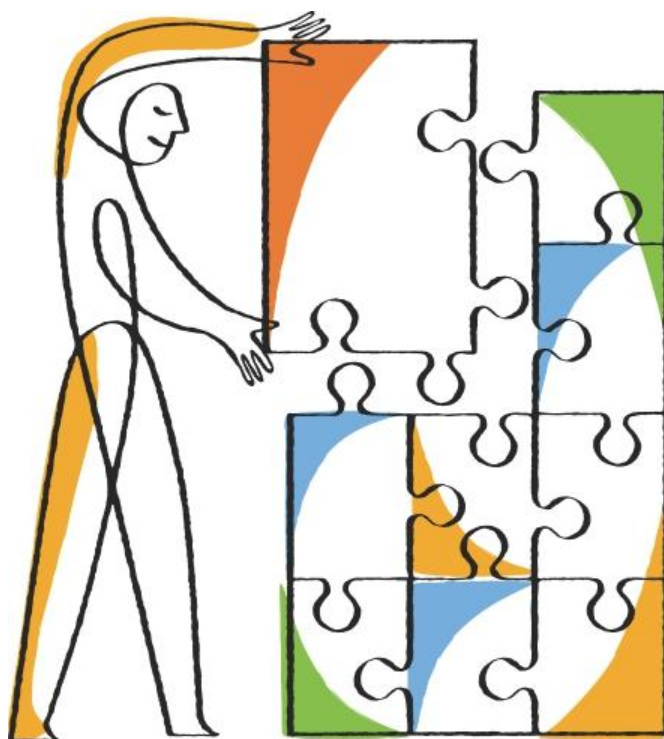




NetApp® SANtricity™ Add-in for Microsoft® SQL Server Management Studio 1.3

Installation Guide



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Table of Contents

Solution Architecture	1
Overview	1
Server Architecture	1
Storage Explorer Database	2
Client Architecture	3
Multi-Instance Architecture	4
Deployment Procedures	5
Download SSMS Storage Explorer Add-in 1.3	5
Install SSMS Storage Explorer Add-in 1.3	5
Install Server Components (Including Client Components)	12
Configure SSMS for Storage Explorer Add-in	15
Upgrade SSMS Storage Explorer Add-in 1.0 to 1.3	16
Provisioning Procedures	21
Add New Instances for Monitoring	21
Remove Instances from Monitoring	22
Remove Storage Explorer Application from Server	23
Operational Procedures	24
Start Storage Explorer Add-in for SSMS	25
Control Frequency of Gathering Job Statistics	27
Configure Storage Explorer Alerting	30
Instance-level Alerts	31
Database-level Alerts	32
View Properties of Storage Objects	34
View Associated Databases Report	36
View Performance Report	38
Performance Report Description	40
Produce SSMS Support Bundle	44
SSMS Storage Explorer BusScan Service	44
Known Issues	45
Installation	45
Starting Storage Explorer	45
Performance Reports	46

Solution Architecture

Overview

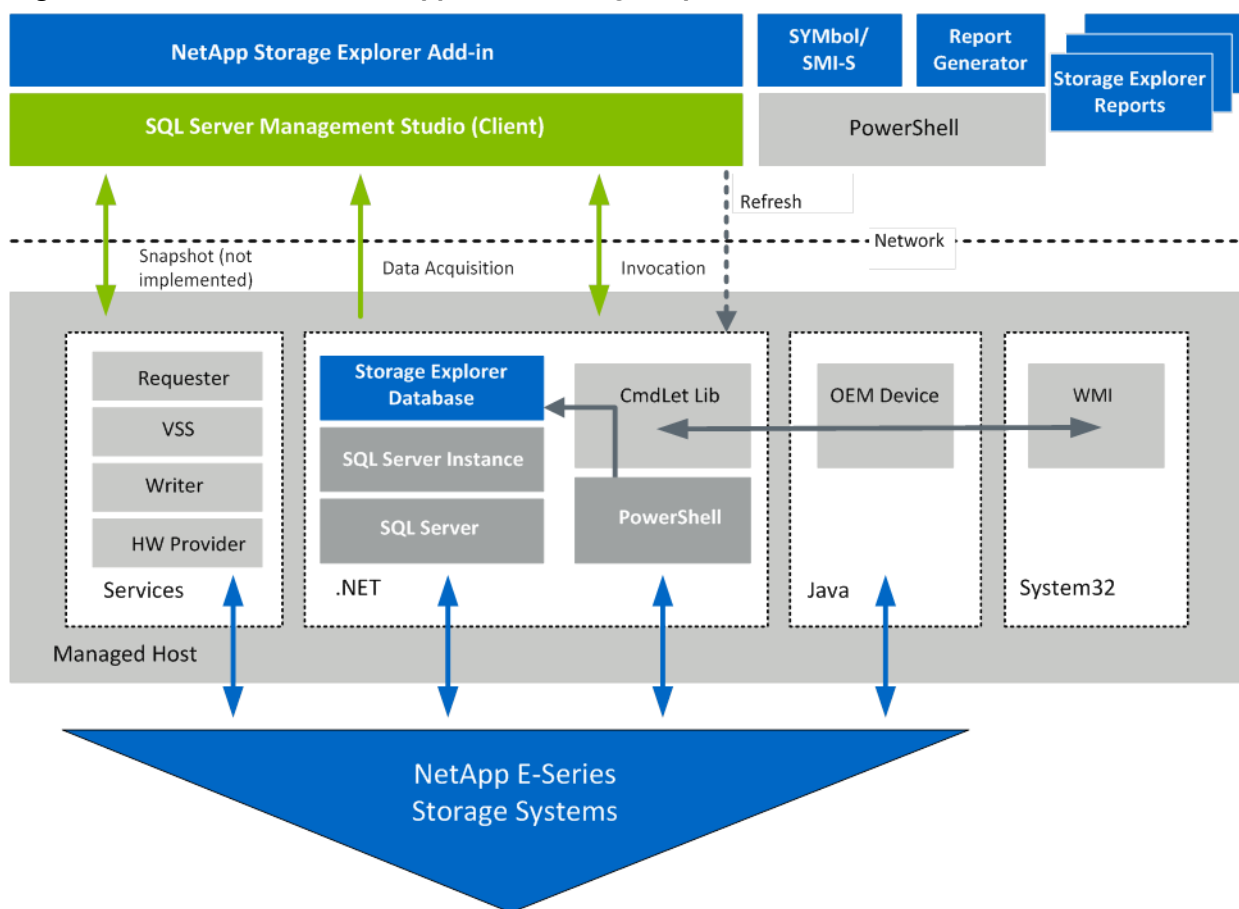
SQL Server Management Studio (SSMS) is an integrated environment for configuring, managing, and administering all components within Microsoft SQL Server. The tool includes both script editors and graphical tools that work with objects and features of the server.

A central feature of SSMS is the Object Explorer, which allows the user to browse, select, and act on any object in the server. SSMS is the principal database administration portal for Microsoft SQL Server databases, and many database administrators use it extensively to perform their job responsibilities.

The NetApp SANtricity add-in for Microsoft SQL Server Management Studio (SSMS Storage Explorer) extends the out-of-box SSMS functions to give the database administrator insight into the NetApp E-Series storage subsystem and to provide feedback on the proper functioning of that storage.

Figure 1 shows an overview of the architecture of the SSMS Storage Explorer add-in. The add-in is integrated with SSMS as a client-side extension that displays the logical and physical properties of attached storage and that generates and displays performance reports.

Figure 1 Architecture for NetApp SSMS Storage Explorer Add-in



Server Architecture

The server-side (managed host) services are installed and run in the background, independently from the client. Most of the work on the server side is performed through PowerShell cmdlets, which connect

to the attached NetApp E-Series storage devices that are collecting storage subsystem configuration information. All data collected on the server side persists in a set of SQL Server Storage Explorer database tables that are created during installation. The server-side services handle the following tasks:

- Discovery of the attached NetApp E-Series storage subsystem
- Retrieval and persistence of the discovered storage subsystem's logical and physical properties
- Retrieval, persistence, and generation of the discovered storage subsystem's performance data
- Retrieval, persistence, and generation of the mapping of a database instance to a volume or LUN
- Retrieval and notification of non-optimal storage system events
- Retrieval and notification of non-optimal Storage Explorer SQL Server Agent job events

Storage Explorer Database

The Storage Explorer database is a SQL Server database with tables and relationships that describe the high-level storage objects (such as storage systems, volumes, volume groups, thin-provisioned volumes [TPVs], dynamic disk pools [DDPs], disk drives and disk enclosures), the high-level, host-side presentations of the exposed storage (such as LUNs, physical devices, and operating system [OS] partitions), as well as current and historical non-optimal alert conditions including SQL Server Agent job events.

The Storage Explorer database and the SQL Server jobs used to insert configuration, performance, and alerting data into it are created during the installation of the add-in server components. The Storage Explorer database can be created in the default location for the SQL Server system databases or in an alternate location chosen by the database administrator.

NOTE No other install-time configuration of the Storage Explorer database is available.

Data Collection

One service and three SQL Server jobs are installed and run for each SQL Server instance. The service, SSMS Storage Explorer BusScan, is installed on the local system during the SSMS installation. This service scans the SCSI bus for new volumes that are used by SQL Server. The three SQL Server jobs collect configuration, performance and alert data:

- Configuration data collection (`StorageExplorer_ConfigScript`)
- Performance data collection (`StorageExplorer_PerfScript`)
- Alerts data collection (`StorageExplorer_AlertScript`)

Configuration data collection is handled by the `StorageExplorer_ConfigScript` SQL Server job. It inserts data into the Storage Explorer database configuration tables. The BusScan service produces the `BusScan.txt` file every two minutes. The `ConfigScript` reads the `BusScan.txt` file for the connection information of the array(s) and updates the database if needed.

The `StorageExplorer_PerfScript` job handles the performance data that is collected from all drives, volumes, volume groups, TPVs, and DDPs, and from the storage system; the data is inserted into the performance tables. Performance data is collected at regular intervals; the default interval is 10 minutes, but the length of time can be modified in the SQL Server job management interface.

Non-optimal storage system conditions are managed by the `StorageExplorer_AlertScript`. Alert data is collected at regular intervals; the default interval is 10 minutes, but the length of time can be modified in the SQL Server job management interface.

The alerting for Storage Explorer's SQL Server Agent jobs is handled within each job.

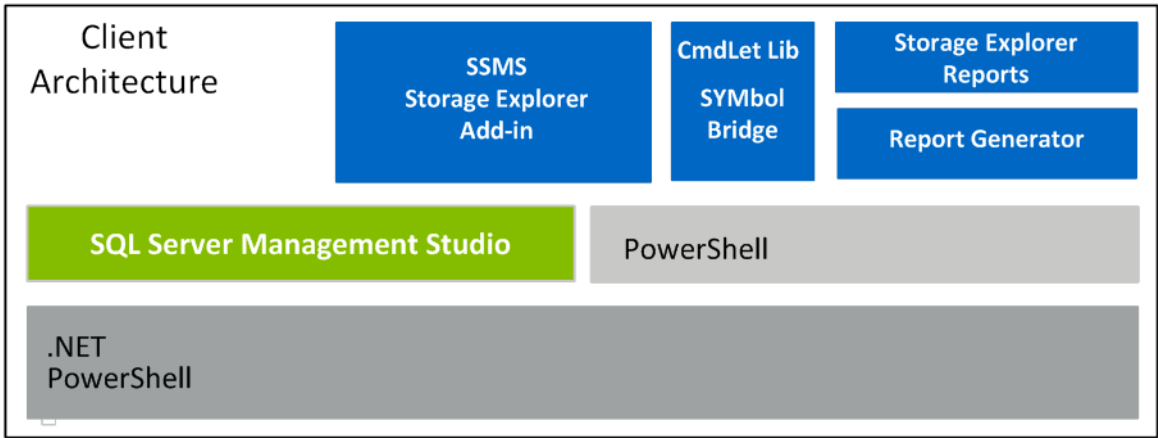
The three SQL Server jobs run periodically and restart automatically when the host is rebooted. For the SQL Server jobs to run, the SQL Server Agent service must be running on the host OS. The installation

program and the cmdlets invoking the jobs verify that the SQL Server Agent service is running and provide notification if it is not.

Client Architecture

The add-in client architecture is comprised of several components, as illustrated in Figure 2.

Figure 2 NetApp SSMS Storage Explorer add-in client architecture



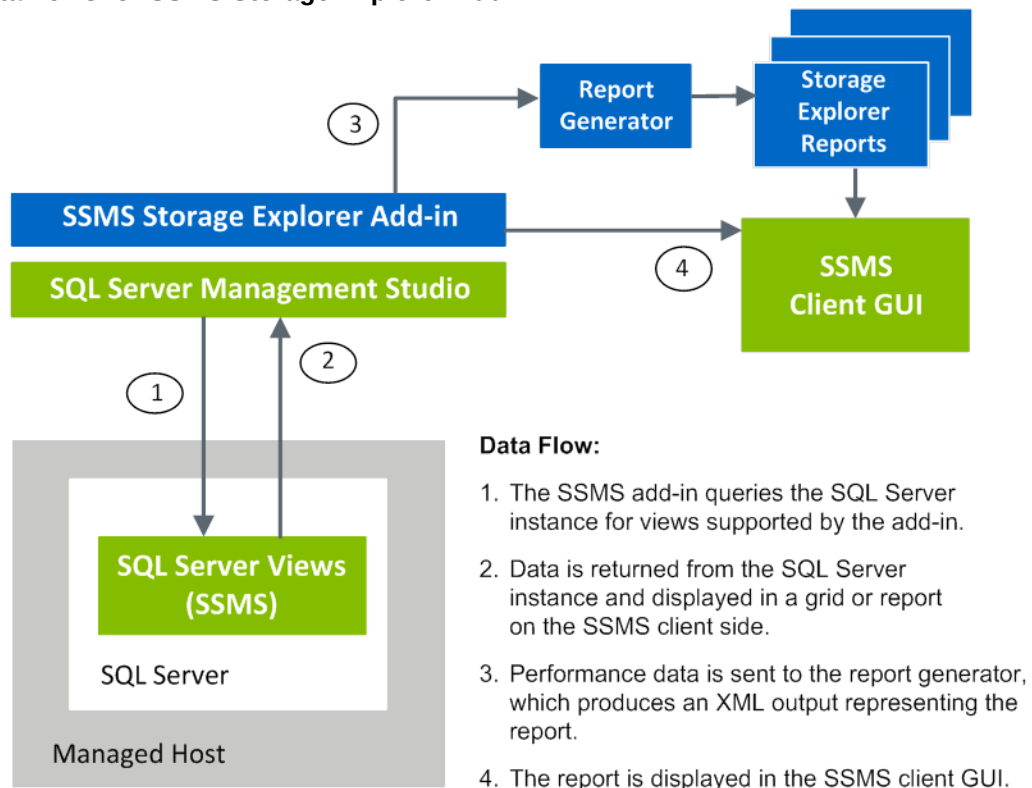
The components include the SSMS Storage Explorer add-in, the Storage Explorer reports, and a report generator.

The add-in client uses the communication protocols built into SSMS. When a database is added to the server, the add-in collects information specific to a SQL Server database instance, the physical mappings from the database to a LUN, and the performance statistics. Data is retrieved through a set of queries to the specific views created on the SQL Server instance. The context of the data (logical, physical, performance, or alert) is indicated by the view names.

Retrieved data is displayed in different ways. Metadata describing the physical and logical elements (such as the database, LUN, volume, or volume group) is displayed in a grid; performance data is displayed in a graphical report; and alerting data is displayed as a badge on the appropriate icon.

The data flows for the SSMS Storage Explorer add-in are illustrated in Figure 3.

Figure 3 Data flows for SSMS Storage Explorer Add-in



Multi-Instance Architecture

The Storage Explorer add-in is designed to work with multiple instances of SQL Server, using the previously described client-server architecture for each instance. The Storage Explorer database is installed on each instance that has a NetApp E-Series storage system as its storage subsystem, as shown in Figure 1. Then all needed data is read from the Storage Explorer database by the client, as shown in Figure 2.

NOTE The Storage Explorer database can be installed on an instance that is not using Netapp E-Series storage. Since no database files reside on volumes using E-Series storage, those databases will not be listed in the Storage Explorer view.

NOTE The storage subsystems of multiple instances cannot be viewed simultaneously, but only one at a time.

The Storage Explorer add-in also works in a cluster environment. When a cluster fails over or fails back, the add-in continues to properly display NetApp E-Series storage properties.

Deployment Procedures

Table 1 Add-in for Microsoft SQL Server Management Studio prerequisites

Description
A NetApp storage system, using an E2600, E2700, E5400,E5500, E5600, EF540, EF550, or EF560 controller
A NetApp storage system, using firmware versions 7.84, 7.86, 8.10, or 8.20
The Standard, Enterprise, Datacenter, or Cluster x64 version of Microsoft Windows Server 2008 R2, Windows Server 2012, or Windows Server 2012 R2
SQL Server 2008 R2 Enterprise, SQL Server 2012 Enterprise, or SQL Server 2014 Enterprise
PowerShell 2.0 or later
.NET Framework 3.5 .NET Framework 4.0 .NET Framework 4 Client Profile

Download SSMS Storage Explorer Add-in 1.3

The Microsoft SQL Server Management Studio (SSMS) Storage Explorer add-in download contains the following files:

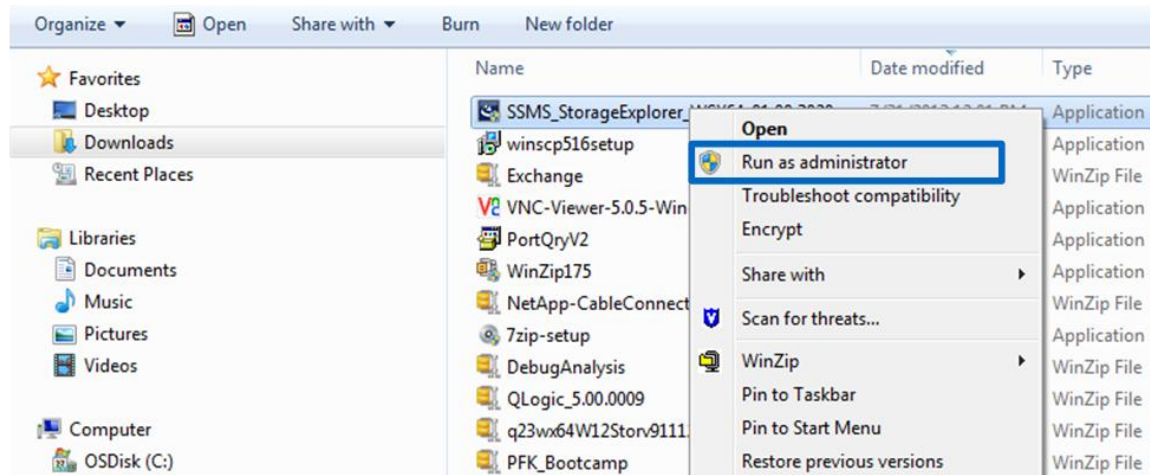
- SSMS_StorageExplorer_<ARCH>_01.30.xxxx.3000.exe
- "NetApp SANtricity Add-in for Microsoft SQL Server Management Studio 1.3"

The SSMS Storage Explorer add-in can be downloaded from the [NetApp Support](#) site.

