Sun StorageTek™ Business Analytics Array Agents Installation Guide

Release 5.0 SP1

Sun Microsystems, Inc.
www.sun.com

Part No. 819-6241-10
March 2006, Revision 01

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INTRODUCTION TO ARRAY AGENTS

Sun StorageTek Business Analytics provides storage array agents supporting different vendor product lines or interfaces; including EMC Symmetrix, EMC Clariion, HDS Thunder and Lightning series, HP/Compaq EVA, HP/Compaq HSG80-based arrays, IBM ESS/Shark, LSI-based arrays (including IBM FastT and StorageTek FlexLine), and HP XP series. Refer to the Sun StorageTek Business Analytics Support Matrix that is located on the Documentation CD to obtain the latest information on supported product lines and interfaces as well as on their support prerequisites.

Note: With the acquisition of StorageTek, Sun Microsystems has re-branded and re-named Global Storage Manager (GSM) as Sun StorageTek Analytics, a member of the Enterprise Storage Manager portfolio of software solutions. The functionality of Business Analytics is identical to GSM, only the name has changed.

Although no two array agents are implemented in exactly the same way, there are broad areas of similarity across vendors in terms of functionality and interface methods. For example, all array agents publish the same objects.

Sun StorageTek Business Analytics 5.0 SP1 provides three installation CDs for agent server platforms: Windows Local Manager, Solaris Local Manager, and UNIX Agent Installation (AIX and HP-UX).

Note: Before you install an Array Agent on a server running a previous release of that agent, uninstall the previously installed agent before you install the corresponding Sun StorageTek Business Analytics 5.0 Array Agent supplied with the latest software. The decision to upgrade an existing Array Agent may be performed because:

- The Sun StorageTek Business Analytics Release Notes indicate a problem has been fixed or a new feature added.

- The upgrade is recommended by your Sun representative.

AUTOMATIC AND STATIC AGENT REGISTRATION

Automatic agent registration is a configuration option for agent data collection. In the storability.ini file, automatic agent registration is configured as follows:

- **Local Manager** – Specify the IP address or host name of the Local Manager to be contacted to activate agent registration.
- **Local Manager Registration Port** – Specifies the TCP port number used by the Local Manager for agent auto registration. The default port number is 17146.
- **Enable Auto Registration** – Turns agent auto registration on (default) or off.

The HDS and HiCommand agents now support auto registration. The following agents do not auto-register with the Routing Agent and, therefore, need to be registered statically:

- Compaq Agent
- ESS Agent
- Engenio/LSI Agent
- HP XP Agent

To register the Array Agent statically, proceed as follows:

- Enter false in the **Enable Auto Registration** field.

- Modify the Routing Agent static agent configuration to include an entry (port number|<agent IP address/name>)
- Restart the Routing Agent
- Restart the companion Central Manager agents

ARRAY AGENT OBJECTS

Table 1 lists the objects that the Array Agents publish.

Table	Columns
alerts-3-0	sourceip, priority, alert_id, progname, alert, time, firsttime, refreshedtime, int1, text1, text2.
gsa_agent_version-2_0	ip_ address, agent_name, version, compile time, tz_name, tz, timestamp.
gsa_cache_control-2_0	ip_address, port, table_name, cache_age, last_update_request_length, update_request_pending, group_name, group_master, timestamp
gsa_ini_control-2_0	ip_address, port, domain, parameter, value, status, timestamp
gsa_parm_info	ip_address, port, object, parm_name, value_syntax, description, example
gsa_array_config-2_2	ip_ address, agent_name, array_id, array_name, array_maker, array _model, array_sw, cache_size, phydisks, controllers, data_ip_address, mgt_ip_address, dev_ip_address1, dev_ip_address2, product_line,timestamp.
gsa_array_HBA_config-2_1	ip_ address, array_id, type, mode, security, current_speed_mbits_sec, wwn, port_wwn, port_id, timestamp.
gsa_cache_perf-2_1	ip_ address, array_id, cache_hits_sec, rd_io_per_sec, wr_io_per_sec, timestamp.
gsa_disk_perf-2_1	ip_address, array_id, addr_1, addr_2, addr_3, io_per _sec, rd_io_per_sec, wr_io_per_sec, timestamp.
gsa_fctl_perf-2_1	ip_address, array_id, addr_1, io_per_sec, timestamp
gsa_host_storage_unit-2_1	ip_address, array_id, wwn_alias, wwn_id, su_id, fe_port, mapped, assigned, scsi_vbus, scsi_target, scsi_lun, timestamp.
gsa_local_unit_mapping	ip_address, array_id, su_id, d_array_id, d_su_id, session_name, mapping_type, mapping_status, timestamp.
gsa_phydisk	ip_address, array_id, addr_1, addr_2, addr_3, disk_size, timestamp.

Table	Columns
gsa_remote_unit_mapping-2_1	ip_address, array_id, su_id, d_array_id, d_su_id, session_name, mapping_type, mapping_status, role, timestamp.
gsa_storage_unit_config-2_1	ip_address, array_id, su_id, addr_1, addr_2, addr_3, addr_4, size, configuration, type, status, primary, component_1, component_2, timestamp.
gsa_su_reference	ip_address, array_id, su_id, su_uid, timestamp

Table 1 - Array Agent Objects

INSTALLING ARRAY AGENTS ON WINDOWS

The Array Agents are located on the installation CD under folders that have the following structure:

\Agents\Agent Name

These agents share the following characteristics:
- Are installed using the Install Shield-based setup program (setup.exe).
- Are configured using the Configuration Tool.
- Share a common configuration file (storability.ini) in the \Agents folder.
- Log to their own Message.log file in the \<Agent _Name > folder.
- Can be started using the context-sensitive Tools menu selection in the Configuration Tool or using the Windows **Services** panel.
- Are installed with the required lmutilities and Configuration Tool components.

INSTALLING ARRAY AGENTS ON SOLARIS

The Array Agents are located on the installation CD in directories that have the following directory structure:

/Unix/<OS>/<version>

These agents share the following characteristics:
- Are installed as Solaris packages or using the install.sh utility.
- Have binaries that are installed into the directory /opt/storability/bin.
- Share a common configuration file (storability.ini) in the directory /opt/storability/etc.
- Log to a common Message.log file in the directory /opt/storability/data.
- Run as daemons and are started/stopped through run control scripts having the agent name and located in the directory /etc/init.d.
- Can be started using the gsmuser account that the installation will create if the installer chooses.
- Require the installation of the GSMbase package, which creates the directory structure, gsm group, as well as installs shared libraries.
- Can use the process status command to verify Storability Agents are running:

```
ps -ef | grep storability
```

Notes: If your system does not auto mount the Local Manager installation media, mount the installation media in your CD-ROM drive using the following steps:

a. Ensure that your CD device is at SCSI target 6 (SunBlade and some others use t1 or t2).

b. Verify that the /cdrom mount directory exists, or create it.

INSTALLING ARRAY AGENTS ON HP-UX

The HP-XP Agent is supported on a HP-UX server. Refer also to the *Sun StorageTek Business Analytics Support Matrix* for the latest information on supported platforms and prerequisites.

The following notes apply to installing agents on this platform:

- The agent installation must be carried out locally by root
- You may mount the software media directly using the local CD-ROM drive or copy the CD contents to some location on the server.
- Depending on which filesystem extensions are recognized by the host, the location, relative to the CD root, will be:

  - `UNIX/HP-UX/<version>` `(basic ISO 9660 filesystem)`
  - `Unix/HP-UX/<version>` `(ISO 9660 with extensions)`

- The software installation directory contains both the .tgz (gzipped tar) file and the install scripts. To install individual agents, simply run the corresponding installation script (i.e., ./<Agentname>_install.sh) script
- The agent should be started and stopped using the init scripts in the /sbin/init.d directory.
- Because the name of each agent binary ends in 'Agent',the following command can be used to confirm which are running:

```
$ ps -ef | grep Agent
```

INTRODUCING SMIS ARRAY AGENT

The SMIS Array Agent collects data from SMI-S 1.0.2 compliant CIM Providers supporting the Array profile identified in the Sun StorageTek Business Analytics Support Matrix. In general, SMIS agents and non-SMIS are not supported collecting information from the same device. See also the **Restrictions** section of the following SMIS Array Agent Matrix.

SMIS ARRAY AGENT MATRIX

Item	Description
Support Prerequisites	
Verify SMI-S 1.0.2 compliant CIM Provider	Manufacturer's documentation.
Limitations	
Agent Objects	The SMIS Array Agent does not currently populate the following agent objects: • gsa_remote_unit_mapping • gsa_fctrl_perf • gsa_disk_perf • gsa_cache_perf

Item	Description

EMC SMI-S Provider Limitations	• For arrays with metaLUNs, the CIM provider does not furnish detailed information on metaluns regarding the parity space used. This results in an inaccurate calculation of RAW configured space in the reports. • The CIM provider does not supply information on the hyper components of a meta lun. This results in inaccuracies in reports regarding meta lun details. The CIM provider does not report individual meta members but does report the meta head with the capacity of the entire metavolume. • The CIM provider does not report that a device is a meta lun. Therefore, our agent will not distinguish between a meta and a normal volume. • The CIM provider does not report every "type of volume. Some administrative volumes, such as, BCV, SFS, VCM, DRV, etc. are not reported by the provider. As a result, the agent does not report these volumes. • BCV assignments are not reported and the reports will incorrectly report the total storage allocated as well as remaining free space. • FC4700 private luns are not furnished by the CIM provided • The CIM provider does not give information on RAID-S raid groups. As a result, the agent will not populate the component_2 column in the storage_unit_config table for RAID-S devices. In addition, this limitation means the agent does not correlate RAID-S devices that are in the same raid group. • The provider does not provide detail disk information for RAID-S devices. This results in incorrect totals in our reports for RAW configured space. • Raid-S devices report incorrect parity information in the storage_unit_config table. • The CIM provider does not provide the agent with scsi vbus information so addr 4 of storage_unit_config table will be "-1" • This version of the agent does not support any of the array performance tables. • This version of the agent does not populate the gsa_local_unit_mapping and gsa_remote_unit_mapping tables. • Cache size data is not reported by the CIM provider. • Disk address prefixes, such as "DA & DF" for a Symmetrix, are not provided by the EMC CIM Provider. • The reports derived from this agent show the total of all controllers in the Front End Controllers field.

Item	Description
Engenio/LSI SMI-S Provider Limitations	• The array_hba_config ports are not being provided correctly due to an Engenio CIM provider anomaly.
SMIS Array Agent on Windows	• Sun StorageTek Business Analytics Windows Local Manager Installation CD (InstallShield) • Local Manager utilities and Configuration Tool required • Required Server Access: Administrator privileges
SMIS Array Agent on Solaris	• Sun StorageTek Business Analytics Solaris Local Manager Installation CD • Package Installation • Required Server Access: root access and Management Station permissions • GSMbase and GSMlmutilities must be installed for all array agents
Configuration Parameters	
CIM_IP	CIM_IP = provider ip|provider port (5988)|namespace| username|password One entry is required per SMI provider. The first field is the IP address of a CIMOM (Common Information Model Object Manager) provider. This may be an individual array that supports CIM natively, or a CIMOM proxy reporting on one or more arrays. The second field is the CIMOM provider port, which is TCP port number 5988 by default. The third field, the namespace value, must be obtained from the vendor documentation for the CIMOM provider. For example, root/cimv2. The Username and password must be configured for an account that grants access to the CIM provider.

Item	Description
Local Manager	Network-resolvable host name/IP address of Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	Local Manager's TCP port number (default is 17146) used for agent auto registration.
Enable Auto Registration	Turns agent auto registration on (default) or off.

Table 2 - SMIS Array Agent Matrix

INSTALLING SMIS ARRAY AGENT - WINDOWS

The following section describes how to install and configure the Storability SMI-S Array Agent on a Windows platform.

1. Insert the Sun StorageTek Business Analytics Windows Local Manager CD into the CD-ROM drive.

2. Click **Next** on the **Welcome** menu to continue the installation.

3. Click **Yes** to accept the terms of the software license agreement.

4. Review/modify the **User Name** and **Company Name** and click **Next>**.

5. Check the **SMIS Array Agent** checkbox on the screen that lists Sun StorageTek Business Analytics Agents for installation.

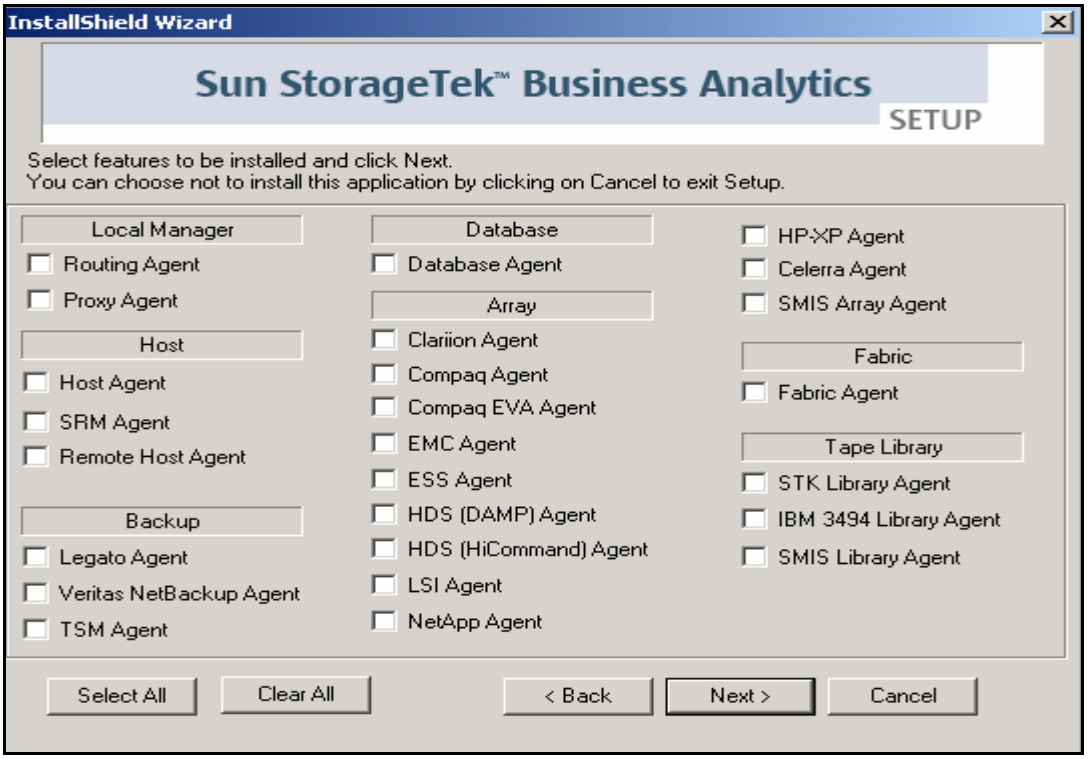


Figure 1 - Select Features To Be Installed

6. Review the settings and click **Next**.

7. Specify whether or not to install the new version of the Configuration Tool.

8. When the Configuration Tool is automatically launched, select **File** -> **Edit** -> **Smart Agent Configuration**.

9. Click the **SMIS Array Agent** tab and click **Add**. As noted, all fields are required.

10. Specify the following configuration settings:

- **IP or HostName**– Specify one entry per SMI provider. This entry may support one or several arrays at the same time, depending on the configuration of the provider.

- **Port** – Specify the provider port number. The default port number is 5988.

- **Namespace** – Specify the namespace value that must be obtained from the vendor documentation for the CIM provider.

- **User Name** – Specify a user name for an account that grants access to the CIM provider.

- **Password** – Specify a password for the above specified user.

11. Click **Submit** after you have finished configuring the SMI-S Array Agent.

12. For **Local Manager**, specify the IP address or host name of the Local Manager to be contacted for agent auto registration.

13. For **Local Manager Registration Port**, specify the TCP port number the Local Manager uses for agent auto registration. The default port number is 17146.

14. Click **Show Advanced Settings** and review/modify the following configuration variables:

    - **Enable Auto Registration** – Turns agent auto registration on (default) or off. Default value is true (enabled) but may be set to false to disable agent auto registration.

    - **CONFIG_CACHE_REFRESH_ INTERVAL** - Specifies how often to collect array configuration data in seconds. The default value is 3000 seconds for CONFIG_CACHE_REFRESH_INTERVAL.

    - **CMD_EXECUTION_TIMEOUT** – Specifies how long the agent will wait for the completion of a command. The default value is 250 seconds.

        - **EXCLUDE_ARRAY_ID** – Specifies array ID to be excluded from data collection. Click the **Change Option Values** button to open the Enter EXCLUDE_ARRAY_ID Options dialog. Enter one array ID per line and click the Submit button when you have completed your entries.

    15. With "Save Configuration Settings" enabled (check mark), select **File->Save** to store the configuration settings within the storability.ini file.

    16. Select **Tools->Start Service** to start the agent before you verify agent functionality.

17. Select **File->Exit** to close the Configuration Tool.

18. Use the Windows Services panel to start the agent before you verify it using the Sun StorageTek Business Analytics Agent Diagnostic Tool.

INSTALLING SMIS ARRAY AGENT - SOLARIS

1. Mount the UNIX Local Manager installation CD on the Solaris server. For example:

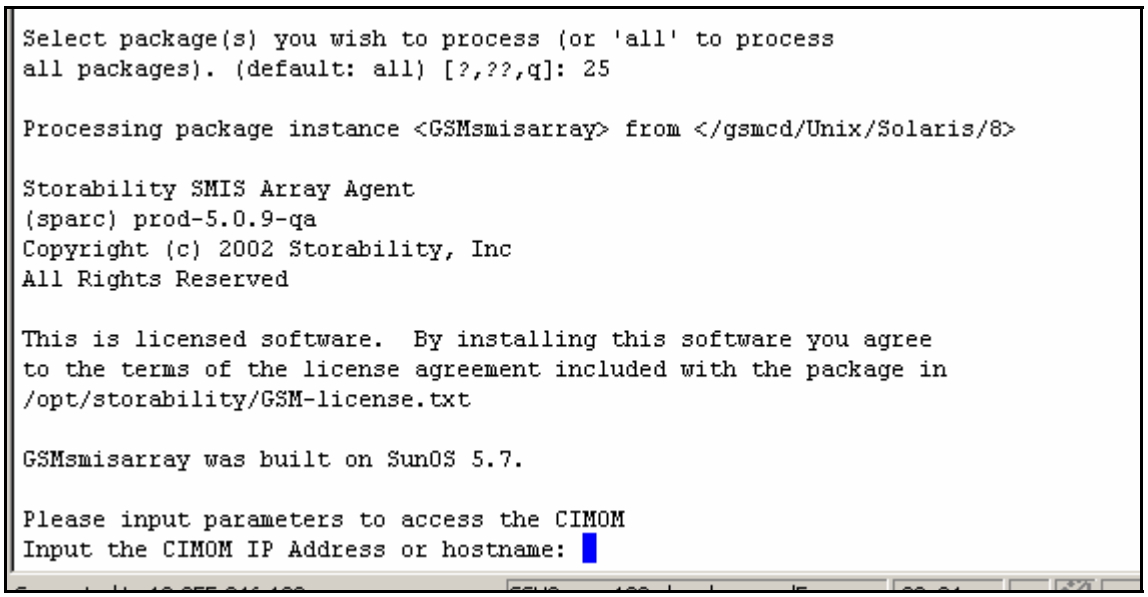
```
mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /mnt
```

2. Change directory to the appropriate directory for the Solaris operating system.

3. Run the pkgadd command and the main package installation menu is displayed.

```
pkgadd -d .
```

4. Type the package selection number for the SMIS Array Agent (Option 25) and press **Enter** to select installing this agent.



5. Enter the IP address or network resolvable host name to connect to the CIMOM provider and press Enter. This may be an individual library that supports CIM natively, or a CIM proxy server and press Enter.

6. At the "Input the CIMOM TCP port#: [5988] [?] " prompt, enter the TCP port number to connect to the CIMOM provider or press Enter to accept the default TCP port number (5988) and press Enter.

7. At the "Input the CIMOM user name:" prompt, type the username of an account that grants access to the CIM provider and press Enter.

8. At the "Password for <user_name>:" prompt, type the password for the above specified user and press Enter.

9. At the "Confirm the password:" prompt, retype the password and press Enter.

10. At the "Input the CIMOM provider's namespace:" prompt, specify the namespace value that must be obtained from the vendor documentation for the CIM provider. Press Enter to continue.

11. At the "Input the CIMOM interop namespace:" prompt, specify the interoperability namespace, which implies where the CIMOM interoperability classes are stored. Press Enter to continue.

12. At the "Do you want to input another CIMOM? [n] [y,n,?]" prompt, type y to configure another CIMOM provider or n if you have finished. If you type y and press Enter, you again perform Steps 5-11 for the next CIMOM provider. If you type n and press Enter, you proceed directly to the following step.

13. Type **y** and press **Enter** to review/modify the **Advanced Settings**.

    - Automatically restart this agent from agent Monitor – Type y or n to specify whether the SMIS Array Agent will be restarted if down by the agent monitor.

    - Intervals of updating configuration information - How long to wait before refreshing the configuration data in cache; default value is 3600 seconds.

    - Timeout on execution a single CIM read command – Specify the command execution timeout value; the default value is 120 seconds.

    - Array discovery/check interval - Specifies how often the agent performs an array status check. The default value is 5 seconds.

    - Enable automatic agent registration - Turn on or off agent auto registration; is enabled (true) by default.

    - (Re)start agents after install – Enter **y** or **n** to specify whether to start/restart agents after the install.

    - Local Manager address for auto registration - Network-resolvable host name/IP Address of Local Manager/Central Manager to be contacted for agent auto registration.

    - TCP port for auto registration – Local Manager Registration Port used for agent auto registration; default value is 17146.

14. Type **y** and press **Enter** to restart agents after installation.

15. Type **y** and press **Enter** to confirm installing the agent.

16. The installation completes and returns you to the main package installation menu.

17. Type **Ctrl-D** and **q** to exit the package installation menu.

EMC AGENT

The EMC Agent reports configuration, capacity allocation, and performance information for EMC Symmetrix arrays. Refer to the *Sun StorageTek Business Analytics Support Matrix* to obtain the latest information on this agent's software and hardware requirements.

EMC AGENT MATRIX

Item	Description
Support Prerequisites	
Verify a supported version of EMS Solutions Enabler is installed	`symcfg –version`

Verify access to the VCM Database devices and check the version of Volume Logix installed on the system	`vcmfind (legacy)`
	
	`symmaskdb list database`

Verify access to Gatekeeper volumes	*syminq*
Verify availability of physical disk information	*symdev show*
Using EMC Remote SYMCLI Functionality:	

1. Configure storability.ini file	`REMOTE_CONNECTION = <proxy server name>`
	`SYMMASKDB_CMD_PATH = <location of the symmaskdb executable on the machine you are running the command>`
	(i.e. C:\Program Files\EMC\SYMCLI\bin\symmaskdb.exe)

2. Set SYMCLI_CONNECT and SYMCLI_CONNECT_TYPE environment variables on Windows server	`SYMCLI_CONNECT = "<proxy server name>"`
	
	`SYMCLI_CONNECT_TYPE="REMOTE"`
	
	Note: The "proxy server name" must correspond to an entry in the netcnfg file as set up by the Symmetrix administrator.

Agent Installation	
EMC Agent on Windows	• Sun StorageTek Business Analytics Windows Local Manager Installation CD (InstallShield) • Local Manager utilities and Configuration Tool required • Required Server Access: Administrator privileges
EMC Agent on Solaris	• Sun StorageTek Business Analytics Solaris Local Manager Installation CD • Package Installation • Required Server Access: root access and Management Station permissions • GSMbase and GSMlmutilities must be installed for all array agents
EMC Agent on AIX	• UNIX Local Manager Installation CD • Required server access: root access

Item	Description
Configuration Parameters	
Local Manager	• Network-resolvable host name/IP address of Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	• Local Manager's TCP port number (default is 17146) used for agent auto registration.
Enable Auto Registration	• Turns agent auto registration on (default) or off.
SYMAPI_LOCAL=Yes/No	• Indicates whether the agent will attempt to report on locally-attached Symmetrix arrays via local gatekeepers. The default value is Yes. Specifying No turns off the local access method.
SYMCLI_CONNECT_TYPE="REMOTE"	• This configuration setting must be set to run the EMC Agent in remote mode.
SYMMASKDB_CMD_PATH	• Specify the full pathname to the symmaskdb executable program. There is no default path on Windows; the default path on UNIX servers is: `/usr/symcli/bin/symmaskdb`.
ARRAY_STATUS_CHECK_INTERVAL = <value>	• Specifies how often the agent performs an array status check. The default value is 3600 seconds.
CONFIG_CACHE_REFRESH_INTERVAL = <value>	• Specifies how often to collect array configuration data. The default value is 600 seconds.
PERF_SAMPLE_INTERVAL = <value>	• Specifies how often to take a new sample performance read. The value of zero (0) disables performance collection. The default value is 120 seconds.
PERF_AVERAGE_INTERVAL = <value>	• Specifies the interval over which we average our performance reads. The value of zero (0) disables performance collection. The default value is 3600 seconds.
EXCLUDE_ARRAY_ID = <array id>	• This is multi-valued variable; one per line in the storability.ini file. Each entry specifies an Array Id from which the agent collects neither Configuration nor Performance data.
EXCLUDE_PERF_ARRAY_ID = <array id>	• This is multi-valued variable; one per line in the storability.ini file. Each entry specifies an Array Id from which the agent does not collect Performance data.

