.

Adaptive Server's sensitivity to the case of database objects, such as table names, depends on the sort order installed on Adaptive Server. You can change case sensitivity for single-byte character sets by reconfiguring the Adaptive Server sort order. For more information, see the *System Administration Guide*.

Accessibility features

This document is available in an HTML version that is specialized for accessibility. You can navigate the HTML with an adaptive technology such as a screen reader, or view it with a screen enlarger.

Adaptive Server HTML documentation has been tested for compliance with U.S. government Section 508 Accessibility requirements. Documents that comply with Section 508 generally also meet non-U.S. accessibility guidelines, such as the World Wide Web Consortium (W3C) guidelines for Web sites.

Note You might need to configure your accessibility tool for optimal use. Some screen readers pronounce text based on its case; for example, they pronounce ALL UPPERCASE TEXT as initials, and MixedCase Text as words. You might find it helpful to configure your tool to announce syntax conventions. Consult the documentation for your tool.

For information about how Sybase supports accessibility, see Sybase Accessibility at http://www.sybase.com/accessibility. The Sybase Accessibility site includes links to information on Section 508 and W3C standards.

If you need help

Each Sybase installation that has purchased a support contract has one or more designated people who are authorized to contact Sybase Technical Support. If you cannot resolve a problem using the manuals or online help, please have the designated person contact Sybase Technical Support or the Sybase subsidiary in your area.

CHAPTER 1

Overview

This chapter discusses the following topics.

What is Unified Agent?

Unified Agent provides runtime services to manage, monitor, and control distributed Sybase resources. The Unified Agent provides a common set of services, as well as the ability to host agent plug-ins to manage server resources or to perform various operations. These agent plug-ins can perform product specific command, control, and discovery capabilities including: status, start, stop, restart, ping and server log retrieval.

Unified Agent extends Java Management Extensions (JMX) to provide these management interfaces. Unified Agent enables other Sybase products to “plug in” to an agent to provide remote management capabilities.

Services provided

The most important services provided are port configuration and port conflict resolution.

Agent Management Console

The Agent Management Console is a Sybase Central™ plug-in that manages Unified Agent and its components. The Agent Management Console is a centralized tool for a system administrator to monitor, configure, administer, and manage the agent environment.

For more information on Agent management, see “Agent Management Console Features and Functionality” on page 15.

CHAPTER 2

Installing and Configuring Unified Agent and Agent Management Console

This chapter contains information about installing and configuring Unified Agent and the Agent Management Console.

Pre-installation tasks

Before installing Unified Agent, determine what type of discovery services to use:

- User Datagram Protocol (UDP) Listener – opens a listener on the current subnet and “listens” for a broadcast request for information. This discovery method contacts those agents that respond to the broadcast request. If the resources you want to discover are all on the same subnet, choose UDP.
- JINI registry – requires a running JINI server to be accessible in the enterprise, that is across subnet boundaries. If a JINI discovery service is to be used, you must enter the JINI server’s host name and port number during the installation process. If the resources you want to discover are not all on the same subnet, allocate a resource to run the JINI discovery server.

These values are provided during installation at the Custom Configure Unified Agent step of the Adaptive Server™ Installer. After installation, users can use the Agent Management Console to add, configure, and remove discovery adaptors.

Installing Unified Agent

Unified Agent is installed as a component of the Adaptive Server™ installation. For information about installing Adaptive Server, see the *Adaptive Server Installation Guide* for your platform.

Installation requires that you log in with administrative privileges.

Upon installation, the *$SYBASE/ua* directory includes the following folders:

- *bin* – start and stop scripts for the agent and JINI server.
- *conf* – configuration information for agent, security service, and security policy.
- *ldap* – LDAP schema definition.
- *log* – log file for agent, RMI server, and JINI server.
- *plugins* – contains agent plug-ins for each managed resource (for example, the ASEAgentPlugin.)

Starting the JINI server

If JINI has been selected as the discovery method, you must start a JINI server. On the host where the JINI server will run:

1. Change to the Sybase installation directory *$SYBASE* on UNIX platforms or *%SYBASE%* on Windows platforms.
2. Set the Sybase environment variables by sourcing *SYBASE.csh* or executing *SYBASE.bat*.
3. Change to the *$SYBASE_UA/bin* or *%SYBASE_UA%\bin* directory.
4. Execute startJini or *startJini.bat*.

Starting and stopping Unified Agent

Before you open a support call, or when you identify candidates for new boundaries:

1. Change to the Sybase installation directory—*$SYBASE* or *%SYBASE%*.
2. Set the Sybase environment variables by sourcing *SYBASE.csh* or executing *SYBASE.bat*.

3 Change to the *$SYBASE_UA/bin* or *%SYBASE_UA%\bin* directory.

4 Execute *uafstartup.sh* or *uafstartup.bat*, or add the parameter /background to run the Unified Agent in the background.

To stop Unified Agent:

1 Change to the Sybase installation directory—*$SYBASE* or *%SYBASE%*.

2 Set the Sybase environment variables by sourcing *SYBASE.csh* or executing *SYBASE.bat*.

3 Execute shutdown or *uafshutdown.bat*.

Starting Unified Agent as a service on UNIX platforms

A UNIX service is a process that automatically runs in the background after the machine is started. On UNIX and Linux platforms, a shell script, *agentd*, is available in the directory *$SYBASE_UA/bin*. To install the agent as a service:

1 Copy the *agentd* into the */etc/init.d* directory.

2 Make two soft links in the directory */etc/rcX.d* (where *X* is the run level, for example, 3) that link to */etc/init.d/agentd: SXXagentd* and *KXXagentd* (where *XX* is a two digit number, for example, 88). One is for starting the service and the other is for stopping the service.

Note Different UNIX systems might have slightly different directory structures.

Starting Unified Agent as a service on Windows platforms

Unified Agent can be started as a Windows service using the Microsoft Windows Administrative Tools | Services dialog. If you cannot find the “Service” dialog, contact your system administrator.

1 Locate the “Sybase Unified Agent” in the list of services.

2 Double-click the service. A dialog containing several tabs displays.

3 From the General tab, choose Start. Unified Agent starts.

4 You can set the service to automatically start when the system starts by changing “Startup type” to “Automatic.”

5 Additionally, you can automatically restart the service in case of failover by choosing the “Recovery” tab on this same dialog and changing the First, Second, and Subsequent failures to “Restart Service.”

6 Click Apply to save the modifications before closing the dialog.

Installing the Agent Management Console

The Agent Management Console is a Sybase Central™ plug-in that manages Unified Agent and its components. The Agent Management Console is a centralized tool for a system administrator to monitor, configure, administer, and manage the agent environment.

After successfully installing Adaptive Server and the Unified Agent, register the Agent Management Console Plug-in to Sybase Central and start Sybase Central. To do this, run the following scripts:

For Windows:

- *%SYBASE%\AMCP\bin\registerAMCP.bat*
- *%SYBASE%\Shared\Sybase Central 4.3\win32\scjview.exe*

For UNIX:

- *$SYBASE/AMCP/bin/registerAMCP*
- *$SYBASE/source SYBASE.csh*
- *$SYBASE/shared/sybcentral43/scjview.sh*

An alternate way to register the Agent Management Plug-in from within Sybase Central is to select Tools | Plug-ins. Click the Register button and specify the plug-in registration file found in:

- On Windows – *%SYBASE%\AMCP\amcplugin.jpr*
- On UNIX – *$SYBASE/AMCP/amcplugin.jpr*

Click Finish to complete the plug-in registration.

Configuring Unified Agent

For information on how to update configurations for your environment's specific requirements, see Chapter 4, "Agent Management Console Features and Functionality."

Post-configuration tasks

Security

- In a simple login module:
  - Assign a password for the default administrative login, uafadmin. Enter a password that conforms to your password standards. This login allows you to connect to Unified Agent and perform administrative tasks when other security modules are not available.
  - Turn on encryption for the password. By default, encryption is not enabled.
- Security Services – the security service provides encryption services used by various components such as the Simple Login Module. The default encryption algorithm is set to DES. To change the algorithm to RSA, see Appendix A, "Password Encryption and Security Configuration."

Discovery

- Login modules – define role mappings for each login module defined in addition to the Anonymous Login Module and the Simple Login Module. Create mappings between native roles and the roles defined in Unified Agent. At a minimum, map to the "uaAgentAdmin" role to allow administrators to administer the agent without using the Simple Login Module.
- Discovery Adapters – add discovery adapters to enable the agent to register with additional discovery services. You can also edit or delete existing adapters.

Agent Properties

- SNMP Service – the SNMP Service is a Simple Network Management Protocol Agent that responds to client requests and sends SNMP notification messages, called traps. The default port for the SNMP command responder is UDP 1498. The default notification port for SNMP traps is 49152. This service is not started unless it is required by another service or an agent plug-in, and its enablement depends on the plug-in's ability to use it .

- TDS™ Service – The TDS Service provides Tabular Data Stream remote procedure calls into the Unified Agent Framework. The default TDS port number is 9995. This service is not started unless it is required by another service or an agent plug-in, and its enablement depends on the plug-in's ability to use it.

After you have made all the changes, restart the agent.

CHAPTER 3 Security

This chapter discusses general security concepts for Unified Agent. All administrative tasks are performed through the Agent Management Console. See Chapter 4, “Agent Management Console Features and Functionality” for details on how to administer security.