Install SSMS Storage Explorer Add-in 1.3

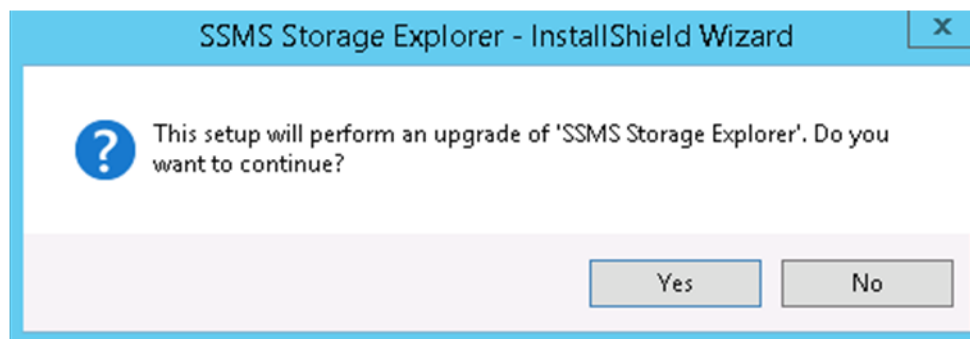
To install the SSMS Storage Explorer add-in, complete the following steps:

1. Close any open SSMS sessions.
2. Locate the SSMS_StorageExplorer executable file.
3. Start the installation:
 - To install the add-in on a client computer, perform the installation as the local administrator of the client or right-click the SSMS_StorageExplorer executable file and select Run as Administrator.

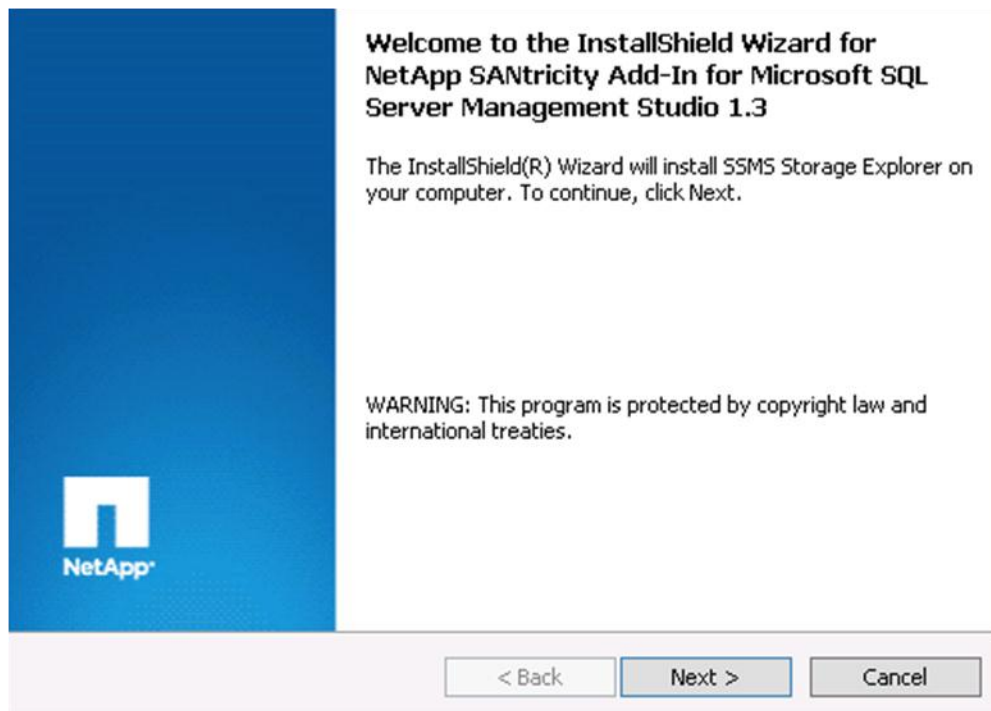


- To install the add-in on a SQL Server host, perform the installation as the server administrator. This installation type includes both the server components and the client components of the add-in.

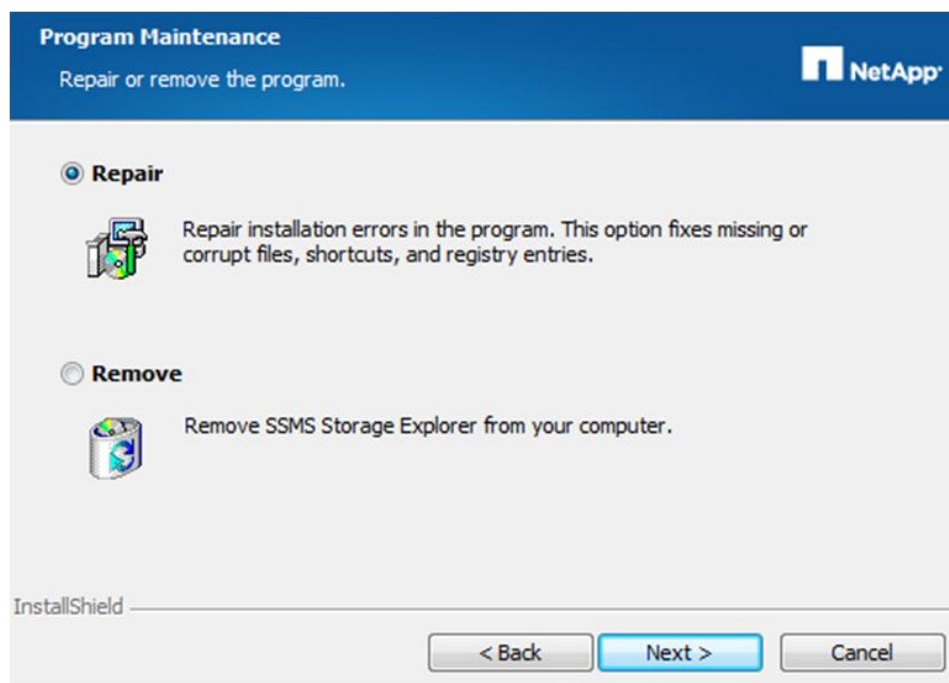
NOTE If an older version of SSMS Storage Explorer is already installed on your system, an informational message is displayed that an upgrade will be performed. See section Upgrade SSMS Storage Explorer Add-in 1.0 to 1.3.



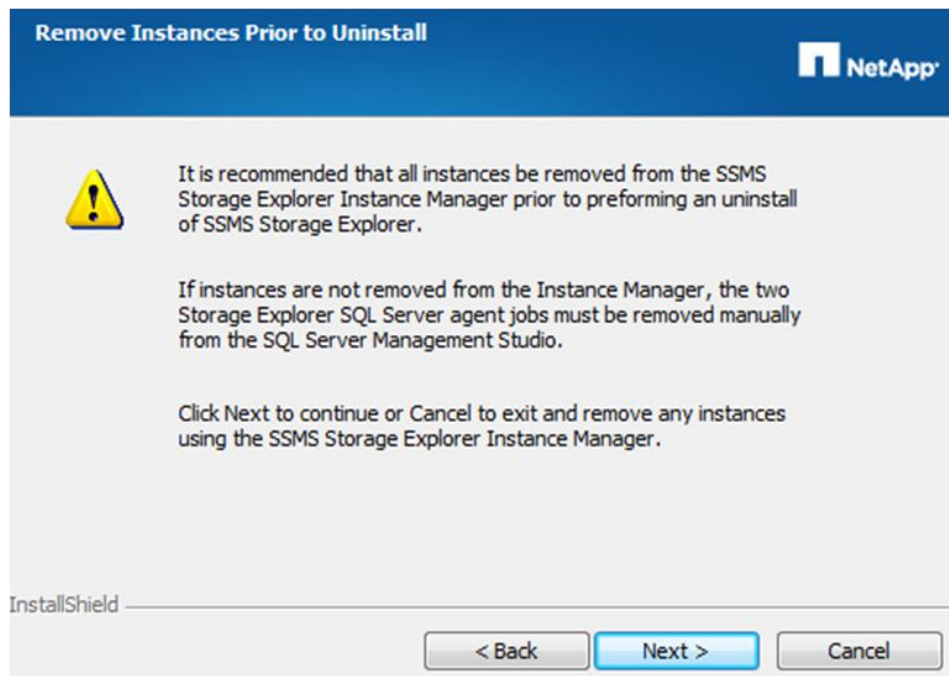
4. On the Welcome page of the installation wizard, click Next.



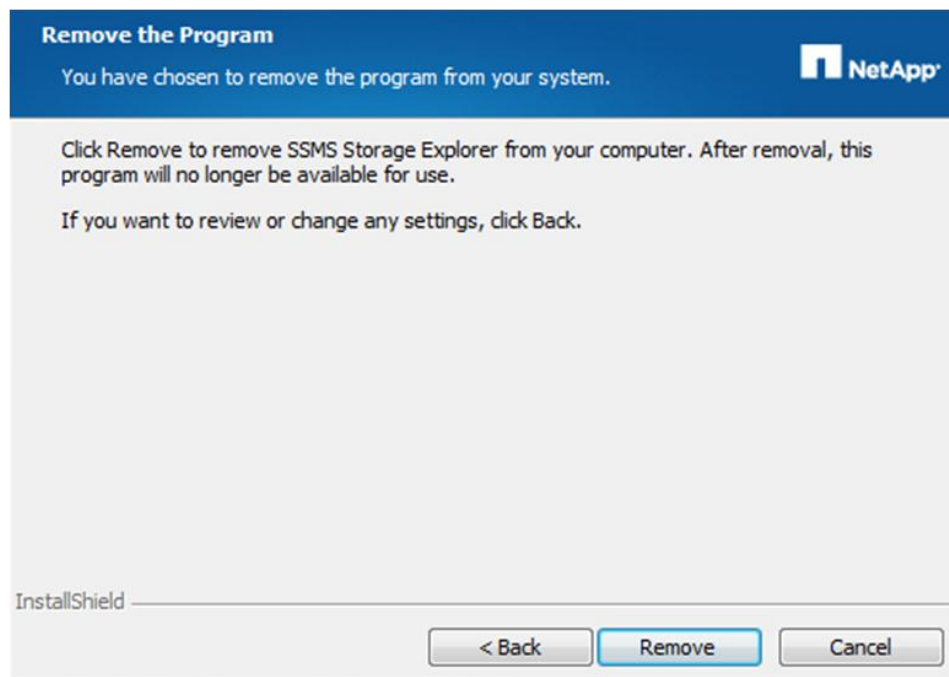
5. If you are installing SSMS Storage Explorer for the first time, go to Step 8.
6. If you are reinstalling the same version of SSMS Storage Explorer, you can choose either to repair installation errors in the program or to remove the add-in before reinstalling it:
 - To repair the installation, select Repair, click Next, and go to Step 10.



- To remove SSMS Storage Explorer, select Remove and verify that all SQL Server instances have been removed from Instance Manager before proceeding. Click Next.



7. Click Remove to complete the removal of SSMS Storage Explorer.



8. Accept the terms of the license agreement and click Next.

License Agreement 

Please read the following license agreement carefully.

END USER LICENSE AGREEMENT

This end user license agreement ("Agreement") is a contractual agreement between you ("You" or "Your") and NetApp ("NetApp"), and provides the terms under which NetApp licenses its i) software, including where relevant, backup and recovery, disaster recovery, storage efficiency and management software, operating systems, protocols, updates and upgrades ("Software"), and ii)

☒ I accept the terms in the license agreement

☐ I do not accept the terms in the license agreement

InstallShield

9. Accept the default destination folder for the installation, or click Change to install the software to a different folder. Click Next.

Destination Folder 

Click Next to install to this folder, or click Change to install to a different folder.

 Install SSMS Storage Explorer to:
C:\Program Files\NetApp\StorageExplorer\

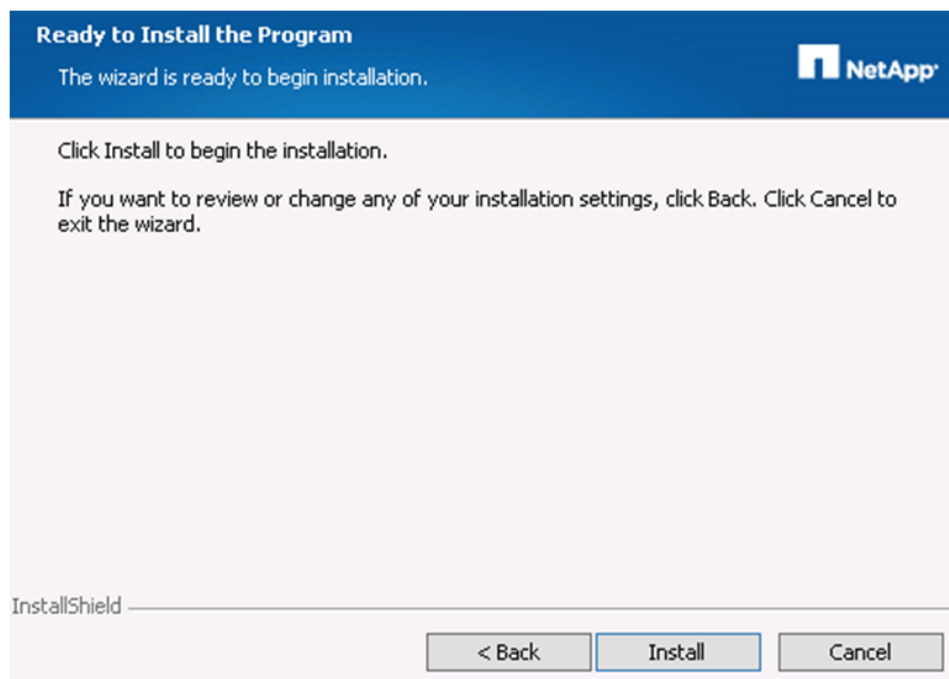
InstallShield

10. Select the installation type. You can install only the client components or you can install the server components plus the client components. Click Next.

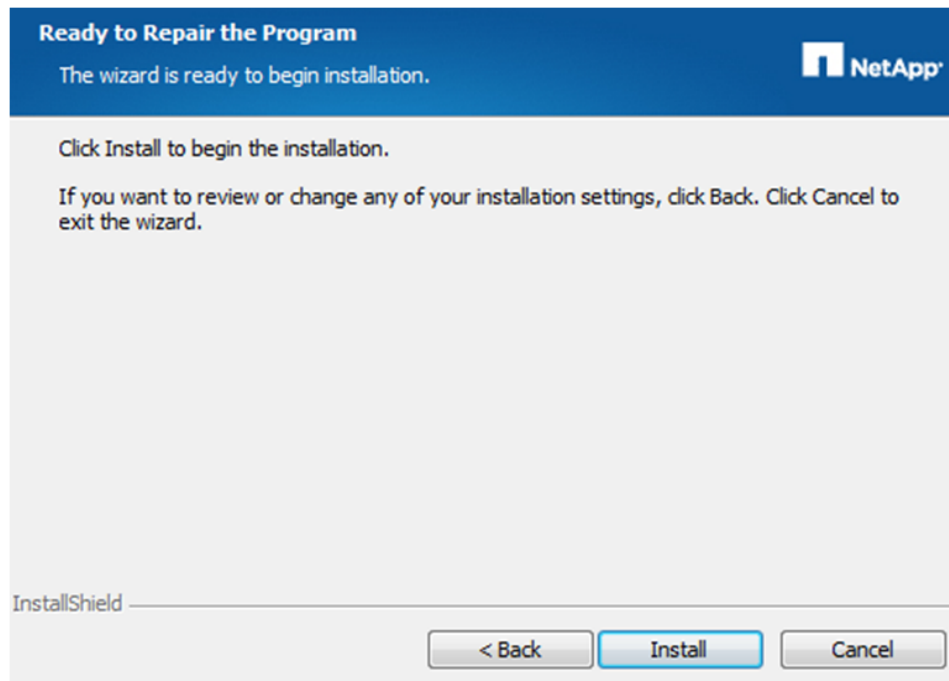
NOTE To perform a server installation, you must be running the installer as the server administrator.



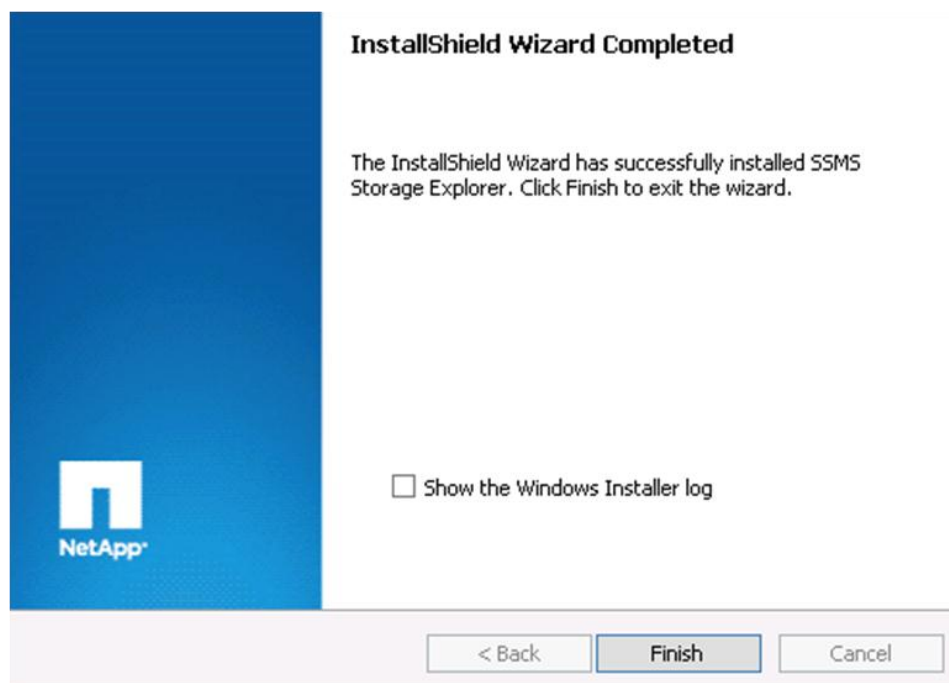
11. When you are ready to install the add-in, click Install.



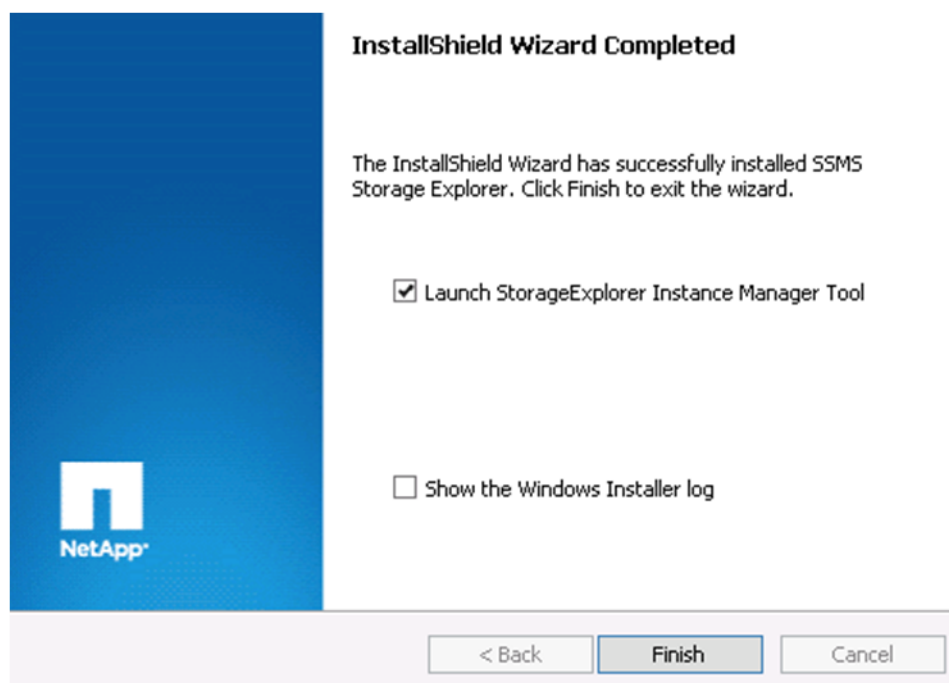
NOTE If you are repairing the add-in components, click Install to begin the repair process.