Table 3 - EMC Agent Matrix

Sample SYMAPI netcnfg File

The EMC SYMAPI netcnfg file contains the service names and connection information of the available network services. The Symmetrix administrator, who has knowledge of the available network services, maintains the file contents. A template file is shown in the following figure.

```
###########################################################################
#                                                                         #
# SYMAPI NETWORK SERVICE FILE TEMPLATE                                    #
#                                                                         #
# This network service file maps a service name to a remote               #
# server host node name and/or internet address and also to               #
# a port number to provide a TCP/IP connection for executing              #
# remote SYMAPI functions. More than one service can be                   #
# listed; one per line. This file, netcnfg is maintained in the SYMAPI    #
# configuration directory.                                                #
#                                                                         #
# There are six space separated fields:                                   #
# Service name, domain, protocol, server node, server address, and port.  #
# Domain should be unspecified (-) and protocol specified as TCPIP        #
# A hyphen (-) may be used as a substitute for an unspecified             #
# server nodename or internet address field.                              #
# A hatch (#) may be used as the first character in the line              #
# to indicate a comment line.                                             #
#                                                                         #
# Service Name  Domain Protocol   ServerNodename  IP Address       Port   #
#                                                                         #
# For example:                                                            #
# SYMAPI_SERVER    -      TCPIP       node001      208.148.76.168   1234  #
```

Figure 2 - SYMAPI netcnfg File Example

Installing EMC Agent - Windows

This section describes how to install and configure the EMC Symmetrix Agent on a Windows server.

1. Verify array access and gatekeeper devices. The designation of "GK" in the Type field indicates a gatekeeper device. For example:

```
C:\>syminq

       Device                           Product               Device
------------------------ --------- --------------------- -------------------
       Name        Type  Vendor    ID                Rev  Ser Num    Cap (KB)
------------------------ --------- --------------------- -------------------

\\.\PHYSICALDRIVE0       Compaq    Disk Array       1.42 N/A             N/A
\\.\PHYSICALDRIVE1       EMC       SYMMETRIX-SUNAPE 5567 72000000       7680
\\.\PHYSICALDRIVE2  GK   EMC       SYMMETRIX-SUNAPE 5567 72223000       2880
\\.\PHYSICALDRIVE3  GK   EMC       SYMMETRIX-SUNAPE 5567 72224000       2880
\\.\PHYSICALDRIVE4  GK   EMC       SYMMETRIX-SUNAPE 5567 72225000       2880
\\.\PHYSICALDRIVE5  GK   EMC       SYMMETRIX-SUNAPE 5567 72226000       2880
\\.\PHYSICALDRIVE6  GK   EMC       SYMMETRIX-SUNAPE 5567 72227000       2880
\\.\PHYSICALDRIVE7  GK   EMC       SYMMETRIX-SUNAPE 5567 72228000       2880
\\.\PHYSICALDRIVE8  GK   EMC       SYMMETRIX-SUNAPE 5567 72229000       2880
```

Figure 3 - Verify Array Access and Gatekeeper Devices

2. Verify access to the Volume Logix database, if applicable.

```
C:\Program Files\EMC\SYMCLI\bin>symmaskdb list database

Symmetrix ID            : 000184501372

Database Type           : Type1
Last updated at         : 02:44:01 PM on Mon Jan 30,2012

Director Identification : FA-3A
Director Port           : 0

                                  User-generated
Identifier        Type    Node Name        Port Name          Devices
----------------  ------  ---------------------------------  ---------
10000000c924187d  Fibre   srmmc            hba0               0057:0059
10000000c922cca4  Fibre   lmw2k01          hba0               0000
                                                              022D

Director Identification : FA-4A
Director Port           : 0

                                  User-generated
Identifier        Type    Node Name        Port Name          Devices
```

Figure 4 Using symmaskdb list database

3. Insert the Sun StorageTek Business Analytics Windows Local Manager CD into the CD-ROM drive. The Install Shield-based installation should automatically start up.

4. Click **Next>** on the **Welcome** menu to continue the installation.

5. Click **Yes** to accept the terms of the software license agreement.

6. Review/modify the **User Name** and **Company Name** and click **Next>**.

7. Select (check) the **EMC Agent** checkbox on the screen that allows you to select Sun StorageTek Business Analytics Agents for installation. You may also wish to install the **Host Agent** if you have not already. Click **Next** to continue with the installation.

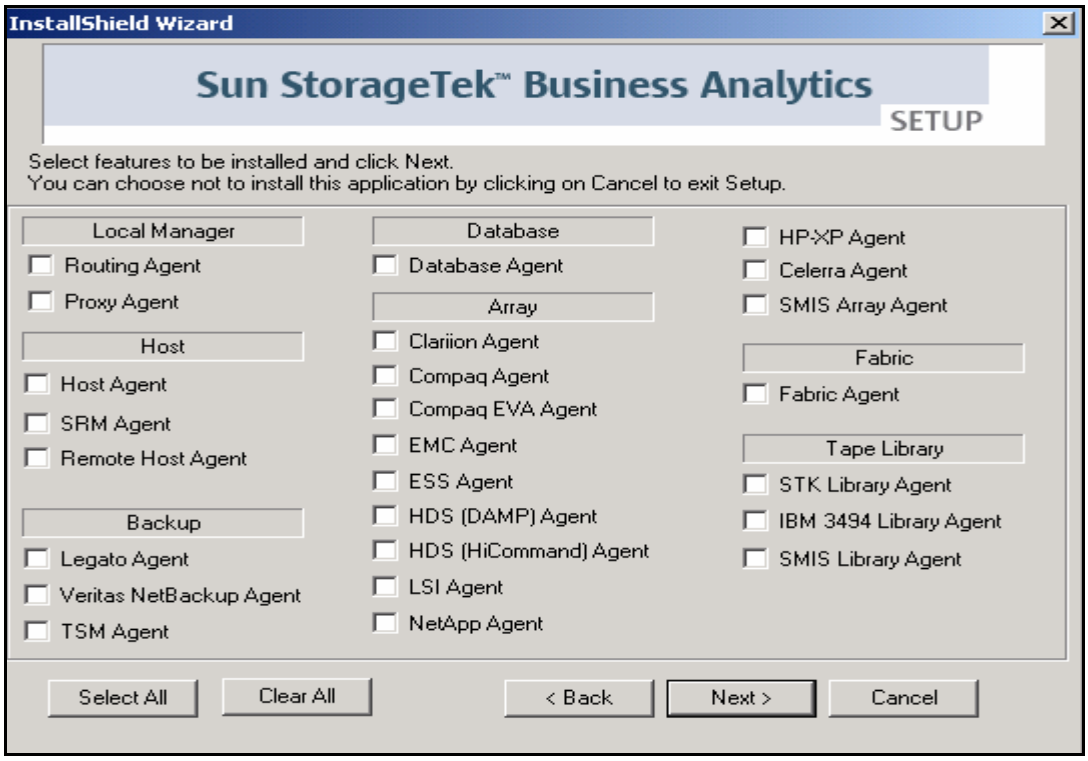


Figure 5 - Select Features To Be Installed

8. Review the settings and click **Next>** to continue. Besides the agent, the Local Manager is automatically installed with the Local Manager Utilities and the Configuration Tool.

9. The installation proceeds and an informational splash box is displayed showing the progress of the agent installation.

10. After the **Configuration Tool** is automatically launched, select **File**->**Edit**-> **Smart Agent Configuration**.

11. Click the **EMC Agent** tab.

12. For **Local Manager**, enter the IP Address or network-resolvable host name of the Local Manager to be contacted for agent auto registration.

13. For **Local Manager Registration Port**, specify the TCP port number the Local Manager uses for agent auto registration. The default port number is 17146.

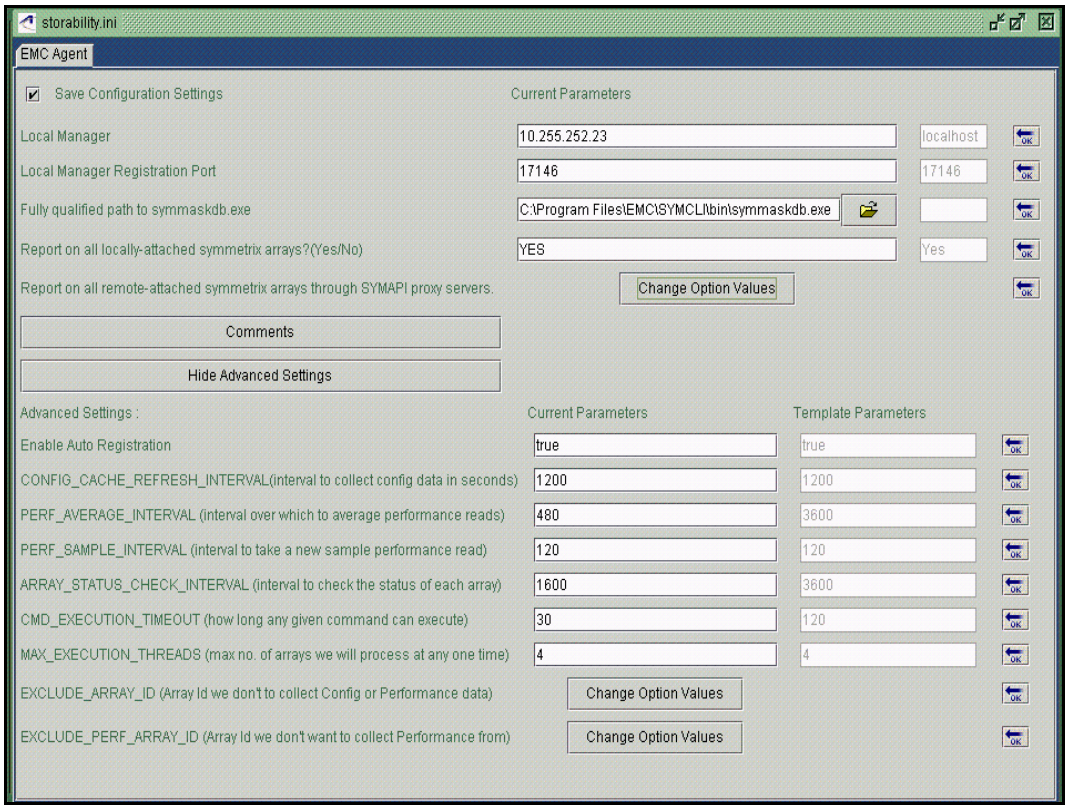


Figure 6 - EMC Agent Tab

14. For **Fully qualified path to symmaskdb.exe**, click the **Folder** icon and browse to the location of the symmaskdb.exe program. Click **Open** to select the fully qualified path to this program, if applicable.

15. The **Report on all remote attached symmetrix arrays through SYMAPI proxy servers** configuration setting allows you to configure the SYMAPI server interface if it is to be used. If to be used, proceed as follows:

    a. Click the **Change Option Values** button and the **Enter REMOTE_CONNECTIONS** Options dialog is opened.

b. Enter the servicename value for each (one per line) SYMAPI server that the EMC Agent will query. This value must correspond to an entry in the SYMAPI netcnfg file that the Symmetrix administrator has set up.

c. Click **Submit** after you have completed defining the SYMAPI servers.

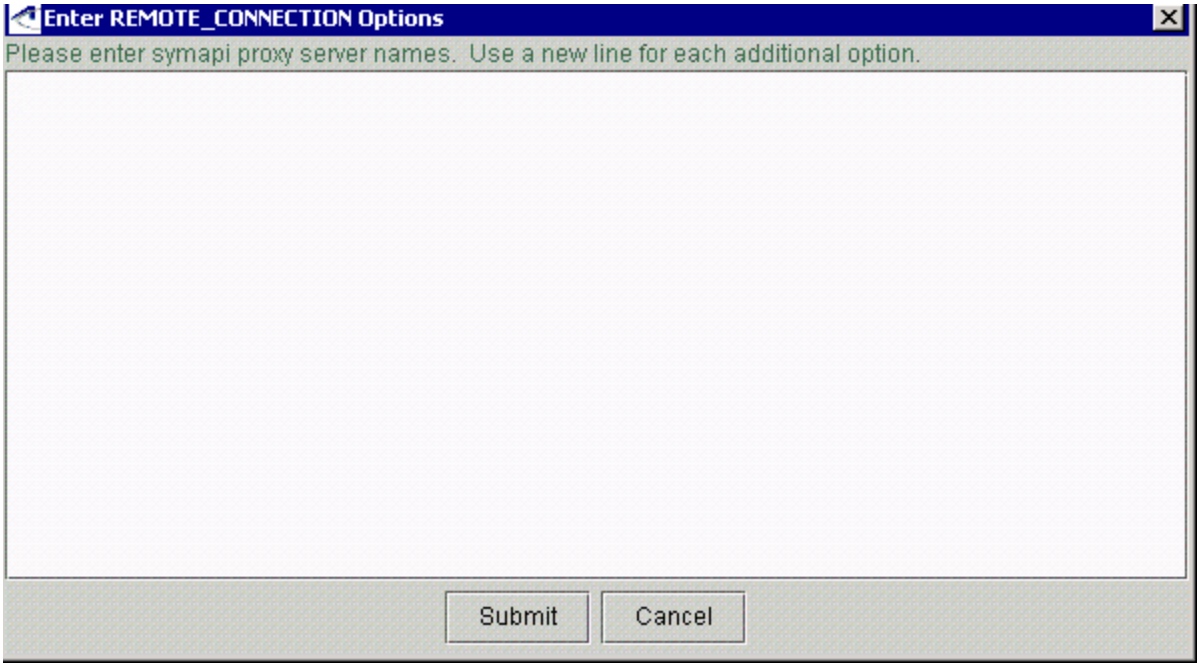


Figure 7 - Enter REMOTE_CONNECTION Options

16. Click **Show Advanced Settings** to review/modify the configuration settings:

- **Enable Agent Auto Registration** – Enable agent auto registration (default) or set to false to disable agent auto registration.
- **CONFIG_CACHE_REFRESH_ INTERVAL** - Specifies how often to collect array configuration data. The default value is 600 seconds for CONFIG_CACHE_REFRESH_INTERVAL.
- **PERF_AVERAGE_INTERVAL** - Specifies the interval over which the agent will average its performance reads. The default value is 3600 seconds for PERF_AVERAGE_INTERVAL.
- **PERF_SAMPLE_INTERVAL** – Specifies how often the agent takes a sample performance read. The default value is 120 seconds. Specifying the value of zero (0) disables performance collection.
- **ARRAY_STATUS_CHECK_INTERVAL** – Specifies how often the agent performs an array status check. The default value is 3600 seconds.
- **CMD_EXECUTION_TIMEOUT** – Specifies how long the agent will wait for the completion of a command. The default value is 3600 seconds.
- **MAX_EXECUTION_THREADS** – Specifies the maximum number of arrays the agent will process at a time. The default value is four (4).

- **EXCLUDE_ARRAY_ID** - This is a multi-valued variable; one entry per line in the storability.ini file. Each entry will specify an Array ID for which the agent will neither collect configuration information nor performance data.

- **EXCLUDE_PERF_ARRAY_ID** - This is a multi-valued variable one entry per line in the storability.ini file. Each entry will specify an Array ID for which the agent will not collect performance data.

17. With "Save Configuration Settings" enabled (check mark), select **File->Save** to store the configuration settings within the storability.ini file.

18. Select **Tools->Start Service** to start the agent before you verify agent functionality.

19. Select **File->Exit** to close the Configuration Tool.

INSTALLING EMC AGENT - SOLARIS

1. Verify array access and gatekeeper devices. The following example uses the `syminq` command; see Table 2: EMC Array Matrix for additional commands you can use.

```
root@symmsun01# syminq

        Device                          Product              Device
-------------------------- --------- ---------------------- --------------------
        Name         Type  Vendor    ID                 Rev  Ser Num    Cap (KB)
-------------------------- --------- ---------------------- --------------------

/dev/rdsk/c0t0d0s2         SEAGATE   ST39175LC          0001 3AL0W52T     8891620
/dev/rdsk/c2t0d0s2         EMC       SYMMETRIX          5567 72000000        7680
/dev/rdsk/c2t0d247s2 GK    EMC       SYMMETRIX          5567 7222A000        2880
/dev/rdsk/c2t0d248s2 GK    EMC       SYMMETRIX          5567 7222B000        2880
/dev/rdsk/c2t0d249s2 GK    EMC       SYMMETRIX          5567 7222C000        2880
```

Figure 8 - Verify Access to Array

2. Use the **vcmfind** command (legacy) or the **symmaskdb list database** command to verify access to the VCM Database devices.

3. Verify fully qualified path to symmaskdb. The following example uses the **find** command.

```
root@symmsun01# find / -name symmaskdb -print
/opt/emc/SYMCLI/V5.5.0/bin/symmaskdb
```

Figure 9 - Location of symmaskdb

4. Insert the Sun StorageTek Business Analytics UNIX Local Manager CD into the CD-ROM drive.

5. Mount the CD using the following command, for example:

```
mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /mnt
```

6. Change directory to the directory corresponding to the host's Solaris Operating System version.

7. Run the package installation utility and the main package installation menu is displayed.

```
pkgadd -d .
```

- **EXCLUDE_ARRAY_ID** - This is a multi-valued variable; one entry per line in the storability.ini file. Each entry will specify an Array ID for which the agent will neither collect configuration information nor performance data.

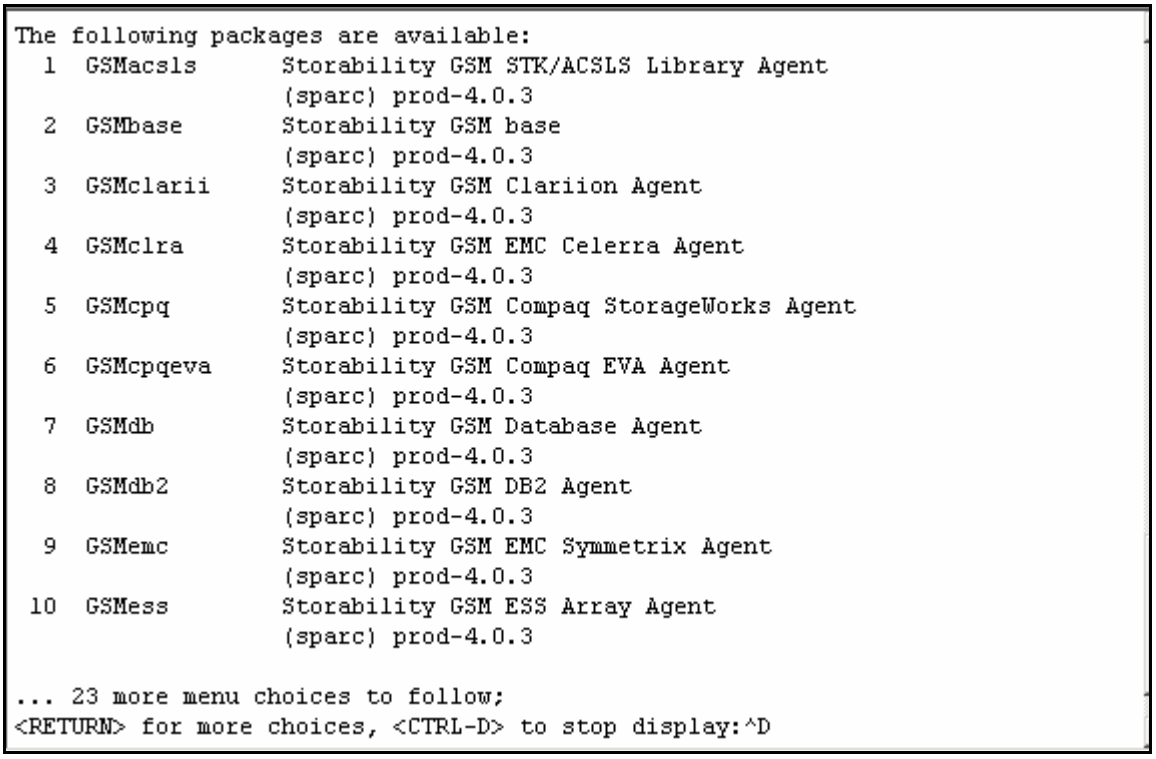


Figure 10 - Package Installation Main Menu

8. Select **GSMemc** from the package installation menu; type 9 and press **Enter**.

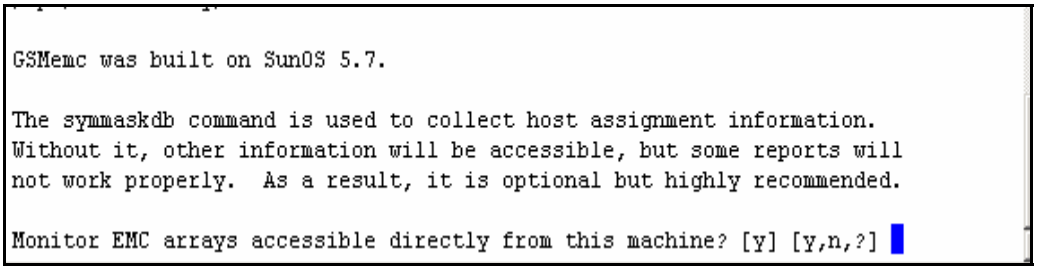


Figure 11 - Monitor Locally-Attached Symmetrix Arrays

9. Specify whether (y/n) the agent will attempt to report on locally-attached Symmetrix arrays via gatekeeper devices. The default value is y(es). Specifying n(o) disables the local access method.

10. For **SYMAPI proxy server name**, specify a SYMAPI server (servicename) that the agent will query, or press **Enter** to accept the default value of none. If specified, each servicename value must correspond to an entry in the SYMAPI **netcnfg** file, which the Symmetrix administrator has set up.

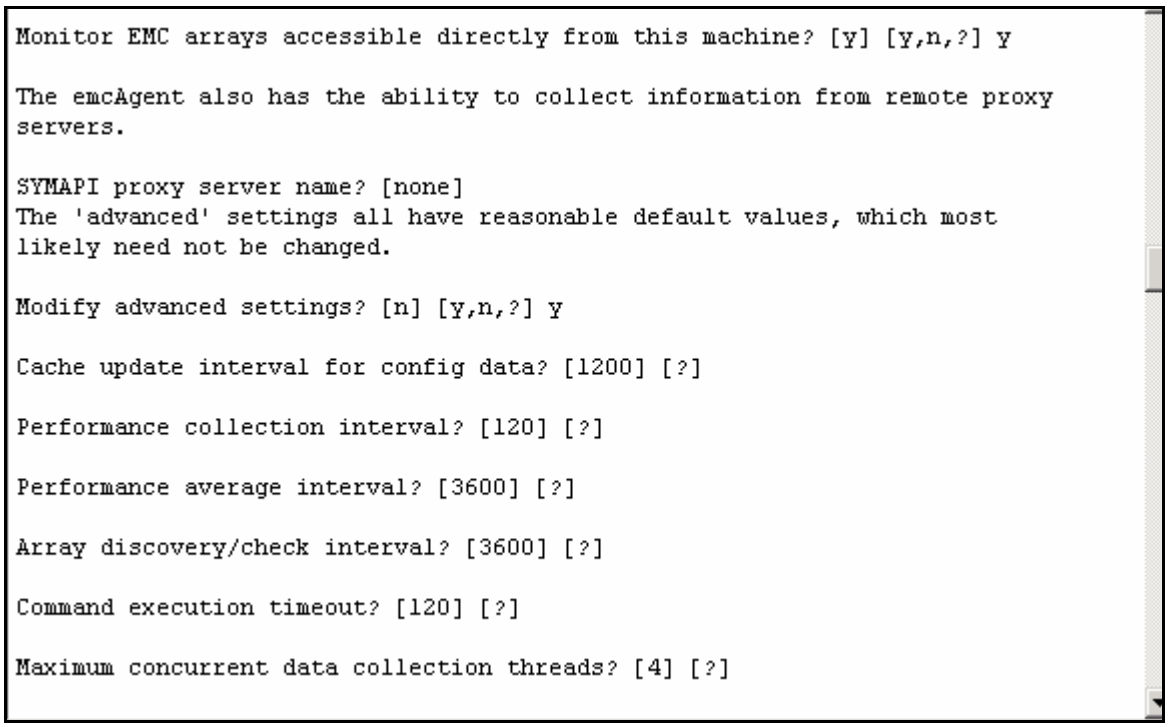


Figure 12 - EMC Agent Advanced Settings

11. Type **y** and press **Enter** to review/modify the **Advanced Settings**.

- **Cache update interval for config data** - Specifies how often to collect array configuration data. The default value is 1200 seconds.
- **Performance collection interval** - Specifies how often the agent takes a sample performance read. The default value is 120 seconds. Specifying the value of zero (0) disables performance collection.
- **Performance average interval** - Specifies the interval over which the agent will average its performance reads. The default value is 3600 seconds.
- **Array discovery/check interval** - Specifies how often the agent performs an array status check. The default value is 3600 seconds.
- **Command execution timeout** - Specifies how long the agent will wait for the completion of a command. The default value is 3600 seconds.
- **Maximum concurrent data collection threads -** Specifies the maximum number of arrays the agent will process at a time. The default value is four (4).
- Specify whether (y/n) the agents will be restarted after the package installation has completed.
- Specify whether (y/n) agent auto registration is enabled. Agent auto registration is enabled by default.

