

EMC Storage Integrator for Windows Suite

Version 4.1

Product Guide

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CHAPTER 1

Introduction

This chapter includes the following topics:

- [About this document](#)..... 10
- [Product Overview](#)..... 10

About this document

This product guide provides information and instructions for installing and configuring EMC® Storage Integrator (ESI) for Windows Suite. It also provides information and procedures for using ESI to provision and manage storage arrays.

The guide also provides instructions for setting up and configuring ESI system adapters, ESI application adapters, replication adapters, ESI Service, the ESI PowerShell Toolkit, and the ESI Service PowerShell Toolkit.

Audience

ESI for Windows Suite is designed for Microsoft applications administrators who manage storage and application provisioning and monitor storage health.

This software enables administrators to view, provision, and manage block and file storage for Microsoft Windows, Microsoft Exchange, Microsoft SQL Server, and Microsoft SharePoint sites on supported EMC storage systems. Microsoft System Center Operations Manager (SCOM) integration with ESI provides administrators with a dashboard view of storage entities to monitor health and performance.

Administrators can manage their environment using either the ESI graphical user interface (GUI) or the PowerShell command line interface (CLI).

Scope

This document describes how to install, configure, and use EMC Storage Integrator for Windows Suite.

Related documentation

The following EMC documents, available at EMC Online Support, contain additional information about ESI and related products.

- *EMC Storage Integrator for Windows Suite Release Notes* provides the latest information about new and changed features, known issues, and environment and system requirements.
- EMC storage system documentation.

Product Overview

ESI for Windows Suite is a set of tools for Microsoft Windows and Microsoft applications administrators. The suite includes: ESI for Windows and the ESI PowerShell Toolkit, ESI hypervisor support and system adapters, application and replication adapters, ESI Service and ESI Service PowerShell Toolkit, and ESI SCOM Management Packs.

ESI for Windows, ESI PowerShell Toolkit, and ESI system adapters

The ESI for Windows GUI is based on Microsoft Management Console (MMC). You can run ESI as a stand-alone tool or as part of an MMC snap-in on a Windows computer.

ESI for Windows enables you to view, provision, and manage block storage for Microsoft Windows, SQL Server, and SharePoint sites and to manage existing Exchange systems.

The ESI PowerShell Toolkit provides ESI storage provisioning and discovery capabilities with corresponding PowerShell cmdlets.

Install the corresponding system adapters for specific system and application support. The [EMC Simple Support Matrix](#) provides supported environment and software requirements. Prerequisites for ESI system and adapters are listed in this product guide.

ESI supports the following products:

- EMC Unity™ and UnityVSA™
- EMC VMAX®, VMAX3™, and VMAX All Flash families
- EMC VNX® series
- EMC VNXe® series
- EMC VPLEX®
- EMC XtremIO®
- EMC AppSync®
- EMC RecoverPoint®
- Windows and Linux hosts
- ESX and Microsoft Hyper-V hypervisors

ESI hypervisor support

In addition to supporting physical environments, ESI supports storage provisioning and discovery for Windows virtual machines that are running on Microsoft Hyper-V or VMware vSphere. Install the corresponding adapters for specific hypervisor support.

Storage options in ESI vary depending on the hypervisor:

- For Hyper-V virtual machines, you can create virtual hard disk (VHD and VHDX) files and pass-through SCSI disks. You can also create host disks and cluster shared volumes.
- For vSphere ESXi virtual machines, you can create virtual machine disk (VMDK) files and raw device mapping (RDM) disks without virtual compatibility mode. You can also create SCSI disks and view datastores. SCSI disks require the use of existing SCSI controllers.

ESI Service and ESI Service PowerShell Toolkit

ESI Service is the communications link between ESI and the ESI System Center Operations Manager (SCOM) Management Packs. You can use ESI Service to view and report on registered EMC storage systems and storage-system components that are connected to the ESI host system. SCOM then pulls this data from ESI Service. You can also use the ESI Service as a stand-alone tool without SCOM to collect, view, and report this same system data.

When you install the ESI Service as part of the ESI installation, both the ESI Service and the ESI Service PowerShell Toolkit are installed on the ESI host system. Use the PowerShell Toolkit to set up the ESI Service to communicate with the storage systems and ESI SCOM Management Packs.

ESI SCOM Management Packs

The ESI SCOM Management Packs enable you to manage EMC storage systems with SCOM by providing consolidated and simplified dashboard views of storage entities.

The ESI SCOM Management Packs support the same EMC storage systems that ESI supports.

The ESI SCOM Management Packs enable you to do the following:

- Discover and monitor the health status and health events of EMC storage systems and system components in SCOM.
- Receive alerts in SCOM for possible problems with disk drives, power supplies, storage pools, and other types of physical and logical components.