12. If you chose to install only the client components in Step 10, the installation is complete. You may select the Show the Windows Installer Log checkbox to view the installation log file, if desired. Click Finish to exit the installation wizard.



13. If you chose to install the server components plus the client components in Step 10, the last page of the wizard will include the Launch Storage Explorer Instance Manager Tool checkbox. Select this checkbox and click Finish to exit the installation wizard.



14. To finish the installation of the server components, proceed to the next subsection, “Install Server Components (Including Client Components).”

Install Server Components (Including Client Components)

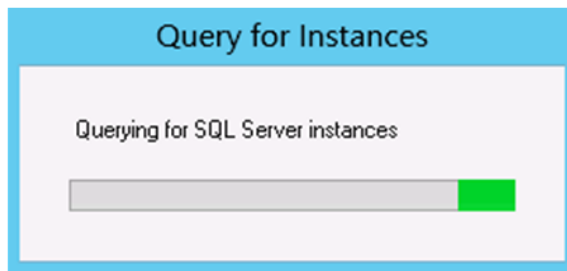
The SSMS Storage Explorer add-in can monitor only NetApp E-Series storage systems. Although the add-in can be installed on a SQL Server instance that does not have databases residing on a NetApp E-Series storage system, it cannot provide information about them.

NOTE The SQL Server Agent for the instance must have the required permissions (such as those granted by the Local System account or be part of the local administrator group) on the local server during the installation to create database files on the server.

To finish the SSMS Storage Explorer installation and install the server components in addition to the client components, complete the following steps:

1. Complete the previous procedure, “Install SSMS Storage Explorer Add-in,” making sure to:
 - Run the installer as the server administrator.
 - Select Server Components as the type of installation in Step 10 of that procedure.
 - Select the Launch Storage Explorer Instance Manager Tool checkbox on the last page of the installation wizard before clicking Finish.
2. Once you click Finish to exit the installation wizard, Instance Manager starts and searches for any SQL Server instances that are installed on the server and that do not have Storage Explorer SQL Server Agent jobs installed on them.

NOTE It is possible for the SSMS Storage Explorer database to exist without the jobs.



3. Add SQL Server instances to the SSMS Storage Explorer installation:

- a. Select the type of connection security to use for connecting to SQL Server.

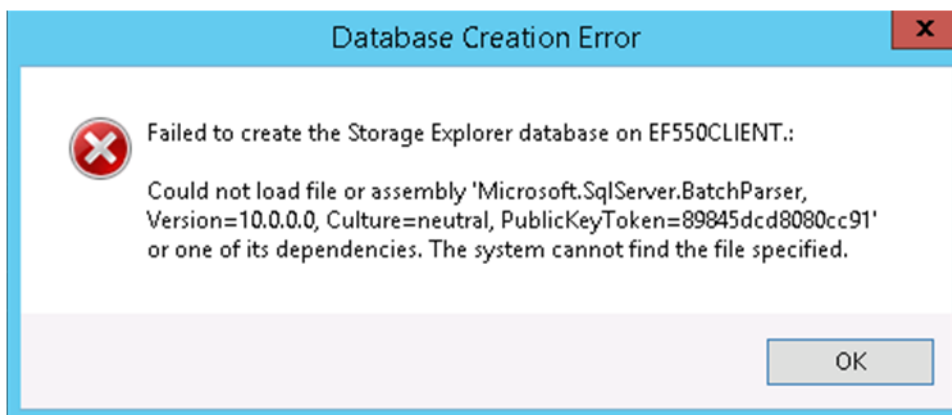
NOTE If you select SQL Server authentication, the credentials must be validated before you can proceed.

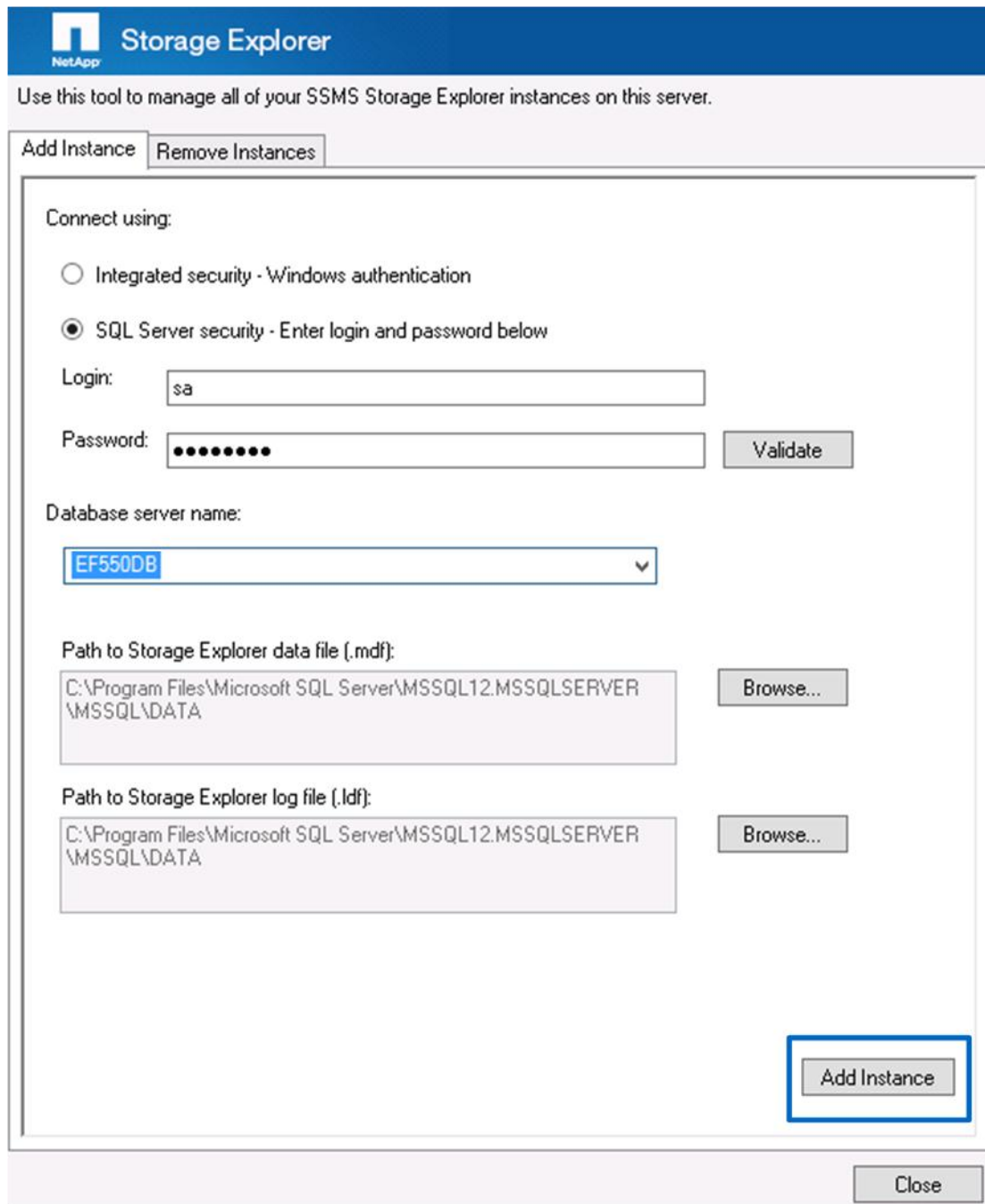
NOTE For a login ID to be able to perform the installation, it must be a member of the SQL Server sysadmin role.

- b. Select the first SQL Server instance to be monitored by SSMS Storage Explorer and click Add Instance.

NOTE Instance Manager installs the Storage Explorer database, procedures, and required jobs to collect configuration and performance data only from NetApp E-Series storage systems. The only method for changing the file paths for the Storage Explorer data and log file is to use the Browse button. If the Storage Explorer database already exists, the path may not be modified, and the Browse button is disabled.

NOTE If the below message is received during instance installation, it will be necessary to download and install the Microsoft SQL Server 2008 R2 Management Objects and Microsoft SQL Server System CLR Types found at Microsoft® SQL Server® 2008 R2 Feature Pack.



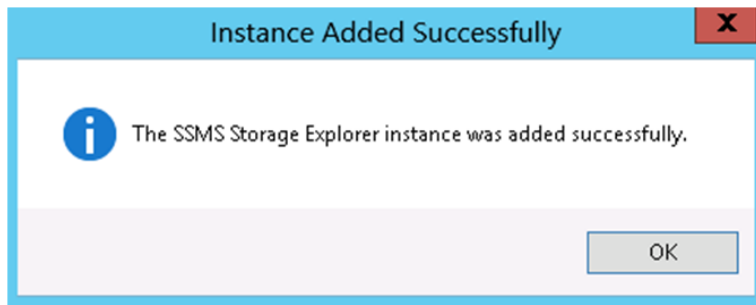


The image shows a 'Storage Explorer' dialog box with a blue header bar containing the NetApp logo and the title 'Storage Explorer'. Below the header, a light blue bar contains the text 'Use this tool to manage all of your SSMS Storage Explorer instances on this server.' The main area has two tabs: 'Add Instance' (selected) and 'Remove Instances'. The 'Add Instance' tab contains the following fields and controls:

- Connect using:**
 - ☐ Integrated security - Windows authentication
 - ☒ SQL Server security - Enter login and password below
- Login:** A text box containing 'sa'.
- Password:** A password box with 10 dots, followed by a 'Validate' button.
- Database server name:** A dropdown menu showing 'EF550DB'.
- Path to Storage Explorer data file (.mdf):** A text box containing 'C:\Program Files\Microsoft SQL Server\MSSQL12.MSSQLSERVER\MSSQL\DATA', followed by a 'Browse...' button.
- Path to Storage Explorer log file (.ldf):** A text box containing 'C:\Program Files\Microsoft SQL Server\MSSQL12.MSSQLSERVER\MSSQL\DATA', followed by a 'Browse...' button.
- Add Instance:** A button at the bottom right of the main area, highlighted with a blue border.

At the bottom right of the dialog box is a 'Close' button.

4. In the Instance Added Successfully dialog box, click OK.



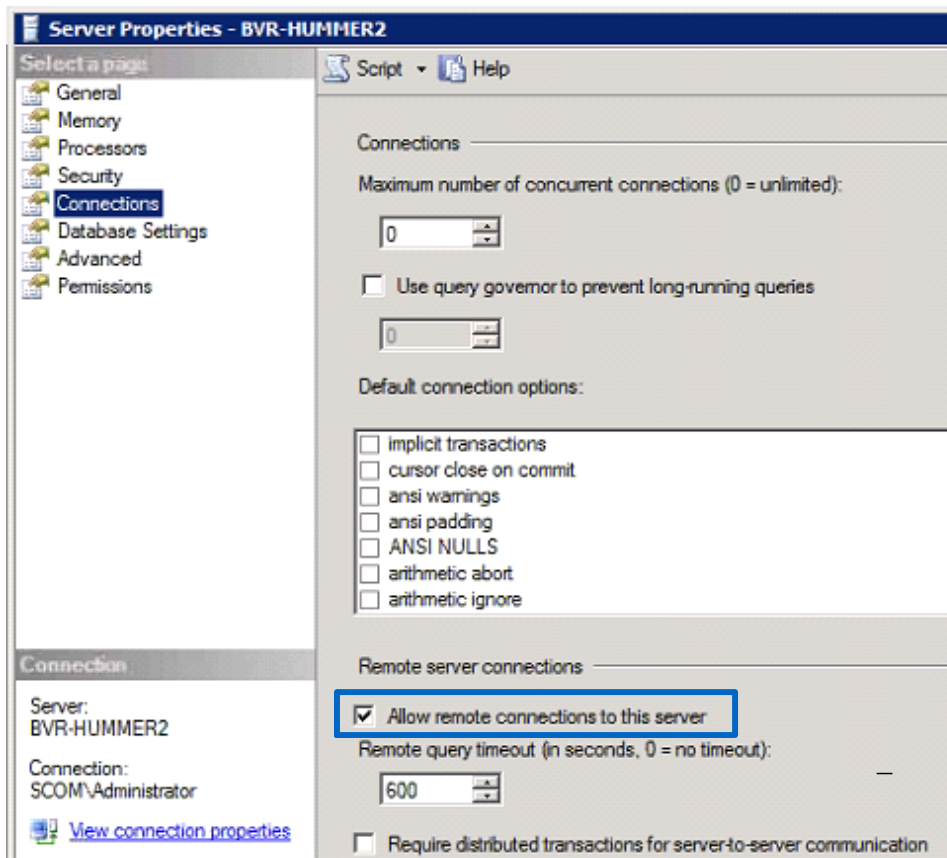
5. Repeat Steps 3 and 4 to add more instances until all desired instances have been added.
6. Click Close to complete the add-in installation.

Configure SSMS for Storage Explorer Add-in

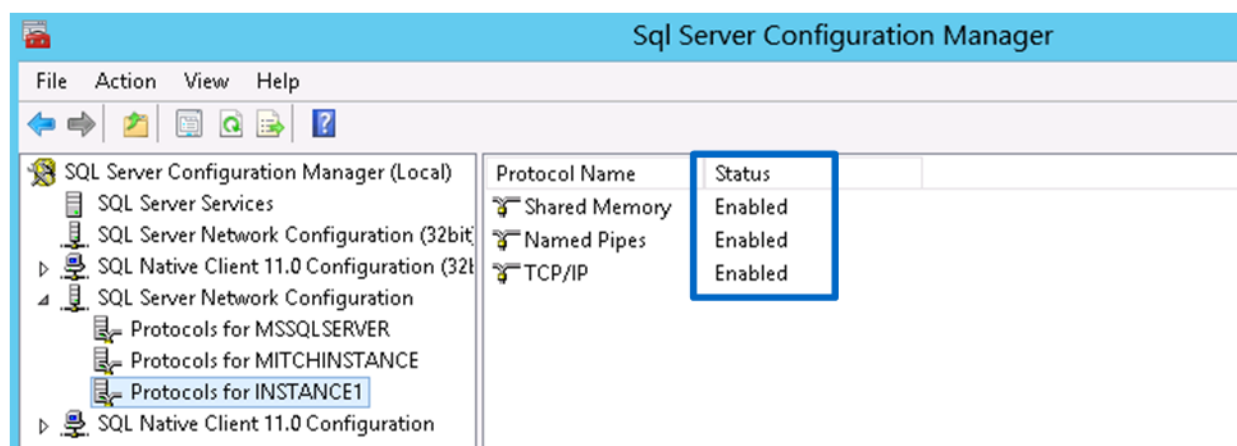
Because the SSMS Storage Explorer add-in is multi-instance aware and is designed to be used from a client workstation, a few additional configuration steps are required in SSMS.

To configure SSMS for the Storage Explorer add-in, complete the following steps:

1. On the Connections page in SSMS, select the server to which SSMS will connect remotely and select the checkbox Allow Remote Connections to This Server.

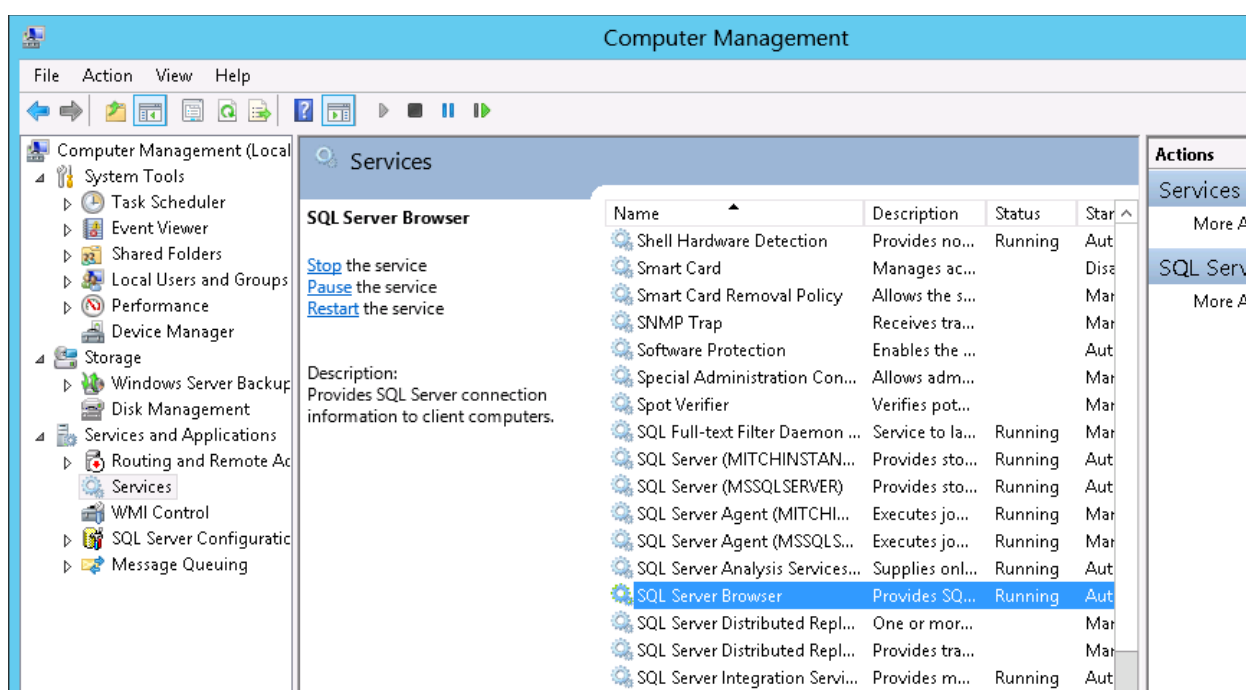


2. Enable the appropriate protocol for remote connections.



3. Verify that the SQL Server Browser service is running.

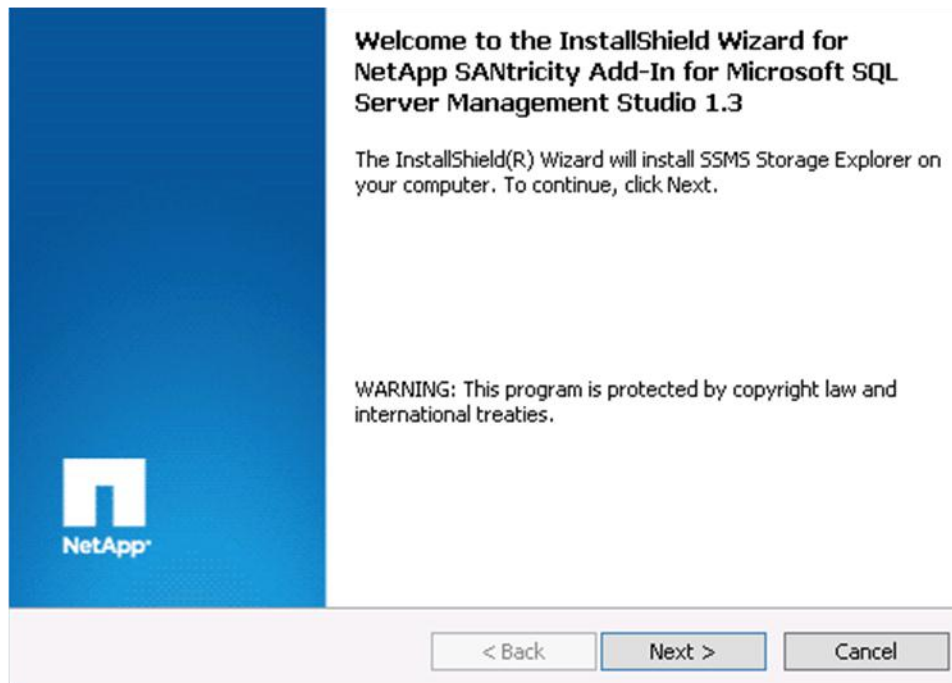
NOTE In order for named SQL Server instances to be managed from a remote client, the SQL Server Browser service must be running. NetApp recommends setting this service to start automatically.