- Review the port number on which the Local Manager listens for agent auto registration. The default TCP port number is 17146.

12. Enter **y** if prompted to install conflicting files.

13. Enter y and press **Enter** to confirm continuing with the EMC Agent, when prompted.

14. The installation proceeds and returns you to the main package installation menu after it has completed.

15. Type Ctrl-D and enter **q** to exit the package installation menu.

INSTALLING EMC AGENT - AIX

1. Verify array access and gatekeeper devices using the `syminq` command.
2. Mount the installation CD in the CD-ROM drive of the AIX server. For example:

```
mount -v cdrfs -r /dev/cd0 /mnt  # /mnt directory must exist
```

3. Change directory to the software installation directory. For example:

```
cd /cdrom/UNIX/AIX/5.1
```

4. Run the EMC Agent installation script. For example:

```
./emcAgent-install.sh
```

5. Set up the following agent configuration parameters:

   - CONFIG_CACHE_REFRESH_ INTERVAL - Specifies how often to collect array configuration data. The default value is 600 seconds for CONFIG_CACHE_REFRESH_INTERVAL.
   - PERF_AVERAGE_INTERVAL - Specifies the interval over which the agent will average its performance reads. The default value is 3600 seconds for PERF_AVERAGE_INTERVAL.
   - PERF_SAMPLE_INTERVAL – Specifies how often the agent takes a sample performance read. The default value is 120 seconds. Specifying the value of zero (0) disables performance collection.
   - ARRAY_STATUS_CHECK_INTERVAL – Specifies how often the agent performs an array status check. The default value is 3600 seconds.
   - CMD_EXECUTION_TIMEOUT – Specifies how long the agent will wait for the completion of a command. The default value is 3600 seconds.
   - MAX_EXECUTION_THREADS – Specifies the maximum number of arrays the agent will process at a time. The default value is four (4).
   - EXCLUDE_ARRAY_ID - This is a multi-valued variable; one entry per line in the storability.ini file. Each entry will specify an Array ID for which the agent will neither collect configuration information nor performance data.
   - EXCLUDE_PERF_ARRAY_ID - This is a multi-valued variable; one entry per line in the storability.ini file. Each entry will specify an Array ID for which the agent will not collect performance data.

6. At the "Continue with Installation?" prompt, type **y** and press **Enter** to continue.

7. At the "(Re-)start agents after install [y]" prompt, specify whether (y/n) agents are to be restarted after the agent installation has completed.
8. The Installation completes and the EMC Agent is started on the AIX server.

Agent Auto Registration - Non-Solaris UNIX Hosts

To configure agent auto registration, you can add the EMC Agent to a Local Manager Routing Agent configuration as a SUB_AGENT entry or manually add the required entries to the agent's storability.ini file. Sample storability.ini settings appear below.

```
GSM_LM_HOST = 10.255.252.123
GSM_LM_PORT = 17146
GSM_ENABLE_LM_REGISTRATION = true
```

VERIFYING THE EMC SYMMETRIX AGENT

1. Use the Sun StorageTek Business Analytics Agent Diagnostic Tool (gsmdiag.exe) to verify agent functionality.
   a. Enter the IP Address or Hostname of the server where the agent is installed and set the port to 17135 (or select the agent from the drop down list of service names).
   b. Click the **Get Object List** button and you should receive a list of tables published by the Storability EMC Agent.
   c. Select the **gsa_ini_control-2_0** object and review the agent's configuration settings.

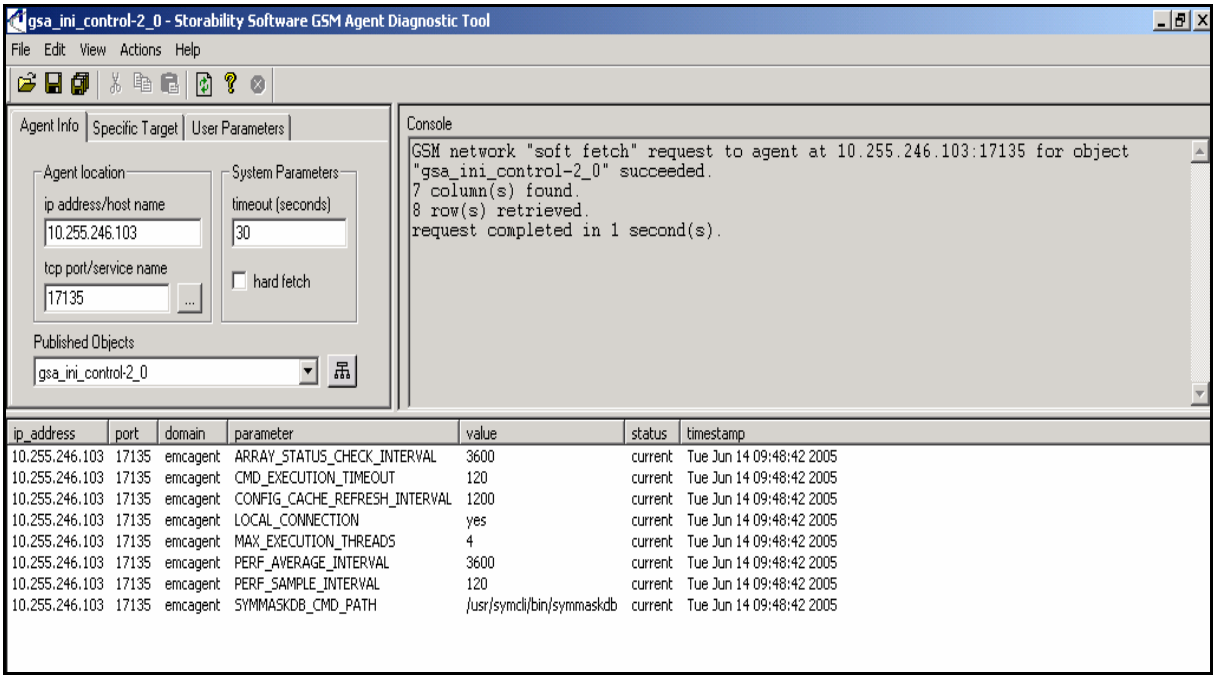
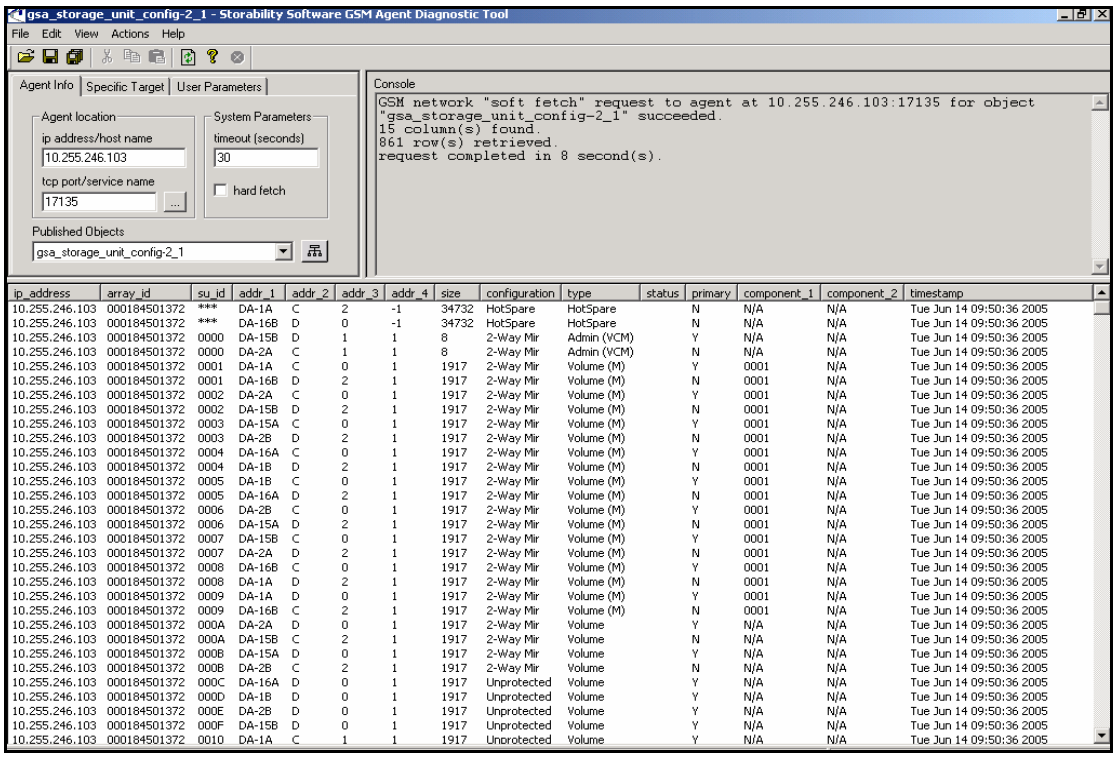


Figure 13 – Verify EMC Agent Configuration Settings

   d. Select the **gsa_storage_unit_config-2_1** object and verify data is returned.



ip_address	array_id	su_id	addr_1	addr_2	addr_3	addr_4	size	configuration	type	status	primary	component_1	component_2	timestamp
10.255.246.103	000184501372	***	DA-1A	C	2	-1	34732	HotSpare	HotSpare		N	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	***	DA-16B	D	0	-1	34732	HotSpare	HotSpare		N	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0000	DA-15B	D	1	1	8	2-Way Mir	Admin (VCM)		Y	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0000	DA-2A	C	1	1	8	2-Way Mir	Admin (VCM)		N	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0001	DA-1A	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0001	DA-16B	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0002	DA-2A	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0002	DA-15B	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0003	DA-15A	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0003	DA-2B	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0004	DA-16A	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0004	DA-1B	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0005	DA-1B	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0005	DA-16A	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0006	DA-2B	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0006	DA-15A	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0007	DA-15B	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0007	DA-2A	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0008	DA-16B	C	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0008	DA-1A	D	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0009	DA-1A	D	0	1	1917	2-Way Mir	Volume (M)		Y	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0009	DA-16B	C	2	1	1917	2-Way Mir	Volume (M)		N	0001	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000A	DA-2A	D	0	1	1917	2-Way Mir	Volume		Y	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000A	DA-15B	C	2	1	1917	2-Way Mir	Volume		N	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000B	DA-15A	D	0	1	1917	2-Way Mir	Volume		Y	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000B	DA-2B	C	2	1	1917	2-Way Mir	Volume		N	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000C	DA-16A	D	0	1	1917	Unprotected	Volume		Y	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000D	DA-1B	D	0	1	1917	Unprotected	Volume		Y	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000E	DA-2B	D	0	1	1917	Unprotected	Volume		Y	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	000F	DA-15B	D	0	1	1917	Unprotected	Volume		Y	N/A	N/A	Tue Jun 14 09:50:36 2005
10.255.246.103	000184501372	0010	DA-1A	C	1	1	1917	Unprotected	Volume		Y	N/A	N/A	Tue Jun 14 09:50:36 2005

Figure 14 – EMC Agent Storage Unit Configuration Object

e. Use the drop down list of **Published Objects** to proceed collecting all other objects published by the agent.

2. Verify the Storability EMC Agent has registered successfully with its configured Local Manager.

   a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the **ip address/host name** input box.

   b. Set the port to 17135 (or select the Storability Routing Agent from the drop down list of service names).

   c. Click the **Get Object** List button and you should receive a list of tables published by the Routing Agent.

   d. Select the gsa_agent_register object.

   e. Determine that the EMC Agent is registered for agent data collection:

      - Verify that its TCP port number (17135) appears in the "port" field and its host name/IP address is listed in the "active_peer" field.
      - Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

CLARIION AGENT

The Clariion Agent reports configuration and capacity allocation information for EMC CLARIION FC4500, FC 4700, and CX-series arrays. The Clariion Agent is now enhanced to support CX array MetaLUN functionality, which requires EMC Navisphere Management Suite or the Navisphere command-line interface (Navicli) version 6.5 (included in release 12 of CLARiiON firmware) or later.

Refer to the *Sun StorageTek Business Analytics Support Matrix* to obtain the latest information on this agent's software and hardware requirements.

CLARIION AGENT MATRIX

Item	Description
Support Prerequisites	
Resolve Firmware Version	Example: navicli –h <ip address> getagent Sample Output: Agent Rev: 6.7.1 (0.0) Name: K10 Desc: Node: A-APM00044403249 Physical Node: K10 Signature: 1213832 Peer Signature: 1206935 Revision: 2.07.500.5.010 SCSI Id: 0 Model: 500 Model Type: Rackmount Prom Rev: 3.16.00 SP Memory: 2046 Serial No: APM00044403249 SP Identifier: A Cabinet: DPE2 In the above example, the second decimal value is 07. To resolve the level of FW/Flare code, 7 is added to this value. In this example, our FW/Flare code version is 14 (7+7=14). If the value is greater than 15, this formula does not apply.
Verify Navicli Version	*navicli –help*
Determine the access path to the array controller(s) and verify accordingly	If the array is an FC4500, specify the IP address of a host running Navisphere Agent that is used to manage the array. The host running Navisphere Agent must have in-band access to the FC4500 array. If access to the array is through a fabric switch, the proper zoning must be in place to ensure the server has access to the array. For FC4700 or CX series arrays, specify the IP addresses of both array controllers.

Item	Description

Determine whether or not AccessLogix is enabled	For Navicli 6.x, use the following command to verify whether AccessLogix is enabled:
	
	`navicli -h <IP address of SP> storagegroup -status`
	
	`Data Access control: ENABLED # Sample command output`
	
	For Navicli 5.x, use the following command:
	
	`navicli -h <IP address of SP> storagegroup –list`
	
	Or:
	
	Use the Navisphere GUI interface to determine if AccessLogix security is enabled on the array.
	
	If the command returns storagegroup information, AccessLogix is enabled. However, if it does not return information, it could mean that AccessLogix is disabled, or it could mean that AccessLogix is in use but no volumes are assigned. Please use the Navisphere GUI to verify the AccessLogix status in that case.

User Name and Password	The user name and password required to access the storage system using the Java CLI must be configured in the storability.ini file. The storage administrator uses the -AddUserSecurity or –RemoveUserSecurity commands (e.g., java -jar navicli.jar -AddUserSecurity -password mypass -scope 0) to set up users in the Navisphere security file.
Best Practices	
Maximum number of monitored arrays	Five arrays per agent
Agent Installation	
Clariion Agent on Windows	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
Clariion Agent on Solaris	• Unix Local Manager Installation CD • Package Installation • Required Server Access: root access and Management Station permissions
Configuration Parameters	
EMC MirrorView	Specify whether or not EMC MirrorView (remote replication) software is installed.
SPA IP Address	Specify the IP address of the SPA Controller.
SPB IP Address	Specify the IP address of the SPB Controller.

Item	Description
Access Logix	Specify whether Access Logix is installed.
Collect Performance	Specify whether the agent is to collect performance statistics.
Cache Interval for Configuration Data	Specifies how often to collect array configuration data. The default value is 1200 seconds.
Local Manager	Network-resolvable name/IP Address of Local Manager/Central Manager to be contacted for agent auto registration.
Local Manager Registration Port	Local Manager's TCP port number (default is 17146) used for agent auto registration.
Enable Auto Registration	Turns agent auto registration on (default) or off.

Table 4 - Clariion Agent Matrix

INSTALLING THE CLARIION AGENT ON WINDOWS

This section describes how to install and configure the EMC Clariion Agent on a Windows platform.

1. Insert the Windows Local Manager Installation CD into the CD-ROM drive. The Install-Shield-based installation should be automatically started.

2. Click **Next>** on the **Welcome** menu to continue the installation.

3. Click **Yes** to accept the terms of the software license agreement.

4. Review/modify the **User Name** and **Company Name** and click **Next>**.

5. Check the **Clariion Agent** checkbox on the screen that allows you to select the agents for installation. Click **Next>.**

6. Review the settings and click **Next>** to continue.

7. Specify an install directory path or accept the default destination of <drive>:\Program Files\Storability. Click **Next** to continue.

8. When the Configuration Tool is automatically launched, select **File**->**Edit**->**Smart Agent Configuration**.

9. Click the **Clariion Agent** tab and then click **Add**. Specify the following information and then click **Submit** for each Clariion array:

    - **SPA IP ADRESS** –This line specifies the IP address of the SPA Controller or a Proxy server.
    - **SPB IP ADRESS –**This line specifies the IP address of the SPB Controller.
    - **Access Logix Installed –** Leave the check in the checkbox if Access Logix is installed, or remove it if it is not installed.
    - **Collect Performance -** Leave the check in the checkbox if performance data is to be collected, or remove it if it is not to be collected.
    - **User Name –** Enter a valid user name the storage administrator has added to the Navisphere security file.
    - **Password –** Enter the user's password if it is not already defined in the Navisphere security file.

10. For **Local Manager**, enter the network-resolvable name/IP Address of Local Manager/Central Manager to be contacted for agent auto registration or accept localhost.
11. **For Local Manager Registration Port**, the TCP port used for agent auto registration is 17146.
12. For **NaviCLI executable**, enter the fully qualified path for the NaviCLI executable program or click the folder icon to browse for the program.
13. Beside the **MirrorView_Installed** heading, specify **Yes** if MirrorView is installed or **No** if it is not installed.
14. For **Complete JRE Path**, enter the fully qualified path to the Java runtime environment executable or click the Folder icon to browse for the location. To see the latest JRE supported, refer to the *EMC Navisphere Manager and Manager Base Release Notes*.

15. Optionally click the **Comments** button and a dialog opens to allow you to type comments.

16. Click **Show Advanced Settings** and review/modify the following configuration parameters:

    Enable Auto Registration – Turns on or off agent auto registration; is enabled (true) by default.

    CONFIG_CACHE_REFRESH_INTERVAL - How long to wait before refreshing the configuration data in cache; default value is 1200 seconds.

    PERF_AVERAGE_INTERVAL – Interval over which to average the performance of Read operations. Default value is 3600 seconds.

    PERF_SAMPLE_INTERVAL – Interval between collections of performance data for the Clariion array; default is 120 seconds.

    ARRAY_STATUS_CHECK_INTERVAL – Maximum cache age for status data in seconds; default is 3600 seconds.

    CMD_EXECUTION_TIMEOUT – Statistics and events collection interval in seconds; default is 120 seconds.

    MAX_EXECUTION_THREADS – Maximum number of threads used by agent; default value is 4.

    EXCLUDE_ARRAY_ID – Click the **Change Option Values** tab and the EXCLUDE_Array_ID Options dialog box opens. Specify each Array ID for which configuration data is not to be collected; enter one Array ID per line.

    Note: This option is provided for complex FC4500 array configurations, where a single FC4500 array is managed by more than one Navisphere Agent instance, and would be reported by more than one instance of Storability Clariion Agent. In this case, the array must be excluded from all but one instance of the Clariion Agent to avoid duplication.

17. Select **File->Save** and confirm saving the storability.ini file.

18. Select **File->Exit** to close the Configuration Tool.

19. View the **Readme** file and click **Finish** to complete the installation.

20. Use the **Windows** Services panel to start the agent before you verify agent functionality.

INSTALLING THE CLARIION AGENT - SOLARIS

1. Verify supported version of Navicli is installed. For example:

```
root@symmsun01# ./navicli -h 10.250.1.59 getagent

Agent Rev:            6.6.0 (3.18)
Name:                 K10
Desc:
Node:                 B-F60005000096
Physical Node:        K10
Signature:            458808
Peer Signature:       282957
Revision:             8.51.52
SCSI Id:              0
Model:                4700
Model Type:           Rackmount
Prom Rev:             3.06.10
SP Memory:            895
Serial No:            F60005000096
SP Identifier:        B
Cabinet:              DPE
```

Figure 15 - Verifying Navicli Version

2. Verify whether AccessLogix is enabled.

```
root@symmsun01# ./navicli -h 10.250.1.58 storagegroup -status
Data Access control: ENABLED

root@symmsun01#
```

Figure 16 - Verify AccessLogix Enabled

3. Mount the UNIX Local Manager installation CD on the Solaris server. For example:

```
mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /mnt
```

4. Change directory to the appropriate directory for the Solaris operating system.

5. Run the pkgadd command and the main package installation menu is displayed.

```
pkgadd -d .
```

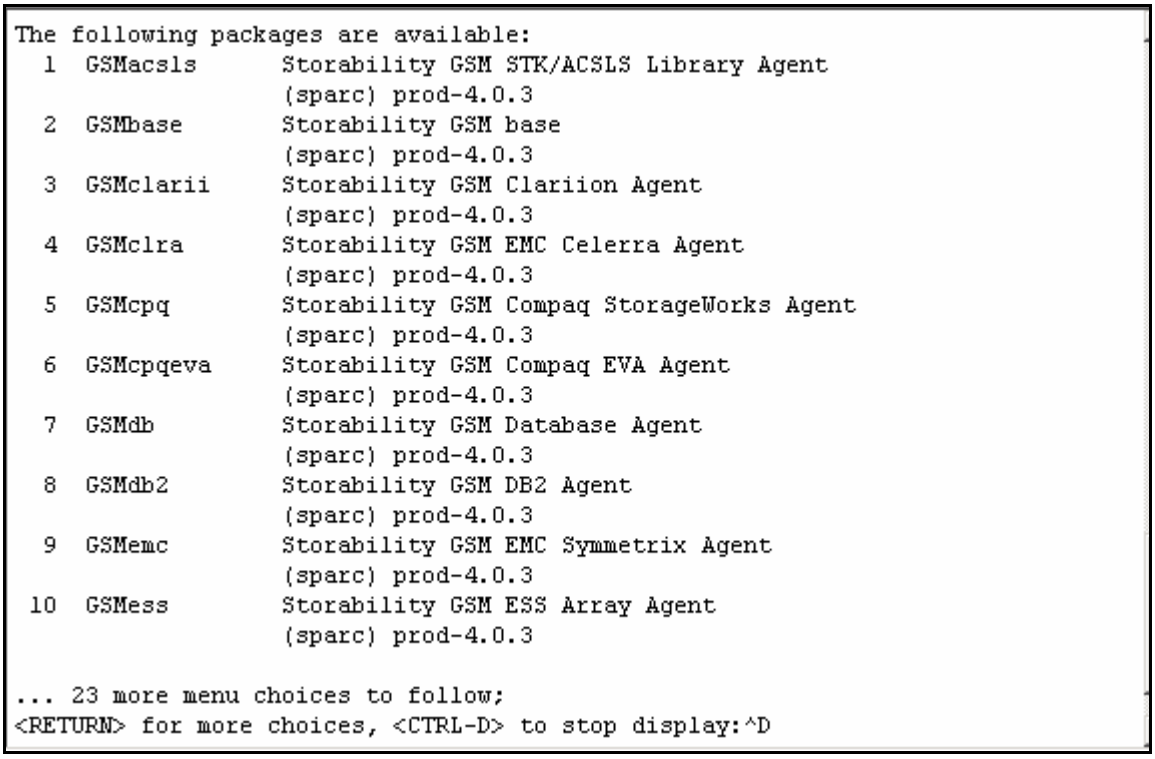


Figure 17 – Select Clariion Agent Package

6. Type the package selection number (Option 3) for the Clariion Agent and press **Enter** to select installing this agent.