EMC Unity Adapter overview

The EMC Unity Adapter enables storage administrators to create, provision, and manage Unity and UnityVSA storage with ESI. This adapter supports all Unity storage systems that are supported in ESI.

You can use the ESI GUI to view Unity and UnityVSA storage systems as well as consistency groups and unified snapshots.

You must use the ESI PowerShell Toolkit to:

- Create and delete consistency groups
- Manage, add, and remove LUNs in consistency groups
- Create and delete unified snapshots of LUNs in consistency groups
- Restore snapshots to LUNs in consistency groups

EMC VMAX Adapter overview

The EMC VMAX Adapter enables storage administrators to create, provision, and manage VMAX storage with ESI. This VMAX adapter is based on the Solutions Enabler Storage Management Initiative Specification (SMI-S) provider. This adapter:

- Supports all VMAX storage systems that are supported in ESI.
- Supports the VMAX3 service level objectives (SLO) feature.
- Replaces the EMC Symmetrix Adapter that was based on the Storage Pool Manager (SPM) from previous versions.

Limitations

The EMC VMAX Adapter has the following limitations:

- [Using FAST VP on page 37](#) lists the limitations associated with EMC Fully Automated Storage Tiering for Virtual Pool (FAST[®] VP).
- [Managing metas on page 37](#) lists the limitations associated with managing metas or composite LUNs.
- This adapter cannot provision storage on host systems that are provisioned with Virtualization Domains or with the Storage Pool Manager (SPM) from previous releases of the ESI VMAX Adapter.

EMC VNX Adapter overview

The EMC VNX Adapter enables storage administrators to create, provision, and manage VNX storage arrays with ESI. This adapter supports all VNX storage systems that are supported in ESI.

You can view and manage advanced VNX snapshots in both the ESI GUI and ESI PowerShell Toolkit.

EMC VNXe Adapter overview

The EMC VNXe Adapter enables storage administrators to create, provision, and manage VNXe storage arrays with ESI. This adapter supports all VNXe storage systems that are supported in ESI.

You can use the ESI GUI to view VNX1600 storage systems as well as VNXe3200 LUN groups and unified snapshots.

You must use the ESI PowerShell Toolkit to:

- Create and delete LUN groups
- Manage, add, and remove LUNs in LUN groups
- Create and delete unified snapshots of LUNs in LUN groups
- Restore snapshots to LUNs in LUN groups

EMC VPLEX Adapter overview

The EMC VPLEX Adapter enables storage administrators to create, provision, and manage VPLEX storage with ESI.

Use the ESI GUI to:

- View storage system components
- Manage virtual volumes
- Manage host disks and hypervisor disks
- Manage consistency groups
- Support Microsoft SQL Server 2016 and Microsoft SharePoint 2016

The EMC VPLEX Adapter enables you to use the ESI SCOM Management Packs and ESI Service to monitor the operational status of VPLEX system components in SCOM. You can use SCOM to monitor the health of both physical and logical VPLEX system components. You can view the health of individual LUNs and if failures occur, the failures roll up to the affected virtual volumes and corresponding VPLEX systems.

EMC XtremIO Adapter overview

The EMC XtremIO Adapter enables you to create, provision, and manage EMC XtremIO storage systems with ESI.

This adapter enables:

- Support for XtremIO snapshots, snapshot sets, and consistency groups
- Support for setting host best practice settings for XtremIO
- Support for associating tags to XtremIO object types for easier management
- Support for managing and monitoring XtremIO clusters and arrays using IPv6

The ESI PowerShell Toolkit includes cmdlets specifically for XtremIO systems. For more information, refer to [Powershell cmdlet storage system operations on page 167](#).

EMC XtremIO Adapter considerations include:

- For XtremIO entities, ESI manages XtremIO volumes as LUNs and manages volume mappings as masking views.
- You can view, but cannot modify, create, or delete XtremIO folders in ESI.
- You cannot provision XtremIO storage for Exchange applications in ESI.

- XtremIO systems do not use service nodes.
- XtremIO does not require host registration.

ESI SharePoint Adapter overview

Use the ESI SharePoint Adapter to perform the following functions with Microsoft SharePoint farms:

- View SharePoint storage, farms, sites, and content databases
- Connect to existing SharePoint farms and enumerate farm information, including servers, web applications, site collections, and content databases
- Create content databases and storage for the databases, and map content databases to the storage
- Provision storage on the SharePoint server by partitioning, formatting, and assigning it a drive letter, and provisioning the storage to the SharePoint site
- Support the File Stream Remote BLOB Store
- Create a web application and map it to a content database
- Provision a web application and the associated content database

Note

For provisioning SharePoint storage, ESI requires that SQL Server and SharePoint be installed in the same Windows domain as the ESI host controller.