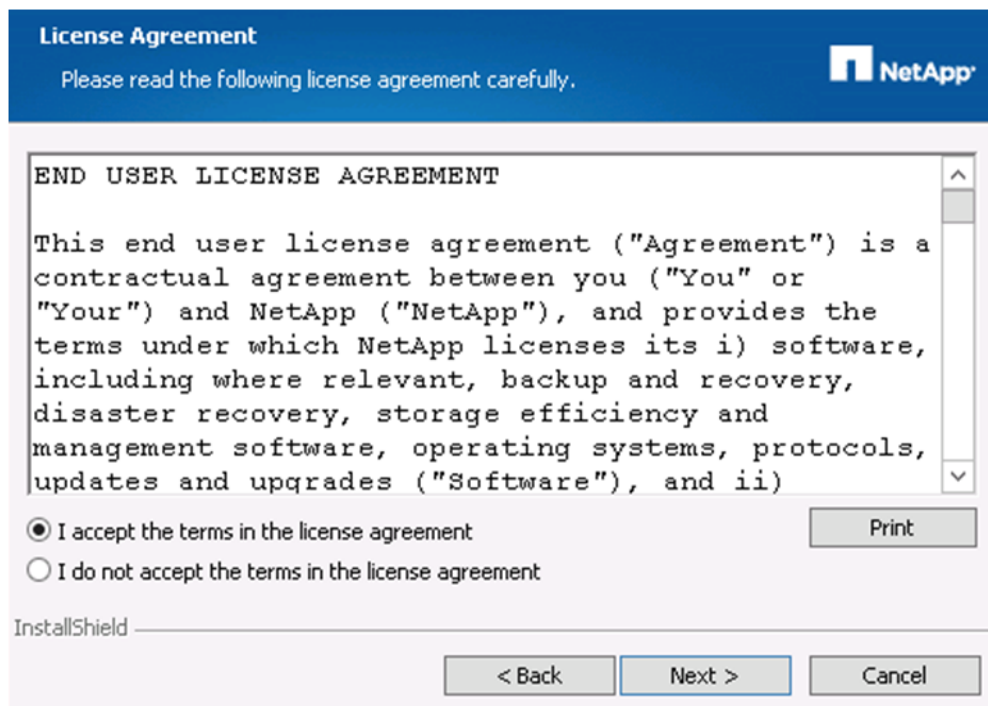
Upgrade SSMS Storage Explorer Add-in 1.0 to 1.3

Upgrading from version 1.0 to 1.3 is performed like a fresh install of the add-in.

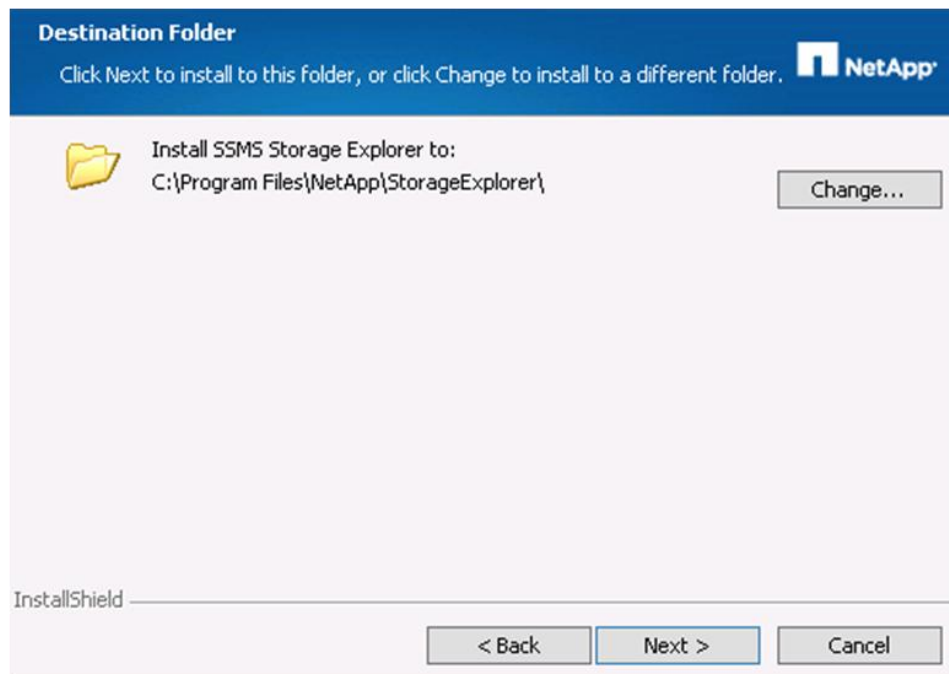
1. On the Welcome page of the installation wizard, click Next.



2. Accept the terms of the license agreement and click Next.

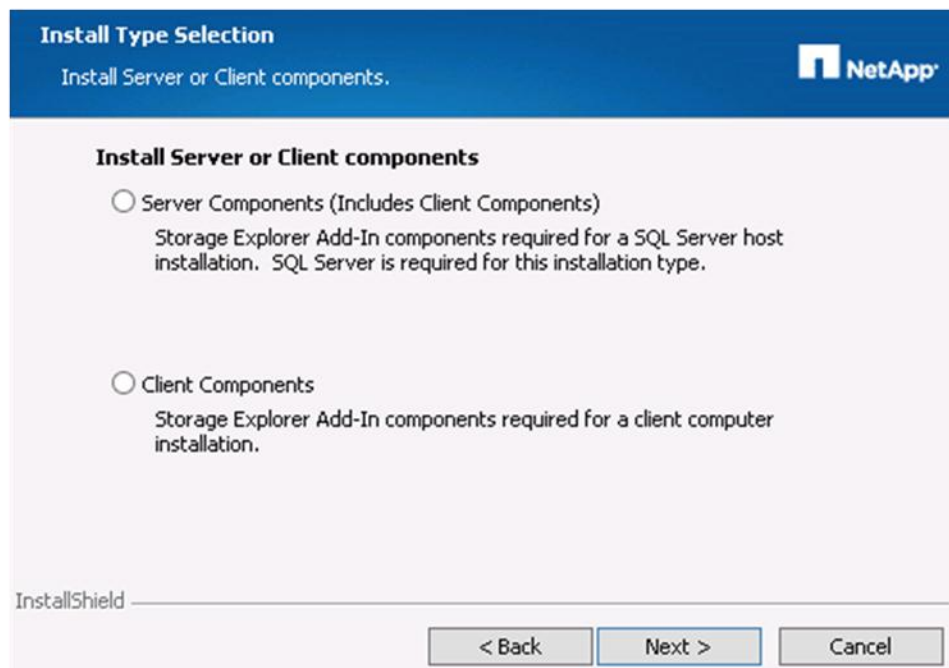


3. Accept the default destination folder for the installation, or click Change to install the software to a different folder. Click Next.

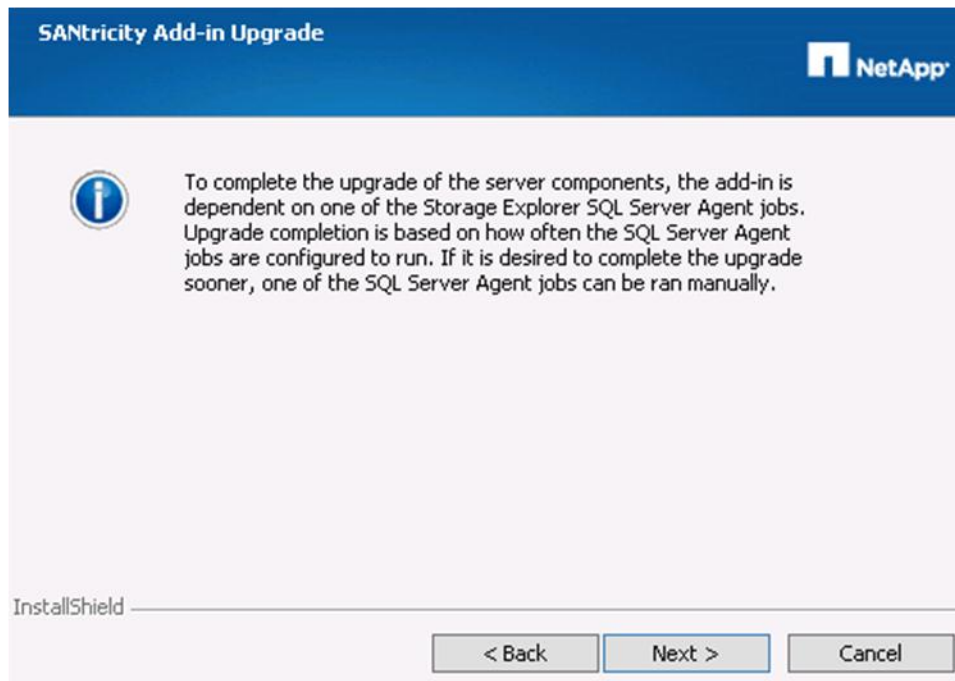


4. Select the installation type. You can install only the client components or you can install the server components plus the client components. Click Next.

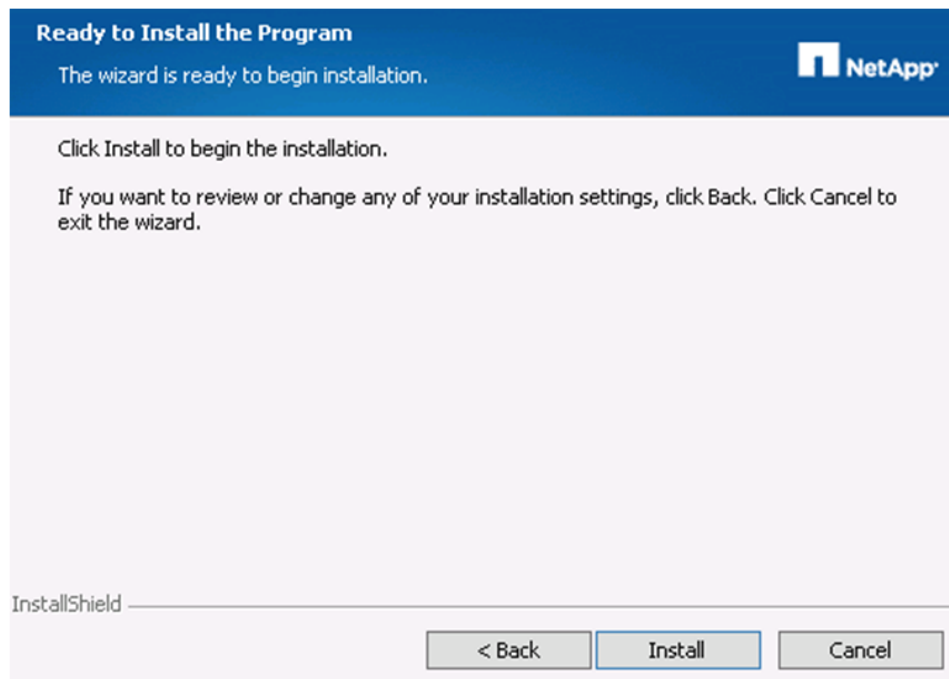
NOTE To perform a server installation, you must be running the installer as the server administrator.



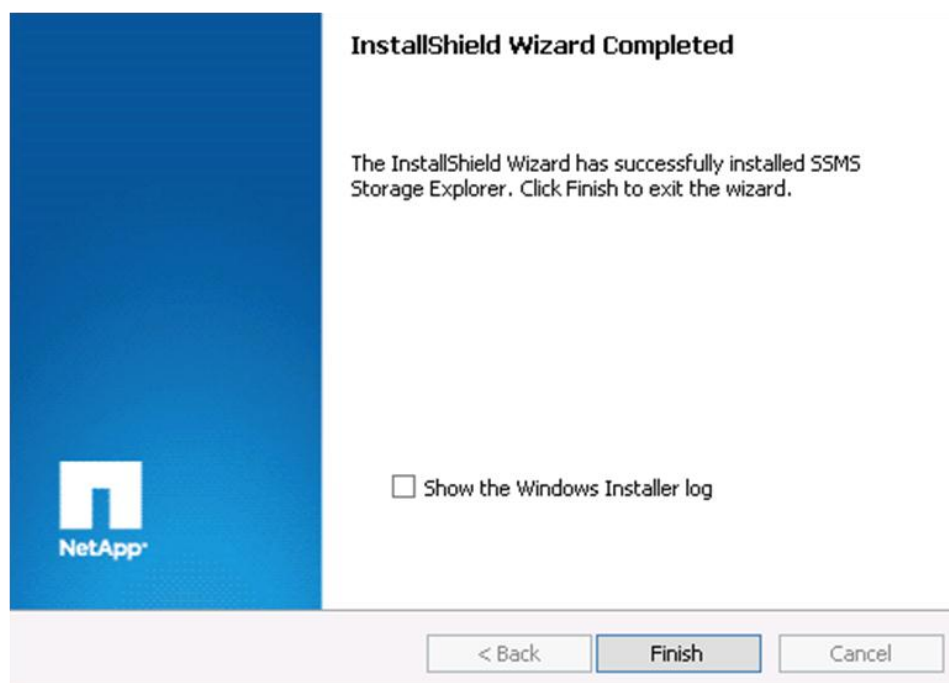
5. An informational message is displayed about the upgrade. After reading the message, click Next.



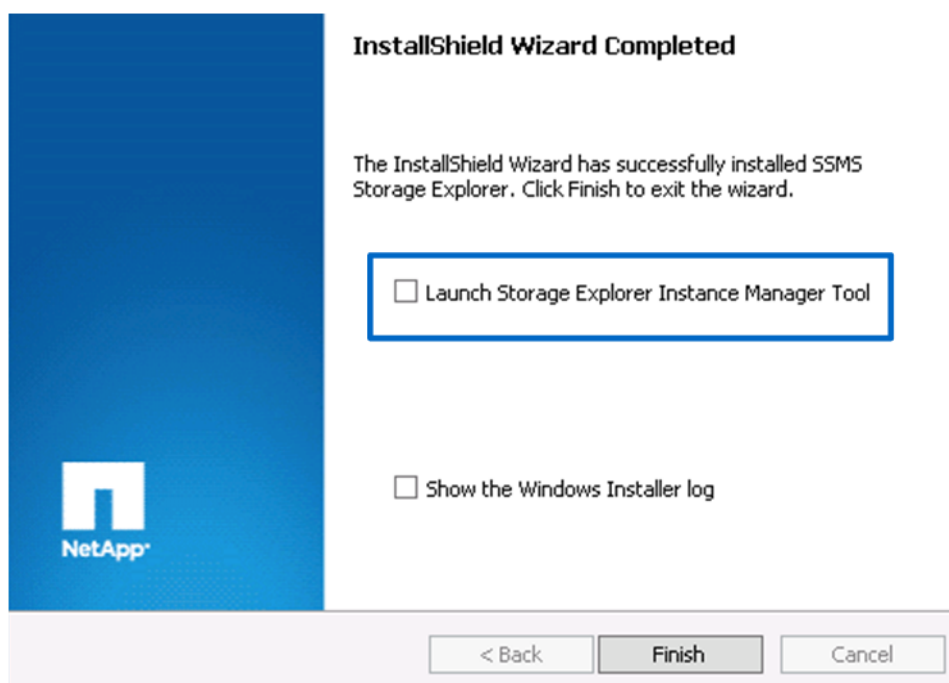
6. When you are ready to install the add-in, click Install.



7. If you chose to upgrade only the client components in Step 4, the upgrade is complete. You may select the Show the Windows Installer Log checkbox to view the installation log file, if desired. Click Finish to exit the installation wizard.

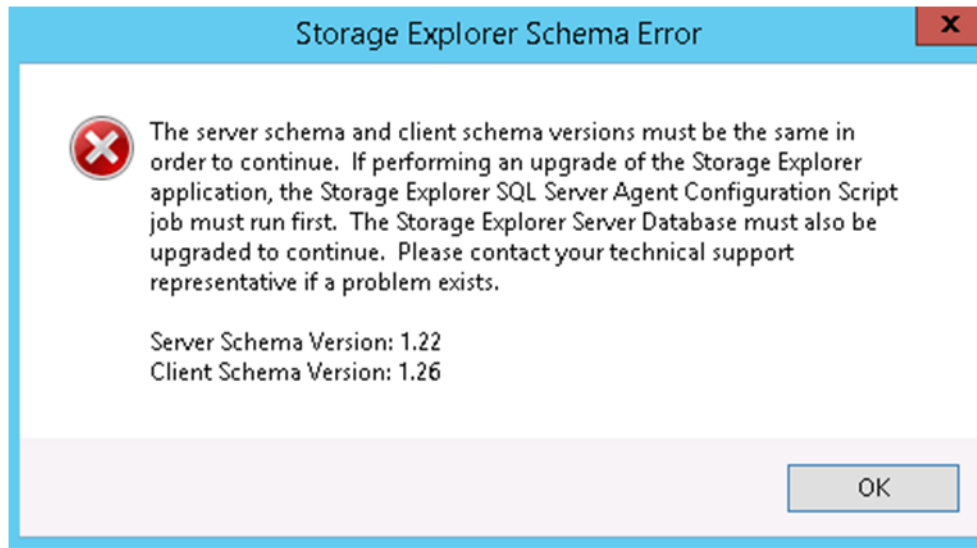


8. If you chose to upgrade the server components plus the client components in Step 4, the last page of the wizard will include the Launch Storage Explorer Instance Manager Tool checkbox. Deselect this checkbox if you do not need to add any additional instances. Click Finish to exit the installation wizard.



9. To complete the upgrade of the server components, the add-in is dependent on the running of one of the Storage Explorer jobs. Based on how often the jobs are configured to run, determines when the upgrade will complete. If it is desired to complete the upgrade sooner, one of the jobs can be run immediately.

NOTE If Storage Explorer is started before the upgrade has completed the following error is displayed.

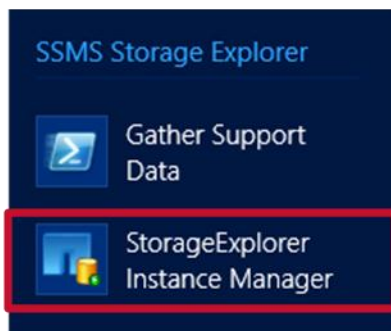


Provisioning Procedures

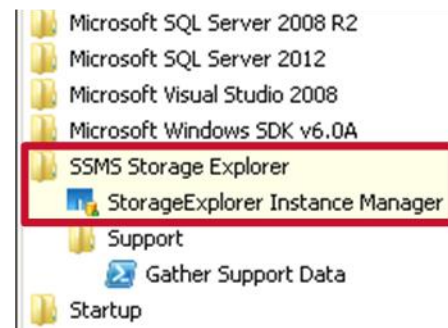
Add New Instances for Monitoring

To add new instances for Storage Explorer to monitor, complete the following steps:

1. On a server where Storage Explorer is already installed, go to Programs and locate Storage Explorer Instance Manager.



MS Windows 2012/2014



MS Windows 2008

2. Start Storage Explorer Instance Manager.
3. After Storage Explorer Instance Manager has started, add the instances as described in the deployment procedures.