Unified Agent security

Unified Agent security does not maintain its own security repository, except in supporting a UAF enabled from outside the machine running UAF. Instead, it delegates the authentication to existing systems such as Adaptive Server or the operating system. Security modules define these systems to which security has been delegated.

When a user is authenticated, roles for the user are retrieved by the security module and are mapped to Unified Agent defined roles. Permission to Unified Agent resources are granted to Unified Agent roles. Authorization is resolved through the mappings between the security module native roles and Unified Agent roles.

The Security Service authenticates logins and authorizes access to agent resources. It also provides password encryption services.

Encryption

The *agent-config.xml* and *csi.properties* files can contain passwords. By default, these passwords are not encrypted. To enable the encryption of these passwords, use the Agent Management Console to set the “encrypted” property to true for the Simple Login Module and for any LDAP discovery adaptors defined for the agent.

To allow installations to choose their own encryption algorithm and cipher provider, Unified Agent does not enable encryption by default. Therefore, it is important that you enable encryption and to set the encryption and cipher provider class.

Note Encryption is not enabled by default.

Use the attributes of the Security Service to specify the encryption algorithm and the cipher provider class. The attributes are encryptionAlgorithm and cipherProviderClass. The default encryption algorithm is DES and the cipher provider class is Sun's JCE provider.

Authentication

Authentication is the process by which the system confirms the identity of each user. Unified Agent provides a set of five predefined login modules. All login modules are defined in the *$SYBASE_UA/conf/csi.properties* file or the *%SYBASE_UA%\conf\csi.properties* file. The syntax is defined by the Sybase Common Security Infrastructure (CSI) framework. By assembling and configuring different login modules, you can customize Unified Agent authentication to your strength requirements.

Login modules

- Anonymous Login Module – accepts a client connection whose user name is "anonymous," and assumes the role of uaAnonymous. The anonymous login does not require a password. The Anonymous Login Module is required and cannot be removed.
- Simple Login Module – defines a user name, password, and a list of roles. The default user name is "uafadmin" with a blank password and a native role of uaAgentAdmin. By default, encryption is not enabled.
- Adaptive Server Login Module – delegates the authentication of users to the Adaptive Server. This module requires ASE Agent Plug-in. The user name must conform to the format of *ase_login@ase_servername*, for example, *sa@testmachine*. To authenticate, Adaptive Server must be running on the Agent's machine and have an ASE Agent plug-in configured.

- UNIX Proxy Login Module – delegates authentication to the underlying UNIX or Linux operating system using Pluggable Authentication Modules (PAM).

Note On some platforms, the SYBASE_UA rtlib proxy file needs to have execute permission or the UNIX Proxy Login Module will fail.

- NT Proxy Login Module – delegates authentication to the underlying Windows operating system. The user name must conform to the format of *username@nt-domain-name*. For example, user@sybase.

When you log in, each login module attempts authentication in the order specified in the *csi.properties* file until a successful module is found.

Note The Anonymous Login Module must always appear first.

Security module control flags

Each security module has a control flag that determines how the overall authentication process behaves. The control flag value indicates whether the success of the security module is:

- Required – the LoginModule is required to succeed. If it succeeds or fails, authentication still continues to proceed down the LoginModule list.
- Requisite – the LoginModule is required to succeed. If it succeeds, authentication continues down the LoginModule list. If it fails, control immediately returns to the application (authentication does not proceed down the LoginModule list).
- Sufficient – the Login Module is not required to succeed. If it does succeed, control immediately returns to the application (authentication does not proceed down the LoginModule list). If it fails, authentication continues down the LoginModule list.
- Optional – the LoginModule is not required to succeed. If it succeeds or fails, authentication still continues to proceed down the LoginModule list.

Authorization

Authorization determines if a user has permission to access a service or plug-in resource. A resource is defined as an attribute or operation of an agent service or agent plug-in.

Unified Agent security is role-based. Permissions to agent service and agent plug-in resources are granted to unified agent roles. These unified agent roles are mapped back to roles returned by each security module.

The mapping of unified agent roles to security module roles allows the agent to tie its authorization model back to the authenticating security module.

When a client application attempts to access a resource, the authorizer compares the user's rights with the resource's access requirements.

Unified agent resources have default permissions set to the predefined unified agent roles. In most cases, only the role mappings need to be defined.

The predefined unified agent roles are:

- uaUser – for a typical end user
- uaGuest – for a temporary user
- uaAnonymous – for an unauthenticated user
- uaAgentAdmin – for the administrator of the Unified Agent
- uaPluginAdmin – for the administrator of agent plug-ins
- uaASEAdmin – for the administrator of the Adaptive Server
- uaOSAdmin – for the administrator of the operating system

Role mappings

Since Unified Agent delegates authentication through the security modules, role mappings between native security module roles and Unified Agent roles determine authorization. You must define mappings for each security module to allow access to agent resources.

Note On some platforms, administrators may need to know the groups that you are a member of in order to map to these groups.

Permissions

A set of permissions determines access to agent resources. Permissions are granted to Unified Agent roles for each resource. Attribute resources have read and write permission and operation resources have execute permission.

Agent resources have default permissions assigned to the Unified Agent roles. Most installations would not need to change the permissions for individual resources.

CHAPTER 4 Agent Management Console Features and Functionality

This chapter contains information about Agent Management Console features and functionality.

The Agent Management Console is a Sybase Central plug-in that manages Unified Agent and its components. The Agent Management Console is a centralized tool for a system administrator to monitor, configure, administer, and manage the agent environment.

Managing look-up services

Unified Agent servers can broadcast themselves on a subnet using UDP, or register themselves with a look-up server such as JINI or LDAP. Within the Agent Management Console plug-in, the ‘Lookup Services’ folder allows the administrator to create look-up profiles to query such services. Each profile specifies the network protocol, host, port, and an optional plug-in name search filter.

Creating a network lookup profile

❖ **Creating a network look up profile**

1 Specify a unique user defined name for the lookup profile to be created.

2 From the drop-down menu, select the protocol. Your choices are:

- JINI
- LDAP
- UDP

3 Specify the host name of the JINI or LDAP server. The UDP protocol does not require a host name and is therefore disabled when UDP is selected. If you do not know the name and port of the lookup server, contact your Unified Agent or network administrator.

4 The default port for JINI is 4160. However, if you do not know the port for the lookup server, contact your Unified Agent or network administrator.

5 Specify an optional plug-in name search filter. The discovery process uses this filter to perform a string pattern match on the Agent plug-ins registered on each agent. Only agents with positive matches are returned in the lookup query.

For example, if you create a plug-in search filter called ASE, your search will return all agents with plug-ins having the letters ASE. This search is case sensitive.

Discovering Unified Agents

To discover Unified Agents, open the defined network lookup profile. The list of discovered agents are displayed on the right side details pane.

The list of discovered agents can be refreshed through the menu File | Refresh option.

You can establish a connection to a listed agent through the Connect or Connect As menu options. For more information on agents, see “Managing Unified Agents” on page 17.

When a connection is made, the agent is added to the tree view on the left.

Deleting a network look-up profile

❖ **Deleting a network lookup profile**

1 Right click the network lookup profile.

2 Select Delete.

3 Select Yes on the confirmation dialog.

Changing a network look-up profile

The properties dialog for the network lookup profile has information about the protocol, the host name, the port number, and the plug-in search filter. The values here are the values you specified in the Add a new network profile wizard. You can edit these values in this dialog.

When you have finished editing the dialog, select OK to save any new values, and begin your plug-in search.

Specifying a network plug-in name filter

By specifying an optional plug-in name search filter, the discovery process will use this filter to perform a string pattern match on the agent plug-ins registered on each agent. Only agents with positive matches are returned in the lookup query.

Managing Unified Agents

A Unified Agent is a process on a server that is running a service or plug-in

Manually adding an agent

❖ **Manually adding an agent the remembered agents in the tree view**

1 Right click the Agent Management Console node in Sybase Central.

2 Select Add agent.

3 Enter a host name and port number of the agent server.

4 Click OK.

Connecting to an agent

❖ **Connecting to an agent**

1 Right click on a remembered agent on the tree view or on an agent listed under a network lookup profile.

2 Select Connect to connect to the agent anonymously, or:

Select Connect As to create an authenticated connection. If you select Connect As you must provide a user ID and password.

3 Click OK.

Adding credentials

When you connect to an agent, you are authenticated through a login module. You acquire the native roles of that login to create a set of credentials for your session. You can add credentials to your session by providing another login ID and password. The additional login can be through the same login module or a different login module. After the additional login is authenticated, native roles for the new login are added to your session. This allows you to build up a set of credentials for session to perform the desired tasks.

❖ **Adding credentials**

1 Right click on a connected agent in the Agent Management Console in Sybase Central and select Add Credential, or select File | Add Credential.

2 Enter a new user ID and password to add additional login information.

3 Click OK.

4 If successful, your session assumes additional privileges of the new login credentials.

Disconnecting from an agent

❖ **Disconnecting from an agent**

1. Right-click on a connected agent.
2. Select Disconnect.

Restarting an agent

Certain changes made to agents require that you restart the agent.

❖ **Restarting an agent**

1. Right-click on the agent.
2. Select Restart.

Retrieving the agent log

You can view the Unified Agent log through the Agent Management Console in Sybase Central. The log contains status information, activity, warnings, and errors.