The ESI SharePoint adapter includes these limitations:

- SharePoint Foundation Client is not supported.
- Domain-based SharePoint farm deployment is supported; however, clustered and stand-alone installations and web applications for remote farms are not supported.

Note

If you create a database without a web application on a remote farm, you cannot view the new database in ESI.

ESI Exchange Adapter overview

ESI Exchange Adapter enables you to view Microsoft Exchange databases and map the databases to EMC storage.

To add, view, and remove Exchange forests, use the ESI GUI or use the [Exchange cmdlets on page 175](#) in the ESI PowerShell Toolkit.

The ESI Exchange Adapter includes these limitations:

- The adapter does not support XtremIO storage systems.
- You can view, but cannot modify, create, delete, or provision Exchange storage in ESI. Use the Exchange Management Tools for these tasks.

ESI Microsoft SQL Server Adapter overview

The ESI SQL Server Adapter enables you to view local and remote Microsoft SQL Server instances and databases and to map the databases to EMC storage. ESI supports the **Always On** feature in SQL Server 2012 and SQL Server 2014, so you can view the primary SQL Server replica and up to four secondary replicas.

You can use SQL Scripts to create and configure SQL Server databases from an ESI host.

Supported versions

This adapter supports the following versions of SQL Server on Windows 2012 Server and Windows 2012 R2 Server (full, 64-bit installations):

- SQL Server 2008 R2
- SQL Server 2012
- SQL Server 2012 SP1
- SQL Server 2014

ESI AppSync Adapter overview

The ESI AppSync Adapter enables simple, self-service application protection with tiered protection options and proven recoverability. This adapter supports multiple SQL Server instances on the same host.

With this adapter, perform the following tasks in ESI for supported SQL Server and Exchange databases:

- View AppSync Application Server instances and databases, including database files, copies, subscribed service plans, service plan events, registered storage, registered hosts, and registered RecoverPoint systems.
- Subscribe and unsubscribe databases to AppSync service plans.
- Protect databases with AppSync service plans or protection policies.
- Mount and unmount database copies on VNX or RecoverPoint target hosts.
- Expire and restore database copies.

The ESI AppSync Adapter includes these limitations:

- SQL Server system databases are not supported.
- SQL Server database snapshots are not discovered.

ESI RecoverPoint Adapter overview

The ESI RecoverPoint Adapter provides local and remote data protection. If a disaster occurs, RecoverPoint can recover lost data from any point in time. Use this adapter to connect to existing RecoverPoint/SE or RecoverPoint/EX systems to manage and view replication service clusters for replication.

Use the RecoverPoint Adapter to:

- Connect to existing RecoverPoint/SE or RecoverPoint/EX systems.
- Manage and view replication service clusters, which are groups of RecoverPoint sites and appliances working together to perform replication for storage and applications that are managed in ESI.
- Add RecoverPoint consistency groups, which are groups of one or more RecoverPoint replica sets.
- Add replica copies, which can be either local or remote copies of a LUN.
- Add replica sets, which are a source LUN and the local and remote copies for that LUN.
- Seamlessly provision journal and replica LUNs when creating replica copies and sets.
- View underlying storage details for volumes used by RecoverPoint.

CHAPTER 2

Installing ESI

This chapter includes the following topics:

- [Installation overview](#) 18
- [ESI system prerequisites](#) 19
- [ESI system adapter prerequisites](#) 19
- [ESI system adapter installation](#) 22
- [Performing a new installation of ESI](#) 22
- [Additional adapter setup](#) 23
- [Reinstalling ESI](#) 23
- [Upgrading from ESI version 3.x or later](#) 24
- [Uninstalling ESI](#) 24
- [ESI home window](#) 24

Installation overview

For an ESI environment, you install ESI on the host system. You can then install ESI adapters and the ESI Service and ESI SCOM Management Packs.

ESI installation files

The ESI Zip file includes:

- The EMC Storage Integrator for Windows Suite Release Notes.
- The ESI installer for the core ESI setup and other options.
- The ESI SCOM Management Packs installer—If you select to install the ESI Service, the installer also installs the ESI Service PowerShell Toolkit.

ESI installation options

You can install ESI in one of the following ways:

- [Installing ESI on page 22](#): New installation of ESI with all available options. During the installation, you can select which adapters and other options are installed with ESI. During the installation you can select to use [Active Directory Domain Services \(AD DS\)](#) or [Active Directory Lightweight Directory Services \(AD LDS\)](#) on page 28 for persisting connection settings in a central store.
- [Reinstalling ESI on page 23](#): Reinstallation of the same adapters and options as selected during your last ESI installation.
- [Upgrading from ESI version 3.1 or later on page 24](#): Upgrade to the latest version from an earlier version of ESI.