Remove Instances from Monitoring

To remove instances from monitoring, complete the following steps:

1. Start Storage Explorer Instance Manager and click the Remove Instances tab.
2. Select the type of connection security for connecting to SQL Server.

NOTE If you select SQL Server authentication, the credentials must be validated before you can proceed.

NOTE For a login ID to be able to perform the removal of the two Storage Explorer SQL Server Agent jobs, it must be a member of the SQL Server sysadmin role.

3. Select the instance to remove from monitoring and click Remove.

The screenshot shows the 'Storage Explorer' application window. The title bar includes the NetApp logo and the text 'Storage Explorer'. Below the title bar, a subtitle reads: 'Use this tool to manage all of your SSMS Storage Explorer instances on this server.' The main content area has two tabs: 'Add Instance' and 'Remove Instances', with the latter being the active tab. Inside the 'Remove Instances' tab, there is a section titled 'Select an authentication type to view SSMS Storage Explorer instances available for removal. All detected instances will be displayed.' Below this, under 'Connect using:', there are two radio button options: 'Integrated security - Windows authentication' (which is selected) and 'SQL Server security - Enter login and password below'. The second option has input fields for 'Login:' and 'Password:', followed by a 'Validate' button. Below the authentication section, there is a section titled 'Select instances:' with a list box containing one item, 'E2700DB', which is checked. To the right of the list box is a 'Remove...' button. At the bottom right of the window is a 'Close' button.

4. In the confirmation message, click OK to confirm the removal of the instance.



NOTE The Storage Explorer database is not removed when a monitored instance is removed. This allows the database administrator (DBA) to keep the statistics for the NetApp storage system. Later, when it is no longer required, the database can be removed by using SSMS.

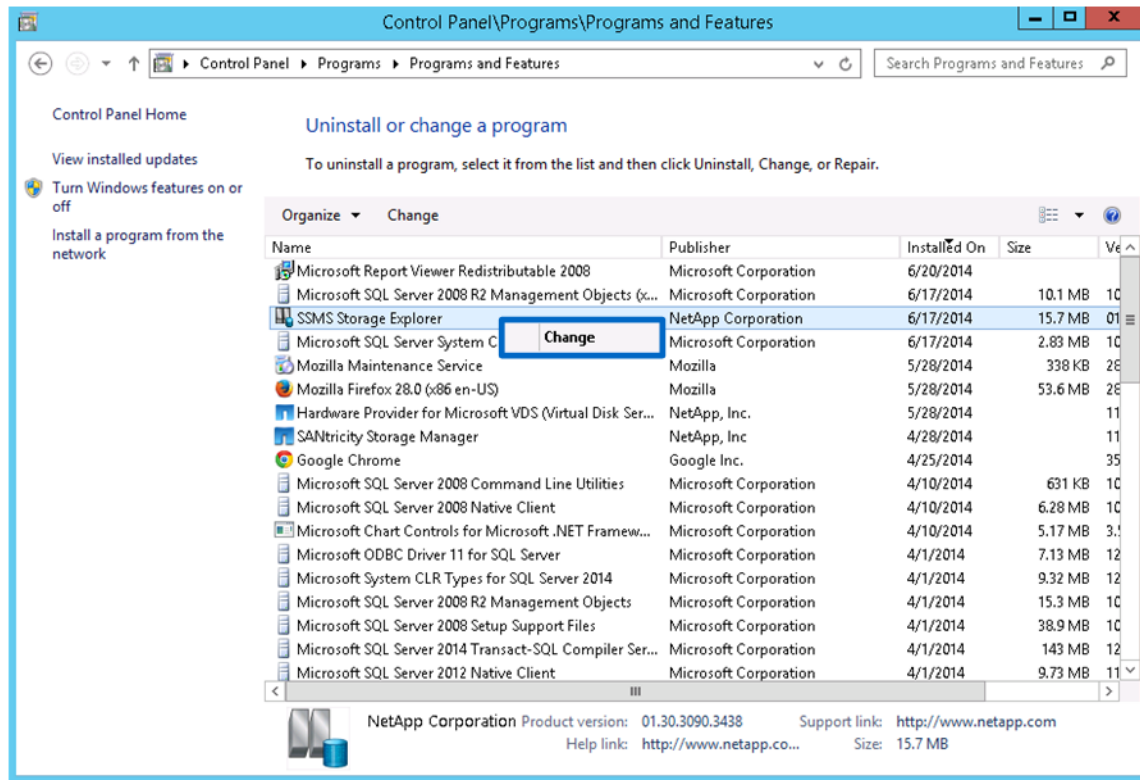
Remove Storage Explorer Application from Server

To remove the Storage Explorer application from the server, complete the following steps:

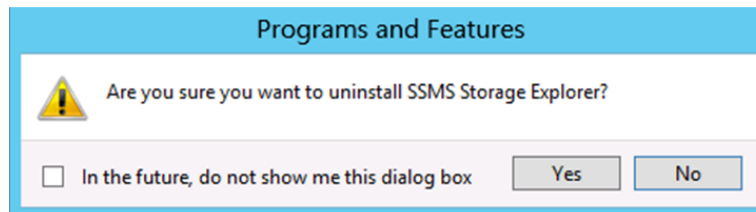
1. Remove all instances from monitoring by using the Storage Explorer Instance Manager as described in the previous section "Remove Instances from Monitoring."

NOTE Removing the Storage Explorer application removes the Instance Manager tool, so you must remove the instances first, before removing Storage Manager.

2. To remove the application software, navigate to Control Panel > Programs > Programs and Features and select the SSMS Storage Explorer application. Right-click it and select Change to begin the uninstall process.



3. In the confirmation message, click Yes to confirm that you want to uninstall SSMS Storage Explorer.



NOTE If the Storage Explorer application is removed before all instances are removed, it is important to manually remove all Storage Explorer SQL Server Agent jobs from each instance on which they have been installed. Otherwise, these jobs will continue to attempt to run and write into the error log.

NOTE To allow the DBA to determine the disposition of the gathered statistics, the Storage Explorer database is not removed automatically. When the database is no longer needed, it should be deleted manually.

Operational Procedures

Table 2 Add-in for Microsoft SQL Server Management Studio use cases

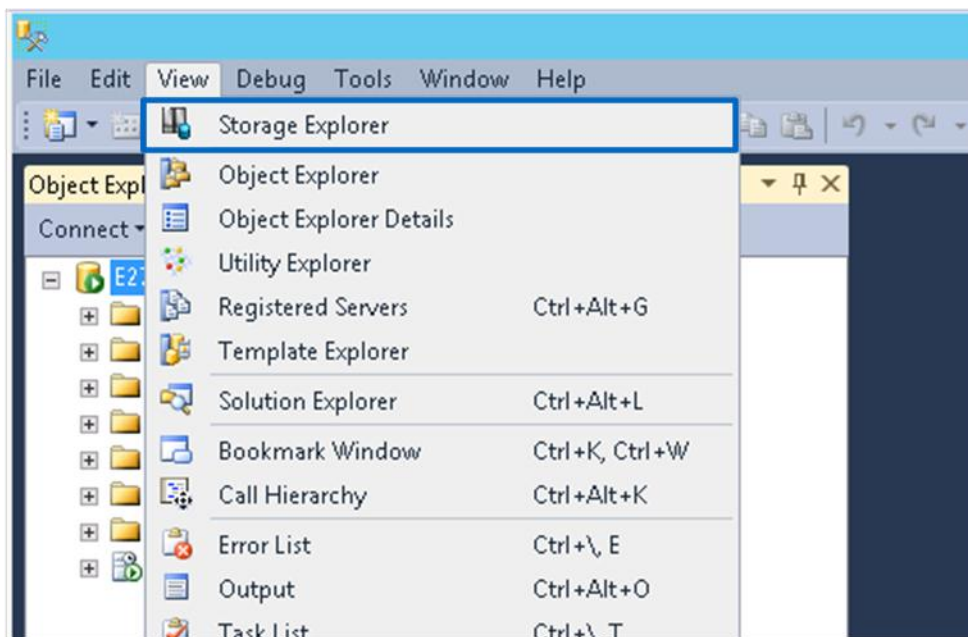
Use Case	Procedure Name
The user wants to monitor the characteristics of NetApp E-Series storage.	Start Add-in for SSMS

Use Case	Procedure Name
The user wants to modify how often the Storage Explorer jobs run.	Control Frequency of Gathering Job Statistics
The user wants to be alerted of a non-optimal status on a database or a failed job.	Configure Storage Explorer Alerting
The user wants to review storage object properties.	View Properties of Storage Objects
The user wants to review information about all databases stored on the same volume, thin-provisioned volume (TPV), volume group, or Dynamic Disk Pool (DDP).	View Associated Databases Report
The user wants to review the performance characteristics of storage objects.	View Performance Report
The user needs to send support information to NetApp Customer Support.	Support SSMS Storage Explorer Add-in

Start Storage Explorer Add-in for SSMS

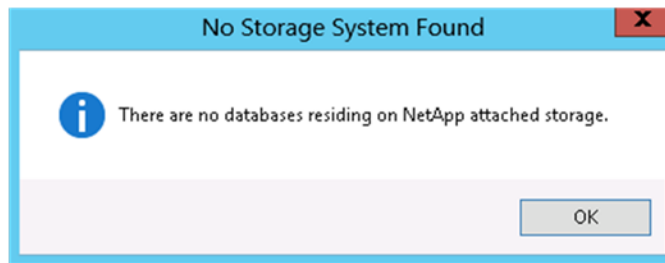
To start the NetApp add-in for SQL Server Management Studio (SSMS), complete the following steps:

1. Select an instance that uses NetApp E-Series storage.
2. From the View menu, select Storage Explorer.

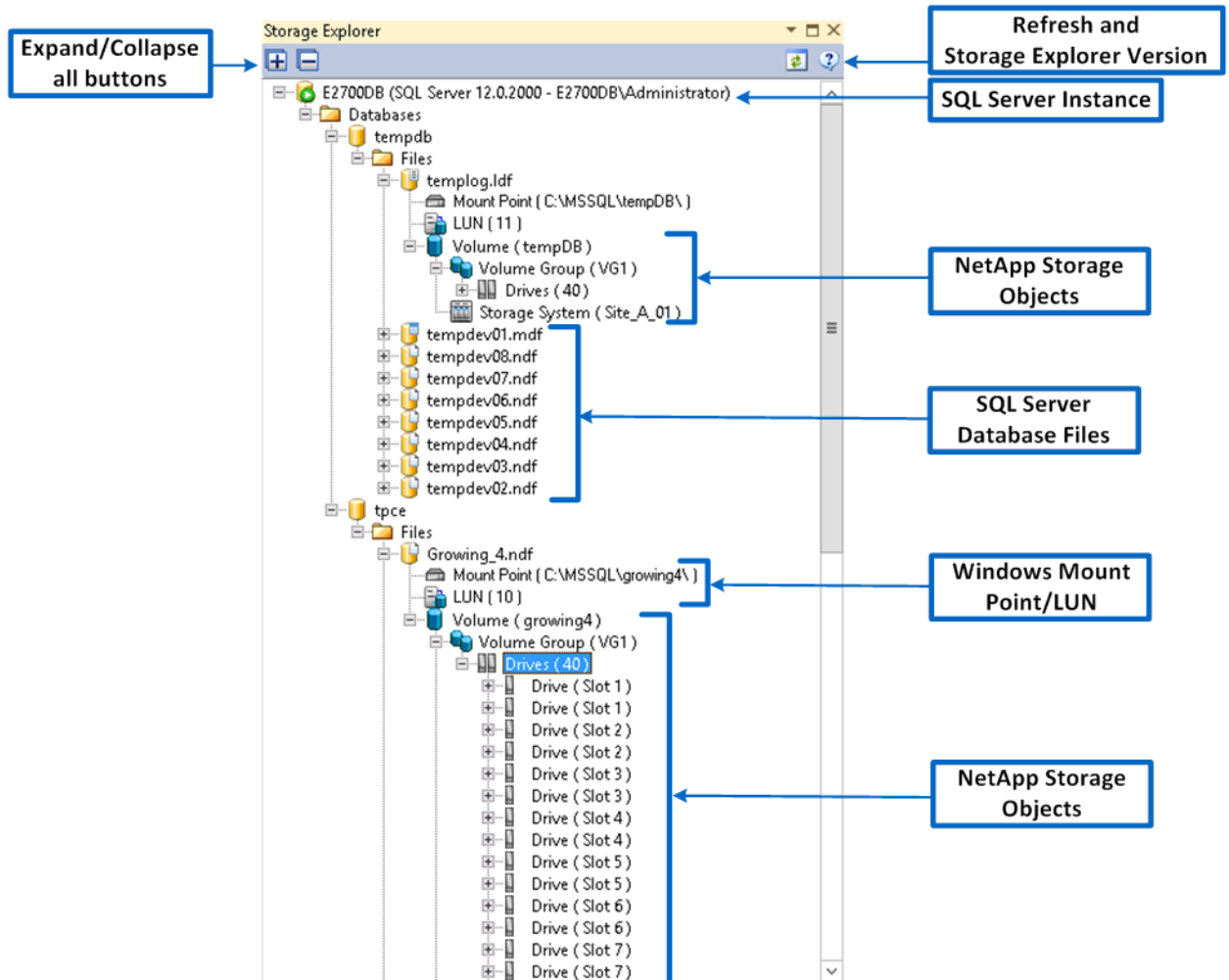


3. When Storage Explorer starts, expand the Databases object to see all databases that have their database files on NetApp E-Series storage. Continue drilling-down to see all objects.

NOTE To change the instance being viewed in Storage Explorer, select the instance that you want to view in SSMS Object Explorer, and then select View > Storage Explorer. If no databases in the selected instance reside on NetApp E-Series storage, the following message is displayed:



4. Expand the Storage Explorer tree and review all items.



NOTE The following screenshot identifies the icons used by the Storage Explorer application:

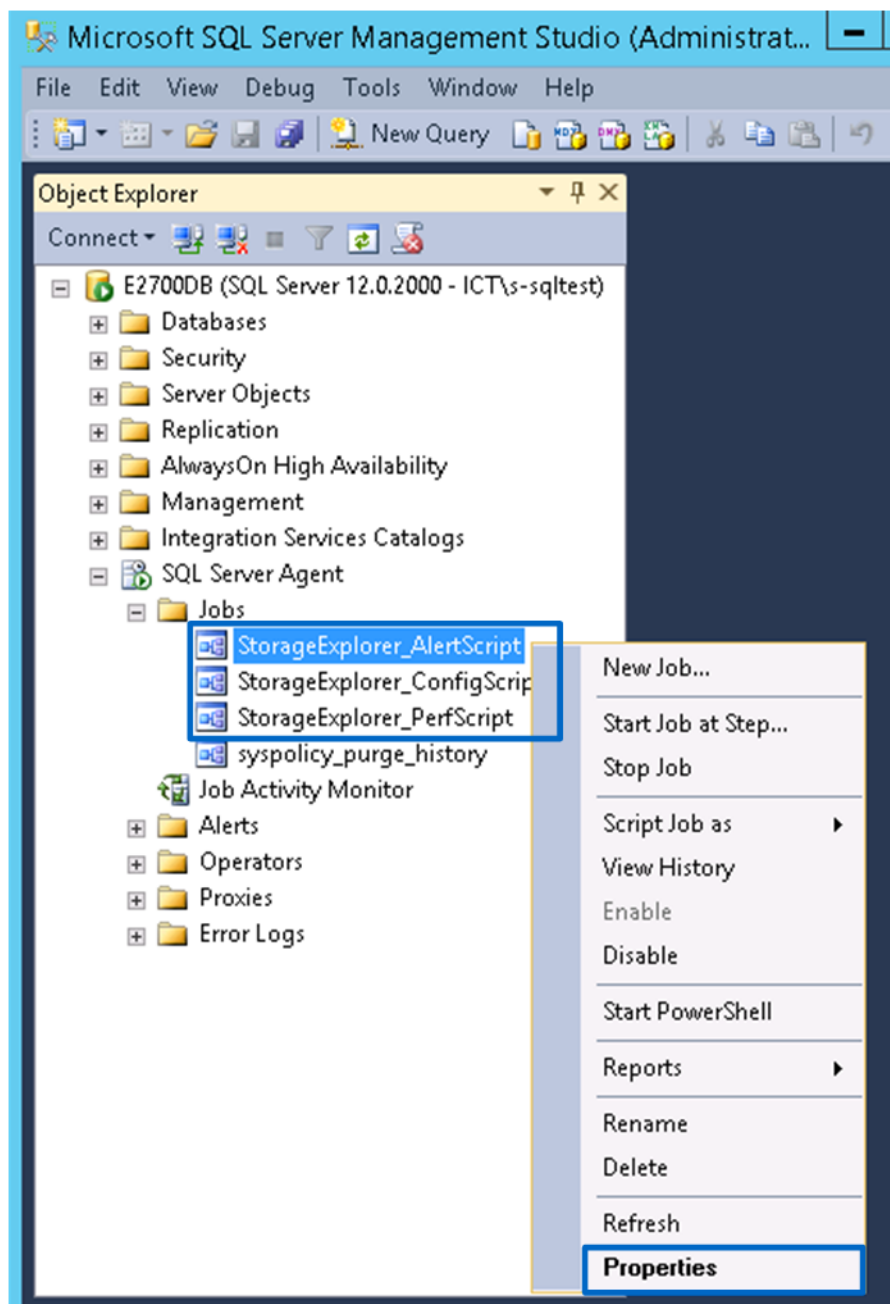
Menu Icons	Storage Explorer Icons	Non-Optimal Status Icons
 Storage Explorer	 Server Instance  <Databases Files>  Server Database  Server Data File  Server Log File  Server Non-Data File  Mount Point  LUN  Volume  Thin Volume  Volume Group  Disk Pool  Drives  Drive  Tray  Storage System	 Server Database  Server Data File  Server Log File  Server Non-Data File  Volume  Thin Volume  Volume Group  Disk Pool  Drive  Storage System

5. If Storage Explorer has been open for longer than 10 minutes, click the Refresh button to have the configuration and alert icons refreshed from the Storage Explorer database.