❖ **Retrieving the agent log**

1. Right-click on the agent.
2. Select retrieve log.
3. The agent log is displayed in the bottom window in Sybase Central.

Viewing and changing agent properties

❖ **Viewing agent properties**

1. Right-click on the agent.
2. Select Properties.
3. The agent properties dialog contains three tabs that displays detail, encryption and session information.

4 The details tab gives you read-only information about the agent’s:

- Name
- Version
- Build
- Operating System
- OS Version
- OS Architecture
- Time started
- Connection URL
- RMI Port

5 The encryption tab allows you to configure the default encryption used by the agent. You can configure the encryption algorithm and the encryption provider class.

6 The session tab shows you available security modules, and which modules are currently authenticated. This is read-only information.

Managing discovery adaptors

Discovery adaptors allow the agent to configure how it can be discovered.

Creating a discovery adaptor

You may register the agent to multiple discovery servers by creating multiple discovery adapters. Since UDP, unlike JINI and LDAP, is a connectionless protocol and broadcasts within a subnet, only one UDP adaptor is supported.

❖ **Creating a discovery adaptor**

1 Open the Discovery Adaptor wizard from the Discovery Adaptor folder for an agent.

2 Enter a unique ID for the discovery adaptor to be added.

3 Select the discovery adaptor class.

4 Click Next.

5 A screen displays notifying you that the new discovery adaptor will be created with default values for the selected adaptor class. Use the properties dialog to change any default values before restarting the agent.

Click finish to complete the wizard.

6 See “Viewing and changing discovery adaptor properties” on page 21 to change any default values for the new discovery adaptor.

Deleting a discovery adaptor

❖ **Deleting a discovery adaptor**

1 To delete a discovery adaptor, right click delete.

2 Click Yes to confirm that you want to delete the selected discovery adaptor.

Viewing and changing discovery adaptor properties

❖ **Viewing discovery adaptor properties**

1 Right click on a discovery adaptor.

2 Select properties.

3 Click Yes to apply the changes.

4 The changes take effect when you restart the agent.

The properties page has the following information. This information is different depending on the discovery adaptor class:

- Heartbeat period – notifies the JINI server that the agent is still running. The default is every 900 seconds.
- Class
- Host name
- Port number

Once you have selected the values for the discovery adaptor, restart the agent. When you restart the agent, your connection is lost, so you must reconnect to the agent.

There are three different types of discovery protocols:

- JINI
- LDAP
- UDP

Setting discovery adaptor password

If a discovery adaptor, such as LDAP, requires a password, the password can be set through a menu item.

❖ **Setting a discovery adaptor password**

1 Right click on the adaptor.

2 Select Set Password.

3 Type and confirm the password.

4 Click OK.

Managing security modules

The Unified Agent does not maintain its own security repository. Instead, it delegates the authentication to existing systems such as Adaptive Server or the operating system. Security modules define these systems to which security has been delegated. Unified Agent security is based on the JAAS framework.

Creating a security module

❖ **Creating a security module**

1 Specify a unique name for the security module.

2 Select the security provider class for the new module.

3 When multiple security modules are configured, the control flag defines the authentication sequence. The options are optional, required, requisite and sufficient.

4 Click Next.

5 Specify the order for the security modules by selecting a modules and using the Move up and Move down buttons. The order is significant because authentication is performed sequentially adhering to the rules set by the control flags.

6 Click Next.

7 A security module wizard prompt reminds you to create valid role mappings for the security module using the role mapping wizard. You can view and change security module default property values in the properties dialog.

8 Click Finish.

Deleting a security module

❖ **Deleting a security module**

1 Right click on the security module.

2 Select Delete.

3 Click Yes in the confirmation box.

Ordering the security module authentication

The order of the security modules is significant. Authentication is performed sequentially adhering to the control flags defined for each security module.

❖ **Modifying the security module authentication order**

1 Select a security module by clicking on it.

2 Use the move up or move down button to change the position of the selected module.

3 Click OK when you have finished. Changes are not in effect until the agent is restarted.

Viewing and changing security module properties

The Security Module Properties dialog allows you to:

- View and change properties of the security modules.

Note The security module class cannot be modified.

- The list of properties shown is dependent on the defined security module class.

Setting a security module password

If a security module requires a password, it can be set through a dialog accessed from the menu.

❖ **Setting a security module password**

1. Right click on the security module.
2. Select Set Password.
3. Type and confirm the password.
4. Click OK.

Managing role mappings

Unified agent security is role-based. Resource permissions are granted to unified agent roles. The mapping of native roles or groups, from the security modules to the unified agent roles, determines authorization. A user ID authenticated through a security module possesses roles or groups. These native roles, or groups, are mapped to unified agent roles. Each security module contains a set of mappings.

Creating a role mapping

❖ **Mapping a new security role**

1. Specify the name of the role or group for which you wish to create a mapping.

2 Then choose a Unified Agent role to which you want to map. Unified Agent comes with default permissions for these UA roles.Your choices are:

- uaUser – an authenticated user with general levels of access.
- uaGuest – a temporary user with limited levels of access.
- uaAnonymous – an unauthenticated user with low level access.
- uaAgentAdmin – an administrator for the agent with the highest level of access.
- uaPluginAdmin – a plug-in administrator with administrative access restricted to the plug-ins.
- uaASEAdmin – similar to uaPluginAdmin but restricted only to the ASE Agent plug-in. Usually mapped to Adaptive Server administrators.
- uaOSAdmin – an administrator with a high level of access. Usually mapped to an OS administrator.

3 Click finished to create the new role mapping.

Managing agent services

The AgentService folder includes a list of services, mandatory as well as optional, running on the agent. Each service provides a set of functionalities, used by the agent, other services, or agent plug-ins. The mandatory services listed are Agent Service, Configuration Service, Environment Service, and Session Service. Mandatory services cannot be started or stopped individually.

Starting an agent service

If optional agent services are not running, you can start them.

❖ **Starting an agent service**

1 Right click on the agent service.

2 Select Start.

3 Select Yes in the confirmation box.

Restarting an agent service

If you want to implement changes you have made in the agent service, you can select restart.

❖ **Restarting an agent service.**

1 Right click on the agent service.

2 Select Restart.

3 Select Yes in the confirmation box.

Stopping an agent service

Some of the optional agent services can be stopped.

❖ **Stopping an agent service**

1 Right-click on the agent service.

2 Select Stop.

3 Select Yes in the confirmation box.

Viewing agent service properties

❖ **Viewing agent service properties**

1 Right click on the agent service.

2 Select Properties.

3 The properties dialog displays with information about the name and class.

Managing agent plug-ins

An agent plug-in is a process that runs on the agent that performs tasks. Tasks can include monitoring, managing, and controlling a server such as the Adaptive Server.

Loading an agent plug-in

If an agent plug-in is not loaded, you can load them.

❖ **Loading an agent plug-in**

1 Right click on the agent plug-in.

2 Select Load.

3 Select Yes in the confirmation box.

Unloading an agent plug-in

Agent plug-ins can be unloaded.

❖ **Unloading an agent plug-in**

1 Right click on the agent plug-in.

2 Select Unload.

3 Select Yes in the confirmation box.

Reloading an agent plug-in

Agent plug-ins can be reloaded.

❖ **Reloading an agent plug-in**

1 Right click on the agent plug-in.

2 Select Reload.

3 Select Yes in the confirmation box.

Viewing agent plug-in properties

The agent plug-in properties page displays read-only information about the name and class.

❖ **Viewing agent plug-in properties**

1 Right click on the agent plug-in.

2 Select Properties.

3 The properties dialog displays with information about the name and class.

Server-based plug-ins

Server based plug-ins are plug-ins that manage servers. For server-based plug-ins there is server specific functionality that they can perform on the server.

Pinging the server

❖ **Pinging a server**

1 Right click on the server-based plug-in.

2 Select Ping Server.

Starting the server

❖ **Starting the server**

1 Right click on the server-based plug-in.

2 Select Start.

3 You are notified that the start command has been invoked on the server.

4 The server's log is retrieved and displayed on the bottom panel to show the status of the server.

Restarting the server

❖ **Restarting the server**

1 Right click on the server-based plug-in.

2 Select Restart.

3 You are notified that the restart command has been invoked on the server.

4 The server's log is retrieved and displayed on the bottom panel to show the status of the server.

Stopping the server

❖ **Stopping the Server**

1 Right Click on the server-based plug-in.

2 Select Stop Server.

3 You are notified that the stop command has been invoked on the server.

4 The server’s log is retrieved and displayed on the bottom panel to show the status of the server.

Retrieving the server log

❖ **Retrieving the server log**

1 Right click on the server-based plug-in.

2 Select Retrieve server log.

3 The server’s log is retrieved and displayed on the bottom panel.

Managing attributes

Agent Services and Agent Plug-ins contain attributes that can be managed individually. An attribute has a name, type, access level, description and value. Depending on the attribute's access level, you can assign permissions for UA-defined roles.

Viewing attributes

You can view an attribute through the details pane of Sybase Central. The details pane shows:

- Name – is the name of the attribute
- Type – is the Java class or datatype of the attribute
- Access – shows whether the attribute is readable and or writable:
  - RO – read only
  - RW – read/write

    - WO – write only
- Value – the display of the attribute’s value is dependent on its access as well as your login’s rights.
- Description – displays the description of the attribute

Updating attribute values

❖ **Updating attribute values**

1. Right click on the attribute.
2. If the attribute is writable and you have sufficient permissions, you can select Update.
3. For an attribute where you have insufficient access, you are prompted for additional credentials.
4. You are prompted for a new attribute value.
5. Enter the new value and click OK.