7. If navicli is not found in the default location (/opt/Navisphere/bin), the script will prompt you for its location.

8. Type **y** if MirrorView is installed or **n** if not installed and press **Enter**.

9. Type the number to specify the type of array and press **Enter** to continue.

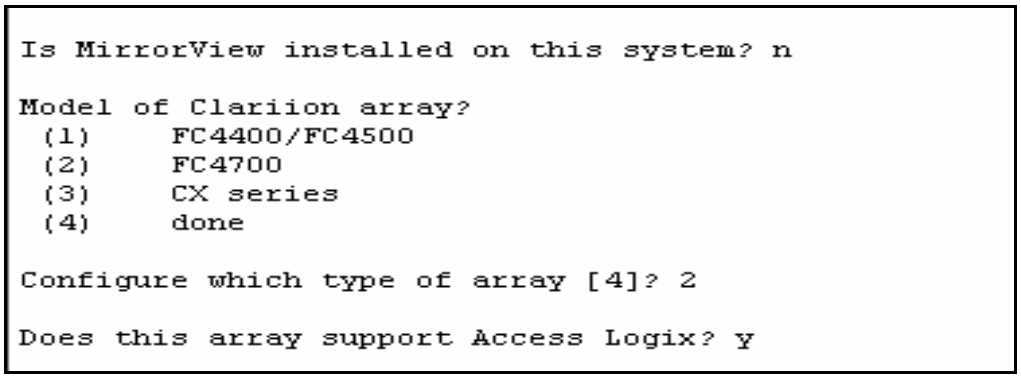


Figure 18 - Specify Clariion Array

10. Specify whether or not the array supports Access Logix and press **Enter** to continue.

11. Specify whether to collect performance information for this array.

12. Type the SPA IP address and press **Enter**.

13. Type the SPB IP Address and press **Enter**.

14. Repeat the above steps for the next array or type 4 and press **Enter** to specify you have finished configuring the arrays.

15. Type **y** and press **Enter** to review/modify the **Advanced Settings**.

```
Modify advanced settings? [n] [y,n,?] y

Cache update interval for config data? [1200] [?]

Performance collection interval? [120] [?]

Performance average interval? [3600] [?]

Array discovery/check interval? [3600] [?]

Command execution timeout? [120] [?]

Maximum concurrent data collection threads? [4] [?]

Automatically restart this agent from agentMonitor? [y] [y,n,?] y

Enable automatic agent registration? [y] [y,n,?] y

Local Manager address for agent registration? [localhost]

TCP port for agent registration? [17146] [?]

(Re-)start agents after install [y] [y,n,?,q] y
```

Figure 19 - Clariion Agent Advanced Settings

- Cache Update for Configuration Data - How long to wait before refreshing the configuration data in cache; default value is 1200 seconds.

- Performance Collection Interval - Interval between collections of performance data for the Clariion array; default is 120 seconds.

- Performance average interval - Interval over which to average the performance of Read operations. Default value is 3600 seconds.

- Array discovery/check interval - Maximum cache age for status data in seconds; default is 3600 seconds.

- Command execution timeout - Statistics and events collection interval in seconds; default is 120 seconds.

- Maximum concurrent data collection threads - Maximum number of threads used by agent; default value is 4. Increase this value if you are collecting data from more than 4 arrays using this agent.

- Automatically restart agent from Agent Monitor – Specify whether a SNMP trap will be sent and the agent will be restart agent, if down.

- Enable automatic agent registration - Turn on or off agent auto registration; is enabled (true) by default.

- Local Manager address for auto registration - Network-resolvable host name/IP Address of Local Manager/Central Manager to be contacted for agent auto registration.

- TCP port for auto registration – Local Manager Registration Port used for agent auto registration; default value is 17146.

16. Type **y** and press **Enter** to restart agents after installation.

17. Type **y** and press **Enter** to confirm installing the agent.

```
Do you want to continue with the installation of <GSMclarii> [y,n,?] y

Installing Storability GSM Clariion Agent as <GSMclarii>

## Executing preinstall script.
## Installing part 1 of 1.
/app/storability/bin/clariionAgent
[ verifying class <none> ]
Modifying /etc/init.d/clariionAgent
[ verifying class <build> ]
/app/storability/etc/agents:    updated.
[ verifying class <cf> ]
```

Figure 20 - Clariion Agent Installation Completed

18. The installation completes and returns you to the main package installation menu.

19. Type **Ctrl-D** and **q** to exit the package installation menu.

VERIFYING THE STORABILITY CLARIION AGENT

1. Use the Sun StorageTek Business Analytics Agent Diagnostic Tool to verify agent functionality.

   a. In **Agent location** window, enter the IP Address or Hostname of the server where the agent is installed.

   b. Set the port to 17141 (or select the agent from the drop down list of service names).

   c. Click the **Get Object List** button and you should receive a list of objects published by the Storability Clariion Agent.

   d. Select the **gsa_ini_control-2_0** object and examine/verify your configuration settings.

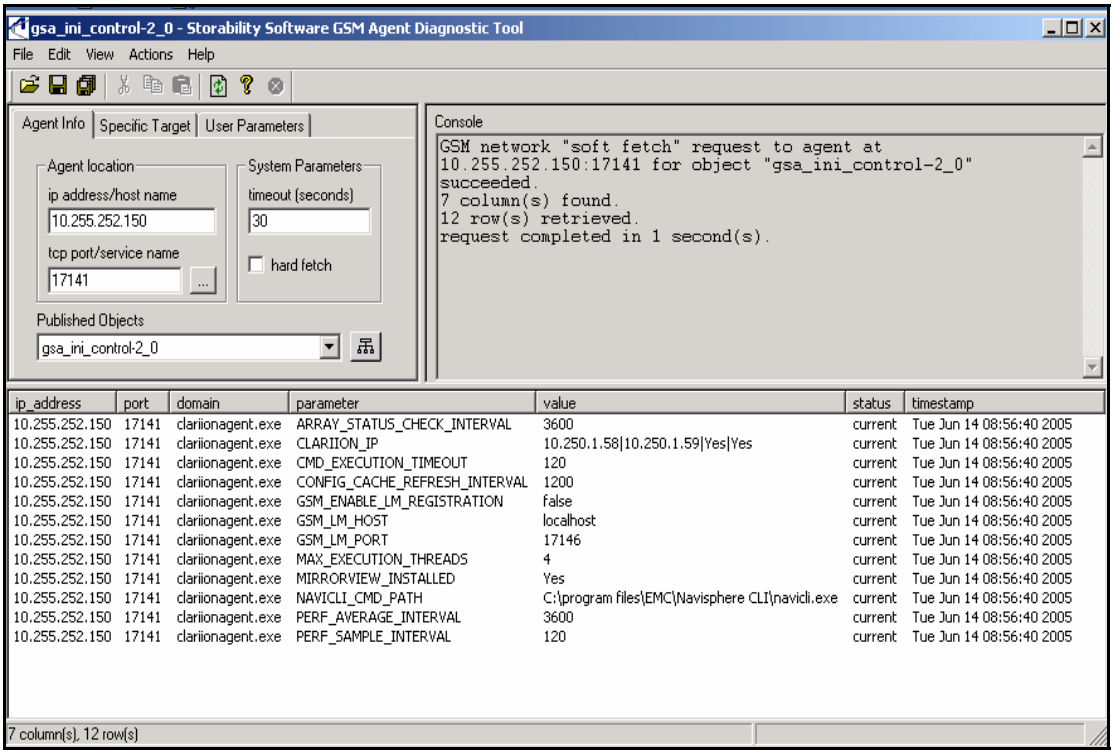


Figure 21 - Verify Clariion Agent Configuration Settings

e. Select the **gsa_storage_unit_config-2_1** object and verify data is returned.

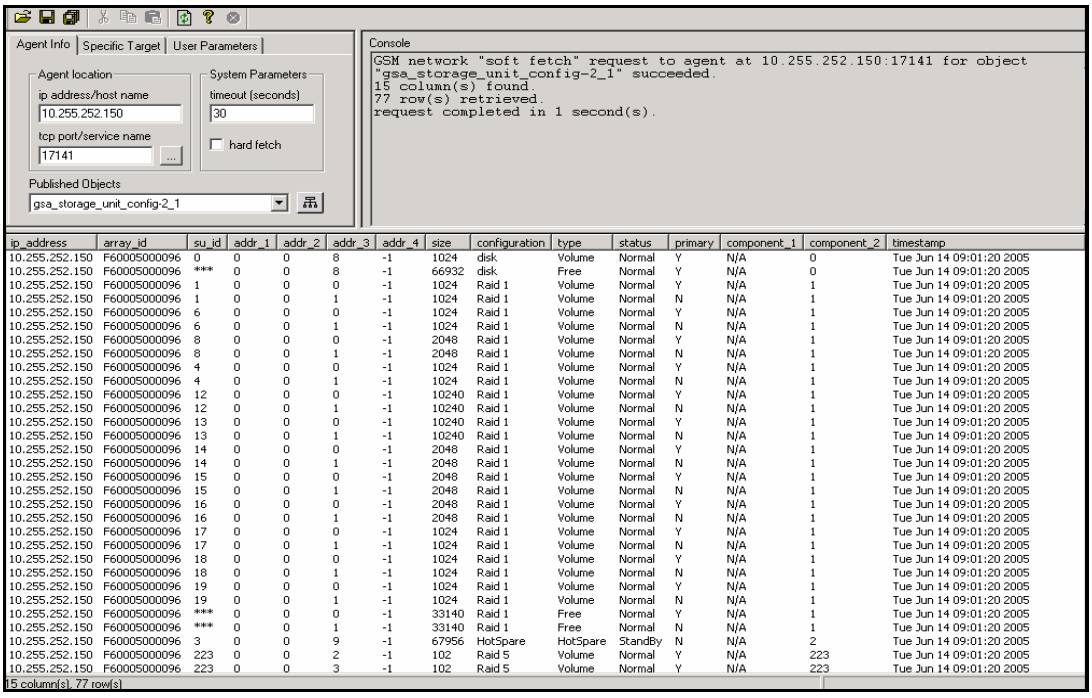


Figure 22 – Verify Storage Unit Configuration Object – Clariion Agent

f. Select the **gsa_host_storage_unit-2_1** object and verify that you can collect allocation information.

1. To verify the agent has registered successfully with its configured Local Manager:

    a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the **ip address/host name** input box.

    b. Set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).

    c. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.

    d. Select the **gsa_agent_register** object.

    e. Determine that the Clariion Agent is registered for agent data collection:

    - Verify that its TCP port number (17141) appears in the "port" field and its host name/IP address is listed in the "active_peer" field.

    - Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

COMPAQ EVA AGENT

The Compaq EVA Agent reports configuration and capacity allocation information on HP/Compaq StorageWorks EVA arrays. Refer to the *Sun StorageTek Business Analytics Support Matrix* to obtain the latest information on this agent's software and hardware requirements.

The Compaq EVA agent can monitor multiple management appliances that, in turn, manage one or more arrays.

EVA AGENT MATRIX

Item	Description
Support Prerequisites	
Verify Ethernet connectivity to SANWorks Management Appliance 1.x or 2.0	`ping <IP_Address>`
Verify Virtual Controller Software (VCS) 1.x or 2.0 is installed	
Verify SSSU 1.x or 2.0 (included in host-specific platform kit) is installed	Provides the required SSSU CLI interface to the array.

Item	**Description**
Best Practices	
Maximum number of monitored arrays	Monitor a maximum of 2 SAN Appliances per agent
Agent Installation	
EVA Agent on Windows 2000	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
EVA Agent on Solaris	• Local Manager Installation CD (Unix) • Package Installation • Required Server Access: root access and Management Station permissions
Configuration Parameters	
IP Address	IP address of the management appliance interface for connection authentication.
User Name	User name for connection authentication
Password	Password for connection authentication
EVA SSSU Command Path	Fully qualified path to the SSSU CLI software
Local Manager	IP Address or host name of the Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	Local Manager's TCP port number used for agent auto registration. The default port number is 17146.
Enable Auto Registration	Turns agent auto registration on (default) or off.
Agent Command Timeout Interval	How long to wait for a data collection command to complete; default value is 60 seconds
Interval to collect configuration data	Array configuration cache interval; default value is 3600 seconds
Interval to check the status	Array status cache interval; default value is 3600 seconds
Max. number of arrays to process at any one time	Maximum number of simultaneously monitored arrays; default value is 5.

Table 5 – Storability EVA Agent Matrix

INSTALLING THE STORABILITY EVA AGENT - WINDOWS

1. Insert the Windows Local Manager CD into the CD-ROM drive.

2. Click **Next>** to on the **Welcome** menu to continue the installation.

3. Click **Yes** to accept the terms of the software license agreement.

4. Click **Next>**.

5. Review/modify the **User Name** and **Company Name** and click **Next**.

6. Check the **Compaq EVA Agent** checkbox on the screen that lists the Sun StorageTek Business Analytics Agents for installation. You may want to install the **Host Agent** as well. Click **Next**.

7. Review the settings and click **Next>** to continue.

8. Click **Yes** to acknowledge the **SSSU executable** requirement (or install this utility and re-install this agent) and click **Next** to continue.

9. Specify whether or not to install the Configuration Tool.

10. When the Configuration Tool is automatically launched, select **File**->**Edit**->**Smart Agent Configuration**.

11. Click the **Compaq EVA Agent** tab and click **Add** to specify the configuration variables:

    IP Address - Specify the IP address of the management appliance interface for connection authentication.

    User Name - Specify the user name for connection authentication.

    Password - Specify the password for connection authentication.

- **Local Manager** Network-resolvable name/IP Address of Local Manager/Central Manager to be contacted for agent auto registration.

- **Local Manager Registration Port -** Local Manager's TCP port number used for agent auto registration; default value is 17146.

12. Click **Show Advanced Settings** and review/modify the following configuration parameters:

    Enable Auto Registration – Turn on (default) or off agent auto registration.

    EVA SSSU Command Path - Set the fully qualified path to the sssu program (sssu.bat). Clicking the **Folder** icon allows you to browse and locate the file.

    Agent Command Timeout Interval - Specify the timeout interval for data collection command execution.

    Interval to collect configuration data – Specify how often to collect performance information for the array.

    Interval to check the status of each array - Set the cache refresh interval (in seconds).

Maximum number of arrays to process at any one time – Specify the number of storage arrays to be monitored in your environment or accept the default value of 5.

20. Select **File->Save** and confirm saving the changes.

21. Select **File-> Exit** to close the Configuration Tool.

22. View and then close the **Readme** file and click **Finish**.

23. Use the Windows **Services** panel to restart the Storability EVA Agent before you verify agent functionality.

INSTALLING THE COMPAQ EVA AGENT - SOLARIS

1. Insert the UNIX Local Manager CD into the CD-ROM drive.
2. Mount the CD using the command:

```
mount –F hsfs –o ro /dev/dsk/c0t6d0s0 /mnt
```

3. Change to the directory corresponding to the host's Solaris Operating System version. Solaris 7 or 8 packages are located in /Unix/Solaris/7,8.
4. Run the package installation utility and the main package installation menu appears.

```
pkgadd –d .
```

5. Select the **GSMcpqeva** agent; type 6 and press **Enter**.
6. At the "IP Address of the EVA Manager" prompt, enter the IP address of the management appliance and press **Enter**.
7. Enter the **user name** for connection authentication and press **Enter**.
8. Enter and confirm the password for connection authentication.
9. Specify the **IP address**, **user name**, and **password** for another array, or press **Enter** on an empty IP Address line to specify you are finished.
10. At the "Location of sssu" prompt, specify the fully qualified path to the sssu program. The installation script verifies the path is valid.
11. When prompted, review/modify the **Advanced Settings**:
    - **Local Manager -** Network-resolvable host name/IP address of Local Manager to be contacted for agent auto registration.
    - **Local Manager Registration Port** – Accept the default Local Manager Registration Port of 17146
    - **Enable Auto Registration** – Is enabled (true) by default; specify false to disable auto registration.
    - **EVA_TIMEOUT_INTERVAL** - Specify the timeout interval for read and write command execution.
    - **ARRAY_REFRESH_INTERVAL** - Set the cache refresh interval (in seconds).
12. Enter **y** to (re) start the agents after installation.
13. Enter **y** to confirm installing the Compaq EVA agent.
14. Enter **y** if prompted to install conflicting files.

15. The installation proceeds and returns you to the main package installation menu after it has completed.

16. Enter **q** to exit the package installation menu.

VERIFYING THE COMPAQ EVA AGENT

1. Use the **Sun StorageTek Business Analytics Agent Diagnostic Tool** to verify agent functionality.
   a. Enter the IP Address or Hostname of the server where the agent is installed and set the port to 17143 (or select the agent from the drop down list of service names).
   b. Click the **Get Object List** button and you should receive a list of tables published by the Storability EVA Agent.
   c. Select the **gsa_storage_unit_config** table and verify data is returned.
   d. Use the drop down list of objects to proceed collecting the other objects published by the agent.
2. To verify the Storability EVA Agent has registered successfully with its configured Local Manager:

   a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the ip address/host name input box and set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).

   b. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.

   c. Select the **gsa_agent_register** object.

   d. Confirm that the Storability EVA Agent is registered:

      - Verify that its TCP port number (17143) appears in the "port" field and its host name/IP address is listed in the "active_peer" field.

      - Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

COMPAQ AGENT

The Storability Compaq Agent reports configuration and storage allocation information for HP/Compaq HSG80-based arrays.

COMPAQ AGENT MATRIX

Item	Description
Support Prerequisites	
Verify serial connectivity from the	

agent platform to both array controller serial console ports	
Warning	
Serial Port Parity	Conserver (one of the agent's components) won't connect to a HSG80-based array if the serial port is set to odd parity.
Item	**Description**
Agent Installation	
HP/Compaq HSG80-Based Array Agent on Windows 2000	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
HP/Compaq HSG80-Based Array Agent on Solaris	• Local Manager Installation CD (Unix) • Package Installation • Required Server Access: root access and Management Station permissions
Agent Installation	
HP/Compaq HSG80-Based Array Agent on Windows 2000	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
HP/Compaq HSG80-Based Array Agent on Solaris	• Local Manager Installation CD (Unix) • Package Installation • Required Server Access: root access and Management Station permissions
Configuration Parameters	
Local Manager	Network resolvable name or IP address of the Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	TCP port number the Local Manager uses for auto registration. The default port number is 17146.
HSG80 Array Logs	Name of the top and bottom controller log files.
HSG80 Log Directory	Directory name where conserver logs the information for the arrays.
Enable Auto Registration	Specifies whether or not the agent is allowed to communicate with the upstream Local Manager for auto registration. Default value is true but may be set to false to disable auto registration.
Read Interval	Averaging interval; default value is 3600 seconds
Read Update Interval	How often performance data is collected; default value is 120 seconds

INSTALLING THE STORABILITY COMPAQ AGENT - WINDOWS

1. Insert the Windows Local Manager CD into the CD-ROM drive.

2. Click **Next** on the Welcome menu to continue the installation.

3. Click **Yes** to accept the terms of the software license agreement.

4. Review/modify the **User Name** and **Company Name** and click **Next**.

5. Check the **Compaq Agent** checkbox on the screen listing Sun StorageTek Business Analytics Agents for installation. You may also want to install the Host Agent as well. Click **Next**> to continue.

6. Review the settings and click **Next>** to continue.

7. Specify whether or not to install **Cygwin**, if not already installed.

   Note: Cygwin is a prerequisite for this Sun StorageTek Business Analytics Agent; the installation will not proceed unless Cygwin is installed.

8. Specify whether or not to install a new version of the Configuration Tool.

9. When the Configuration Tool is automatically launched, select **File** -> **Edit** -> **Smart Agent Configuration**.

10. Click the **Compaq Agent** tab and click **Add.** The "Add property HSG80_ARRAY_LOGS" dialog box appears.

11. Click the **Folder** icon to locate and select the top controller log (e.g., hsg01_top.log)

12. Repeat the above step to locate and select the bottom controller log.

13. Click **Submit**.

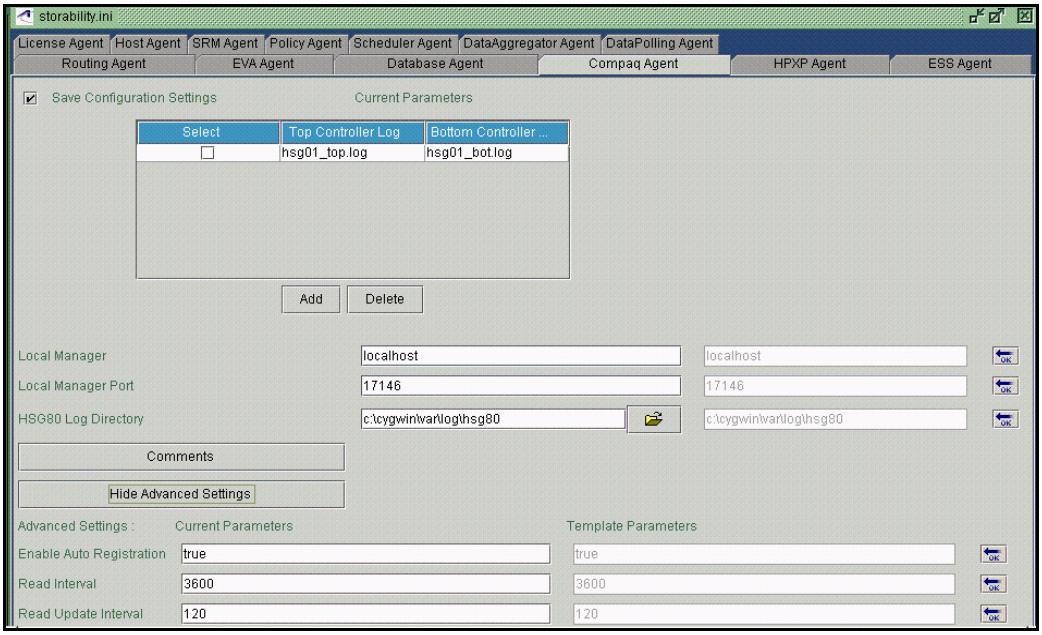


Figure 23 - Compaq Agent Configuration Tab

14. Repeat Steps 10-13 for each array to be monitored.

15. For **Local Manager**, type the network-resolvable name or IP address for the Local Manager to be contacted for auto registration.

16. For **Local Manager Registration Port**, this value specifies the port number the Local Manager uses for auto registration. The default value is 17146.

17. For **HSG80 Log Directory**, enter the name for the directory in which conserver logs the information for the arrays. This is the Windows path to the directory, not the Cygwin path to the directory (i.e. c:\cygwin\var\log\hsg80).

18. Click **Show Advanced Settings**.

19. For **Enable Auto Registration**, specify whether the agent should automatically register (default) with the Local Manager or not.

20. For **Read Interval**, specify the Averaging Interval in seconds or accept the default value of 3600 seconds.

21. For **Read Update Interval**, specify the interval to collect performance data or accept the default value of 120 seconds.

22. Select **File->Save** and verify saving the changes in the storability.ini file.

23. Select **File->Exit** to close the Configuration Tool.

24. Using a text editor (e.g., notepad) open the conserver.cf.sample file located in **/opt/conserver/etc** and save this file as **conserver.cf**.

25. Read the information that specifies how to set up this configuration file for your storage array.

Figure 24 - conserver.cf File

26. Customize the **conserver.cf** file for your storage array and save the modified **conserver.cf** file.

27. Use the Windows **Services** panel to restart the Storability Compaq Agent before you verify agent functionality.

INSTALLING THE STORABILITY COMPAQ AGENT - SOLARIS

1. Insert the UNIX Local Manager CD into the CD-ROM drive.

2. Mount the CD using the following command, for example:

```
mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /mnt
```

3. Change to the directory corresponding to the host's Solaris Operating System version.
4. Run the package installation utility.

   pkgadd –d .

5. Select **STconsrv** from the package installation menu.
6. Press **Enter** to accept the default installation directory.
7. Press **Enter** to allow the default directory to be created (if it does not exist).
8. Enter **y** to continue with the installation. The installation proceeds and returns you to the main package installation menu.
9. Enter **q** to exit and set up the conserver configuration file (conserver.cf).
10. Using a text editor (e.g., vi) open the conserver.cf.sample file located in **/opt/conserver/etc** and save this file as **conserver.cf**.
11. Read the information that specifies how to set up this configuration file for your storage array.

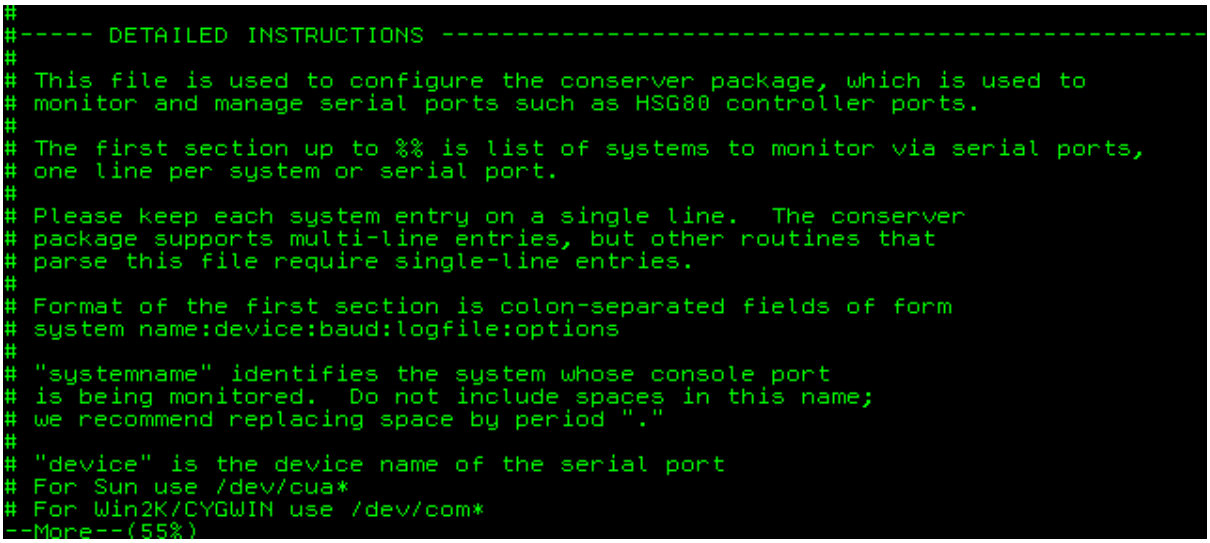


Figure 25 - conserver.cf File

12. Customize the **conserver.cf** file for your storage array and save the modified **conserver.cf** file.
13. Repeat Step 4; run the package installation utility.
14. Select the **GSMcpq** agent.
15. Review/modify the configuration variables:

    HSG80_LOG_DIR - Enter the name for the directory to which conserver logs the information for the arrays.