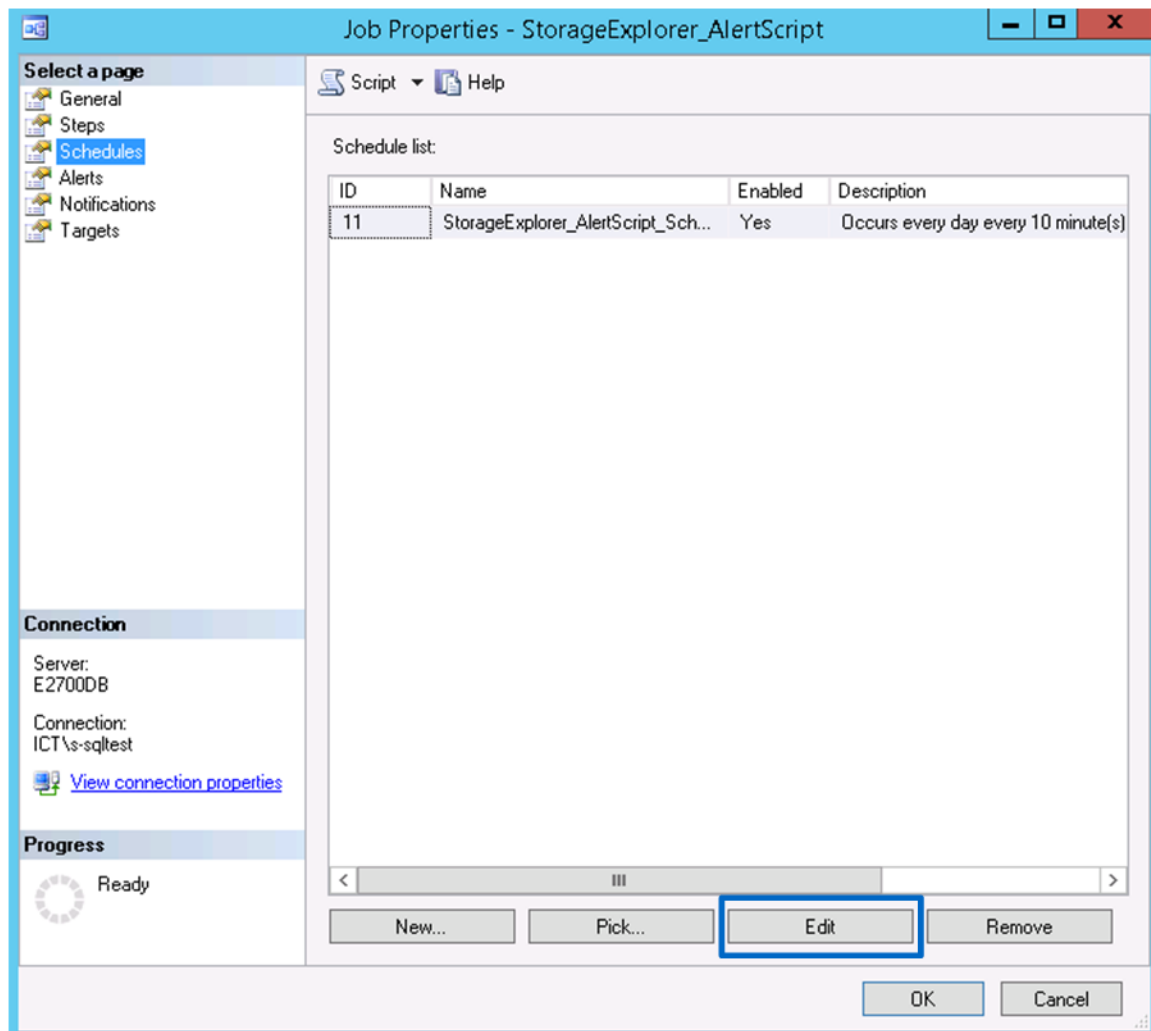
Control Frequency of Gathering Job Statistics

For performance, configuration, and alerting data to be gathered, the SQL Server Agent must be running. The frequency with which data is gathered is controlled by three SQL Server Agent jobs: `StorageExplorer_AlertScript`, `StorageExplorer_ConfigScript`, and `StorageExplorer_PerfScript`. To modify the frequency, complete the following steps:

1. In Object Explorer, navigate to the Jobs section and select the job to be modified.
2. Right-click the job and select Properties.



3. In the left pane of the Job Properties dialog box, select Schedules. Click Edit.



4. In the Job Schedule Properties dialog box, select Occurs Every and then set the desired time interval. Click OK.

Job Schedule Properties - StorageExplorer_AlertScript_Schedule

Name: Jobs in Schedule

Schedule type: ☒ Enabled

One-time occurrence

Date: Time:

Frequency

Occurs:

Recurs every: day(s)

Daily frequency

☐ Occurs once at:

☒ Occurs every: minute(s)

Starting at:

Ending at:

Duration

Start date:

☐ End date:

☒ No end date:

Summary

Description:

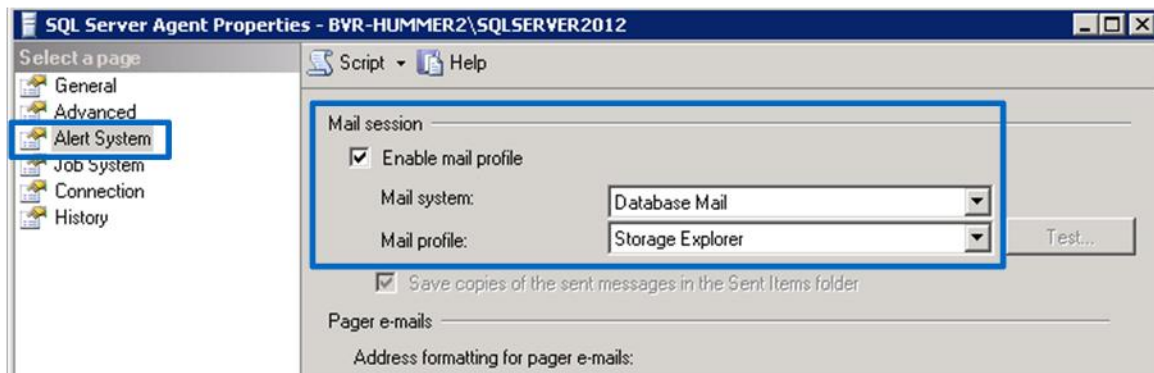
NOTE The defaults are to gather data every 5 minutes for configuration statistics and every 10 minutes for performance statistics and alerting data. These time intervals can be easily modified with SQL Server Management Studio (SSMS). The time to gather data should not be reduced to intervals of less than two minutes. The jobs should be monitored initially to verify that they complete within this time.

Configure Storage Explorer Alerting

Storage Explorer has two types of alerting: at the instance level and at the database level. At the instance level Storage Explorer provides alerts for job failure or jobs that are taking a long time to complete as determined by the DBA.

At a database level, fine grain alerting is possible. The DBA can decide what databases to enable alerting on and then what storage objects, all the way down to the drive objects.

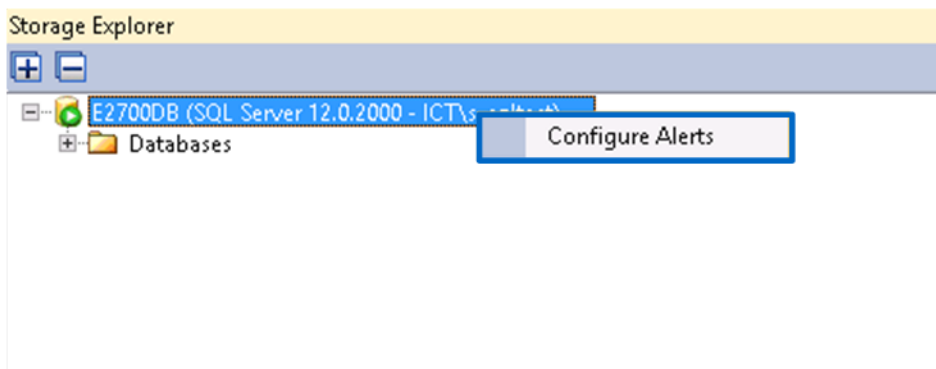
NOTE It is required that the DBA has already configured Database Mail in SQL Server Management Studio and connected the profile to be used for Storage Explorer alerting in the Alert System section under SQL Server Agent properties as shown.



Instance-level Alerts

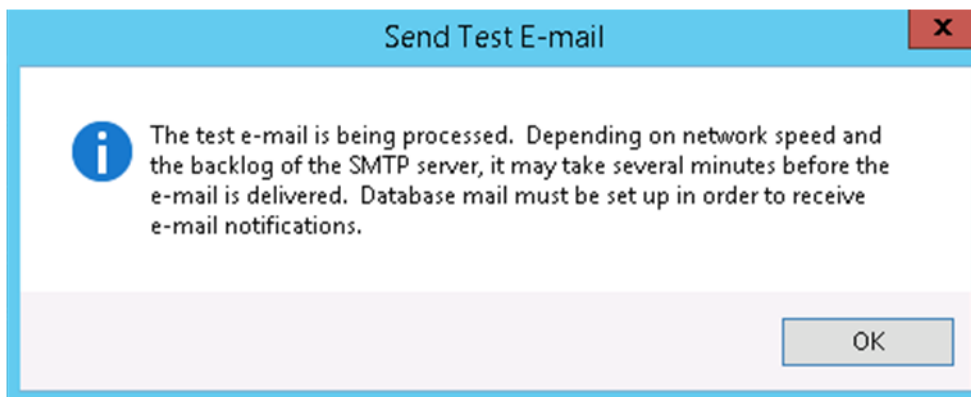
To configure instance level alerts complete the following steps:

1. Select the instance for alerting and start Storage Explorer.
2. Right-click the instance name at the top of the Storage Explorer tree and select Configure Alerts.



3. Fill out the Configure Alerts screen:
 - a. At the top of the configure alerts screen is the Set Notifications portion. Start by deciding whether or not to receive e-mail notification, entering an e-mail address, and setting how much time to leave between the same alert notification. It is also possible to send a test e-mail to the provided e-mail address.

NOTE It may take several minutes for the test e-mail to be received.



- b. Decide whether or not to keep alert history in the Storage Explorer database.

NOTE The database size may rapidly increase if the alerts data is not deleted.

- c. Next, in the Select Alert Types section, choose whether or not to be informed of a Storage Explorer job failing or if a Storage Explorer job is taking longer than a DBA defined time to complete.

NOTE The time required for job completion is dependent on the environment. This should be tested to determine the best value for the particular environment.

- d. Click OK to complete setting up instance alerts.

Storage Explorer

Set Notifications

When a storage system alert is detected on server instance E2700DB, do the following:

☒ Send e-mail notification

E-mail address:

Time between e-mail notifications for the same alert: minutes

☒ Keep alert history in the Storage Explorer database

Note: Database size may rapidly increase if alert entries are not deleted.

Select Alert Types

Notify on the following alert types:

☒ Storage Explorer SQL Server Job fails

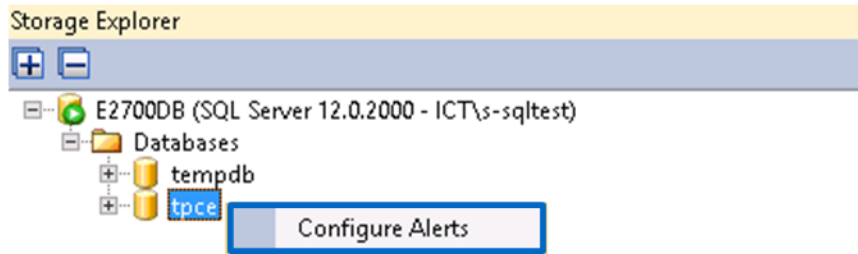
☒ Long-running SQL Server Job exceeds the specified duration

Duration: minutes

Database-level Alerts

To configure database level alerts complete the following steps:

1. Select the instance for alerting and start Storage Explorer.
2. Expand the Databases object and right-click the database desired, select Configure Alerts.



3. Fill out the Configure Alerts screen:

- a. At the top of the configure alerts screen is the Set Notifications portion. Start by deciding whether or not to receive e-mail notification, entering an e-mail address, and setting how much time to leave between the same alert notification. It is also possible to send a test e-mail to the provided e-mail address.

NOTE It may take several minutes for the test e-mail to be received.

- b. Select whether or not to show alert status icons in the Storage Explorer object tree.
- c. Decide whether or not to keep alert history in the Storage Explorer database.

NOTE The database size may rapidly increase if the alerts data is not deleted.

- d. Next, in the Select Storage Objects section, choose to receive alerts on all storage objects or only on selected objects.
- e. Click OK to complete setting up database alerts.

Storage Explorer

Set Notifications

When a storage system alert is detected on server database tpce, do the following:

☒ Send e-mail notification

E-mail address:

Time between e-mail notifications for the same alert: minutes

☒ Show alert status icons in the Storage Explorer object tree

☒ Keep alert history in the Storage Explorer database

Note: Database size may rapidly increase if alert entries are not deleted.

Select Storage Objects

Notify/show alert icons when a non-optimal status is detected for the following:

☒ All storage objects

☒ Storage system ☒ Disk pools ☒ Volume groups ☒ Thin volumes

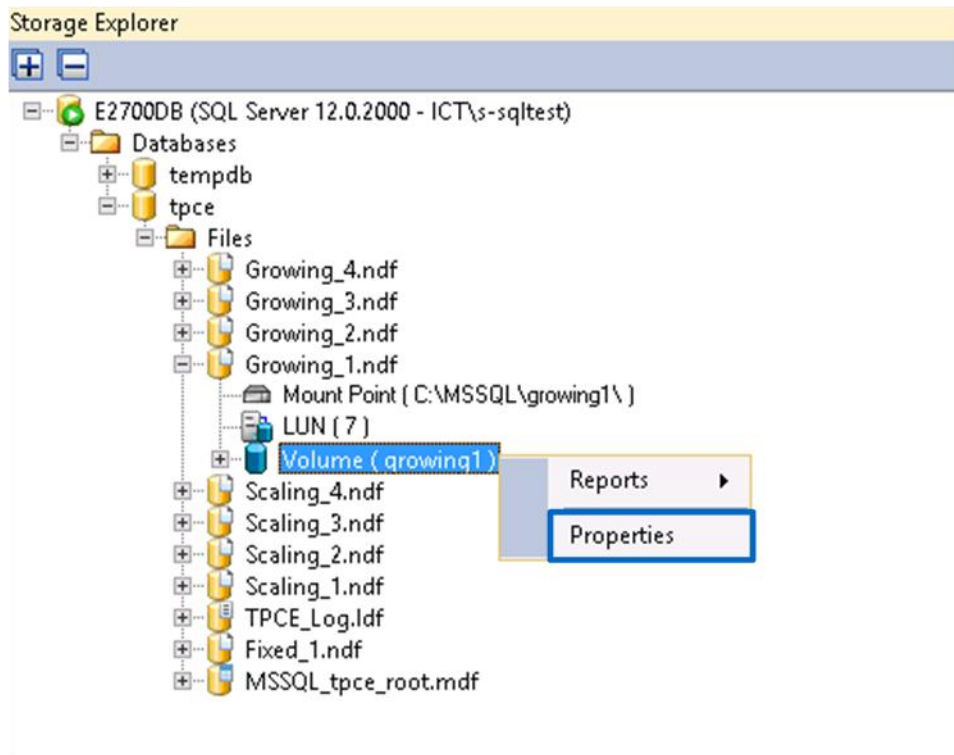
☒ Standard volumes ☒ Drives

View Properties of Storage Objects

To view the properties of a NetApp storage object, complete the following steps:

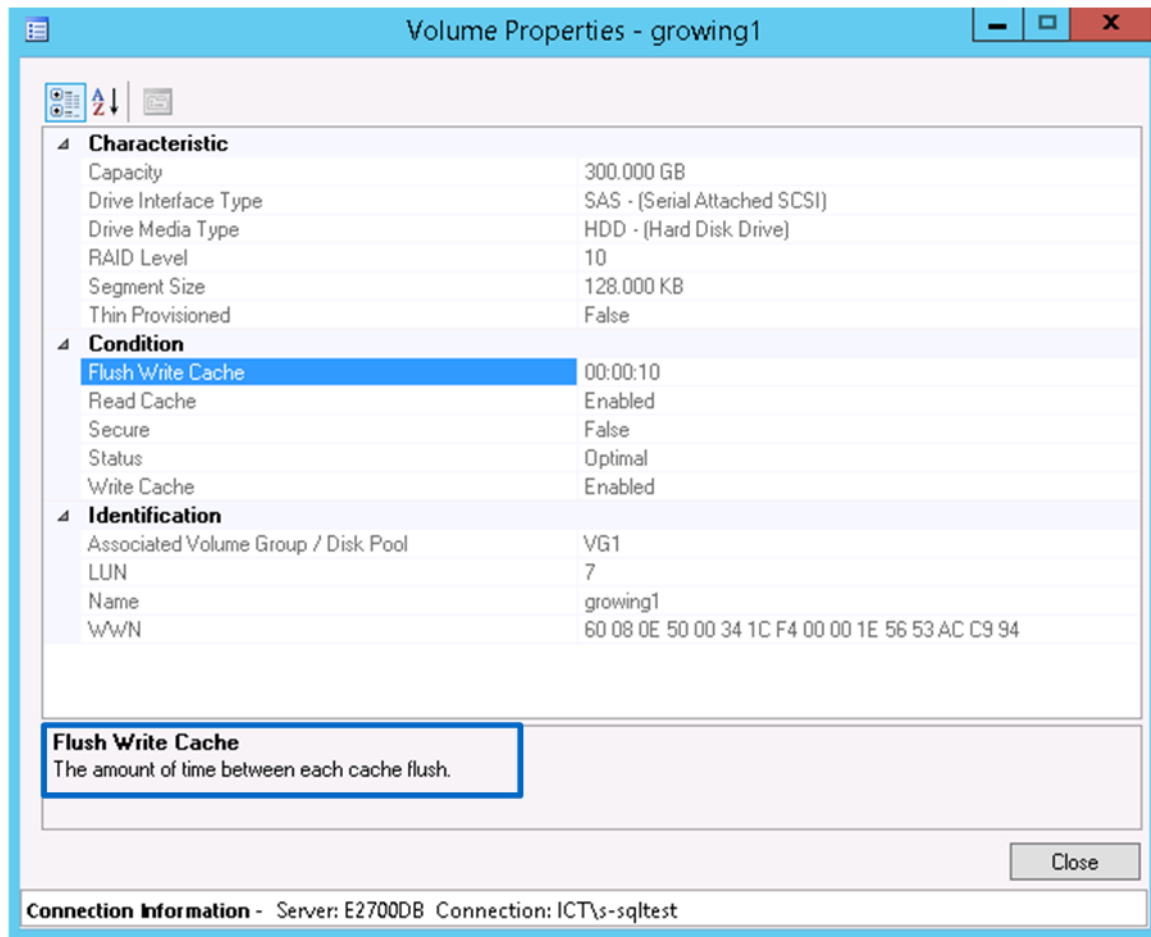
1. From the Storage Explorer pane, right-click the storage object and select Properties. In this example, the storage object is a volume.

NOTE The objects that display properties are volumes, TPVs, volume groups, DDPs, drives, trays, and storage systems.



2. In the Volume Properties dialog box, verify the properties and click OK.

NOTE The properties shown in this example are for the volume selected in Step 1. When you select a property in the list, a brief description is provided at the bottom of the dialog box. Properties for the other storage objects function in the same way.