Viewing properties and changing permissions

❖ **Viewing attribute properties**

1. Right click on the attribute.
2. Select properties.
3. The properties dialog displays.
4. The details tab has read-only information about:
    - Name
    - Type
    - Access
    - Description
5. The permissions tab has a list of roles to which you can grant and revoke access.
6. Click OK.

Managing operations

An operation is a method or function of an agent service or agent plug-in.

Viewing operations

❖ **Viewing operations**

1. Select a service or a plug-in.
2. On the details pane, select the operations tab.
3. The operations tab has information about
   - Name – is the name of the operation.
   - Signature – the signature is the parameters for the operation.
   - Return Type – is the type of data or object that is returned by the operation.
   - Description – of the operation.
4. Use the permissions tab to grant permission.

APPENDIX A

Password Encryption and Security Configuration

Password encryption utility

A password encryption utility passencrypt is available in the agent *bin* directory. It can be used to generate encrypted passwords using a supported encryption algorithm.

Syntax of passencrypt:

```
passencrypt [-help] -[algorithm <encryption_algorithm>] [-provider
<cipher_provider_class>] -text <clear_text>
```

where:

- help – print help
- algorithm – is the encryption algorithm, and is optional. The default value is DES. The supported algorithms are DES and RSA.
- provider – is the cipher provider class, optional. The default DES provider Sun’s JCE. Default RSA provider is org.bouncycastle.jce.provider.BouncyCastleProvider.
- text – clear text, required.

Enabling Rivest-Shamir-Adleman (RSA) encryption

Due to United States export restrictions, Unified Agent does not ship with an RSA encryption provider. Unified Agent has been tested with the BouncyCastle encryption provider. To enable RSA base encryption complete the following steps:

1. Download the the Bouncy Castle RSA encryption provider at http://www.bouncycastle.org.
2. Register Bouncy Castle with JRE by:

   a. Copying the *bcprov-jdk14-124.jar* to *$SYBASE/shared-1_0/JRE-1_4/lib/ext* or *%SYBASE%\shared-1_0\JRE-1_4\lib\ext*.

   b. Adding the following line to *$SYBASE/shared-1_0/JRE-1_4/lib/security/java.security* or the *%SYBASE%\shared-1_0\JRE-1_4\lib\security\java.security* after the line `"security.provider.<number>=sun.security.jgss.SunProvider"`:

      ```
      security.provider.<nextnumber>=org.bouncycastle
      .jce.provider.BouncyCastleProvider
      ```

      Note Security providers are listed sequentially. Modify next number to be the next sequential number.

3. From within the Agent Management Console, change the following attributes values in the Security Service:

   ```
   encryptionAlgorithm = RSA
   cipherProviderClass =
   org.bouncycastle.jce.provider.BouncyCastleProvider
   ```

4. Restart the agent.

Adaptive Server agent plug-in server password encryption

The Adaptive Server agent plug-in requires a valid and privileged Adaptive Server login and password to perform its management functions. These functions include retrieving the server log and checking user roles for other parts of the Authentication systems. The password is encrypted using the Data Encryption Standard (DES). To change the password:

1 Create an encrypted form of the password using the passencrypt program. First, change directory to *$SYBASE_UA/bin or %SYBASE_UA%\bin*. Then, execute the passencrypt utility. For example, enter:

```
passencrypt –text <clear-text-password>
```

Remember the encrypted string that was produced.

2 Start the Agent Management Console (AMC) which runs as a Plug-in under Sybase Central.

3 Connect to the Agent. If the agent is not listed as a child of AMC add the Agent by using the drop down menu on AMC and choosing “Add Agent.” A dialog will appear requesting the host and port name. The agent host name is the network name of the host that the agent is running. The port is typically 9999 but that can be changed on a per agent basis. Use the drop down menu over the Agent and choose “Connect as”. Enter a user name and password that provides and administrative role over the ASEAgentPlugin.

4 Locate the ASEAgentPlugin in the plug-ins tab. On the detail pane locate the “Attributes” tab and find the “password” attribute. Update the password attribute with the saved results of the passencrypt program from above by using the drop down menu over the password attribute and choosing “update”.

The ASE Agent Plug-in password has now been changed.

Pluggable Authentication Module (PAM) configuration

After enabling the UNIX login modules on UNIX platforms, complete the following steps using an ID with root privileges:

For Solaris platforms:

1. Append the contents of the *$SYBASE_UA/utility/sunos/pam.conf* file, provided with the Unified Agent, to the */etc/pam.conf* file on your Solaris platform.
2. Restart the PAM services.

For Linux platforms:

1. Copy the *$SYBASE_UA/utility/linux/sybase-ua* file, provided with the Unified Agent, to the */etc/pam.d* directory on your Linux platform.
2. Restart the PAM services.

For HP-UX platforms:

1. Append the contents of the *$SYBASE_UA/utility/hp-ux/pam.conf* file, provided with the Unified Agent, to the */etc/pam.conf* file on your HP-UX platform.
2. Restart the PAM services.

For IBM AIX platforms:

1. Create or edit the contents of the */etc/pam.conf* file and include the content of the *$SYBASE_UA/utility/aix/pam.conf* file, provided with the UnifiedAgent.
2. Restart the PAM services.

APPENDIX B

SNMP Agent Plug-in

Overview

The Sybase Adaptive Server Simple Network Management Protocol (SNMP) Agent Plug-in is a Unified Agent Framework plug-in, which provides SNMP-based network monitoring for Adaptive Servers. SNMP provides a means to monitor and control network devices, usually in TCP/IP networks.

SNMP sends messages, called protocol data units (PDUs), to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.

The Adaptive Server SNMP Agent Plug-in implements the Adaptive Server Management Information Base (MIB). The Adaptive Server MIB contains descriptions of the objects SNMP manages.

Terminology

These acronyms are used throughout this document for the SNMP Agent Plug-in.

JMX

Java Management Extension. Supplies tools for managing and monitoring applications, system objects, devices, and service-oriented networks. This API allows Java classes to be dynamically constructed and changed. UAF is implemented using JMX.

MIB

Management Information Base. A formal description of a set of objects that can be managed using SNMP. MIB-I refers to the initial MIB definition, and MIB-II refers to the current definition. There are MIB extensions for each set of related management entities, such as the RDBMS-MIB, which defines SNMP tables that provide information about managed database servers and their databases, and APPLICATION-MIBs, which provide general purpose attributes for each database server. Standard MIBs can be extended to include proprietary objects.

TDS

Tabular Data Stream™. Open Clients and Open Servers exchange information using this application protocol. All applications built using the Sybase Open Client libraries are also TDS applications, because the Open Client libraries handle the TDS interface. However, some applications, such as jConnect, are TDS applications even though they do not use the Open Client libraries—they communicate directly using TDS protocol.

UAF

Unified Agent Framework™. A JMX-based, service-oriented agent framework. It reduces the cost of developing a distributed agent by providing common services and interfaces for SNMP Agent Plug-in development and deployment. UAF includes the agent server, an agent framework library (both server and client APIs) and sample SNMP Agent Plug-ins.

USM

User-based Security Model. The Simple Network Management Protocol (SNMPv3) that defines the process for providing SNMP message-level security. USM includes an MIB to remotely monitor and manage the configuration parameters for this Security Model. The USM provides authentication for an SNMPv3 protocol.

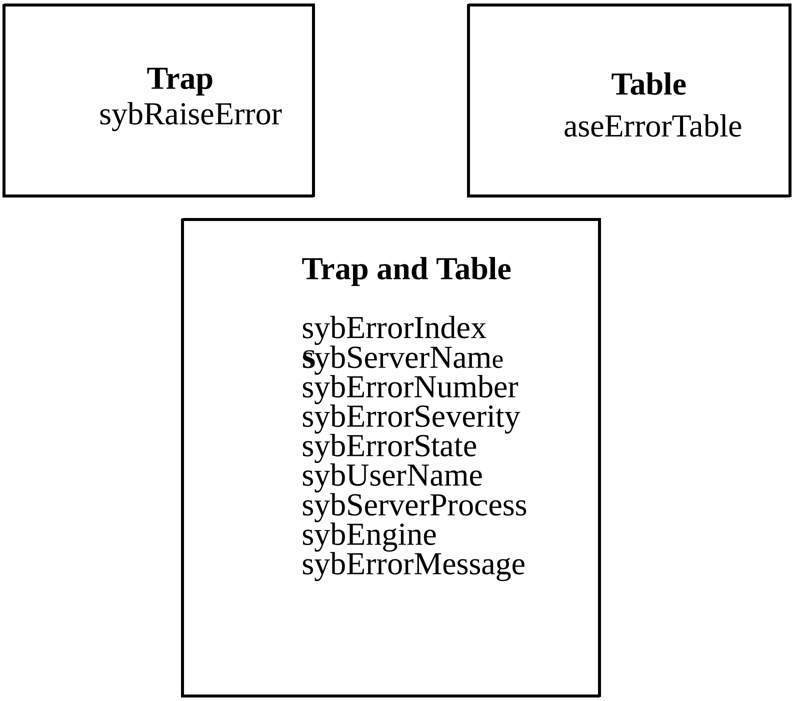
VACM

View-based Access Control Model. The SNMPv3 that defines the process for controlling access to management information. It includes an MIB to remotely manage the configuration parameters for the VACM. While the USM provides authentication, the VACM provides authorization for an SNMPv3 protocol.