16. Enter **y** to add an array to be monitored by conserver.

    HSG80_ARRAY_LOGS - Enter the name of the top and bottom controller log files. This filename should match the one created for the controller in the conserver.cf file.

    Local Manager – Specify the IP address/network resolvable host name of the Local Manager to be contacted for agent auto registration.

Local Manager Registration Port – Specifies the TCP port number the Local Manager uses for auto registration. The default value is 17146.

17. Enter **y** to review/modify the default advanced settings**.**

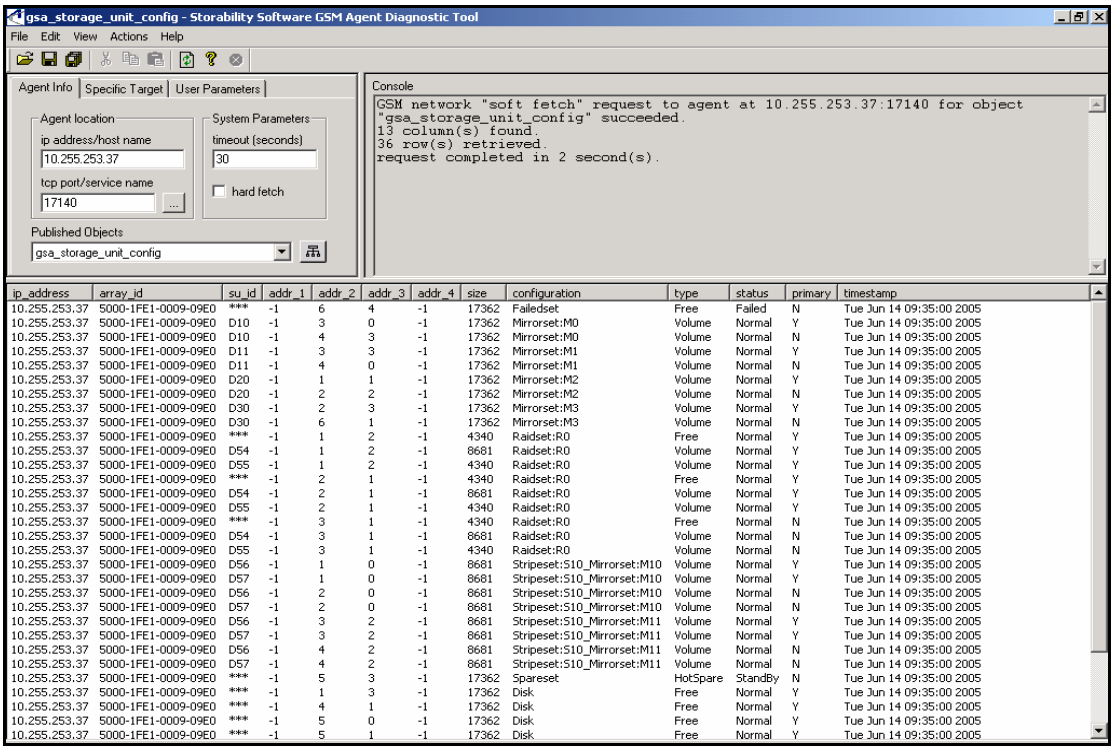
    Enable Auto Registration – Turns agent auto registration on (default) or off.

18. Enter **y** to continue with the installation. The installation proceeds and returns you to the main package installation menu.

20. Enter **q** to exit the package installation menu.

VERIFYING THE COMPAQ AGENT

1. Use the Sun StorageTek Business Analytics Agent Diagnostic Tool to verify agent functionality.
    a. Enter the IP Address or Hostname of the server where the agent is installed and set the port to 17140 (or select the agent from the drop down list of service names).
    b. Click the **Get Object List** button and you should receive a list of tables published by the Storability Compaq Agent.
    c. Select the **gsa_storage_unit_config** object and verify data is returned.



ip_address	array_id	su_id	addr_1	addr_2	addr_3	addr_4	size	configuration	type	status	primary	timestamp
10.255.253.37	5000-1FE1-0009-09E0	***	-1	6	4	-1	17362	Failedset	Free	Failed	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D10	-1	3	0	-1	17362	Mirrorset:M0	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D10	-1	4	3	-1	17362	Mirrorset:M0	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D11	-1	3	3	-1	17362	Mirrorset:M1	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D11	-1	4	0	-1	17362	Mirrorset:M1	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D20	-1	1	1	-1	17362	Mirrorset:M2	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D20	-1	2	2	-1	17362	Mirrorset:M2	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D30	-1	2	3	-1	17362	Mirrorset:M3	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D30	-1	6	1	-1	17362	Mirrorset:M3	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	1	2	-1	4340	Raidset:R0	Free	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D54	-1	1	2	-1	8681	Raidset:R0	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D55	-1	1	2	-1	4340	Raidset:R0	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	2	1	-1	4340	Raidset:R0	Free	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D54	-1	2	1	-1	8681	Raidset:R0	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D55	-1	2	1	-1	4340	Raidset:R0	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	3	1	-1	4340	Raidset:R0	Free	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D54	-1	3	1	-1	8681	Raidset:R0	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D55	-1	3	1	-1	4340	Raidset:R0	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D56	-1	1	0	-1	8681	Stripeset:S10_Mirrorset:M10	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D57	-1	1	0	-1	8681	Stripeset:S10_Mirrorset:M10	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D56	-1	2	0	-1	8681	Stripeset:S10_Mirrorset:M10	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D57	-1	2	0	-1	8681	Stripeset:S10_Mirrorset:M10	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D56	-1	3	2	-1	8681	Stripeset:S10_Mirrorset:M11	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D57	-1	3	2	-1	8681	Stripeset:S10_Mirrorset:M11	Volume	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D56	-1	4	2	-1	8681	Stripeset:S10_Mirrorset:M11	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	D57	-1	4	2	-1	8681	Stripeset:S10_Mirrorset:M11	Volume	Normal	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	5	3	-1	17362	Spareset	HotSpare	StandBy	N	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	1	3	-1	17362	Disk	Free	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	4	1	-1	17362	Disk	Free	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	5	0	-1	17362	Disk	Free	Normal	Y	Tue Jun 14 09:35:00 2005
10.255.253.37	5000-1FE1-0009-09E0	***	-1	5	1	-1	17362	Disk	Free	Normal	Y	Tue Jun 14 09:35:00 2005

Figure 26 - Storage Unit Configuration - Compaq Agent

    d. Use the drop down list of objects to verify the other objects published by the agent.

2. To verify the Storability Compaq Agent has registered successfully with its configured Local Manager:

a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the ip address/host name input box and set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).

b. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.

c. Select the **gsa_agent_register** object.

d. Confirm that the Storability Compaq agent is registered:

- Verify that its TCP port number (17140) appears in the "port" field and its host name/IP address is listed in the "active_peer" field.

- Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

HiCommand Agent

The Sun StorageTek Business Analytics HiCommand Agent reports configuration and storage allocation information for HDS Arrays (e.g., HDS 99xx) accessed through HDS HiCommand software. Refer to the *Sun StorageTek Business Analytics Support Matrix* to obtain the latest information on this agent's software and hardware requirements.

HiCommand Agent Matrix

Item	Description
Support Prerequisites	
Verify Ethernet connectivity from the server running the HiCommand Agent to the server running the HDS HiCommand software	`ping <IP Address>`
Verify HiCommand 2.0 or 2.1 is installed	
For Volume Allocation Reporting, verify LUN Security Option is enabled on the array	
Restriction	
HiCommand software and Storability SNMP Proxy Agent	• Each HiCommand Agent supports only one HiCommand server. To support multiple HiCommand servers, install a HiCommand Agent for each HiCommand server. The HiCommand Agents must be installed on separate servers.

	• The HiCommand management tool for the HDS 99xx series cannot be run from the same machine as the SNMP Proxy Agent.

Item	Description
Best Practices	
Maximum number of monitored arrays	One HiCommand server per HiCommand agent, with a maximum of 5 arrays under management.
Agent Installation	
HiCommand Agent on Windows	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
HiCommand Agent on Solaris	• Local Manager Installation CD (Unix) • Package Installation • Required Server Access: root access and Management Station permissions
Configuration Parameters	
User Name	User name for HiCommand connection authentication. For example, `system`.
Password	Password for HiCommand connection authentication. For example, `manager`.
HiCommand Port	TCP Port Number used to communicate with the HiCommand software. The default TCP port number is 2001.
HC_DO_REFRESH	Does cache refresh only if set to uppercase YES.
Local Manager	IP address or network resolvable host name of the Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	TCP port number the Local Manager uses for agent auto registration. The default value is 17146.
Enable Auto Registration	Turns agent auto registration on (default) or off.

Table 6 – HiCommand Agent Matrix

INSTALLING THE HICOMMAND AGENT - WINDOWS

1. Insert the Local Manager CD into the CD-ROM drive.
2. Click **Next** on the Welcome menu to continue the installation.
3. Click **Yes** to accept the terms of the software license agreement.
4. Click **Next**.
5. Review/modify the **User Name** and **Company Name** and click **Next.**
6. Select the **HiCommand Agent** checkbox when the screen listing the Sun StorageTek Business Analytics Agents for installation appears. (You may also want to install the **Host Agent** as well). Click **Next** to continue.

7. Review the settings and click **Next** to proceed with the installation.

8. Specify whether or not to install the new version of the Configuration Tool.

9. When the Configuration Tool is automatically launched, select **File**->**Edit**-> **Smart Agent Configuration**.

10. Click the **HiCommand Agent** tab to review/modify the configuration variables:

    Local Manager – Specify the IP address or network resolvable host name of the Local Manager to be contacted for agent auto registration.

    Local Manager Registration Port – The port number the Local Manager uses for auto registration. The default port number is 17146.

    User Name/Password - Set the user name and password for connection authentication to the HiCommand server.

    HC Server IP Address - Specify the HiCommand server's IP address. You may specify multiple IP addresses if you have multiple servers.

    HC Server Port - Set the TCP port number used to communicate with the HiCommand server. The default port number is 2001.

    Include HDS9200 Checkbox - Specify whether or not the Agent will be used to manage HDS92xx storage arrays. **Note**: HiCommand does not provide performance data. For this reason, it is recommended that you use the **DAMP HDS Agent** for 9200 model arrays.

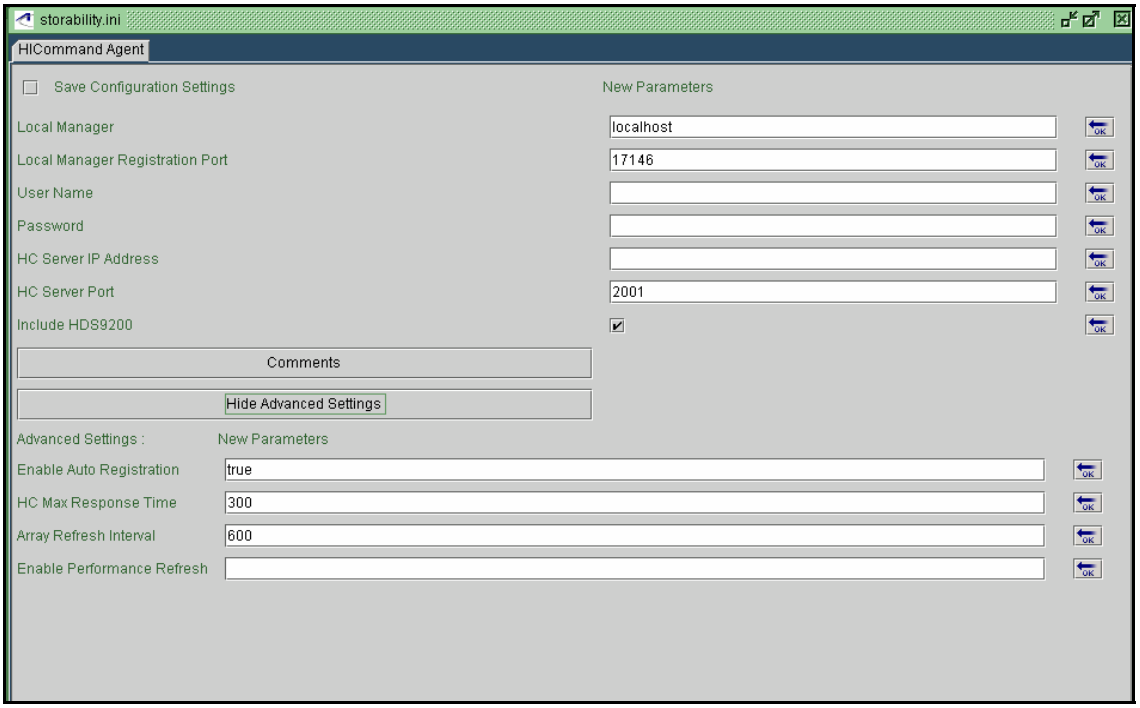


Figure 27 - HiCommand Agent Configuration Window

11. Click **Show Advanced Settings** and review/modify the following:

    Enable Auto Registration – Turns agent auto registration on (default) or off.

HC Max. Response Time - Sets the maximum command execution time in seconds. **Note:** If you are having difficulty collecting data from your HiCommand server, try increasing this value.

Array Refresh Interval – Sets the cache refresh interval.

Enable Performance Refresh – Specifies whether the agent refreshes cache. It only refreshes cache if this configuration is set to uppercase YES.

17. With "Save Configuration Settings" enabled (check mark), select **File->Save** and confirm changes to the storability.ini window.

18. Select **File->Exit** to close the Configuration Tool.

19. View the **Readme** file and click **Finish** to complete the installation.

20. Use the Windows S**ervices** panel to restart the agent before you verify agent functionality.

INSTALLING THE HICOMMAND AGENT - SOLARIS

If you have not already installed the GSMbase and GSMlmutil packages, install these packages before you install the HiCommand Agent.

1. Insert the UNIX Local Manager CD into the CD-ROM drive.
2. Mount the CD using the command:

```
mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /mnt
```

3. Change to the directory corresponding to the host's Solaris Operating System version. Solaris 7 or 8 packages are located in /Unix/Solaris/7,8.
4. Run the package installation utility and the main package installation menu is displayed.

```
pkgadd -d .
```

```
... 23 more menu choices to follow;
<RETURN> for more choices, <CTRL-D> to stop display:

 11  GSMfabric      Storability GSM Fabric Agent
                    (sparc) prod-4.0.3
 12  GSMhds         Storability GSM Hitachi Agent
                    (sparc) prod-4.0.3
 13  GSMhicmd       Storability GSM HiCommand Array Agent
                    (sparc) prod-4.0.3
 14  GSMhost        Storability GSM Host Agent
                    (sparc) prod-4.0.3
 15  GSMhpxp        Storability GSM HP XP Agent
                    (sparc) prod-4.0.3
 16  GSMibmatl      Storability GSM IBM 3494 Library Agent
                    (sparc) prod-4.0.3
 17  GSMlegato      Storability GSM Legato NetWorker Agent
                    (sparc) prod-4.0.3
 18  GSMlmutil      Storability GSM Local Manager utilities
                    (sparc) prod-4.0.3
 19  GSMlsi521      Storability GSM LSI Array Agent (firmware 5.21)
                    (sparc) prod-4.0.3p1
 20  GSMlsi530      Storability GSM LSI Array Agent (firmware 5.30)
                    (sparc) prod-4.0.3p2

... 13 more menu choices to follow;
<RETURN> for more choices, <CTRL-D> to stop display:^D

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]:
```

Figure 28 - Select HiCommand Agent Package

5. Select to install the **GSMhicmd** agent; type 13 and press **Enter**.
6. Specify the HiCommand server's IP address.
7. Enter the TCP port number used to communicate with the HiCommand server, or simply press Enter to accept the default port number (2001).
8. Enter the HiCommand username or simply press **Enter** to accept the default user name (system).
9. Enter the user's password or simply press **Enter** to accept the default password (manager).
10. Confirm the user's password.

```
GSMhicmd was built on SunOS 5.7.

HiCommand server IP address? [127.0.0.1] 10.255.253.23

HiCommand TCP port? [2001] [?]
HiCommand username? ['system']
HiCommand password? ['manager']
Confirm password?
```

Figure 29 - HiCommand Agent Configuration Settings

11. Specify (y/n) whether or not the agent will be used to manage HDS92xx storage arrays.

    Note: HiCommand does not provide performance data. For this reason, it is recommended that you use the DAMP HDS Agent for 9200 model arrays.

12. Type **y** and press **Enter** to review/modify the **Advanced Settings**:
    - Specify (y/n) whether the Agent Monitor will be used to restart the agent, if down.
    - Specify the frequency the agent refreshes its data; the default value is 600 seconds.
    - Specify the maximum command execution time in seconds for agent timeout; the default value is 300 seconds.
    - Specify whether the agent refreshes cache. It only refreshes cache if this configuration is set to uppercase Y(es). The default value is n(o).
    - Turn agent auto registration on (default) or off.
    - Specify the Local Manager Registration Port for agent auto registration. The default port number is 17146.
    - Specify (y/n) whether to restart the agents after the installation has completed.

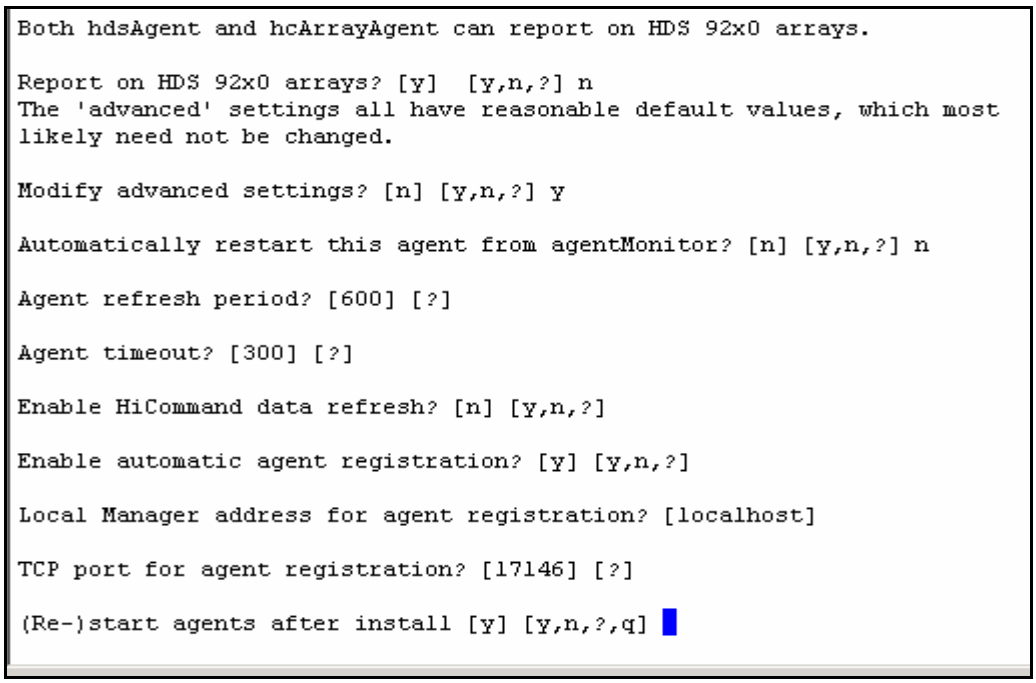


Figure 30 - HiCommand Agent Advanced Settings

13. Enter **y** if prompted to install conflicting files.

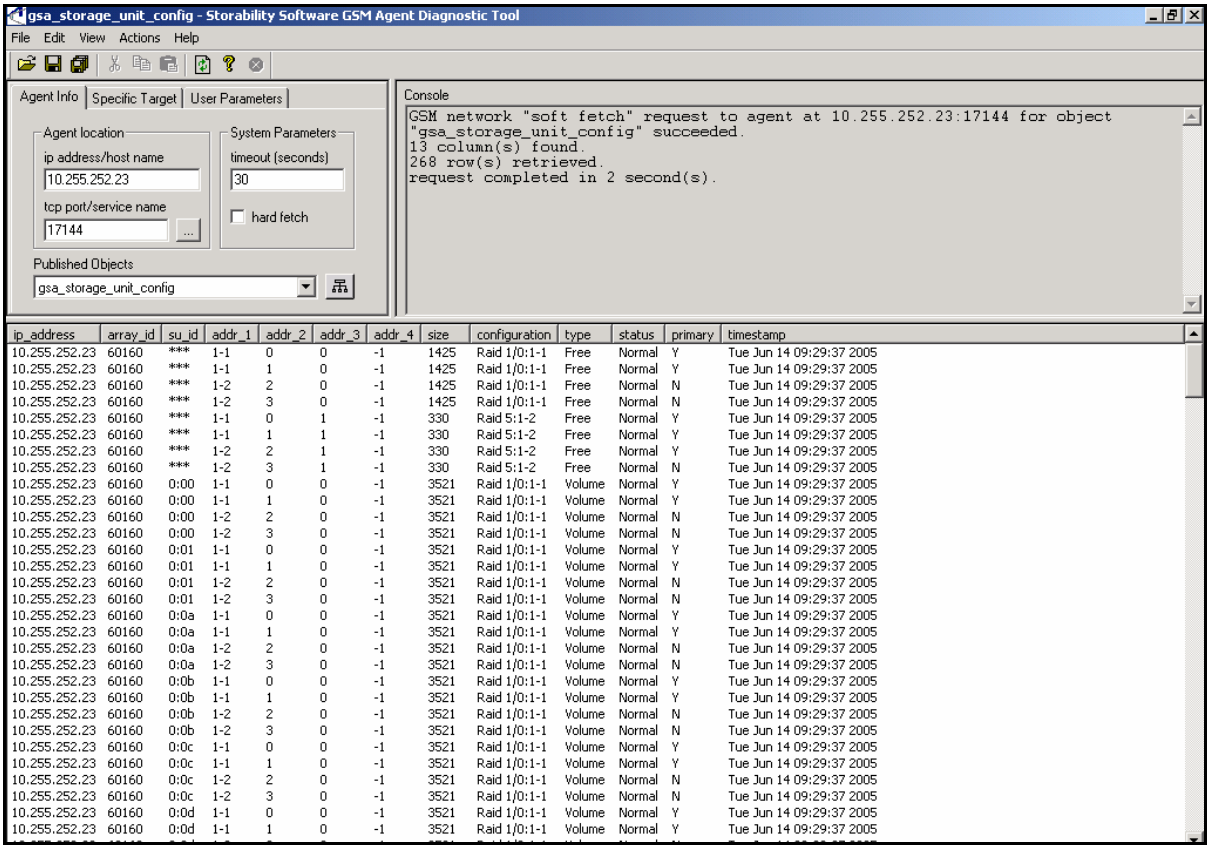
14. Type **y** and press **Enter** when prompted to confirm continuing with the installation of the HiCommand Agent.

15. The installation proceeds and returns you to the main package installation menu.

16. Type **Ctrl-D** and then enter **q** to exit the package installation menu.

VERIFYING THE HICOMMAND AGENT

1. Use the Sun StorageTek Business Analytics Agent Diagnostic Tool to verify agent functionality.
    a. Enter the IP Address or Hostname of the server where the agent is installed in the **Agent location** window.
    b. Set the port to 17144 (or select the agent from the drop down list of service names).
    c. Click the **Get Object List** button and you should receive a list of tables published by the Storability HiCommand Agent.
    d. Select the **gsa_storage_unit_config** object and verify data is returned.



ip_address	array_id	su_id	addr_1	addr_2	addr_3	addr_4	size	configuration	type	status	primary	timestamp
10.255.252.23	60160	***	1-1	0	0	-1	1425	Raid 1/0:1-1	Free	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	***	1-1	1	0	-1	1425	Raid 1/0:1-1	Free	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	***	1-2	2	0	-1	1425	Raid 1/0:1-1	Free	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	***	1-2	3	0	-1	1425	Raid 1/0:1-1	Free	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	***	1-1	0	1	-1	330	Raid 5:1-2	Free	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	***	1-1	1	1	-1	330	Raid 5:1-2	Free	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	***	1-2	2	1	-1	330	Raid 5:1-2	Free	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	***	1-2	3	1	-1	330	Raid 5:1-2	Free	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:00	1-1	0	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:00	1-1	1	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:00	1-2	2	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:00	1-2	3	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:01	1-1	0	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:01	1-1	1	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:01	1-2	2	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:01	1-2	3	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0a	1-1	0	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0a	1-1	1	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0a	1-2	2	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0a	1-2	3	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0b	1-1	0	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0b	1-1	1	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0b	1-2	2	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0b	1-2	3	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0c	1-1	0	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0c	1-1	1	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0c	1-2	2	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0c	1-2	3	0	-1	3521	Raid 1/0:1-1	Volume	Normal	N	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0d	1-1	0	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005
10.255.252.23	60160	0:0d	1-1	1	0	-1	3521	Raid 1/0:1-1	Volume	Normal	Y	Tue Jun 14 09:29:37 2005

Figure 31 – Verify HiCommand Storage Unit Configuration Object

e. Use the drop down list of objects to verify all other objects published by the agent.