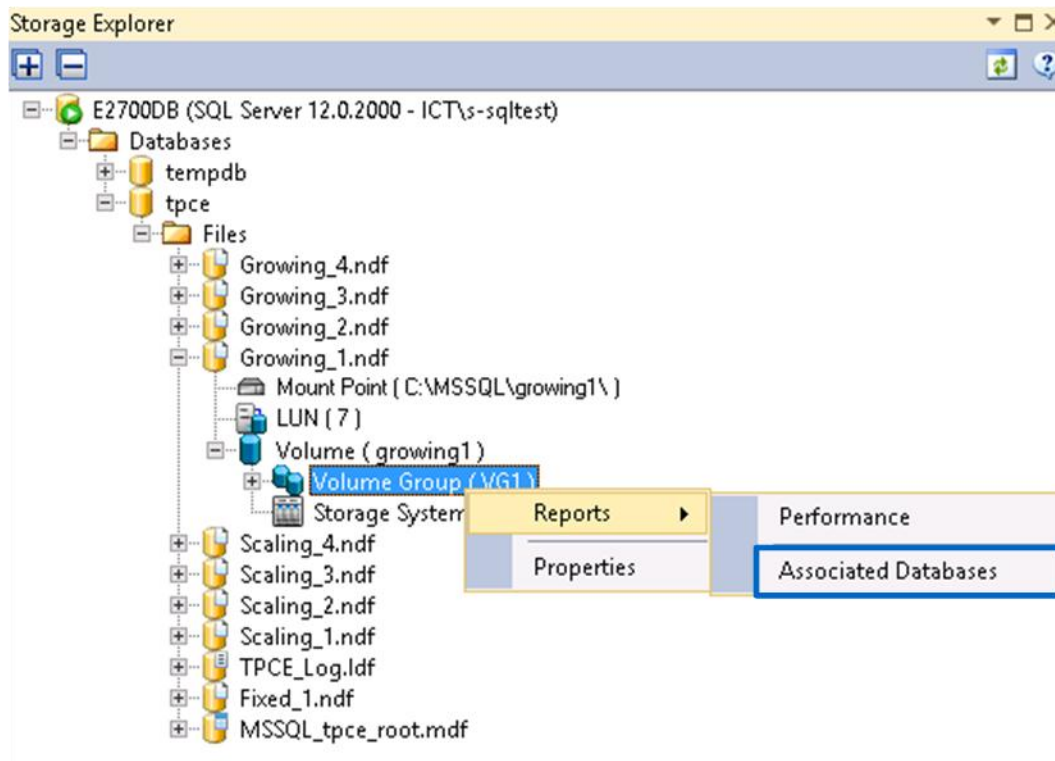


View Associated Databases Report

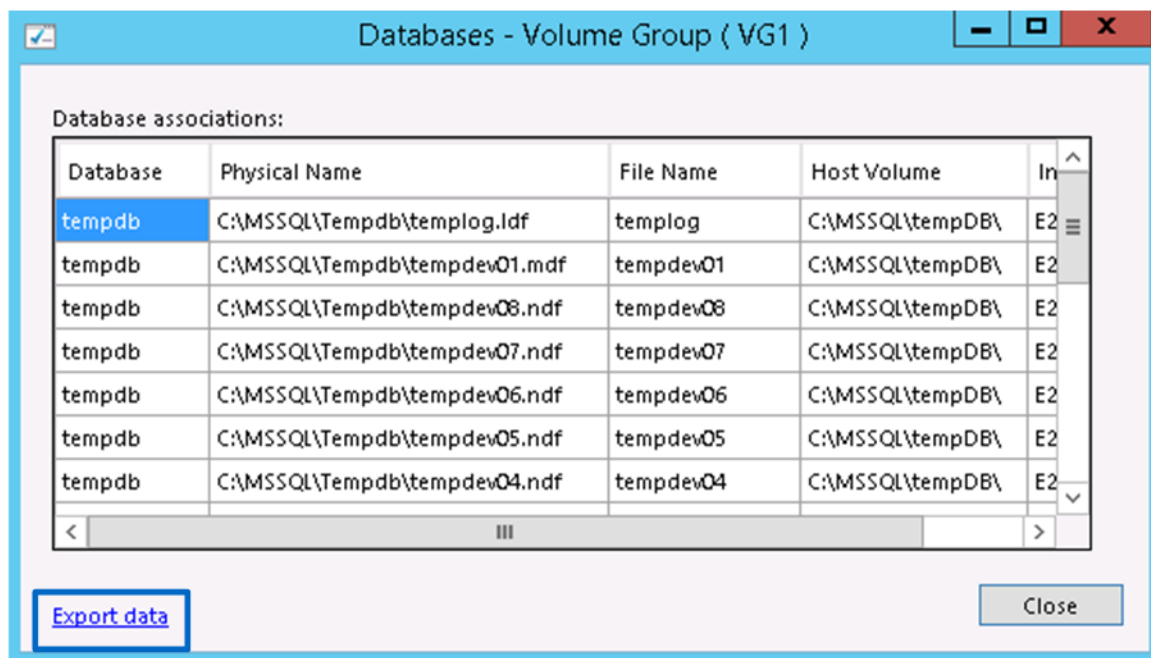
To view the Associated Databases report for a storage object, complete the following steps:

1. Right-click the object and select Reports > Associated Databases.

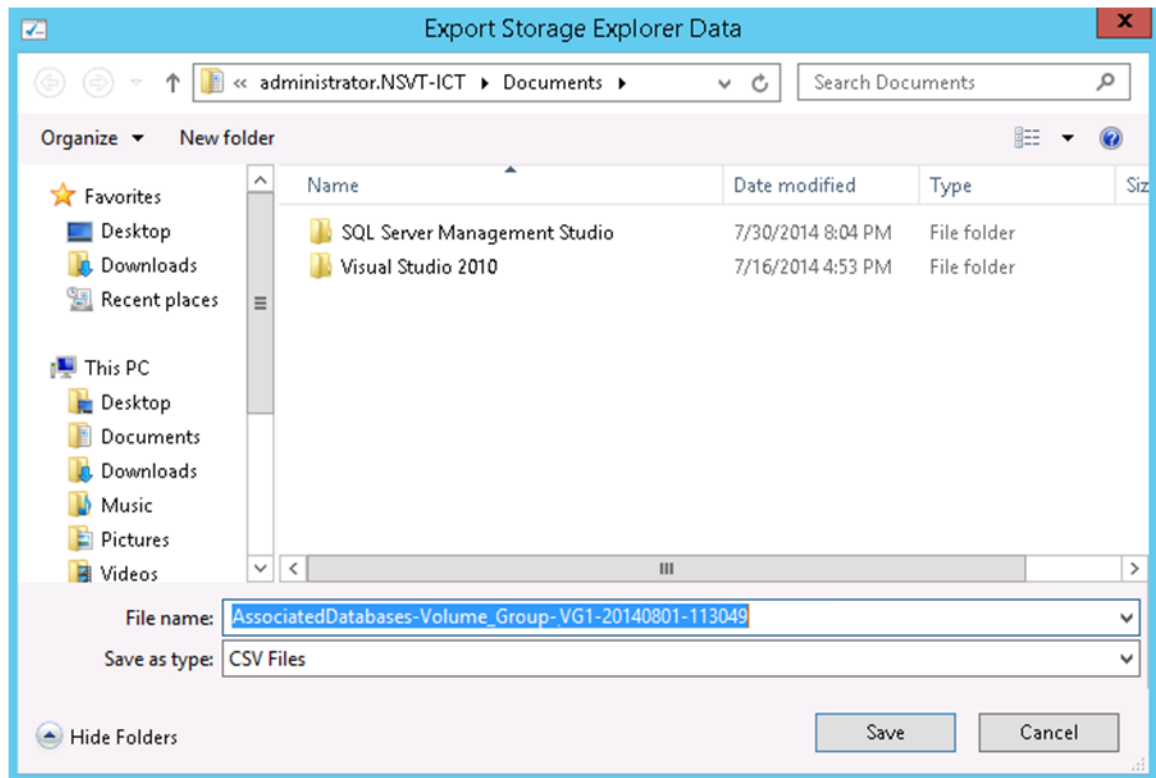
NOTE The Associated Databases report is available for volumes, volume groups, TPVs, and DDPs.



2. Review the list of all database files stored on the selected object.



3. Optional: Export the data to a CSV file for later review.

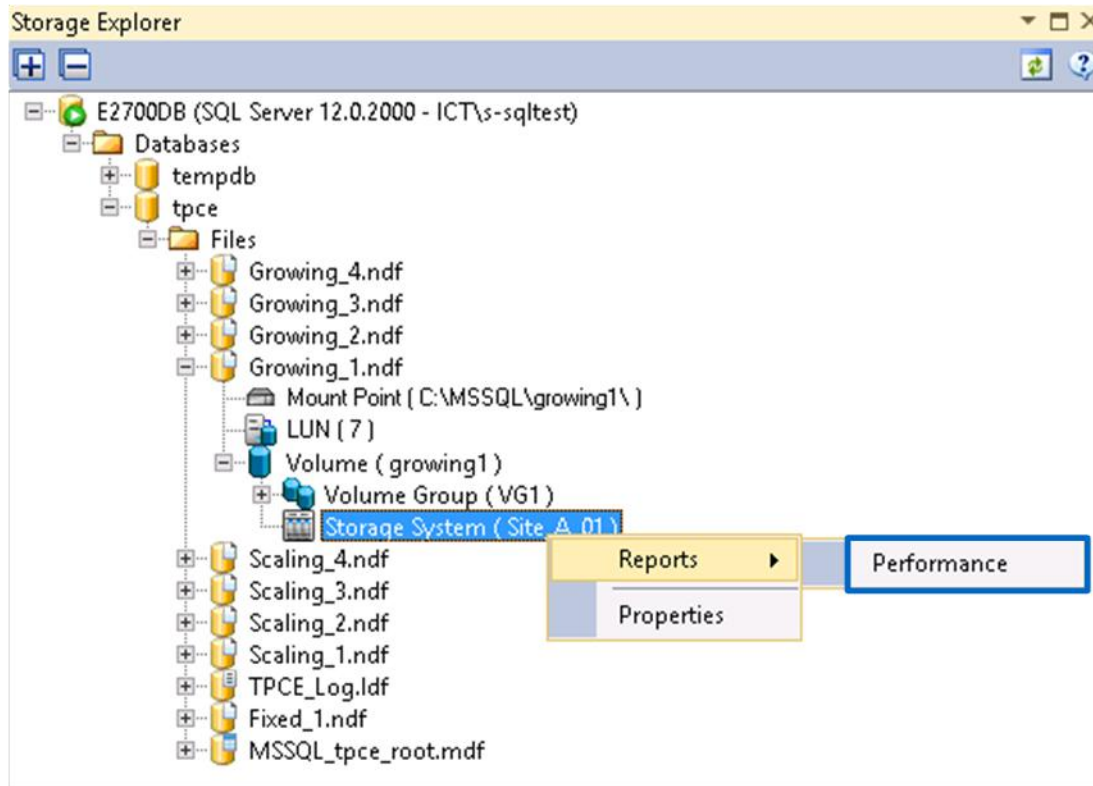


View Performance Report

To view the Performance report for a given storage object, complete the following steps:

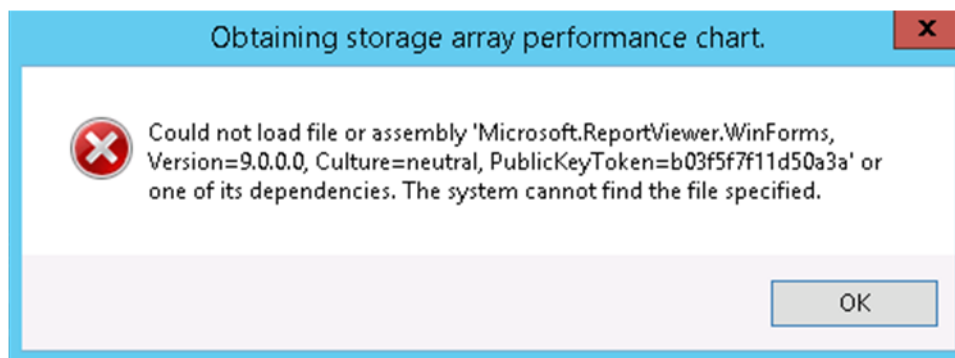
1. Right-clicking the object and select Reports > Performance.

NOTE Performance reports are available for volumes, volume groups, TPVs, DDPs, and storage systems.



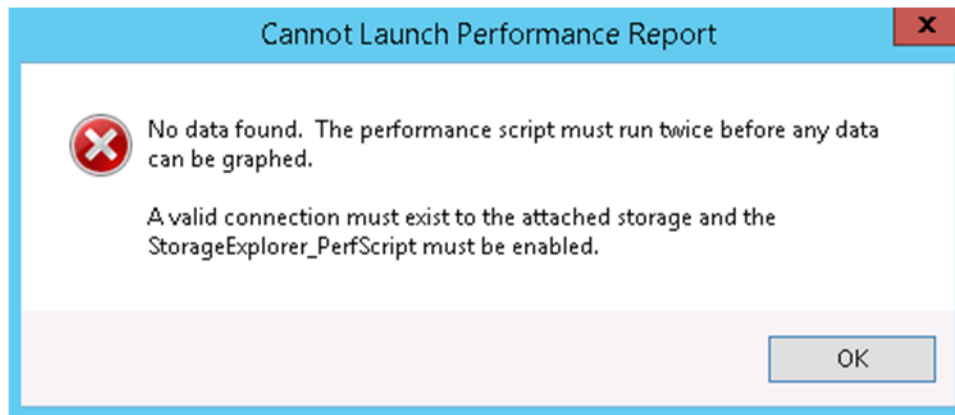
2. Review the Performance report, which is described in more detail in the following section.

NOTE If the following error is received when starting a performance report:



It will be necessary to install the Microsoft Report Viewer Redistributable 2008.

NOTE If the following error message is received when starting a performance report:

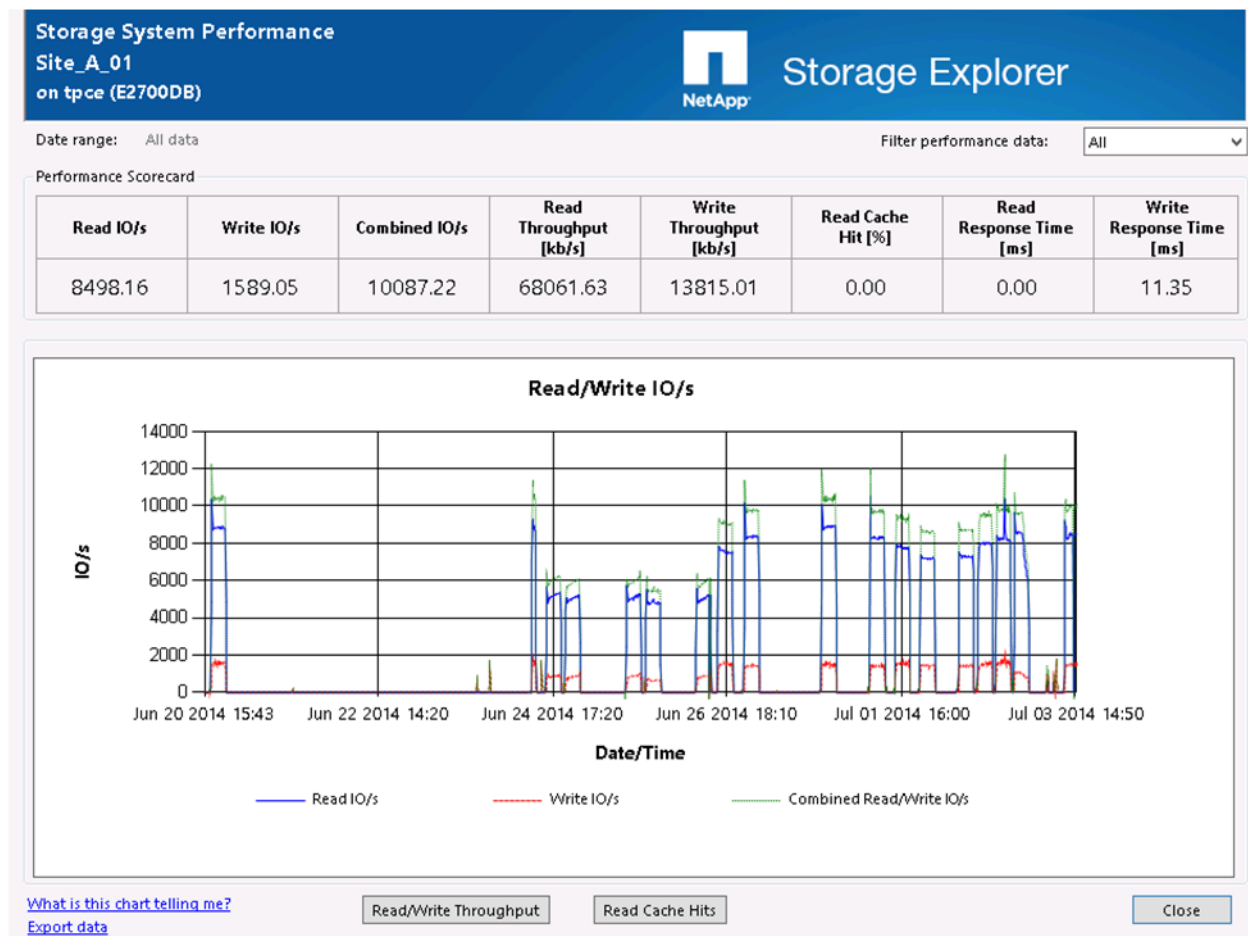


It will be necessary to wait until the performance script has run twice to have enough data to graph.

Performance Report Description

Performance reports represent all activity occurring on the specific object of the report. For example, the Storage System Performance report, shown in Figure 4, displays the activity for all I/Os on the storage system, not just for one database or data file.

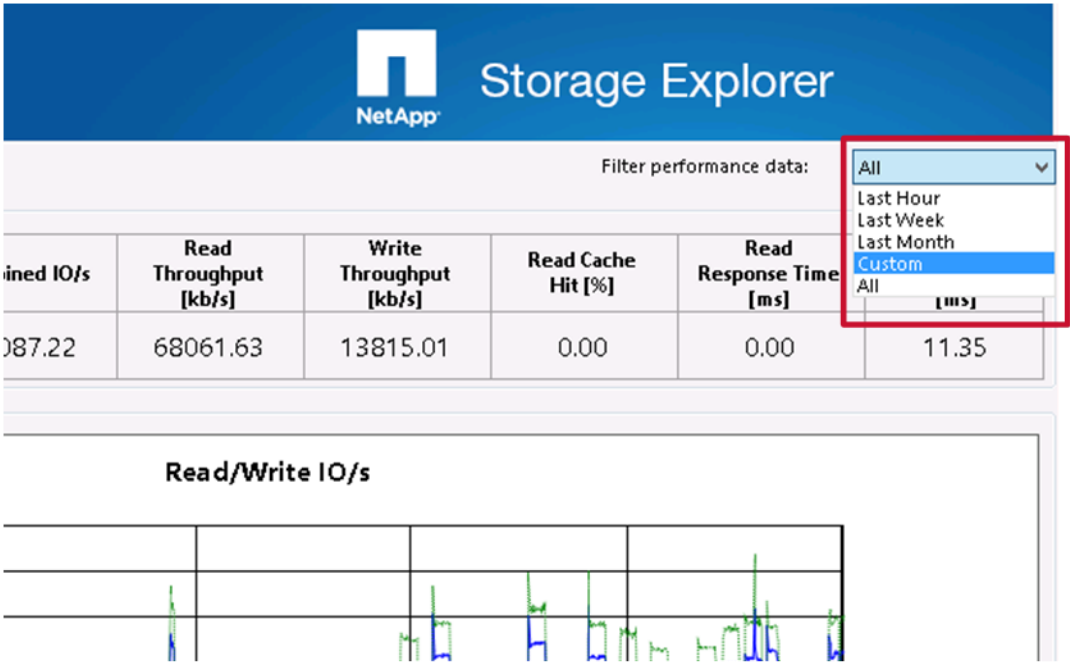
Figure 4 Storage System Performance report



This scope allows the database administrator (DBA) to begin at the volume level, use the Associated Databases report to verify what database files are on the volume, and then look at the Performance reports at this level before moving on to the volume-group level. The same type of activity is then performed at the volume-group level and finally for the whole storage system.