Sybase Adaptive Server MIB

The Sybase Adaptive Server MIB describes information available to SNMP clients. The Adaptive Server Sybase MIB consists of an SNMP table and an SNMP error trap message. The table records the error trap messages. See “Sybase MIB” on page 48 for a sample MIB.

Figure B-1: MIB overview



Unified Agent SNMP services and plug-ins

The Unified Agent Framework (UAF) is a server-based management infrastructure for Adaptive Server and other Sybase products. The server is a collection of application management extensions, called services and plug-ins.

UAF SNMP Service

The UAF SNMP Service consists of the following components:

UAF SNMP engine components

- Dispatcher – dispatch tasks to the multiple version-specific message processing models, and to dispatch PDUs to various agent services and plug-ins.

- Message processing subsystems – interacts with the dispatcher to handle the version-specific SNMP messages. It contains one or more message processing models.
- Security subsystem – provides a framework to support the SNMPv3 protocol, including authentication and privacy on each message.
- Access control subsystem – a set of services that an application (such as a command responder or a notification originator application) can use for checking access rights.

UAF SNMP Service and UAF Adaptive Server SNMP Agent Plug-in managed objects (MOs)

- Command responder – interacts with the Adaptive Server SNMP Agent Plug-in to communicate the request of the SNMP client.
- Notification originator – initiates asynchronous messages on behalf of the Adaptive Server SNMP Agent Plug-in.

UAF SNMP Service MIBs

The UAF SNMP service also provides the following MIBs, which any SNMP client can query:

- SNMP-TARGET-MIB
- SNMP-NOTIFICATION-MIB
- SNMP-FRAMEWORK-MIB
- SNMPv2-MIB
- SNMP-COMMUNITY-MIB
- SNMP-USER-BASED-SM-MIB
- SNMP-VIEW-BASED-ACM-MIB
- SNMP-MPD-MIB
- NETWORK-SERVICES-MIB

These are common MIBs that may be provided with a standard SNMP package, or that you can find online at SNMP repositories.

Adaptive Server-to-SNMP client architecture

This architecture begins with an Adaptive Server stored procedure, and ends with a network management client.The initiation of an Adaptive Server message and the reception of that message as an SNMP trap require three services and plug-ins within UAF. They are:

- Adaptive Server SNMP Agent Plug-in – this plug-in has a sybRaiseError method that is exposed through the TDS service. An Adaptive Server stored procedure initiates a remote server connection to the UAF-TDS service, and calls sybRaiseError.
- UAF TDS Service – a methodology by which Adaptive Server connects and communicates with the UAF. The UAF TDS Service provides a remote procedure call (RPC), which constructs distributed client-server based applications and provides a calling interface that you can use to call any UAF service or plug-in method. Adaptive Server allows RPC calls using CIS (Component Integration Services).
- UAF SNMP Service – communicates the trap message to any SNMP network management client that was listening for traps.

Together, these three agent services and plug-ins provide the management infrastructure for Adaptive Server SNMP monitoring.

Security

Consider two types of security for SNMP monitoring:

- SNMP connections to Unified Agent
- Adaptive Server connections to Unified Agent

Security for connections from Adaptive Server

The UAF manages security for Adaptive Server connections by configuring the Adaptive Server SNMP Agent Plug-in for the data server.

The UAF must authenticate the Adaptive Server connection and ensure that the authenticated user is authorized to perform subsequent Adaptive Server SNMP operations. By configuring the UAF to use the Adaptive Server user name and password as one of its authentication and authorization modules, Adaptive Server can pass its own user name and password to the UAF.

To set the user name and password for connections to remote servers in Adaptive Server, use sp_addexterlogin. For more information see "Examples for configuring the Adaptive Server client" on page 70.

Security for connections from SNMP

Security for SNMP depends on the protocol you use for the SNMP connections. Community names are used to authenticate the connection to the SNMP protocols v1 and 2c. "Public" and "private" are community names; they are passed to the SNMP agent as words that allow access to SNMP data.

SNMPv3 introduces significant increases in security for SNMP connections. Client connections are authenticated with a user name and password.

This version also introduces encrypted passwords and encrypted message content.

For the default login and user authentication for Unified Agent SNMP agent services, see "UAF SNMP Agent Service" on page 44.

Sample connection

For example, you can use the program NET-SNMP to connect the SNMP service and to query the aseErrorTable from the Sybase Adaptive Server MIB. For more information, see the reference at http://net-snmp.sourceforge.net/.

In "Viewing the SNMP information from NET-SNMP" on page 48, "snmpwalk" is a NET-SNMP application using SNMP GETNEXT requests to query a network entity for a tree of information. In the SNMP protocol version 1 ("-v 1"), "-c public" specifies the community name. "localhost:1498" declares the network-addressable host name at port number 1498. The last keyword identifies the branch of the SNMP tree to query.

```
$ snmpwalk -v 1 -c public MYHOST:1498 enterprise
SNMPv2-SMI::enterprises.897.1.1.1.1.1.1 = INTEGER: 1
SNMPv2-SMI::enterprises.897.1.1.1.1.2.1 = STRING:
"WEBSPINNER"
SNMPv2-SMI::enterprises.897.1.1.1.1.3.1 = INTEGER: 1
SNMPv2-SMI::enterprises.897.1.1.1.1.4.1 = INTEGER: 2
SNMPv2-SMI::enterprises.897.1.1.1.1.5.1 = INTEGER: 3
SNMPv2-SMI::enterprises.897.1.1.1.1.6.1 = STRING: "sa"
```

```
SNMPv2-SMI::enterprises.897.1.1.1.1.7.1 = INTEGER: 4
SNMPv2-SMI::enterprises.897.1.1.1.1.8.1 = INTEGER: 5
SNMPv2-SMI::enterprises.897.1.1.1.1.9.1 = STRING:
"Hello SNMP World"
```

Configuring Adaptive Server for the SNMP Agent Plug-in

Adaptive Server generates the SNMP message and the SNMP network client receives it. Reception might be either passive, like receiving an SNMP trap, or active, like querying the UAF SNMP service for Adaptive Server messages. Successful configuration ensures that the components communicating Adaptive Server messages are running, and that the configuration values between components match.

For example, the SNMP client cannot receive a trap on port 49152 if the UAF SNMP service is not configured to send the trap on that port. When you configure Adaptive Server, consider these points:

- Which SNMP network client am I connecting to Adaptive Server?
- Is the default port for the UAF SNMP appropriate for my SNMP network client to use for contacting the UAF SNMP service?
- Is the default port number for the UAF SNMP traps an appropriate port number for my SNMP network client to use for listening to traps?
- Is the default port number for the UAF TDS service listener an appropriate port number for my SNMP network client to use for for contacting UAF through TDS?
- The recommended UAF TDS server name in the Directory Services file, *interface* or *sql.ini*, is “<hostname>_UAF.” Is this the correct naming convention to follow? (This naming convention is the one used by Adaptive Server when naming its servers.)
- How much SNMP security do I need? Specifically, should I change the community name, the user name, or the pass phrase? Should I add a privacy pass phrase? Do I want the message contents to be encrypted?

Verify that all the following steps are complete when you configure Adaptive Server to generate these messages.

v **Configuring Adaptive Server to generate SNMP notifications**

1. Start Adaptive Server.
2. Activate Component Integration Services (CIS) in Adaptive Server.
3. Start Unified Agent.
4. Install and configure Unified Agent SNMP and TDS services.
5. Install the Adaptive Server SNMP Agent Plug-in.
6. Make sure the UAF TDS service is identified in the Adaptive Server *interfaces* file.
7. Verify that an authenticated and authorized user name and password has been assigned to the Open Client connection.

TDS services

You can use the Agent Management Console to specify the TDS service default number as 9995, or to modify any of the numbers you use when you add a line in the interfaces file. For more information about TDS, see “Tabular Data Stream (TDS) Service” on page 55.

UAF SNMP Agent Service

The SNMP Agent Service is installed with the defaults listed in Table 4-1. Use many of these defaults for your initial connections to the SNMP agent from a client. You can modify these defaults from the Agent Management Console at any time.

Table 4-1: Unified Agent SNMP agent service default values

Property	Default
Agent engine ID	SYBASE-UAF or 5359424153452d554146
Transport mapping	UPD: (0.0.0.0/1498)
Default notification port	49152
Management name	Sybase, Inc.
Management location	One Sybase Drive Dublin, CA 94568
Community name (v1 and v2c)	public
USM user name (v3)	snmpadmin
USM authentication pass phrase (v3)	Sybase4me
USM privacy pass phrase (v3)	null

Note To maintain security, change the community name, user name, authentication pass phrase, and privacy pass phrase immediately.

Adaptive Server runtime

Adaptive Server supports connection to remote servers, including the UAF TDS Service. Typically, you place server names in the interfaces file to establish the remote host name and server port number. Only one TDS listener and one agent can be running on the host. In this example, the host name “MYHOST” is part of the server name, and the designation “_UAF” is appended to the end. The name for the TDS service is “MYHOST_UAF”.