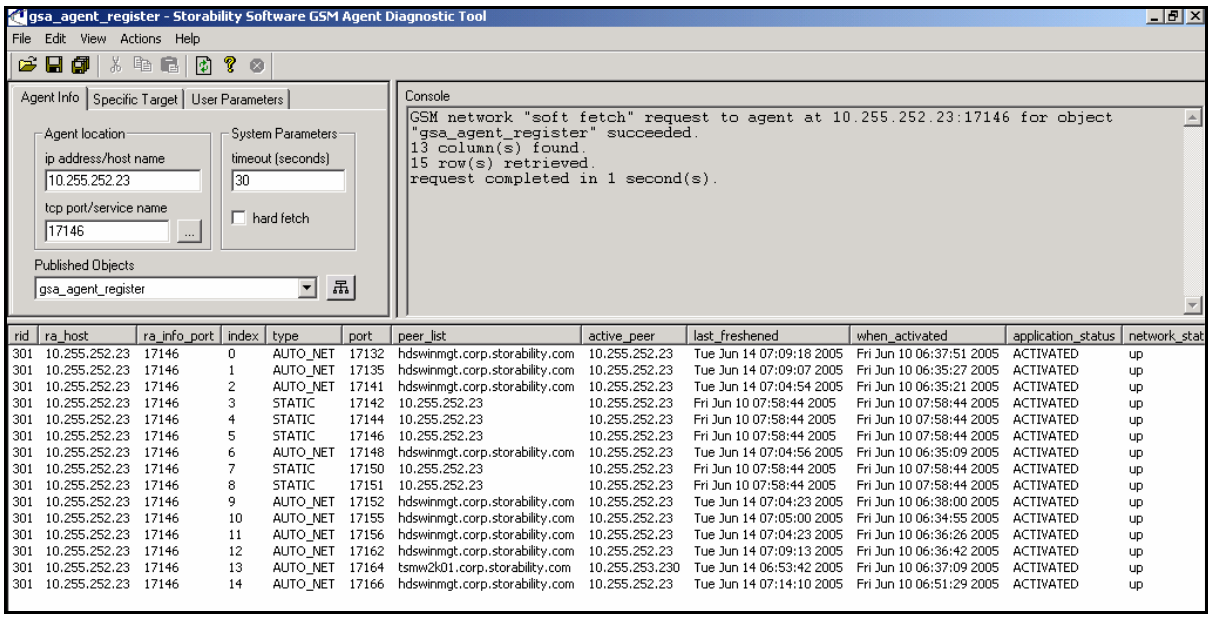
2. To verify the Storability HiCommand Agent has registered successfully with its configured Local Manager:

   a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the ip address/host name input box .

   b. Set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).

   c. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.

   d. Select the **gsa_agent_register** object.



rid	ra_host	ra_info_port	index	type	port	peer_list	active_peer	last_freshened	when_activated	application_status	network_stat
301	10.255.252.23	17146	0	AUTO_NET	17132	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:09:18 2005	Fri Jun 10 06:37:51 2005	ACTIVATED	up
301	10.255.252.23	17146	1	AUTO_NET	17135	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:09:07 2005	Fri Jun 10 06:35:27 2005	ACTIVATED	up
301	10.255.252.23	17146	2	AUTO_NET	17141	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:04:54 2005	Fri Jun 10 06:35:21 2005	ACTIVATED	up
301	10.255.252.23	17146	3	STATIC	17142	10.255.252.23	10.255.252.23	Fri Jun 10 07:58:44 2005	Fri Jun 10 07:58:44 2005	ACTIVATED	up
301	10.255.252.23	17146	4	STATIC	17144	10.255.252.23	10.255.252.23	Fri Jun 10 07:58:44 2005	Fri Jun 10 07:58:44 2005	ACTIVATED	up
301	10.255.252.23	17146	5	STATIC	17146	10.255.252.23	10.255.252.23	Fri Jun 10 07:58:44 2005	Fri Jun 10 07:58:44 2005	ACTIVATED	up
301	10.255.252.23	17146	6	AUTO_NET	17148	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:04:56 2005	Fri Jun 10 06:35:09 2005	ACTIVATED	up
301	10.255.252.23	17146	7	STATIC	17150	10.255.252.23	10.255.252.23	Fri Jun 10 07:58:44 2005	Fri Jun 10 07:58:44 2005	ACTIVATED	up
301	10.255.252.23	17146	8	STATIC	17151	10.255.252.23	10.255.252.23	Fri Jun 10 07:58:44 2005	Fri Jun 10 07:58:44 2005	ACTIVATED	up
301	10.255.252.23	17146	9	AUTO_NET	17152	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:04:23 2005	Fri Jun 10 06:38:00 2005	ACTIVATED	up
301	10.255.252.23	17146	10	AUTO_NET	17155	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:05:00 2005	Fri Jun 10 06:34:55 2005	ACTIVATED	up
301	10.255.252.23	17146	11	AUTO_NET	17156	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:04:23 2005	Fri Jun 10 06:36:26 2005	ACTIVATED	up
301	10.255.252.23	17146	12	AUTO_NET	17162	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:09:13 2005	Fri Jun 10 06:36:42 2005	ACTIVATED	up
301	10.255.252.23	17146	13	AUTO_NET	17164	tsmw2k01.corp.storability.com	10.255.253.230	Tue Jun 14 06:53:42 2005	Fri Jun 10 06:37:09 2005	ACTIVATED	up
301	10.255.252.23	17146	14	AUTO_NET	17166	hdswinmgt.corp.storability.com	10.255.252.23	Tue Jun 14 07:14:10 2005	Fri Jun 10 06:51:29 2005	ACTIVATED	up

Figure 32 - Verify HiCommand Agent Registration

e. Confirm that the Storability HiCommand agent is registered:

- Verify that its TCP port number appears in the "port" field and its host name/IP address is listed in the "active_peer" field.
- Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

HDS AGENT

The Storability HDS agent reports configuration and storage allocation information for HDS storage arrays accessed through the Disk Array Management Program (DAMP) software. Refer to the *Sun StorageTek Business Analytics Support Matrix* to obtain the latest information on this agent's software and hardware requirements.

HDS AGENT MATRIX

Item	Description
Support Prerequisites	
Verify Ethernet Connectivity to array	`ping <IP Address>`
Verify DAMP CLI is installed	
For Volume Allocation Reporting, verify LUN Security Option on array	
Best Practices	
Agent Deployment	It is recommended that you use this agent for HDS 9200 arrays rather than the HiCommand agent.
Security	Password Protection Option on array (recommended)
Agent Installation	
HDS 58xx and 9200 (DAMP) Agent on Windows	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
HDS 58xx and 9200 (DAMP) Agent on Solaris	• Local Manager Installation CD (Unix) • Package Installation • Required Server Access: root access and Management Station permissions
Configuration Parameters	
Access Code	Password to access the array
HDS Command Path	Fully qualified path to the DAMP CLI software
Status File Path	Fully qualified path to the HDS status file
Local Manager	IP address or host name of the Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	TCP port number the Local Manager uses for agent auto registration. The default is 17146.
Enable Auto Registration	Turns agent auto registration on (default) or off.

Table 7 - HDS Agent Matrix

INSTALLING THE STORABILITY HDS AGENT - WINDOWS

1. Insert the Windows Local Manager CD into the CD-ROM drive.

2. Click **Next** on the Welcome menu to continue the installation.

3. Click **Yes** to accept the terms of the software license agreement.

4. Review/modify the **User Name** and **Company Name** and click **Next**.

5. Check the **HDS Agent** checkbox on the screen that allows you to choose the Sun StorageTek Business Analytics Agents for installation. You may also want to install the **Host Agent** as well. Click **Next** to continue.

6. Review the settings and click **Next>**.

7. Specify whether or not to install the new version of the Configuration Tool.

8. When the Configuration Tool is automatically launched, select **File**->**Edit**->**Smart Agent Configuration**.

9. Click the **HDS Agent** tab and then click **Add** to enter the configuration variables and click **Submit** to save them:

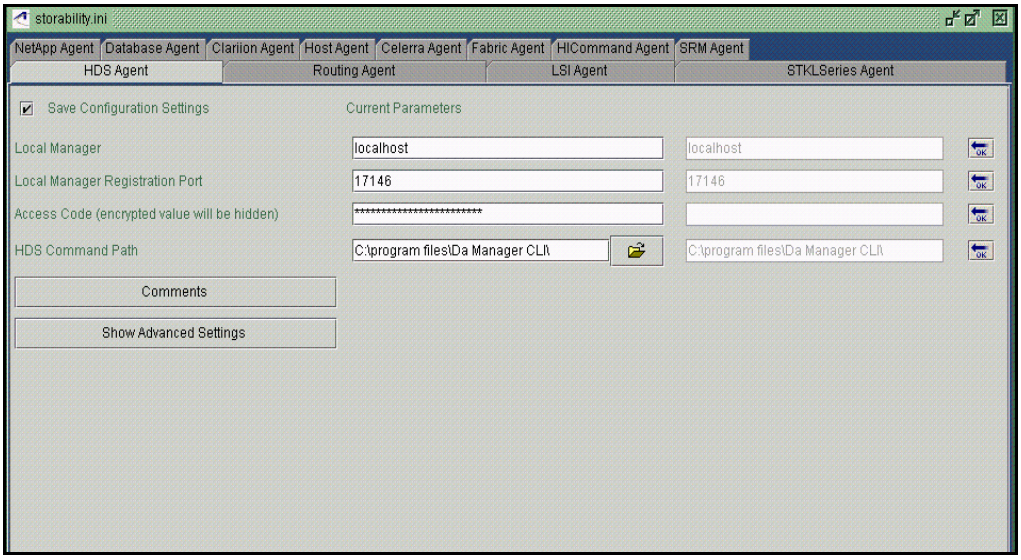


Figure 33 - HDS Agent Configuration Window

- For **Local Manager**, specify the IP address or network resolvable host name of the Local Manager to be contacted for agent auto registration.

- For **Local Manager Registration Port**, this value specifies the TCP port number the Local Manager uses for agent auto registration. The default port number is 17146.

  Access Code - Enter the password for the array.

  HDS Command Path - Type the fully qualified path to the Disk Array Manager CLI executables.

10. Click **Show Advanced Settings** and review/modify the following configuration settings:

- **Enable Auto Registration** - This configuration parameter turns agent auto registration on (default) or off.

- **Launcher Command Line** - The launcher command is used by the HDS agent. If you installed the agent into the default location, no changes need to be made to this entry. Otherwise, browse to the location of the HDSAgent.exe file and select it. This will correctly create the launcher command line.

- **Status File Path** – Enter the full path to the HDS status file.

- **Read Interval** – Sets the frequency at which the agent collects performance data from the array. The time is in seconds and is 600 by default.

- **Read Update Interval** - Specifies how long data is cached. The default value is 3600 seconds.

11. With "Save Configuration Settings" enabled (check mark), select **File->Save** and confirm changes to the storability.ini window.

12. Select **File-> Exit** to close the Configuration Tool.

13. Use the Windows **Services** panel to start the agent before you verify agent functionality.

INSTALLING THE STORABILITY HDS AGENT - SOLARIS

1. Insert the UNIX Local Manager CD into the CD-ROM drive.
2. Mount the CD using the command:

```
mount –F hsfs –o ro /dev/dsk/c0t6d0s0 /mnt
```

3. Change to the directory for the host's Solaris Operating System version.
4. Run the package installation utility and the main package installation menu appears.

```
pkgadd –d .
```

5. Press Enter and type Ctrl-D to stop scrolling on the second list of package selections.
6. Select the **GSMhds** agent; type 11 and press **Enter.**
7. Enter the array password or simply press **Enter** to specify the default value of 'password'.
8. Enter the path to the HDS CLI directory (i.e. /usr/damp).
9. Enter the path to the HDS library directory (i.e. /usr/damp/lib).
10. Type **y** and press **Enter** to review/edit the **Advanced Settings**:
    - Enter the desired **READ_INTERVAL** (in seconds). This sets the frequency at which the agent collects performance data from the array. The time is in seconds and is 600 by default.

    - Enter the desired **READ_UPDATE_INTERVAL** (in seconds), specifying how long data can be cached. By default, this is 3600 seconds.

    - Enter the IP address or network resolvable host name of the **Local Manager** to be contacted for agent auto registration.

    - Accept the default **Local Manager Registration Port** number (17146) the Local Manager uses for auto registration.

- **Enable Auto Registration** turns agent auto registration on (default) or off.

11. Enter **y** to start the agent after installation.

12. Enter **y** if prompted to install conflicting files.

13. Type **y** and press **Enter** when prompted to confirm continuing with the installation of the GSMhds agent.

14. The installation proceeds and returns you to the main package installation menu.

15. Enter **q** to exit the package installation menu.

VERIFYING THE HDS AGENT

1. Use the GSM Agent Diagnostic Tool to verify agent functionality.
   a. Enter the IP Address or Hostname of the server where the agent is installed in the **Agent location** window.
   b. Set the port to 17142 (or select the agent from the drop down list of service names).
   c. Click the **Get Object List** button and you should receive a list of tables published by the Storability HiCommand Agent.
   d. Select the **gsa_storage_unit_config** object and verify data is returned.
   e. Use the drop down list of objects to verify the other objects published by the agent.
2. To verify the HDS Agent has registered successfully with its configured Local Manager:

   a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the ip address/host name input box .

   b. Set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).

   c. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.

   d. Select the **gsa_agent_register** object.

   f. Confirm that the Storability HiCommand agent is registered:

      - Verify that its TCP port number appears in the "port" field and its host name/IP address is listed in the "active_peer" field.

      - Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

ESS AGENT

The ESS Agent reports configuration and allocation information for IBM TotalStorage (also called Shark) ESS storage arrays. Refer to the *Sun StorageTek Business Analytics*

Support Matrix to obtain the latest information on this agent's software and hardware requirements.

Note: Use the LSI/Engenio agent to collect data from IBM FasT arrays. Sun StorageTek Business Analytics 5.0 supports Engenio/LSI firmware version 6.10 with the 5.40 LSI Agent. Beginning with 5.40, the agent library from Engenio is forward-compatible; it's no longer firmware- specific.

ESS AGENT MATRIX

Item	Description
Support Prerequisites	
Verify Ethernet connectivity to the Windows 2000 server or Solaris server running the ESS CLI	`ping <IP Address>`
Verify Ethernet connectivity to array	*`ping <IP Address>`*
Verify ESS CLI 2.1.1.8 is installed on the ESS management server	
Verify that an ESS Specialist Software Account with read-only access exists	
Best Practices	
Maximum number of monitored arrays	Five arrays per ESS Agent
Agent Installation	
IBM ESS Agent on Windows	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
Configuration Parameters	
IP address of server running ESS CLI	
User name and password for ESS Specialist account	
Local Manager	IP address or host name of Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	TCP port number the Local Manager uses for agent auto registration. The default port number is 17146.
Enable Auto Registration	Turns agent auto registration on (default) or off. **Note**: The ESS Agent does not current support auto registration.

Table 8 - ESS Agent Matrix

INSTALLING ESS AGENT - WINDOWS

1. Insert the Windows Local Manager CD into the CD-ROM drive. The Install Shield-based installation should be automatically started.
2. Click **Next>** on the **Welcome** menu to continue the installation.
3. Click **Yes** to accept the terms of the software license agreement.
5. Review/modify the **User Name** and **Company Name** and click **Next>**.
6. Check the **ESS Agent** checkbox on the screen listing Sun StorageTek Business Analytics Agents for installation. You may also want to install the Host Agent as well. Click **Next>** to continue.

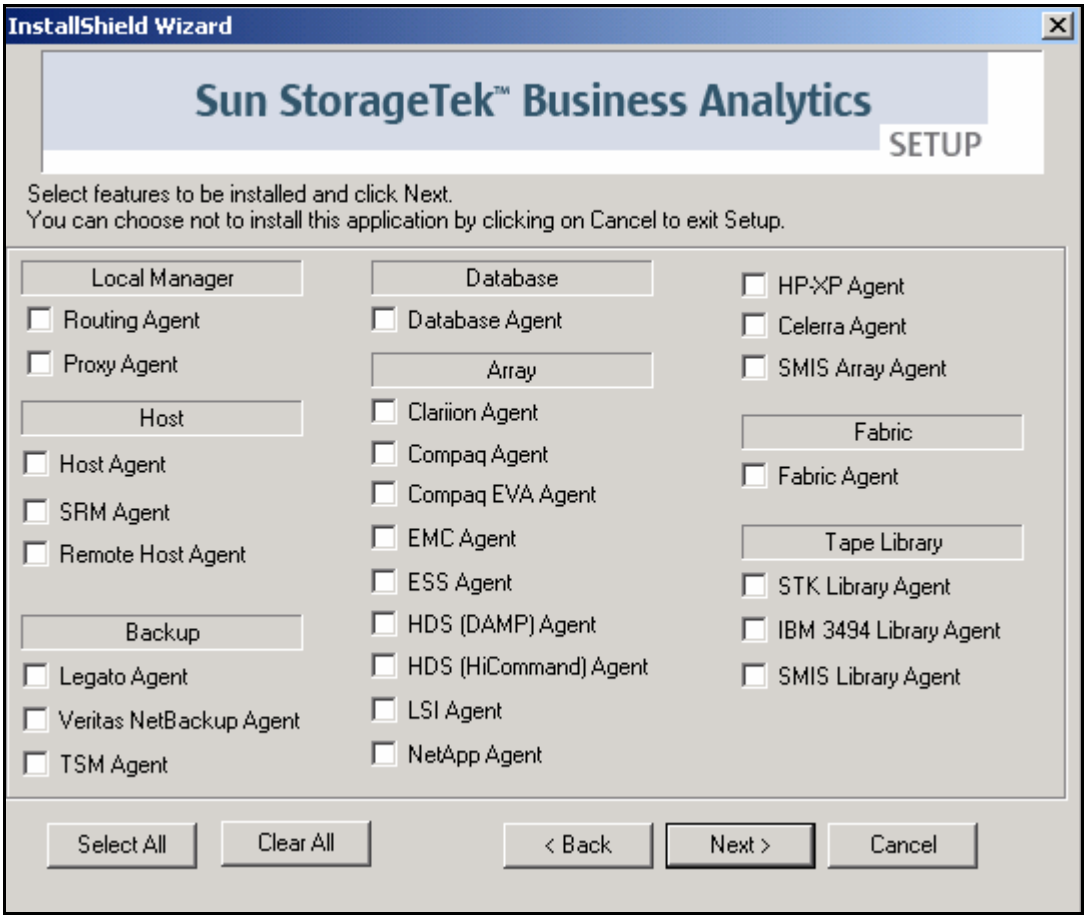


Figure 34 - Agent Selection Dialog

7. Select the ESS Agent and click **Next>**. The Installing ESS Agent splash box appears.
8. Specify whether or not to install the Configuration Tool.
9. When the Configuration Tool is automatically launched, select **File** -> **Edit** -> **Smart Agent** Configuration.
10. Click the **ESS Agent** tab and then click **Add** to enter the configuration variables:

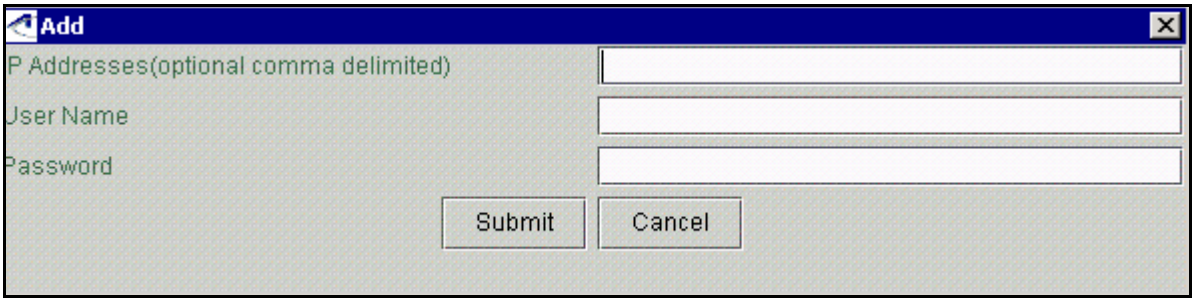


Figure 35 - Add ESS Agent Dialog Box

- **IP Addresses** (optional comma delimited) Enter the IP address of the ESS CLI, and the user name and password of the ESS Specialist Account in the supplied input boxes. The configuration details will be written to the storability.ini file in the format: <IPAddr1 of ESS Server, IPAddr2 of ESS Server>.

  Notes: Each line represents a single ESS CLI Server. You can provide alternate paths to the same ESS Server by entering multiple IP addresses on the same line in the file. No space should be entered between the IP address and comma.

- **User Name** – Enter ESS Specialist user name
- **Password** – Enter password for this user

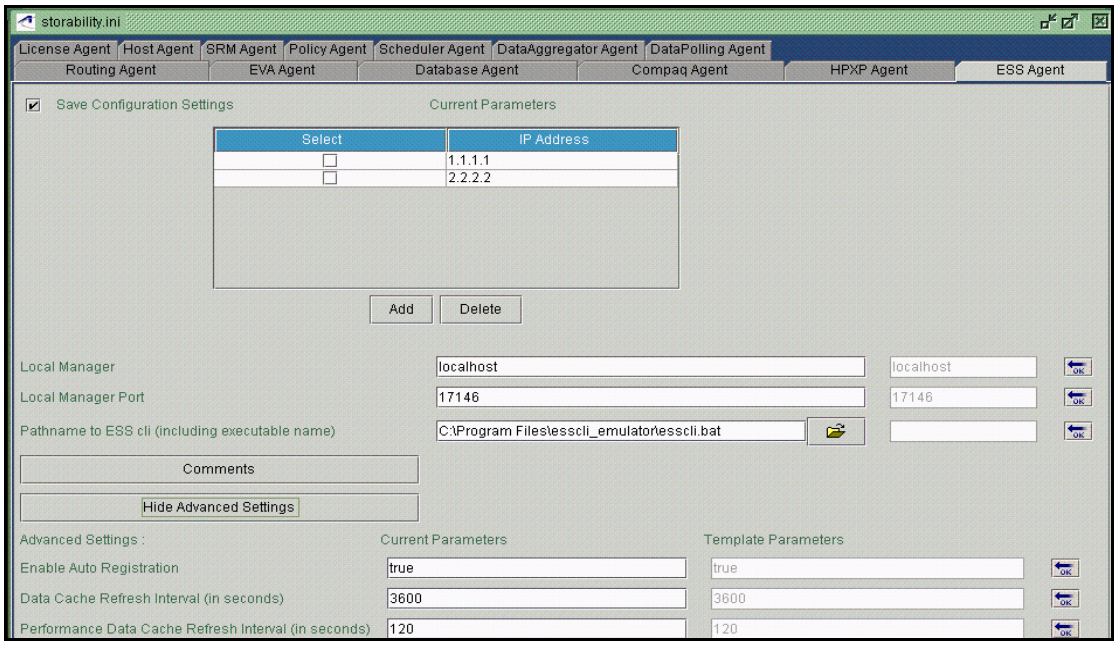


Figure 36 - ESS Agent Configuration Tab

11. Click **Submit**.
12. Review/modify the following:

    Local Manager – Specify the IP address or host name of the Local Manager to be contacted for agent auto registration.

Local Manager Registration Port – Is the port number the Local Manager uses for auto registration; default port number is 17146.

Pathname to ESS – Enter the fully qualified pathname to the ESS CLI including the executable name; may click the **Folder** icon to browse and locate the file.

13. Click **Show Advanced Settings** and review/modify the following:

    Enable Auto Registration – Turns agent auto registration on (default) or off.

    Data Cache Refresh Interval - Specifies how long data can be cached. The time is specified in seconds and is 3600 seconds by default.

    Performance Data Cache Refresh Interval – Sets the frequency at which the agent collects performance data from the array. The time is specified in seconds and is 120 by default.