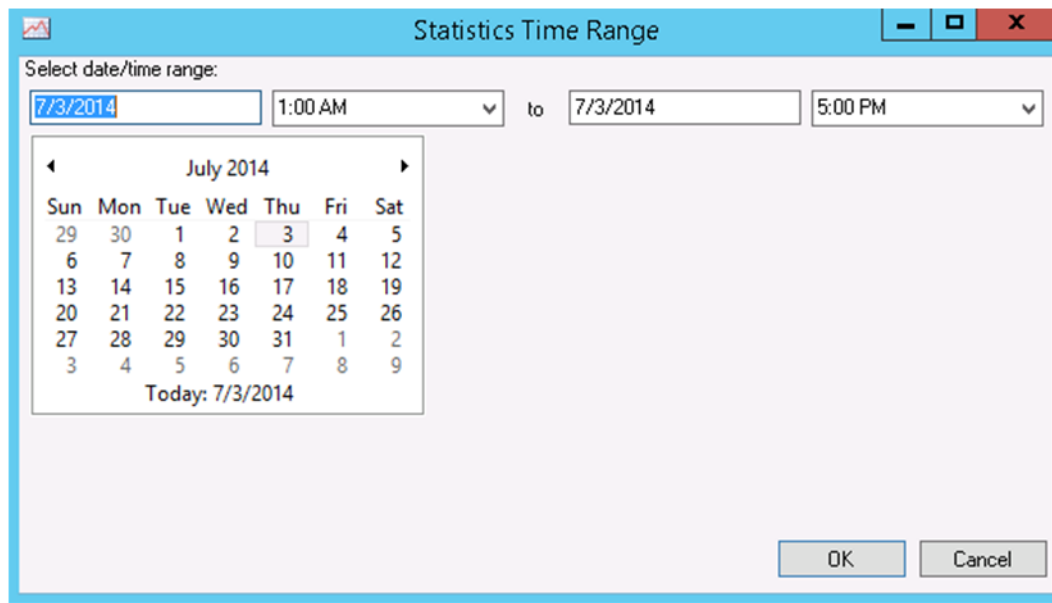
The performance data can be filtered to limit the data displayed to one hour on a specific day, as shown in Figure 5.

Figure 5 Filtering performance data



The DBA can filter the data display by fixed-time intervals or set up a custom range of days/hours to be shown at one time. The Custom option brings up the Statistics Time Range dialog box, shown in Figure 6. Note that the selected Range Start date/time must be earlier than the Range End date/time.

Figure 6 Selecting a customized time range

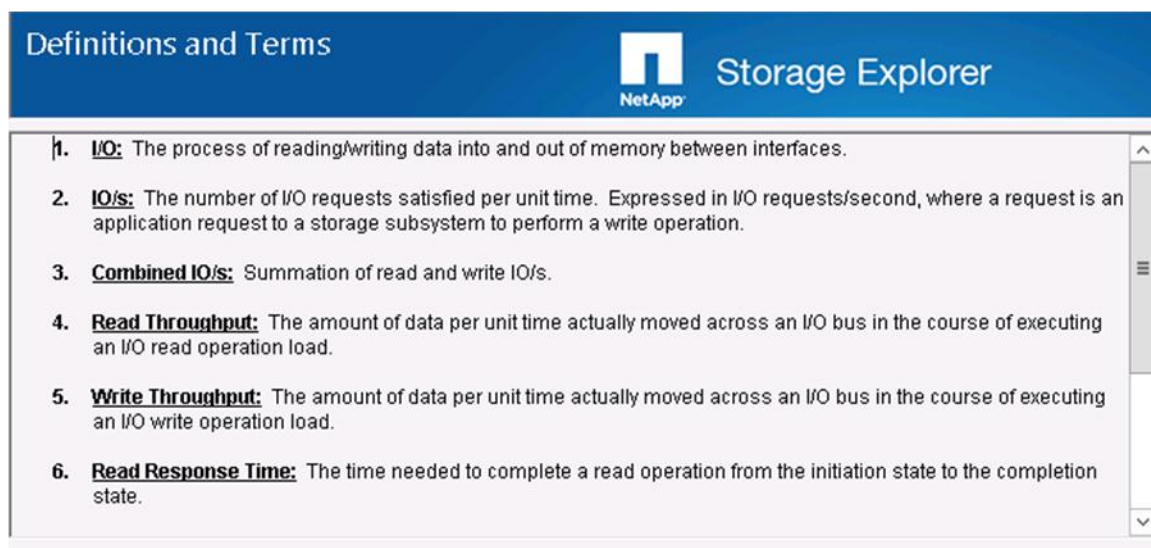


The Performance Scorecard pane at the top of the report displays data from the last collection point for the time range selected.

NOTE If the chosen time range does not contain at least two data points, then no graph is produced. This situation is most likely to happen soon after Storage Explorer is installed, before two nonzero performance statistics collections have occurred.

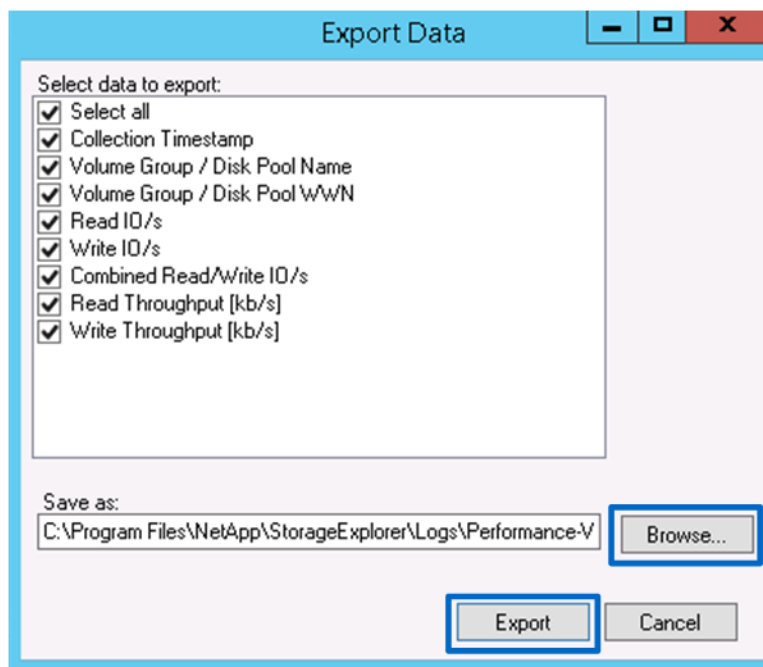
At the bottom of the report window shown in Figure 2, there are two links. Clicking the "What is this chart telling me?" link displays additional information about the types of data on the chart, as shown in Figure 7.

Figure 7 Chart definitions and terms



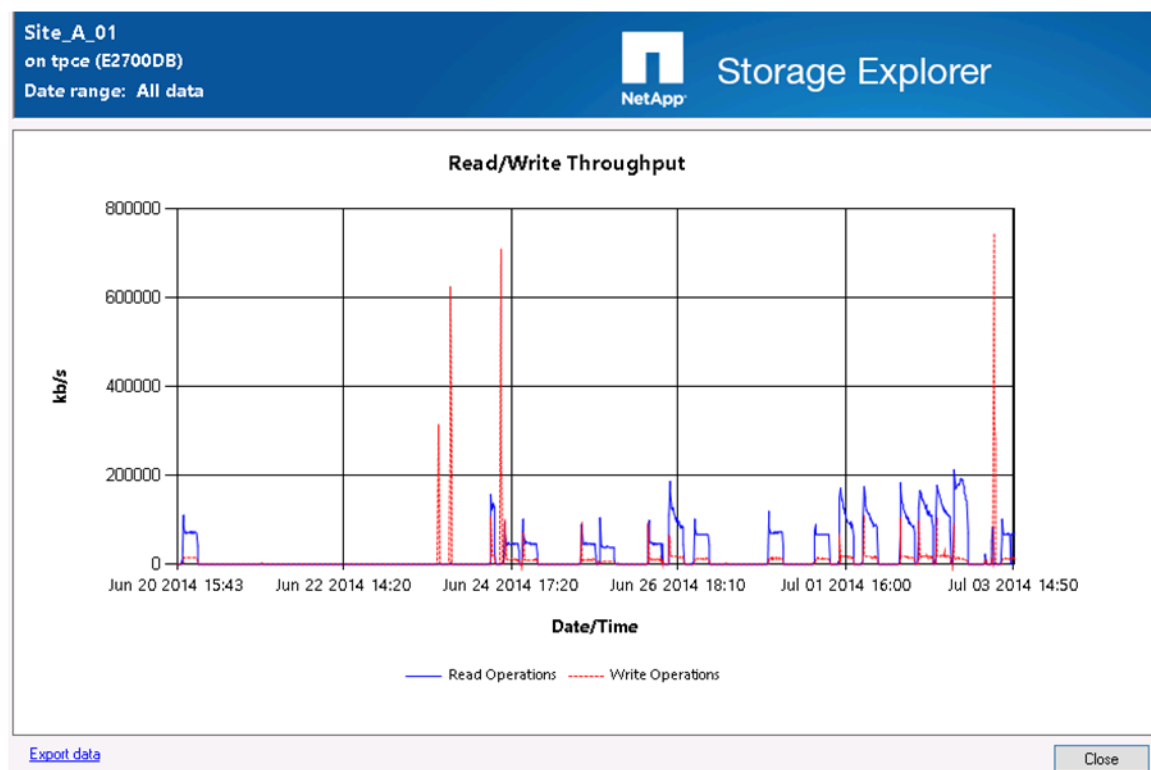
The Export Data link is used to export report performance data. Figure 8 below shows the Export Data screen. The performance data relating to the performance graph can be selected, file name and location specified, and then the data can be exported into a CSV file.

Figure 8 Export Data screen



The main chart for each object, volume, volume group, TPV, DDP, and storage system also includes additional charts, which can be displayed by clicking the buttons at the bottom of the main chart. These charts use the same timeline filter as the main chart. The Read/Write Throughput chart shown in Figure 9 is one example of these charts.

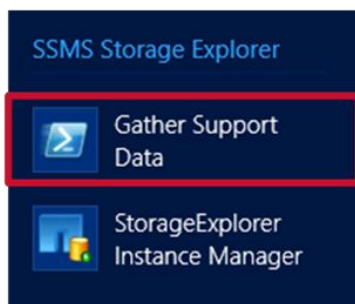
Figure 9 Read/Write Throughput chart



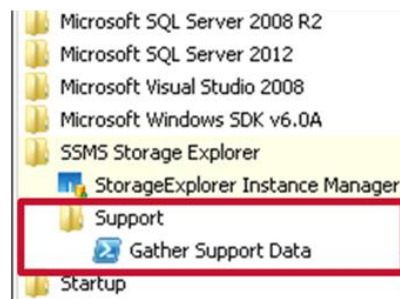
Produce SSMS Support Bundle

To aid NetApp Customer Support in resolving issues with the SSMS Storage Explorer add-in, the Gather Support Data tool is provided with the add-in installation. To produce an SSMS support bundle, complete the following steps:

1. On the server where Storage Explorer is installed, go to Programs and locate the Gather Support Data tool.



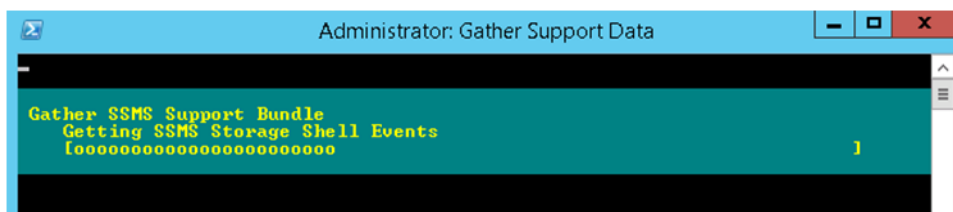
Windows Server 2012



Windows Server 2008

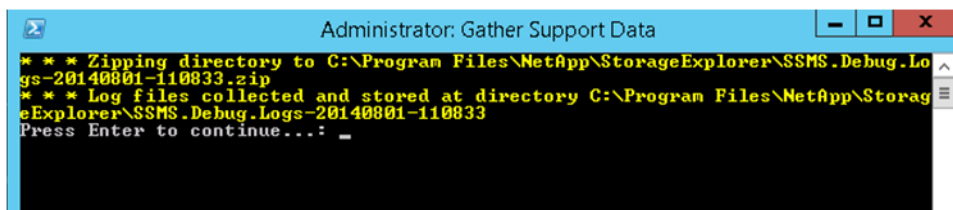
2. Start the tool.

NOTE Gathering of support data files may take several minutes.



3. After the tool creates all support data files, it will provide notification and start MS Windows Explorer to display the directory.

NOTE The contents of the directory can be large.



SSMS Storage Explorer BusScan Service

The BusScan service is installed on the local system during the SSMS installation. It scans the SCSI bus for new volumes that are used by SQL Server. This service is set to restart automatically with a delayed start when the host is rebooted.

NOTE For the BusScan service to function correctly, the E-Series storage system being monitored must be using the management port 1 with IPv4 enabled as recommended by NetApp when the storage system is deployed.

The `StorageExplorer_ConfigScript` SQL Server Agent job uses the BusScan service through management port 1 on the storage system to learn whether the configuration has changed. If the `StorageExplorer_ConfigScript` job appears to run without finishing or if a configuration change is made but not reflected in the Storage Explorer application, do the following:

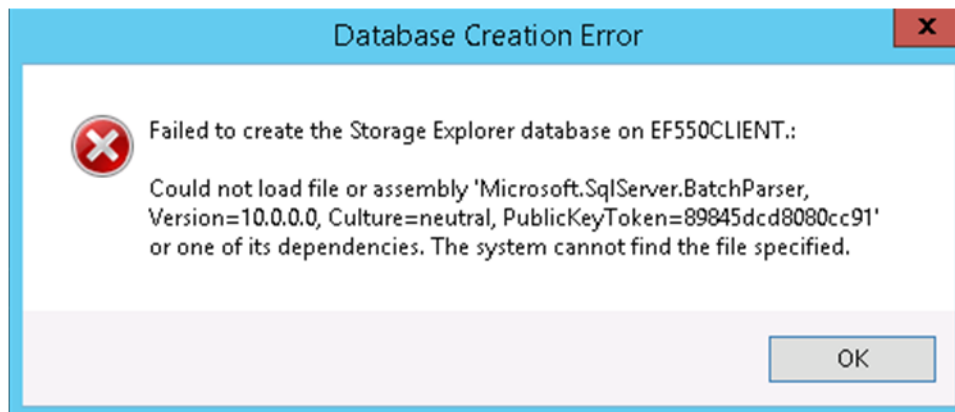
- Verify that the BusScan service is running.
- Verify that the storage system is using management port 1.

Known Issues

The NetApp SSMS Storage Explorer add-in has the following known issues:

Installation

- The NetApp SANtricity Add-in for Microsoft SQL Server Management Studio 1.3 should be installed with administrative privileges for both the client and server installs.
- The log on account for both the SQL Server (Instance) service and the SQL Server Agent service should have local administrative privileges for Storage Explorer to install and operate properly.
- In the Add Instance tab of the Instance Manager tool, using the arrow keys on the keyboard to select the authentication method radio buttons might cause the application to stop functioning. This is an unresolved Microsoft bug.
- If the following error is received when installing an instance:



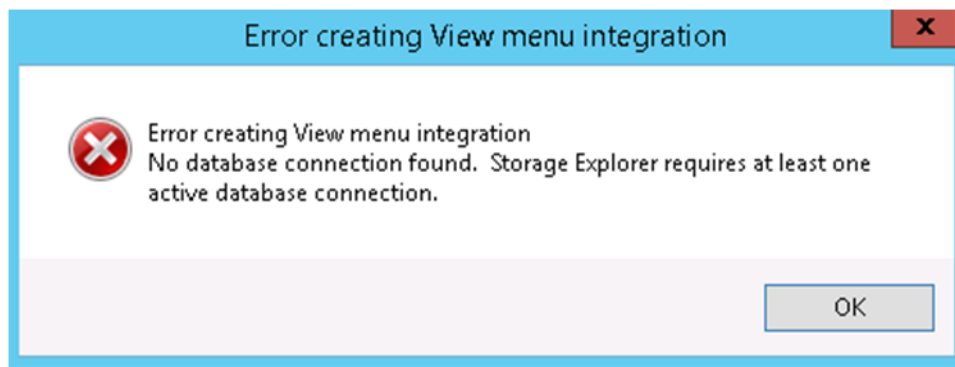
It will be necessary to install Microsoft SQL Server 2008 R2 Management Objects and Microsoft SQL Server System CLR Types. CLR types is a prerequisite for Management Objects. These may be downloaded from this Microsoft site: <http://www.microsoft.com/en-us/download/details.aspx?id=16978>

Starting Storage Explorer

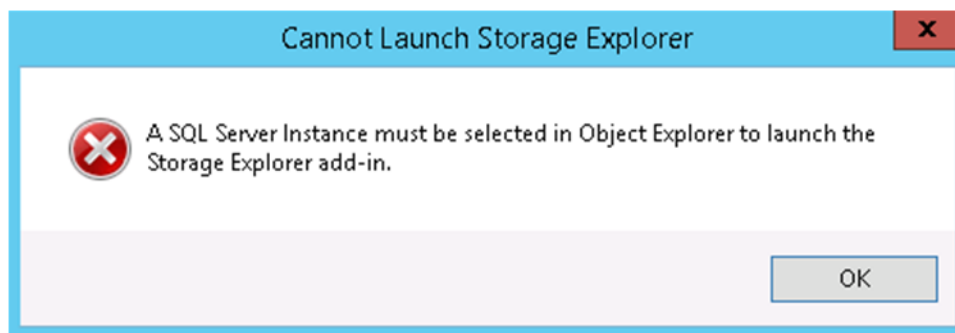
- If no instances were added using the Instance Manager, then when starting Storage Explorer the following message will appear:



- The following error message can be triggered when there are no SQL server instances in the Object Explorer and the user attempts to start Storage Explorer:

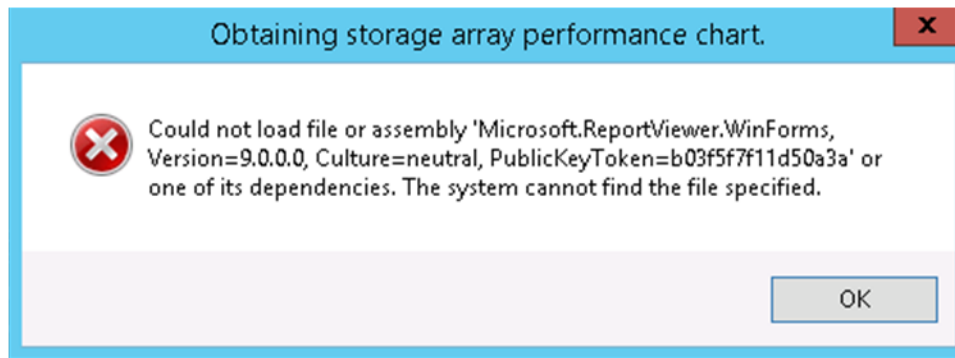


- If there are SQL Server instances showing in the Object Explorer but none have been selected, then the following error message will be displayed:



Performance Reports

- If the following error is received when starting a performance report:



It will be necessary to install the Microsoft Report Viewer Redistributable 2008. It may be downloaded from this Microsoft site: <http://www.microsoft.com/en-us/download/details.aspx?id=6576>

- If the host instance being monitored is under a heavy load, the date range on charts might become garbled. Refreshing Storage Explorer returns the date range field to correct operation.
- If the host instance being monitored is under a heavy load, a timeout might occur while Storage Explorer is in use, causing SSMS to shut down. If this happens, SSMS and Storage Explorer must be restarted.

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