This example shows an entry in the *interfaces* file representing this server. The syntax of master and query TCP varies depending on the platform and operating system, but resembles the following:

```
myhost_uaf
            master tcp ether myhost 9998
            query tcp ether myhost 9998
```

Adaptive Server uses CIS to connect to the TDS service. Enable CIS by using one of these commands:

- sp_configure “cis rpc handling,” 1
- set cis_rpc_handling on

Restart your machine to activate CIS.

Adaptive Server needs information on connecting to this remote server. UAF supports many login modules. This example uses an Adaptive Server that is already running, to provide authentication and authorization through Adaptive Server login and user roles.

The login to UAF passes an “@” character to its login name, followed by the Adaptive Server name. An authenticated Adaptive Server login name and password grants access to the UAF, based on established authorization Adaptive Serve roles for that login, and on mapped UAF functionality for that role. The UAFvs1.5 contains these mappings:

Table B-1: Adaptive Server/Unified Agent role mappings

Adaptive Server role	Unified Agent role
sa_role	uaAgentAdmin
sa_role	uaASEAdmin

An Adaptive Server login with sa_role privileges can access any UAF agent, services, and plug-ins that previously granted access using the roles uaAgentAdmin or uaASEAdmin.

You can use two Adaptive Server stored procedures— sp_addserver and sp_addexternallogin— to connect the TDS remote server to an Adaptive Server. Executing these stored procedures requires a client that can connect to the Adaptive Server database and execute SQL commands. These two commands display the Adaptive Server command line utility isql:

```
C:\Sybase>isql –U sa –P Sybase4me –S myserver

sp_addserver MYHOST_UAF
-----------

sp_addexternlogin
     MYHOST_UAF,sa,sa@myserver,Sybase4me
-----------
exit
```

Using the Adaptive Server SNMP Agent Plug-in

The Sybase Adaptive Server MIB defines the sybRaiseError error trap. This trap can be generated from a stored procedure:

```
create procedure snmpSybRaiseError
@errno int,
@severity int,
@state int,
@spid int,
@engine int,
@msg varchar(255) as
declare @user varchar(255)

begin
   select @user = suser_name()
   exec MYHOST_UAF...uaf_invoke_plugin_operation
"com.sybase.ase.snmp",î2.0.0",1,
      "sybRaiseError",@@servername,@errno,@severity,
@state,@user,@spid,@engine,@msg
end
```

The stored procedure takes a set of arguments and calls the Adaptive Server SNMP Agent Plug-into generate the SNMP notification. The call to this stored procedure follows this format:

```
$ isql -Usa -P -Smyserver

1> exec snmpSybRaiseError 1,2,3,4,5,"Hello SNMP World"
sybRaiseError
-------------
1
```

For example:

```
exec snmpSybRaiseError 1,2,3,4,5,"Hello SNMP World"
sybRaiseError
-------------
1
```

The stored procedure returns the SNMP table index:

```
(0 rows affected)
(return status = 0)
```

Viewing the SNMP information from NET-SNMP

The error message is sent as an SNMP trap and added to the *aseErrorTable* in the Adaptive Server SNMP Agent Plug-in. You can use an SNMP client to query the table to see whether messages have been logged. For example, an open source SNMP network client application called NET-SNMP could be used to see the reported messages:

```
$ snmpwalk -v 1 -c public MYHOST:1498 enterprise
SNMPv2-SMI::enterprises.897.1.1.1.1.1.1 = INTEGER: 1
SNMPv2-SMI::enterprises.897.1.1.1.1.2.1 = STRING: "WEBSPINNER"
SNMPv2-SMI::enterprises.897.1.1.1.1.3.1 = INTEGER: 1
SNMPv2-SMI::enterprises.897.1.1.1.1.4.1 = INTEGER: 2
SNMPv2-SMI::enterprises.897.1.1.1.1.5.1 = INTEGER: 3
SNMPv2-SMI::enterprises.897.1.1.1.1.6.1 = STRING: "sa"
SNMPv2-SMI::enterprises.897.1.1.1.1.7.1 = INTEGER: 4
SNMPv2-SMI::enterprises.897.1.1.1.1.8.1 = INTEGER: 5
SNMPv2-SMI::enterprises.897.1.1.1.1.9.1 = STRING: "Hello SNMP World

$ snmptable -m SYBASE-MIB -v 1 -c public MYHOST:1498 aseErrorTableSNMP table:
SYBASE-MIB::aseErrorTable

sybErrorIndex sybServerName sybErrorNumber sybErrorSeverity sybErrorState
      sybUserName sybServerProcess sybEngine  sybErrorMessage
1   WEBSPINNER            1             2           3 sa             4
5 Hello SNMP World
```