14. Select **File->Save** and then confirm saving changes to the storability.ini file.

15. Select **File->Exit** to close the Configuration Tool.

16. Use the Windows **Services** panel to start the agent before you verify agent functionality.

INSTALLING THE ESS AGENT - SOLARIS

1. Insert the UNIX Local Manager CD into the CD-ROM drive.
2. Mount the CD using the command:

```
mount –F hsfs –o ro /dev/dsk/c0t6d0s0 /mnt
```

3. Change to the directory corresponding to the host's Solaris Operating System version.
4. Run the package installation utility.

```
pkgadd –d .
```

5. Select to install the **GSMess** agent.
6. Review/modify the configuration variables:

   ARRAY_FRESH_INTERVAL – Specifies how long data can be cached. The time is specified in seconds and is 3600 by default.

   READ_FRESH_PERF INTERVAL - Sets the frequency at which the agent collects performance data from the array. The time is in seconds and is 120 by default.

   ESS_IP – Enter the IP address of the ESS Server, and user name and password of the ESS Specialist account when prompted. The configuration details will be written to the storability.ini file in the format:

   <IPAddr1 of ESS Server,IPAddr2 of ESS Server>|<ESS Specialist username>|<password>

   Notes: Each line represents a single ESS Server. You can provide alternate paths to the same ESS Server by entering multiple IP addresses on the same line. Do not enter a space between the IP address and the comma.

   Local Manager – Specify the network resolvable name or IP address of the Local Manager to be contacted for agent auto registration.

Local Manager Registration Port – Review/modify the TCP port the Local Manager uses for agent auto registration. The default port number is 17146.

ESS_CMD_PATHNAME – Enter the fully qualified pathname to the ESS CLI including the executable name.

Enable Auto Registration – Accept that auto registration is enabled (true); set this configuration parameter to false to disable auto registration.

7. Type **y** to (re)start the agents after the install has completed.
8. Type **y** to continue if prompted to install conflicting files.
9. Type **y** and press Enter to confirm the continuation of the installation, when prompted.
10. Type **q** and press Enter to exit the package installation menu.

VERIFYING THE STORABILITY ESS AGENT

1. Use the Sun StorageTek Business Analytics Agent Diagnostic Tool to verify agent functionality.
    a. Enter the IP Address or Hostname of the server where the agent is installed.
    b. Set the port to 17154 (or select the agent from the drop down list of service names).
    c. Click the **Get Object List** button and you should receive a list of tables published by the Storability ESS Agent.
    d. Select the **gsa_storage_unit_config** object and verify data is returned.
    e. Use the drop down list of objects to verify the other objects published by the agent.

2. To verify the ESS Agent has registered successfully with its configured Local Manager:

    a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the ip address/host name input box .

    b. Set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).

    c. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.

    d. Select the **gsa_agent_register** object.

    g. Verify the Storability ESS Agent is registered:

    - Verify that its TCP port number appears in the "port" field and its host name/IP address is listed in the "active_peer" field.

    - Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

ENGENIO/LSI AGENT

The Storability Engenio/LSI Agent reports configuration and storage allocation information for LSI controller-based disk arrays, StorageTek FlexLine arrays, and IBM FAStT arrays. Refer to the *Sun StorageTek Business Analytics Support Matrix* to obtain the latest information on this agent's software and hardware requirements.

LSI AGENT MATRIX

Item	Description
Support Prerequisites	
Verify Ethernet connectivity from agent platform to the disk array	`ping <IP Address>`
Verify supported controller firmware version	There is a unique LSI agent version to support each controller firmware version that Storability currently supports. Multiple versions of the LSI agent are included on the Local Manager Installation media for Windows or Solaris.
Best Practices	
Maximum number of monitored arrays	You may need to use a separate instance of the agent for each array firmware version you have deployed (i.e., if you have 2 arrays with different firmware versions, you may need to deploy 2 agents.). Beginning with 5.4, the agent library from Engenio is forward compatible; it is not longer firmware specific. Sun StorageTek Business Analytics 5.0 supports Engenio/LSI firmware version 6.10 with the 5.40 LSI agent.
Agent Installation	
LSI Agent on Windows	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
LSI Agent on Solaris	• Local Manager Installation CD (Unix) • Package Installation • Required Server Access: root access and Management Station permissions
Configuration Parameters	
Primary IP Address	• IP address for the primary controller in the array or a proxy server
Alternate IP Address	• IP address for a second controller in the array
Local Manager	• IP address or host name of the Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	• TCP port number the Local Manager uses for agent auto registration; the default value is 17146.

Item	Description
Enable Auto Registration	• Turns agent auto registration on (default) or off.

Table 9 - LSI Agent Matrix

INSTALLING THE LSI AGENT – WINDOWS

You must load the correct LSI agent binary to match the version of the firmware. Currently supported firmware versions are 5.01, 5.21, 5.30, 5.33, 5.36 and 5.40. The location of these agents is as follows:

/Win32/LSI agents/lsi_agent-fw5.xx.exe

For Windows servers, first perform the Local Manager installation and then replace the agent (binary) with the appropriate one for the version of the controller firmware running on the LSI agent array.

1. Insert the Windows Local Manager CD into the CD-ROM drive.

2. Click **Next** on the Welcome menu to continue the installation.

3. Click **Yes** to accept the terms of the software license agreement.

4. Review/modify the **User Name** and **Company Name** and click **Next**.

5. Check the **LSI Agent** checkbox on the screen that lists Sun StorageTek Business Analytics Agents for installation. You may also wish to install the **Host Agent**. Click **Next>**.

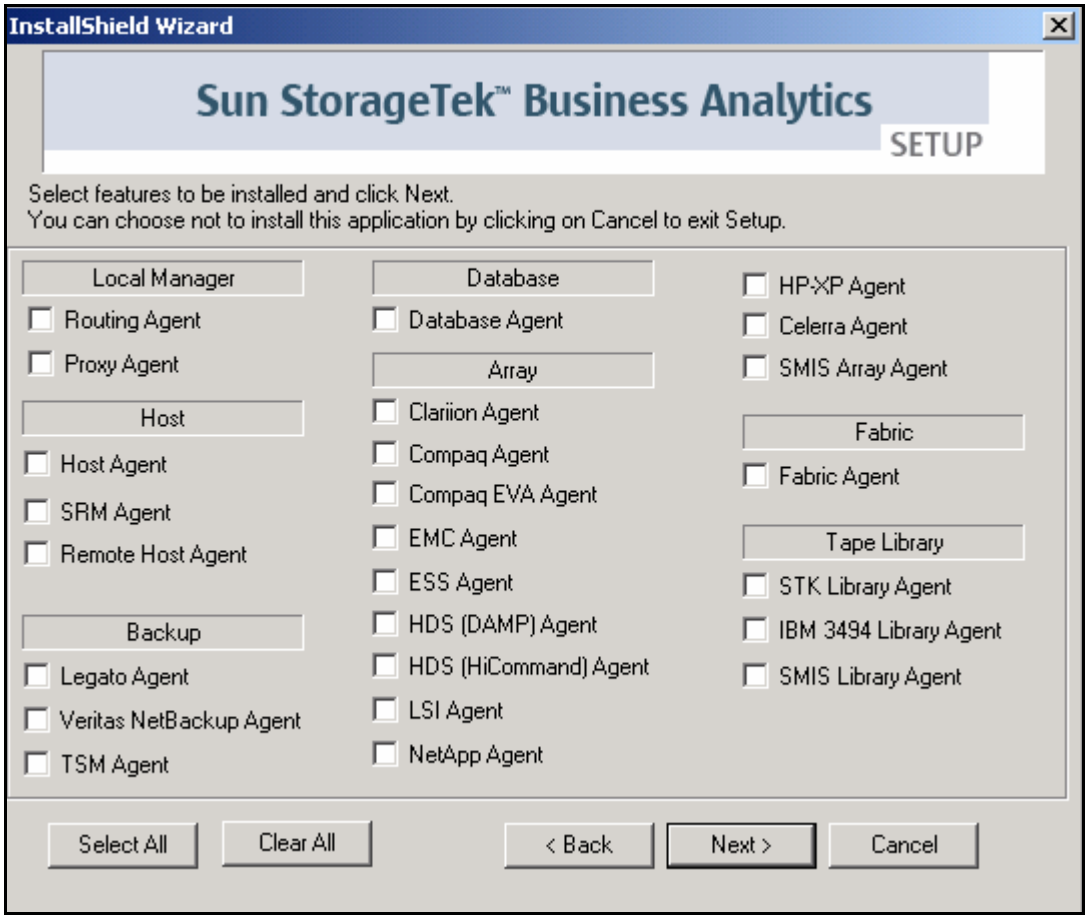


Figure 37 - Agent Selection Dialog

6. Review the settings and click **Next>**. The Installing LSI Agent splash box is displayed.

7. Specify whether to install the Configuration Tool.

8. When the Configuration Tool is automatically launched, choose **File** -> **Edit** -> **Smart Agent Configuration**.

9. Click the **LSI Agent** tab and click **Add**. In the window below, note that the IP addresses are for illustrative purposes only and will not appear when you open the tab.

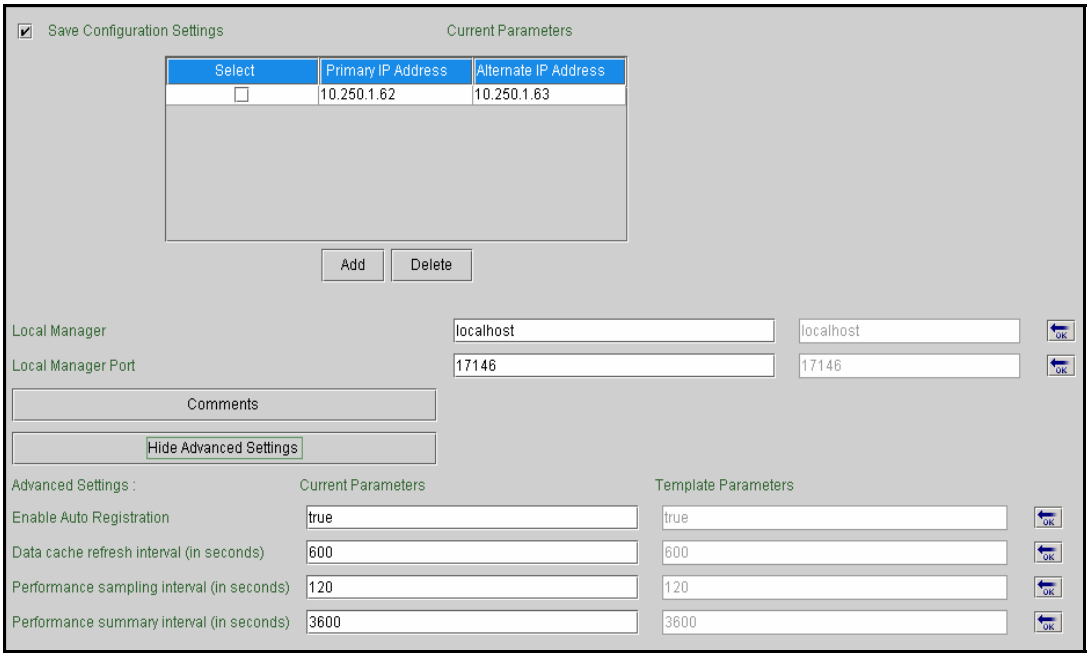


Figure 38 - LSI Agent Configuration Settings

10. Enter the following configuration parameters and click **Submit**.

    Primary IP Address – Enter the IP address for the primary controller in the array.

    Alternate IP Address – Enter the IP address for a secondary controller in the array. The IP Address for all controllers must be provided in order to collect performance for all controllers.

11. For **Local Manager,** enter the IP address or host name of the Local Manager to be contacted for auto registration.
12. For **Local Manager Registration Port**, specify the TCP port number the Local Manager uses for agent auto registration. The default port number is 17146.

13. Click **Show Advanced Settings** to review/modify the following parameters:

    Enable Auto Registration – Turns agent auto registration on (default) or off.
    Data Cache Refresh Interval – Specifies the frequency the agent refreshes cached data. The default value is 600 seconds.
    Performance Sampling Interval - Specifies how often (in seconds) the performance information is collected.
    Performance summary interval – Specifies how long (in seconds) the performance information is stored before being purged.

14. Select **File->Save** and then confirm changes to the storability.ini window.

15. Select **File->Exit** to close the Configuration Tool.

16. Use the Windows panel to start the Storability LSI Agent before you verify agent functionality. **Services**

INSTALLING THE LSI AGENT - SOLARIS

If you have not already installed the **GSMbase** and **GSMlmutil** packages, install these packages before you install the LSI Agent.

Multiple versions of the LSI agent are included on the Local Manager media. You must load the correct agent to match the version of the controller firmware. Currently supported firmware versions are 5.01, 5.21, 5.30, 5.33, 5.36 and 5.40. There is an LSI agent version to support the different firmware versions that Storability currently supports. For Solaris hosts, the correct package is selected from the `pkgadd` main menu and the proper agent will be installed.

1. Insert the UNIX Local Manager CD into the CD-ROM drive.
2. Mount the CD using the following command, for example:

   ```
   mount -F hsfs -o ro /dev/dsk/c0t6d0s0 /mnt
   ```

3. Change to the directory corresponding to the host's Solaris Operating System version.
4. Run the package installation utility and the main package installation menu is displayed.

   ```
   pkgadd -d .
   ```

5. Select to install LSI agent package for your firmware revision.

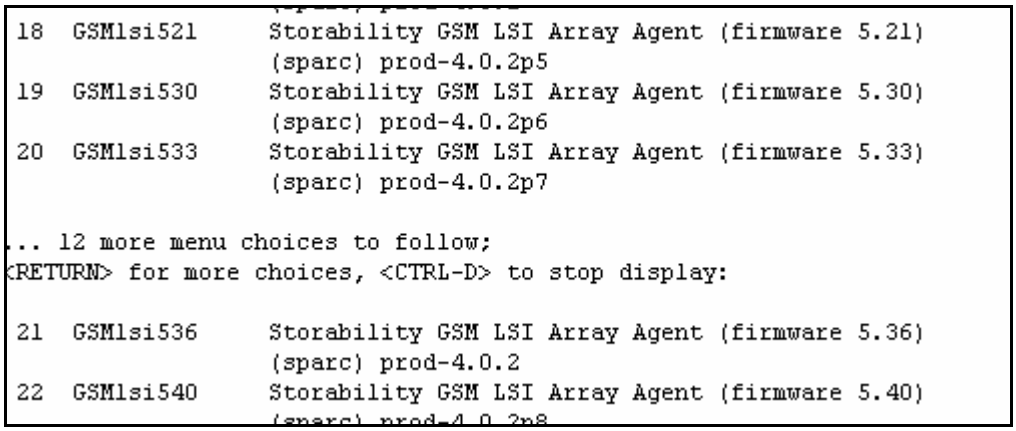


Figure 39 - LSI Agent Package Selections

6. Specify the Primary IP address for the array or the IP address of the proxy server and press Enter.

7. Enter the Secondary IP address for the array (if applicable) and press **Enter**.

8. Press **Enter** on an empty line after you have finished specifying the above IP addresses. **Note**: Each IP address is the address for a single controller in the array. The IP Address for all controllers must be provided in order to collect performance for all controllers.

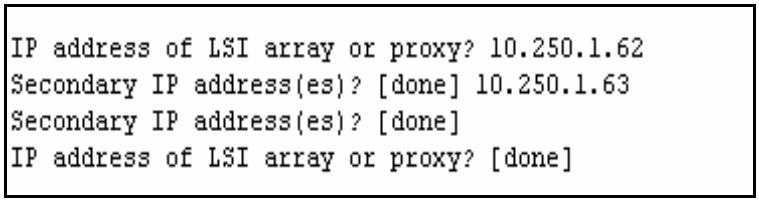


Figure 40 - LSI Agent Configuration Settings

9. Type **y** and press **Enter** to review/modify the **Advanced Settings**.

   - Specify (y/n) whether the AgentMonitor will be used to restart the agent, if down.
   - Specify the frequency that the agent refreshes its cache (configuration and performance data); the default value is 600 seconds.
   - Specify how often performance data is sampled.
   - Specify the period of time for which performance data should be summarized (e.g., provide an hourly average).
   - Review/modify whether (y/n) agent auto registration is turned on (default).
   - Specify the IP address or host name of the Local Manager to be contacted for agent auto registration.
   - Review/modify the TCP port number the Local Manager uses for auto registration; the default value is 17146.
   - Specify (y/n) whether to restart the agents after the installation has been completed.

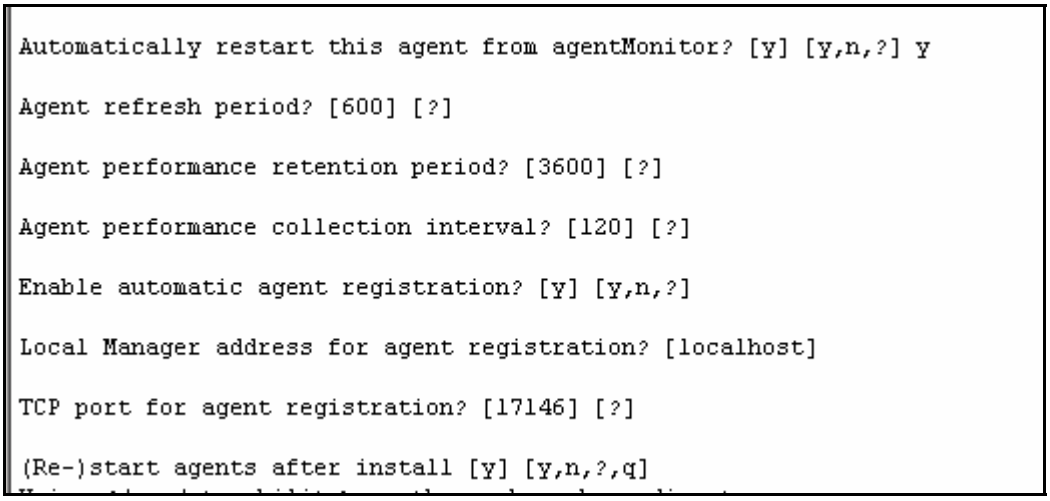


Figure 41 - LSI Agent Advanced Settings

10. Enter **y** if prompted to install conflicting files.

11. Enter **y** and press Enter to confirm the continuation of the LSI Agent installation, when prompted.

12. The installation proceeds and returns you to the main package installation menu when it is finished.

13. Type Ctrl-D and enter **q** to exit the package installation menu.

VERIFYING LSI AGENT

1. Use the Agent Diagnostic Tool to verify agent functionality.
    a. Enter the IP Address or Hostname of the server where the agent is installed.
    b. Set the port to 17151 (or select the agent from the drop down list of service names).

    Click the **Get Object List** button and you should receive a list of tables

    c. Select the **gsa_storage_unit_config** object and verify data is returned.

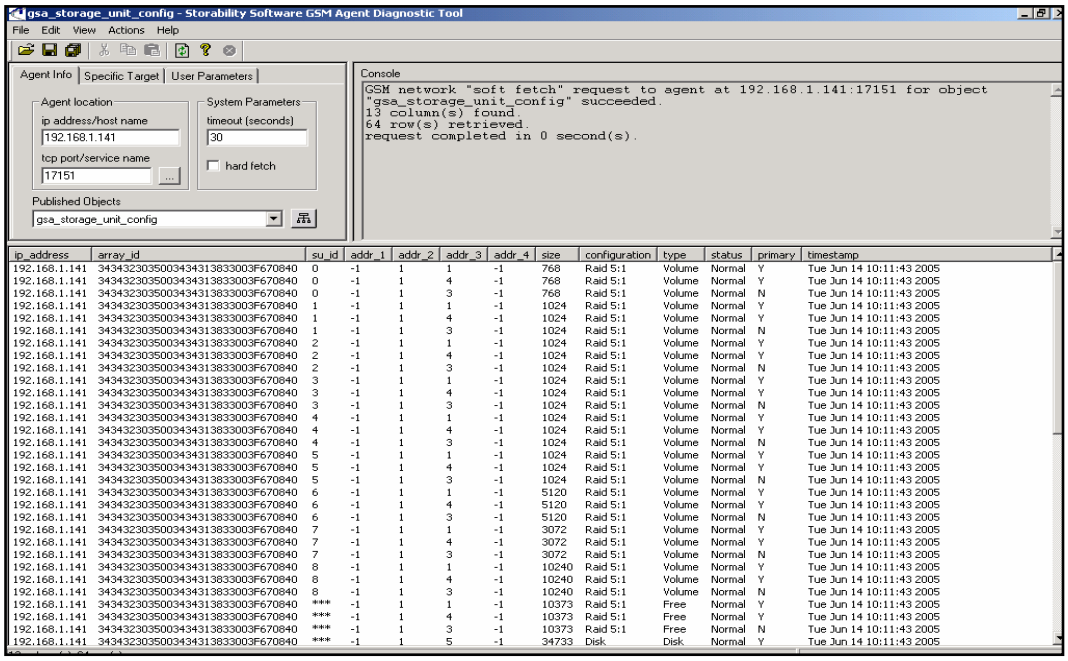


Figure 42 - Storage Unit Configuration Object - LSI Agent

    d. Use the drop down list of objects to verify the other objects published by the agent.

2. To verify the Storability LSI Agent has registered successfully with its configured Local Manager:

    a. In the **Agent location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the ip address/host name input box.
    b. Set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).
    c. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.
    d. Select the **gsa_agent_register** object.

    - Verify that its TCP port number appears in the "port" field and its host name/IP address is listed in the "active_peer" field.

    - Examine the "type" field. If the agent was registered through auto registration, the value is AUTO_NET. The value of STATIC means it was registered through a SUB_AGENT entry in the Routing Agent's storability.ini file.

XP AGENT

The XP Agent reports configuration and storage allocation for the HP-XP family of arrays (except for the XP256 series of arrays).

Refer to the *Sun StorageTek Business Analytics Support Matrix* to obtain the latest information on this agent's software and hardware requirements.

XP AGENT MATRIX

Item	Description
Support Prerequisites	
Verify Command View XP CLI version 1.8 or higher is installed	Refer to the next section.
Verify Ethernet connectivity to the CommandView server from the server running the XP Agent	`ping <IP Address>`
Verify access to the CommandView XP account with read privileges	
Verify Windows 2000 server equipped with Service Pack 2 or higher	Select **Start->Settings->Control Panel->System** to verify this requirement.
Agent Installation	
XP Agent on Windows	• Windows Local Manager Installation CD (InstallShield) • Required Server Access: Administrator privileges
XP Agent on HP-UX	• root user privileges
Configuration Parameters	
User Name	CommandView XP account with read or greater privileges
Password	Password for that user account
CommandView Directory	Fully qualified directory containing the CVCLI and supporting files.

Item	Description
CommandView CLI File Name	CVCLI command file name.
Local Manager	IP address or host name of Local Manager to be contacted for agent auto registration.
Local Manager Registration Port	TCP port number the Local Manager uses for agent auto registration; the default port number is 17146.
Enable Auto Registration	Turns on (default) or off agent auto registration.
Mapped Unassigned Alias	Specify a wwn_alias and wwn_id to report for mapped but unassigned volumes, which would otherwise be reported as unassigned. These are often Business Copy volumes.
Array Refresh Interval	Never change the default value.
Array Update Interval	Interval to collect performance data.

Table 10 - HP XP Agent Matrix

HP XP COMMANDVIEW CLI REQUIREMENT

The HP XP CommandView CLI must be configured properly to communicate with the CommandView Server. If the agent is installed on the CommandView server, no modification to the CommandView CLI is normally required. If the agent is installed on a separate system, the text file "CVCLI.properties" in the CVCLI installation directory must be modified.

Edit this file and change the line:

```
SERVLET_URL=http://localhost/hpstmgmt/servlet/MarsDm
```

To:

```
SERVLET_URL=http://servername/hpstmgmt/servlet/MarsDm
```

replacing **servername** with the hostname or IP address of the CommandView server.

The CommandView CLI requires a valid CommandView account with read privileges or higher to connect to the CommandView server. This is an application username and password within CommandView, which the Command View administrator should be able to provide. The default read-only Account, username=user password=user, will work unless the defaults have been changed.

Before you install the Storability XP Agent, verify proper operation of the CommandView CLI by running a command.

1. Open a command window.
2. Change directory to the CommandView CLI installation directory, which contains CVCLI.properties and CVCLI.bat.
3. Type the command:

```
cvcli -p username  password
```

The output should be similar to:

```
Version : CV1.80.00
Loading XML Parser for validation, Please wait.....
Commands Loaded ....
```

4. Enter the list device command

```
CV_CLI> list device
```

The command output should be similar to:

```
Sending Request to CV server ...
Array Sno,IpAddress,Array Type,Location,Contact
info,Manage,Ftp,Protocol
12345,10.10.10.10,XP 512,SanLab,John Doe,manage,ftp,snmp
67890,10.10.10.11,XP 512,SanLab,John Doe,manage,ftp,snmp
CV_CLI> exit
```

Important Note:
If the above commands fails or "list device" does not show any array devices, troubleshoot the CommandView CLI installation before proceeding to install the Storability XP Agent. When troubleshooting, be aware that the CVCLI.properties file must contain an entry like:

```
SERVLET_URL=http://servername/hpstmgmt/servlet/MarsDm
```

The hostname part of the URL must be the name or address of the Command View XP server. The default is installed with hostname "localhost", and must be changed if the localhost is not the CommandView XP server. Also, if CommandView XP was installed with SSL security enabled, the URL must be changed to https instead of http.

INSTALLING THE STORABILITY XP AGENT - WINDOWS

This section describes how to install and configure the HP-XP Agent on a Windows platform.

1. Insert the Windows Local Manager CD into the CD-ROM drive.

2. Click **Next>** on the **Welcome** menu to continue the installation.

3. Click **Yes** to accept the terms of the software license agreement.

4. Click **Next>**.

5. Review/modify the **User Name** and **Company Name** and click **Next**.

6. Check the **HP-XP Agent** checkbox on the screen that lists the Sun StorageTek Business Analytics Agents for installation. You may want to install the **Host Agent** as well. Click **Next**.

7. Review the settings and click **Next** to continue.

8. Click **Yes** to acknowledge the informational dialog box that specifies the CommandView CLI (CVCLI) must be installed and properly configured for the HP-XP agent to operate correctly . The “Installing HP-XP Agent” popup window appears.

9. Specify whether or not to install the Configuration Tool.

10. When the Configuration Tool is automatically launched, select **File**->**Edit**->**Smart Agent Configuration**.

11. Click the **HPXP Agent** tab and click **Add.**

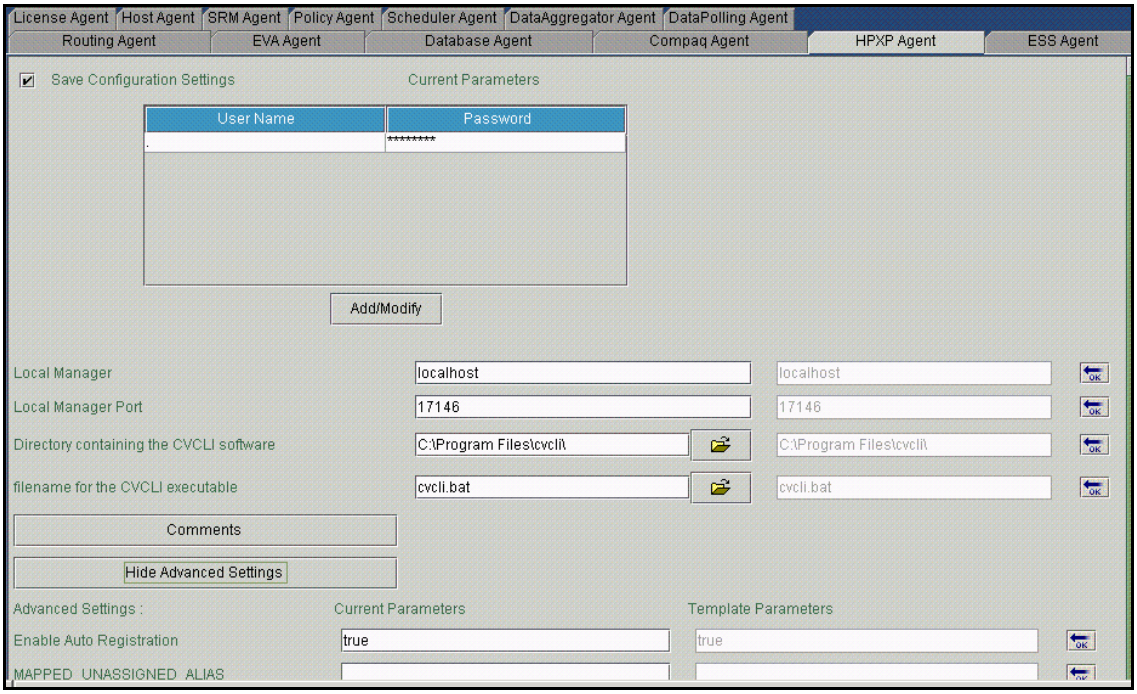


Figure 43 – HP XP Agent Tab in Configuration Tool

12. Click **Add** and the "Add property" dialog appears. It allows you to specify user accounts in the dialog box:

    User Name - CommandView XP account with read or greater privileges.

    Password - Password for the user account specified above.

13. Click **Submit** to add the user account.

14. Review/modify the following configuration variables:

- **Local Manager** – Network resolvable host name or IP address for the Local Manager with which the agent is to be registered if auto registration is enabled.
- **Local Manager Registration Port** – Accept default TCP port number of 17146.
- **Directory Containing the CVCLI software** – Fully qualified directory containing the CVCLI and supporting files. This directory must contain the CVCLI batch file or executable, and the CVCLI.properties file.
- **Filename for the CVCLI executable** - Name of CVCLI command file. The expected value for Windows is **cvcli.bat**.

15. Click **Show Advanced Settings** and review/modify the following variables:

- **Enable Auto Registration –** Turns agent auto registration on (default) and off.

- **MAPPED_UNASSIGNED_ALIAS** - Specify a wwn_alias and wwn_id to report for mapped but unassigned volumes, which would otherwise be reported as unassigned. These are often BusinessCopy volumes.

- **ARRAY_FRESH_INTERVAL** – Do not change the default setting (0).

- **ARRAY_UPDATE_INTERVAL** - Specify the frequency in seconds to obtain updated data from the CVCLI interface. It is recommended that you do not set this variable to a value less than 600 seconds.

16. Select **File->Save** and confirm saving the changes.

17. Select **File->Exit** to close the Configuration Tool.

18. View and then close the **Readme** file and click **Finish**.

19. Use the Windows **Services** panel to restart the agent before you proceed to verify agent functionality.

INSTALLING THE XP AGENT ON HP-UX

The XP Agent prerequisites are described in the *Sun StorageTek Business Analytics Support Matrix*. Verify these prerequisites are met on the HP-UX server before you proceed to installing this agent.

Note: The HP XP CommandView CLI must be configured properly to communicate with the CommandView Server. See the previous `HP XP CommandView CLI` section for additional information on this support requirement.

1. Mount the installation CD in the CD-ROM drive of the HP-UX server.
2. Change directory to the software installation directory. For example:

```
cd /cdrom/UNIX/HP_UX/11.00
```

3. Run the XP Agent installation script. For example:

```
./xpAgent-install.sh\;1 xp_Agent-hpux.tgz\;1
```

4. Read the displayed information on the agent, which should be similar to the text that follows:

```
x opt/storability/bin/xpAgent, 3919872 bytes, 7656 tape blocks
x opt/storability/bin/inicrypt, 2015232 bytes, 3936 tape blocks
x opt/storability/tmp/request, 6559 bytes, 13 tape blocks
x opt/storability/tmp/agents, 92 bytes, 1 tape blocks
x opt/storability/tmp/install.sh, 660 bytes, 2 tape blocks
x opt/storability/tmp/i.cfg, 1956 bytes, 4 tape blocks
x opt/storability/tmp/i.touch, 343 bytes, 1 tape blocks
x opt/storability/tmp/storability.ini, 290 bytes, 1 tape blocks
x opt/storability/GSM-license.txt, 9930 bytes, 20 tape blocks
x opt/storability/lgpl-license.txt, 26532 bytes, 52 tape blocks
x opt/storability/openssl-license.txt, 6279 bytes, 13 tape blocks
x opt/storability/pcre-license.txt, 1944 bytes, 4 tape blocks
x opt/storability/snia-license.txt, 23716 bytes, 47 tape blocks
x opt/storability/snmp++-license.txt, 1238 bytes, 3 tape blocks
x opt/storability/xercesc-license.txt, 2697 bytes, 6 tape blocks
```

```
x sbin/init.d/xpAgent, 1567 bytes, 4 tape blocks
x sbin/rc1.d/K248xpAgent symbolic link to ../init.d/xpAgent
x sbin/rc3.d/S122xpAgent symbolic link to ../init.d/xpAgent
This version of GSMhpxp was built on HP-UX B.11.00 and has
not been tested on HP-UX B.11.11.
```

5. At the "Continue with installation? [n]" prompt, type **y** and press **Enter** to continue.
6. At the "Location of cvcli?" prompt, type the fully qualified path to the directory containing the CVCLI and supporting files and press **Enter**. This directory must contain the CVCLI batch file or executable, and the CVCLI.properties file.
7. At the "Username for CommandView? [admin]" prompt, type the CommandView administrative user name or press Enter to accept the default user name (admin).
8. At the "Password for CommandView?" prompt, type the password for that CommandView user.
9. At the "Confirm password?" prompt, retype the password you entered.
10. At the "(Re-)start agents after install [y]" prompt, press **Enter** to restart the agents after the installation is completed.

    The installation is completed and the agent is started.

```
/opt/storability/etc/storability.ini:   updated.
/opt/storability/etc/agents:    updated.
/opt/storability/data/Message.log
Starting Storability HP XP agent:       xpAgent started
```

Agent Auto Registration

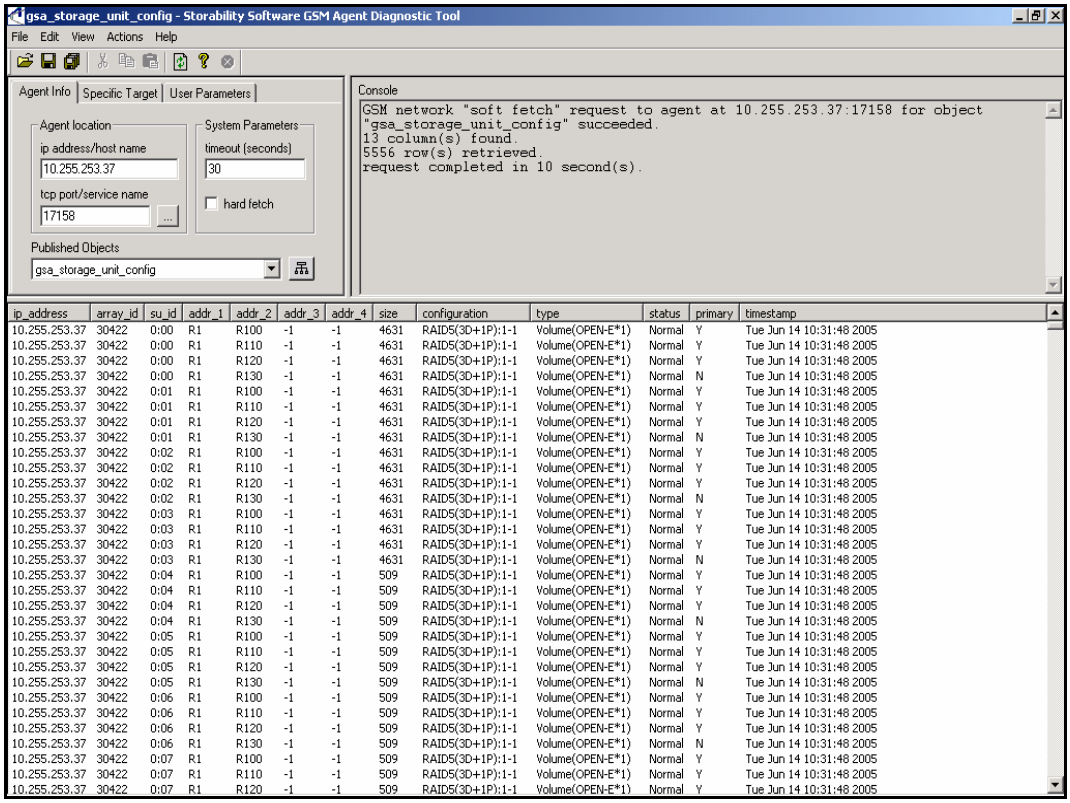
- To configure agent auto registration, you can add the HP XP Agent to a Local Manager Routing Agent configuration or manually add the required entries to the storability.ini file.

Sample entries follow.

```
GSM_LM_HOST = 10.192.252.53
GSM_LM_PORT = 17146
GSM_ENABLE_LM_REGISTRATION = true
```

VERIFYING THE XP AGENT

1. Use the GSM Agent Diagnostic Tool to verify agent functionality.
    a. Enter the IP Address or Hostname of the server where the agent is installed, and select the Storability XP Agent from the drop down list of service names.
    b. Click the **Get Object List** button and you should receive a list of tables published by the HP XP Agent. If unsuccessful, verify the agent is running.
    c. Select the **storage_unit_config** object published by the agent. Verify the ip_address, array_id, su_id, configuration, type, status, primary, and timestamp fields are reported.



ip_address	array_id	su_id	addr_1	addr_2	addr_3	addr_4	size	configuration	type	status	primary	timestamp
10.255.253.37	30422	0:00	R1	R100	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:00	R1	R110	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:00	R1	R120	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:00	R1	R130	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	N	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:01	R1	R100	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:01	R1	R110	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:01	R1	R120	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:01	R1	R130	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	N	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:02	R1	R100	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:02	R1	R110	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:02	R1	R120	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:02	R1	R130	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	N	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:03	R1	R100	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:03	R1	R110	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:03	R1	R120	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:03	R1	R130	-1	-1	4631	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	N	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:04	R1	R100	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:04	R1	R110	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:04	R1	R120	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:04	R1	R130	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	N	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:05	R1	R100	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:05	R1	R110	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:05	R1	R120	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:05	R1	R130	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	N	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:06	R1	R100	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:06	R1	R110	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:06	R1	R120	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:06	R1	R130	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	N	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:07	R1	R100	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:07	R1	R110	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005
10.255.253.37	30422	0:07	R1	R120	-1	-1	509	RAID5(3D+1P):1-1	Volume(OPEN-E*1)	Normal	Y	Tue Jun 14 10:31:48 2005

Figure 44 - Storage Unit Configuration Object for XP Array

d. Collect all other tables published by the agent.

Note: The agent does not report performance, local copy (Business Copy XP), or remote copy (Continuous Access XP) information due to limitations of the CommandView interface used to obtain array data. In particular, this means the following tables are expected to be empty:

- gsa_fctrl_perf
- gsa_cache_perf
- gsa_disk_perf
- gsa_local_unit_mapping
- gsa_remote_unit_mapping
- gsa_su_reference_config

3. To verify the Storability Compaq Agent has registered successfully with its configured Local Manager:

   a. In the **Agent Location** window, enter the IP Address or network resolvable Host Name of the Local Manager in the ip address/host name input box.

   b. Set the port to 17146 (or select the Storability Routing Agent from the drop down list of service names).

   c. Click the **Get Object List** button and you should receive a list of tables published by the Routing Agent.

   d. Select the **gsa_agent_register** object.

e. Verify it reports the XP Agent in the "active_peer" field by IP address with a port number of 17158.

Verifying Management Console Functionality

The following procedure describes how the administrator verifies the Sun StorageTek Business Analytics Array Agent reports in the Management Console. Refer to the *Administration* chapter to obtain information on the administrative menus you can access from the **Tools** pull down menu, including the **Data Polling Schedule** and **Change Dashboard** menus.

1. Log in to the Management Console as an administrative user (e.g., gsmuser) or another user whose views provide access to the desired assets (e.g., sites).
2. Verify that your customized Home Page includes the **Storage Allocation Overview** dashboard (or use **Change Dashboard** to assign one).
3. Select **Tools->Data Polling Schedule**.
4. Use the **Collect Now** button to collect the Array (collection type) Configuration (Collection Metric) data using a polling schedule that includes the specific site or all sites.
5. After you wait approximately thirty seconds, use the **Collect Now** button to collect the Array (collection type) Allocation (Collection Metric) data using a polling schedule that includes the specific site or all sites.
6. After you wait approximately thirty seconds, use the **Collect Now** button to collect the Array (collection type) Performance (Collection Metric) data using a polling schedule that includes the specific site or all sites.
7. Close the **Data Polling Schedule** window.
8. Select **Tools->Database->Refresh Capacity Allocation** for the desired site to refresh the array data displayed in the Storage Allocation Overview pane on the home page.
9. Verify the **Storage Capacity Allocation Overview** pane reports information on the array being monitored by the specific array agent you are verifying.

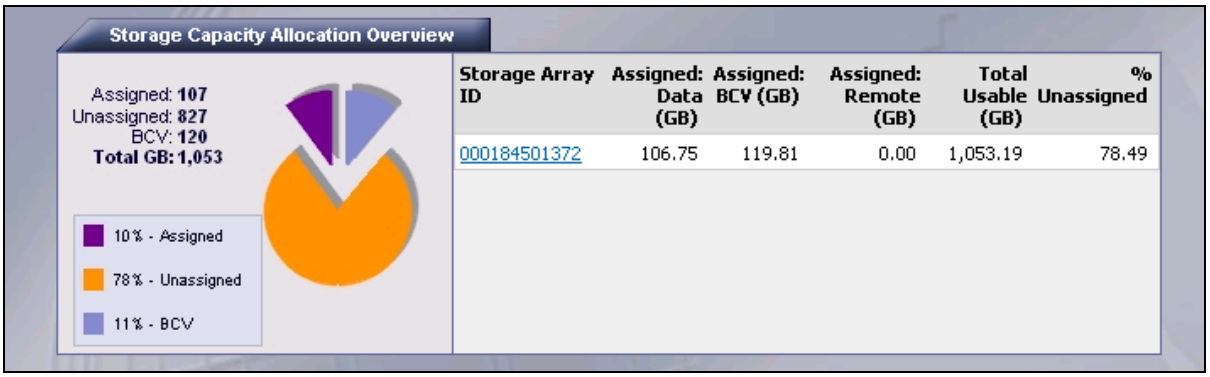


Figure 45 - Storage Capacity Allocation Overview

10. Click the **Storage Array ID** link in the pane and the **Detailed Array Configuration** report appears.
11. Verify the Site and Array ID are reported properly on the General tab.
12. Verify the tabular device reports by clicking the respective tabs: Ports, Volume Configuration, Volume Allocation, Performance, Trending, and Asset.
    Keep in mind that some device-specific tabs may not display data because they are not available for that particular array (e.g., Performance for an XP array). In these instances, the window may display "No Data Found" or an empty table.

ARRAY AGENT TROUBLESHOOTING

1. **Verify system/agent prerequisites** – Refer to the *Sun StorageTek Business Analytics Support Matrix* that is located on the Documentation CD to verify the most recent support requirements for the agent.
2. **Verify Agent Functionality** - Use the Sun StorageTek Business Analytics Agent Diagnostic Tool to save the output for all the tables if escalating a problem to Sun Support.
   a. Launch the Sun StorageTek Business Analytics Agent Diagnostic Tool from the Storability Program Folder.
   b. Enter the **IP Address** or **Hostname** of the server where the agent is installed and set the port number by selecting the particular Array Agent (e.g., Storability LSI Agent) from the drop down list of service names.
   c. Click the **Get Object List** button and you should receive a list of tables published by the agent. If unsuccessful, verify the Ethernet connectivity to the server running the agent and that the Array Agent is running.
   d. Select the **alerts-3_1** table and examine the **Description** column for each reported alert.
   e. Select **File->Save All** and respond OK to "This action will network fetch all objects published by the currently specified agent and save the data to a single file."
   f. When the **Save As** dialog appears, enter a meaningful file name and click **OK** to initiate the collection.
   g. Enter the desired file name and click **OK**.

3. **Review the Message Log** – Review/collect the Message.log file that contains information on startup errors, configuration errors, or errors regarding accessing data or parsing output.

   Windows

   - Message.log is located by default in: <drive>:\Program Files\Storability\GSM\Agents\Storability <Array Agent Name> Agent folder.
   - You can enable debug level logging by appending **LOG_SEVERITY=Debug** to the <Array Agent> section of the storability.ini file (if Storability Support requests it).

   Solaris

   - GSM agents' common Message.log file located by default in: /opt/storability/data.
   - You can enable debug level logging by appending LOG_SEVERITY=Debug to the <Array Agent> section of the storability.ini file (if StorageTek Support (Technical Excellence Center) requests it).

4. **Verify Local Manager Registration –** Collect the configured Routing Agent's **gsa_agent_register** object to verify the Array Agent has a STATIC or AUTO_NET type registration. If not, use the Sun StorageTek Business Analytics Agent Diagnostic Tool to:
   - ☐ Verify the **gsa_ini_control** object shows a valid IP address or network resolvable host name for the **Local Manager** used for auto registration.
   - ☐ "Enable auto registration" setting has a value of "true"

5. **Review the Routing Agent Message Log** – Review/collect the Routing Agent Message Log to check for errors related to Ethernet connectivity or other problems collecting the Array Agent's published objects.

6. **Confirm Polling Schedules** – Using the Management Console's Data Polling Schedule menus under Tools, review/modify the existing Polling Schedules for the Collection Type of Array for all sites.
    - ☐ Verify the **Collection Type** of *Array* exists in the Polling Schedules window.
    - ☐ Verify the scheduled frequency: Start Date/Time and recurrence.
    - ☐ Try a **Collect Now** (on-demand) agent data collection.
7. **Review Aggregator Message Log** – Wait a few minutes after you perform the above step and open the Aggregator's Message Log in a text editor.
    - ☐ Verify that the Array objects are being requested (e.g., **gsa_storage_unit_config**).
    - ☐ Verify the Data Aggregator received array data.
    - ☐ Verify the Data Aggregator inserted the database without logged errors.

    Note: The log contains two entries, TID (Transaction ID) and SID (Session ID), which can help you locate (e.g., Find) and view relevant logged entries. For scheduled polling requests, the TID will be equal to the Job ID in the Polling menu. Each SID is a unique identifier for a particular agent data collection session. For on-demand polling requests, the TID is a uniquely generated TID (not the Job ID) and SID, and the TID and SID will be equal to the same integer value.

8. **Check the assurent database** – The assurent database is the data repository for your Sun StorageTek Business Analytics application. Use any MS SQL Query interface, such as isql, to verify rows have been inserted into the array-related tables, such as the **gsa_storage_unit_config_v2** table.

9. **Verify Management Console Functionality** – As a final step in the agent troubleshooting procedure, minimally verify the monitored arrays now appear in the Storage Allocation Overview dashboard or in the Asset Management report for the site.

Upgrade Array Agent

For upgrading a Sun StorageTek Business Analytics Array Agent, uninstall the current Array Agent before you upgrade by installing the Sun StorageTek Business Analytics 5.0 Array Agent for the current software version.

Uninstall Array Agent - InstallShield

1. Select **Start->Program Files->Storability->Uninstall->Uninstall Local Manager**
   Or:
   Start->Program Files->Storability->Uninstall->Uninstall <Array Agent Name>. The Storability Uninstall dialog appears.
2. Click the checkbox for the particular Array Agent (e.g., Clariion Agent).
3. Click **Next>**. The **Question** dialog appears.
4. Click **Yes** to confirm uninstalling the agent. An uninstalling agent splash box appears as each selected agent is uninstalled.
5. When the InstallShield Wizard Complete dialog box appears, click **Finish**.

Uninstall Cygwin (HSG80 Agent on Windows Only)

The **cron** service runs as the local SYSTEM account and takes ownership of certain files and directories. Before uninstalling CYGWIN, run the following commands, in a CYGWIN command window as an Administrator:

```
umount -s /app
```

```
cygrunsrv -R cron
cygrunsrv -R conserver  # if installed
cd /
chown -R Administrator:Administrators var tmp
chmod -R g+w var tmp
```

This will take ownership and add write permission to all files under /var and /tmp. Next, exit ALL CYGWIN applications (including any bash shell windows).

After the above commands have completed, it should be possible to delete the entire CYGWIN installation directory.

Note: If all users of CYGWIN are in the *Administrators* group, the above steps should be sufficient. However, if there are CYGWIN users not in the Administrators group with home directories, then possibly the "home" directory will need to be added to the above list of directories for "chown" and "chmod".

UNINSTALL ARRAY AGENT – SOLARIS

1. Create a backup copy of the existing storability.ini file.

2. Type:

   ```
   pkgrm GSM<array agent name> e.g., GSMemc
   ```

3. At the "do you want to remove this package" prompt, enter **y** and press **Enter**.

4. At the "do you want to continue the removal of the package?" prompt, type **y** and press **Enter**. The "Removal of GSM<agent name>" agent was successful" message should appear to indicate the package was removed successfully.

REINSTALL ARRAY AGENT – NON-SOLARIS UNIX HOST

The reinstallation procedure for all Storability agents supported on non-Solaris UNIX hosts, such as the EMC Agent on an IBM AIX server, requires that the installer perform the following steps **before** running the agent's installation script:

1. Make a backup copy of the existing agent configuration file (storability.ini).

2. Make a backup copy of the contents of /opt/storability/etc/agents.

3. Open the existing agent configuration file (storability.ini) in a system text editor.

4. Locate the configuration section for the agent to be reinstalled.

5. Delete all existing configuration settings for that Storability agent.

6. Save the modified agent configuration file.

7. Remove the existing /opt/storability/etc/agents directory.

At this point, you may reinstall the agent using the agent's installation script (e.g., emcAIX-install.sh).