Sybase MIB

This is the Sybase MIB file. The values here are described in the sections above.

```
--Sybase-Common-MIB

This is a Sybase private MIB definition to be used in conjunction with SNMP and
CSMI (Client Server Management Interface) tools.  It is intended to be a common
MIB for all Sybase products.

It is Sybase's intention to make this information freely available and encourage
widespread use of this MIB in connection with the agents and adaptors that
monitor and administer Sybase products. However, Sybase retains exclusive
ownership and title.

--  Confidential Property of Sybase, Inc.
--  (c) Copyright Sybase, Inc., 2002

--  All rights reserved

--  Use, duplication or disclosure by the Government is subject to restrictions
as set forth in subparagraph (c) (1) (ii) of DFARS 52.227-7013 for the DOD and
as set forth in FAR 52.227-19 (a) - (d) for civilian agencies.

--  Sybase, Inc. 5000 Hacienda Drive, Dublin, CA  94568

Notes:

Sybase is a registered IAB number {897} under the enterprises node.

 ===============================================================

SYBASE-MIB DEFINITIONS ::= BEGIN

IMPORTS
MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,
     Counter32, Gauge32, Integer32, enterprises
          FROM SNMPv2-SMI
     DisplayString, DateAndTime, AutonomousType
          FROM SNMPv2-TC;

sybase   MODULE-IDENTITY
LAST-UPDATED "0206182100Z"
ORGANIZATION "Sybase Inc."

CONTACT-INFO

" Bill Cox
  Sybase Inc.
  5000 Hacienda Drive
  Dublin, CA 94568
  US
  Tel USA  (603) 230 7106
  E-mail: bcox@sybase.com"

 DESCRIPTION

       "The MIB module to describe objects for Sybase proprietary products"

 ::= { enterprises 897 }

-- ------------------------------------------------

Adaptive Server Enterprise related objects

--------------
ase       OBJECT IDENTIFIER ::= { sybase 1}


aseObjectsOBJECT IDENTIFIER ::= {ase 1}
```

```
aseErrorTable OBJECT-TYPE
   SYNTAX        SEQUENCE OF AseErrorEntry
   MAX-ACCESS   not-accessible
   STATUS       current

DESCRIPTION

          "A table relating databases and servers present on a host."

      ::= { aseObjects 1 }

aseErrorEntry   OBJECT-TYPE
   SYNTAX       AseErrorEntry
   MAX-ACCESS     not-accessible
   STATUS          current
   DESCRIPTION

       " "
INDEX { sybErrorIndex }
::= { aseErrorTable 1 }

aseErrorEntry   OBJECT-TYPE
   SYNTAX      AseErrorEntry
   MAX-ACCESS  not-accessible
   STATUS      current
   DESCRIPTION

       " "
   INDEX { sybErrorIndex }::= { aseErrorTable 1 }

AseErrorEntry ::=

 SEQUENCE {
   sybErrorIndex     INTEGER,
   sybServerName     DisplayString,
   sybErrorNumber    INTEGER,
   sybErrorSeverity  INTEGER,
   sybErrorState     INTEGER,
   sybUserName       DisplayString,
   sybServerProcess  INTEGER,
   sybEngine         INTEGER,
   sybErrorMessage    DisplayString
}

sybErrorIndex    OBJECT-TYPE

     SYNTAX          INTEGER (1..2147483647)
     MAX-ACCESS      read-only
     STATUS          current
     DESCRIPTION
"An index value used to uniquely identify an entry in this table."
```

```
      ::= {aseErrorEntry 1}

sybServerName    OBJECT-TYPE
     SYNTAX          DisplayString
     MAX-ACCESS      read-only
     STATUS          current

      DESCRIPTION
"Name of the Adaptive Server Enterprise reporting an error condition"

      ::= {aseErrorEntry 2}

sybErrorNumber   OBJECT-TYPE
     SYNTAX           INTEGER
     MAX-ACCESS       read-only
     STATUS           current

      DESCRIPTION

          "Number of error condition being raised."

      ::= {aseErrorEntry 3}

sybErrorSeverity OBJECT-TYPE
     SYNTAX           INTEGER
     MAX-ACCESS       read-only
     STATUS           current

      DESCRIPTION

          "Severity level of error condition being raised."

      ::= {aseErrorEntry 4}

                       sybErrorState   OBJECT-TYPE
                            SYNTAXI          INTEGER
                            MAX-ACCESS       read-only
                            STATUS           current

                             DESCRIPTION

                                 "SQL State of error condition."

                             ::= {aseErrorEntry 5}

                         sybUserName      OBJECT-TYPE
                            SYNTAX             DisplayString
                            MAX-ACCESS          read-only
                            STATUS              current

                             DESCRIPTION

                                 "Database user name"

                             ::= {aseErrorEntry 6}
```

```
 sybServerProcess OBJECT-TYPE
     SYNTAX                 INTEGER
     MAX-ACCESS             read-only
     STATUS                 current

      DESCRIPTION

          "Server process number (spid)"

      ::= {aseErrorEntry 7}
```

```
sybServerProcess OBJECT-TYPE
     SYNTAX                INTEGER
     MAX-ACCESS            read-only
     STATUS                current

      DESCRIPTION

          "Server process number (spid)"

      ::= {aseErrorEntry 7}
```

```
 sybEngine OBJECT-TYPE
     SYNTAX     INTEGER
     MAX-ACCESS read-only
     STATUS     current

      DESCRIPTION

          "Server engine number"

      ::= {aseErrorEntry 8}

 sybErrorMessage  OBJECT-TYPE
     SYNTAX                DisplayString
     MAX-ACCESS             read-only
     STATUS                 current

      DESCRIPTION

          "Text message associated with an error"

      ::= {aseErrorEntry 9}

sybASEtraps        OBJECT IDENTIFIER ::= { ase 2 }


  sybRaiseError    NOTIFICATION-TYPE

      OBJECTS          { sybErrorIndex, sybServerName, sybErrorNumber,
sybErrorSeverity,sybErrorState, sybUserName,
sybServerProcess,sybEngine,sybErrorMessage }

      STATUS          current
      DESCRIPTION

        "An error condition was raised within an instance of ASE.  The condition
could have been raised either internally, or from within a user written
storedprocedure."

      ::= { sybASEtraps 1 }

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

APPENDIX C Tabular Data Stream (TDS) Service

What is TDS?

TDS, or Tabular Data Stream, is an application protocol by which Open Clients and Open Servers exchange information. Applications that use the Sybase Open Client libraries are also TDS applications, as are some (such as Sybase jConnect) that do not use the Open Client libraries.

As part of the Unified Agent Framework, TDS:

1. Starts when you start the UAF (Unified Agent Framework).
2. Reads the TDS port number from its own configuration file. This file is set by another application, such as Agent Management Console.
3. Obtains the Agent RMI (Remote Method Invocation) port number from UAF Agent Services.
4. Starts a TCP/IP socket listener on the designated TDS port number, which waits for login, logout, and remote procedure requests, then:
    - Upon receiving a login request, the service creates a UAF session for that user, using the RMI client interface.
    - Upon receiving a logout request, the service closes the UAF session.

- Upon reciving an RPC request, the service processes it and returns a result set, which may contain only the returned status of the request.

5 Shuts down the listener when the session is closed.

Using the TDS service

The TDS service provides one remote procedure call, uaf_list_rpc, which returns information about remote procedures. Table C-1 shows the columns this function returns.

Table C-1: Columns returned by uaf_list_rpc

Column name	Returned datatype	Description
Operation	java.lang.String	Name of RPC
Arguments	java.lang.String	Arguments for RPC
Description	java.lang.String	Description of RPC

Table C-2 on page 56 shows the output from this function.

Table C-2: Output from uaf_list_rpc

Operation	Arguments	Description
uaf_list_rpc	<none>	Returns information about remote procedure calls
uaf_list_plugins	<none>	Returns information about agent plug-ins
uaf_list_services	<none>	Returns information about services
uaf_list_plugin_operations	*Plugin ID, Plugin Version*	Returns information about operations available for a particular plug-in
uaf_list_plugin_operation_arguments	*Plugin ID, Plugin Version, Plugin Operation*	Returns information about the arguments for a particular plug-in operation
uaf_invoke_plugin_operation	*Plugin ID, Plugin Version, Instance Number, Plugin Operation <operation arguments>*	Invokes a plug-in operation
uaf_list_plugin_attributes	*Plugin ID, Plugin Version*	Returns the list of attributes for a plug-in

Operation	Arguments	Description
uaf_get_plugin_attribute	*Plugin ID,Plugin Version, Instance Number, Attribute Name*	Updates the value of the requested plug-in attribute
uaf_set_plugin_attribute	*Plugin ID, Plugin Version, Instance Number, Attribute Name*	Updates the value of the provided plug-in attribute
uaf_list_service_operations	*Service ID*	Returns information about operations available for a particular service
uaf_list_service_operation_arguments	*Service ID, Service Operation*	Returns information about the arguments for a particular service operation
uaf_invoke_service_operation	*Service ID, Service Operation, <operation arguments>*	Invokes a service operation
uaf_list_service_attributes	*Service ID*	Returns the value of the requested service attribute
uaf_get_service_attribute	*Service ID, Attribute Name*	Returns the value of the requested service attribute
uaf_set_service_attribute	*Service ID, Attribute Name, Attribute Value*	Updates the value of the provided service attribute

UAF services

A set of remote procedure call (RPC) functions accesses UAF plugins, operations and attributes:

- uaf_list_services – lists the UAF services.
- uaf_list_service_operations – lists the operations for a service.
- uaf_list_service_operation_arguments – lists the arguments for a service operation.
- uaf_invoke_service_operation – invokes an operation in a service.
- uaf_list_service_attributes – lists the attributes of a service.
- uaf_get_service_attribute – gets the value of an attribute of a service.

- uaf_set_service_attribute – sets the value of an attribute.

These services can be called from these interfaces:

- JDBC
- .NET/ADO.NET
- ODBC
- OLEDB
- CT_LIB
- DB_LIB

For this reason, syntax is omitted in documenting the services.

uaf_list_service_operations

Returns information about operations available from a particular service. The valid service identifiers are listed in Table C-4, though this table is dynamic. Table C-6 uses the identifier RemoteShellService from Table C-4.

Argument – *Service ID*

Table C-3: Columns returned

Column name	Returned datatype
Operation	string
Description	string
ReturnType	java.lang.Boolean

Table C-4: Sample output from uaf_list_service_operations RemoteShellService

Operation	Description	ReturnType
start	Starts the service	void
stop	Stops the service	void
restart	Restarts the service	void
saveArl	Saves Access Requirement List	void
saveConfig	Saves the configuration settings of the service	void
incrementReferenceCount	Increases the reference count by 1	void
decrementReferenceCount	Decreases the reference count by 1	void
executeWait	Executes a command asynchronously; that is, the control flow immediately reverts back to before the calling process	com.sybase.ua.util.ProcessInfo

uaf_list_services

Returns information about services.Table C-3 shows the columns returned by this function. This service has no arguments.

Table C-5: Columns returned

Column name	Returned datatype
Name	java.lang.String
Identifier	java.lang.String
Inited (initialized)	java.lang.Boolean
Started	java.lang.Boolean

Table C-6: Sample output

Name	Identifier	Inited (Initialized)	Started
Agent service	Agent	1	1
Bootstrap service	BootstrapService	1	1
Configuration service	ConfigService	1	1
Environment service	EnvironmentDiscoveryService	1	1
File transfer service	FileTransferService	1	1
Plugin registration service	PluginRegisterService	1	1
RMI service	RMIService	1	1
Remote shell service	RemoteShellService	1	1
Security service	SecurityService	1	1
Self discovery service	SelfDiscoveryService	1	1
Service registration service	ServiceRegistrationService	1	1
Session service	SessionService	1	1
TDS service	TdsService	1	1

uaf_list_service_operation_arguments

Returns information about the arguments for a particular service operation.

Arguments – *Service Id, Service Operation*

Table C-7 returns columns from the service identifiers in Table C-4, and the service operations in Table C-6.

Table C-7: Columns returned

Column name	Returned datatype
Argument name	string
Description	string
Type	string

Table C-8: Sample output from uaf_list_service_operation_arguments RemoteShellService, executeNoWait

Argument	Description	Type
command	String representing the command to be executed on a remote resource	java.lang.String
workingDirectory	Directory in which the command exists	java.lang.String
processStatusChangeListener	Interface that listens for changes in the process state	com.sybase.ua.services.rshell.ProcessResponseListener
processResponseListener	Interface that listens for a process response	com.sybase.ua.services.rshell.ProcessResponseListener
timeoutSeconds	Number of seconds before the operation is terminated	java.lang.Integer

uaf_invoke_service_operation

Invokes a service operation.

Arguments – *Service Id, Service Operation, <operation arguments>*

Only one column is returned, the column name; the datatype returned depends on the operation executed.

uaf_list_service_attributes

Returns the value of the requested service attribute.

Argument – *Service Id*

Table C-9: Columns returned

Column name	Returned datatype
Attribute	string
Type	string
Description	string

Table C-10: Attributes

Attribute	Type	Description
modelerType	string	The type of the source modeled. You can set this attribute only once.
id	string	Service ID.
name	string	Service name.
mBeanName	string	Service MBean name.

uaf_get_service_attribute

Returns the value of the requested service attribute.

Arguments – *Service Id*, *Attribute Name*

Only one column, Value, is returned; the datatype returned depends on the operation executed.

uaf_set_service_attribute

Updates the value of the service attribute provided.

Arguments – *Service Id*, *Attribute Name*, *Attribute Value*

This service returns no columns.

UAF plug-ins

This set of RPC (Remote Procedure Call) plug-in functions accesses the UAF:

- uaf_list_plugins – lists the UAF plug-ins.
- uaf_list_plugin_operations – lists operations for a plug-in.

- uaf_list_plugin_operation_arguments – lists arguments for a plug-in operation
- uaf_invoke_plugin_operation – invokes an operation for a plug-in.
- uaf_list_plugin_attributes – lists the attributes of a plug-in.
- uaf_get_plugin_attribute – gets the value of a specified attribute of a plug-in.
- uaf_set_plugin_attribute – sets the value of a specified attribute of a plug-in.

uaf_list_plugins

Returns information about plug-ins.

This function has no arguments.

Table C-11:

Column name	Returned datatype
Name	string
Identifier	string
Version	string
Instance	string
Home directory	string
Provider	string
Loaded	java.lang.Boolean
Enabled	java.lang.Boolean

Sample output:

```
Name                 Identifier       Version   Instance  Home Directory
----------------    -----------       -------     ------   -------------
ASE Agent Plugin     com.sybase.ase   15.0.0        1       /opt/sybase...

             Provider        Loaded               Enabled
          ------------      ------------         ------------
        Sybase.Inc         1                       1
```

uaf_list_plugin_operations

Returns information about operations available to a particular plug-in.

Arguments – *Plugin Identifier*, *Plugin Version*

Table C-12: Columns returned

Column name	Returned datatype
Operation	string
Description	string
ReturnType	java.lang.boolean

Table C-13: Sample output from: uaf_list_plugin_operations"com.sybase.ase","15.0.0"

Operation	Description	ReturnType
loadPlugin	Loads the plug-in	void
unload	Unloads the plug-in	void
reload	Reloads the plug-in	void
saveArl	Saves the ARL (Access Requirement List)	void
saveConfig	Saves the configuration settings of the plug-in	void
retrieveServerLog	Returns the server log identified by the attribute ASELogfile	void

uaf_list_plugin_operation_arguments

Returns information about the arguments of a particular plug-in operation.

Arguments – *Plugin Id, Plugin Operation*

Table C-14: Columns returned

Column name	Returned datatype
Argument name	java.lang.String
Description	java.lang.String
Type	java.lang.String

The output for the argument *"maxLines"*, for instance, is the maximum number of lines returned to the function that called it, in datatype java.lang.Integer.

The output for these arguments is dynamic, based on the plug-ins installed in UAF. To display a list of valid arguments, query a running program.

uaf_invoke_plugin_operation

Invokes a plug-in operation.

Arguments – *Plugin Id*, *Plugin Operation*, <*operation arguments*>

This plug-in returns a value, the datatype of which depends on the operation executed. For example, when the operation invoked returns an integer, the datatype returned is also an integer.

```
Sample output from:
uaf_invoke_plugin_operation      "com.sybase.ase","15.0.0",1,getASELogTail,4

Value
00.00000.00001:2005/11/28 10:23:29:53 server ’bin_iso_1’ (ID=50)
00.00000.00001:2005/11/28 10:23:29:53 server on top of default character set:
00.00000.00001:2005/11/28 10:23:29:53 server ’iso_1 (ID=1).
00.00000.00001:2005/11/28 10:23:29:53 server Master device size: 30 megabytes,
           or 15360 virtual pages. (A virtual page is 2048 bytes.)
```

uaf_list_plugin_attributes

Returns the value of the requested plug-in attribute.

Table C-15: Columns returnedColumn n

Column name	Returned datatype
Attribute	java.lang.String
Type	java.lang.String
Description	java.lang.String

Table C-16: Sample output using "com.sybase.ase", "15.0.0"

Attribute	Type	Description
modelerType	java.lang.String	The datatype of the modeled resource, which can be set only once.
ID	java.lang.String	The ID of the plug-in
name	java.lang.String	The name of the plug-in
version	java.lang.String	The plug-in version, as defined in the *agent-plugin.xm*l file
instanceNumber	java.lang.String	The number of the instance plug-in

uaf_get_plugin_attribute

Returns the value of the requested plug-in attribute.

Arguments – *Plugin Id*

The datatype of the returned value depends on the operation executed.

uaf_set_plugin_attribute

Updates the value of the provided plug-in attribute.

Arguments – *Plugin Id, Attribute Name, Attribute Value*

This function returns no columns.

TDS listener client examples

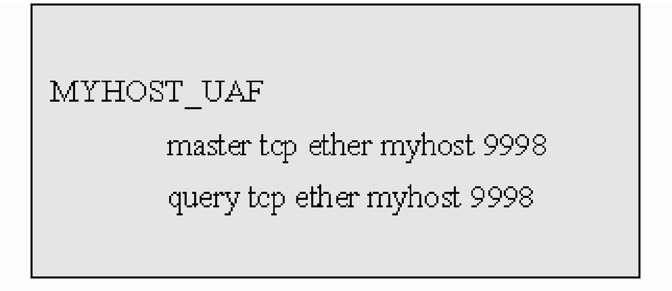
This section shows client examples, and provides information on setting them up.

Setting up examples for the Adaptive Server client

Adaptive Server supports the TDS service as a connection to remote servers. These server names are typically placed in the interfaces file, to establish the remote server port number and the remote host namer.

Only one agent is expected to run on the remote host, so only one TDS listener is expected. In this example, “MYHOST” is part of the server name, with the designation “_UAF” at the end. The TDS service name is, therefore, “MYHOST_UAF.”

Figure C-1: Interfaces file entry



```
MYHOST_UAF
          master tcp ether myhost 9998
          query tcp ether myhost 9998
```

Adaptive Server uses Component Integration Services to connect to the TDS service. Enable CIS by using one of these commands:

```
sp_configure "cis rpc handling",
```

```
set cis_rpc_handling on
```

You must restart the database to activate CIS.

Adaptive Server requires specific information to connect to the remote server MYHOST_UAF. See , “Using the Adaptive Server SNMP Agent Plug-in” on page 47 and “Installing and Configuring Unified Agent and Agent Management Console” on page 3, for more information about authenticating a client connection.

In the first example in “Examples for using the Adaptive Server client” on page 68, the running Adaptive Server provides authentication and authorization through an Adapted Server Enterprise login and user roles. The login to UAF passes “@” to its login name, followed by the Adaptive Server name. An authenticated login name and password grants access to the UAF, based on established authorization roles for that login, and mapped UAF functionality for that role:

Table C-17: Mappings in UAF version 1.5

Adaptive Server role	UAF role
sa_role	uaAgentAdmin
sa_role	uaASEAdmin

An Adaptive Server login, with an sa_role, can access any UAF agent, services, and plug-ins granted access to the roles uaAgentAdmin or uaASEAdmin.

Examples for configuring the Adaptive Server client

You can use any of these methodologies to configure the TDS listener port number:

- The installation program prompts for the TDS port number, and automatically modifies the TDS service XML file.
- The Agent Management Console changes the port number value and restarts the service.
- The UAF administrator edits the TDS service XML file by hand.

Valid values for this port are between 1024 and 32768. This value is stored in the service configuration file, using the property “tdsPort.”

Examples for using the Adaptive Server client

Two stored procedures, sp_addserver and sp_addexternlogin, add the TDS remote server connection to Adaptive Server.You can execute these stored procedures using any client that can connect to the Adaptive Server database and execute SQL commands. This example uses the Adaptive Server command line utility isql.

```
C:\Sybase> isql -U sa -P Sybase4me -S myserver
               sp_addserver MYHOST_UAF
               go
               -----------
               sp_addexternlogin MYHOST_UAF, SA, SA@MYSERVER,      sYBASE4ME
               go
               ------------
```

The remote server representing the UAF TDS service is complete, and you can now call other stored procedures. This example shows a stored procedure that lists the available services in the agent:

```
C:\Sybase> isql -U sa -P Sybase4me -S myserver
               MYHOST_UAF...uaf_list_services
               go
               -----------
      Name                 Version   ServiceDescription
-----------           -------   ------------------
   FileTransferService       1.0.0    Transfers files between client and agent.

   SelfDiscoveryService      1.0.0    Registers the agent and its
                                      services and plug-ins with discovery
                                      servers.

      MYHOST_UAF...sp_uaf_serviceinvoke "SelfDiscoveryService",discoverAgents
      go
      ------------------
         Host                   Port          Version
                     -----------            ---------      ----------
         MYHOST                 9999           1.5.0
         MYOTHERHOST            14578          1.5.0
         -----------            ---------      ----------
         (2 rows returned)
```

The calling interface to plug-ins requires information, such as version and instance number.

For example, this next example shows a plug-in called “com.sybase.ase” in version 15.0, the first plug-in instance of that name. To display the last 20 lines of the log and return to the calling procedure, enter:

```
C:\Sybase> isql -U sa -P Sybase4me -S myserver
                    MYHOST_UAF...uaf_invoke_plugin_operation
                       "com.sybase.ase", "15.0.0",1, getASELogTail,20
                    go
                    --------------
                    ASE Log
                    --------------
                    00:00000:00001:2005/10/13 16:31:31:26 server  Master
                    device size: 30 megabytes, or 15360 virtual pages.(A
                    virtual page is 2048 bytes.)
```

```
.
.
.
00:00000:00010:2005/10/14 16:36:34:30 server  Maximum
number of user seat licenses used since startup: 1
-------------
(20 rows returned)
```

Examples for configuring the Adaptive Server client

You can use any of these methodologies to configure the TDS Lister port number:

- The installation program prompts for the TDS port number, and modify the TDS service XML file.
- The Agent Management Console automatically changes the port number value and restarts the service.
- The UAF administrator manually edits the TDS service XML file .

Valid values for this port are between 1024 and 32768. This value is stored in the service configuration file, using the property “tdsPort.”

Reporting functionality and error recovery

A TDS service places all logging messages in the Agent log file, using existing logging services.

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