Note

You must uninstall the previous version of ESI and then install the new version. [Uninstalling ESI on page 24](#) provides information about uninstalling ESI.

ESI system adapter installation

To ensure that the ESI system adapters work correctly with ESI, ensure that your system meets the prerequisites and perform additional setup.

- [ESI system prerequisites on page 19](#)
- [ESI system adapter prerequisites on page 19](#)
- [Additional adapter setup on page 23](#)

ESI Service and ESI SCOM Management Packs installation

- You can use and install the ESI Service and ESI SCOM Management Packs separately or together with ESI. The following provide installation and setup instructions:
- [Installing the ESI Service on page 136](#) and [Setting up ESI Service for SCOM on page 136](#).
- [Installing the ESI SCOM Management Packs on page 143](#) and [Setting up ESI SCOM Management Packs on page 144](#)

ESI system prerequisites

For ESI 4.1 to function properly, ensure that your environment meets these minimum system requirements.

Procedure

1. Install a supported version of .NET Framework on the ESI controller (the host on which ESI runs).
2. Ensure that Windows Server is installed on the ESI controller (Windows Server Core installations are not supported).
3. Ensure that a supported version of MMC is installed. Otherwise, the ESI installer prompts you to upgrade before installing ESI. If MMC is not installed, download and install it from the Microsoft website.
4. Enable the following firewall exceptions on the ESI controllers and ESI controllees (hosts on which ESI provisions storage):
 - Remote Volume Management-Virtual Disk Service (RPC) (`vds.exe`)
 - Remote Volume Management-Virtual Disk Service Loader (RPC) (`vdsldr.exe`)
 - Remote Volume Management (RPC-EPMAP) (`svchost.exe`)
 - Windows Management Instrumentation
5. Ensure that Microsoft PowerShell is installed on all hosts. If PowerShell is not installed, download and install it from the Microsoft website.
6. Enable the remote PowerShell on ESI controllee hosts by running the following command on the controllee host: `Enable-PSRemoting -force`
7. If you use iSCSI or FC transport for SAN connectivity:
 - Use the iSCSI initiator to log in to the storage systems.
 - Configure zoning for the FC initiator and use that initiator to log in to the storage system.
8. Install the latest version of EMC PowerPath or Microsoft Multipath I/O (MPIO) with the Microsoft Device Specific Module (MSDSM) on the controllee host.
9. Ensure that ESI is installed and runs in a domain user login session with administrative privileges for the controller host. The controller and controllee hosts must be members of the same Windows domain or in trusted domains.
10. To use AD DS with ESI, confirm that Windows Server Active Directory is installed. To use AD LDS, confirm an AD LDS instance is installed on the Windows Server.

ESI system adapter prerequisites

For ESI system adapters to function correctly with ESI, ensure your environment meets the prerequisites.

Note

You can perform these prerequisites before or after you install ESI. However, they must be in place before you start the ESI application or the ESI service.

Table 1 System adapter prerequisites

Adapter	Prerequisites
Unity	Install the latest version of the EMC Unisphere [®] Unity Command Line Interface for your specific environment on the ESI controller host. The latest versions of the Unity CLIs are available for download on EMC Online Support.
VMAX	<ul style="list-style-type: none"> • Download and install the latest applicable version of SMI-S that is available for your VMAX model from EMC Online Support. Supported versions of Enginuity and EMC Solutions Enabler for this release are listed in the EMC Simple Support Matrix. • Install and run SMI-S on a management server that is separate from all ESI hosts and storage systems. The VMAX Adapter cannot provision storage on a server that is running SMI-S. • After installing the latest version of EMC SMI-S Provider, use VMAX to create two or more gatekeeper devices and unmask the gatekeepers to the SMI-S server that is hosting the SMI-S provider. Gatekeepers are required for accessing and issuing management commands. EMC VMAX documentation has more details. • Refer to the EMC Simple Support Matrix to install a supported version of Oracle Java SE Runtime Environment (JRE), which is required for VMAX3.
VNX	Enable Access Logix on the storage array before connecting a host disk on a Windows host.
VNXe	Install the latest version of the EMC Unisphere VNXe CLI for your specific environment on the ESI controller host. The latest versions of the VNXe CLIs are available for download on EMC Online Support.
VPLEX	<ul style="list-style-type: none"> • Ensure that a supported version of GeoSynchrony is installed on the VPLEX systems. Supported software versions are listed in the EMC Simple Support Matrix. • This adapter uses the standard SSH network connection to communicate with VPLEX. Confirm that the SSH port 443 is open on the ESI host. If it is not open, the connection fails.
XtremIO	<ul style="list-style-type: none"> • Requires a supported version of XtremIO. • VMware-vSphere-CLI must be installed using the default installation path.
SharePoint	Supported versions of the following are installed: <ul style="list-style-type: none"> • Windows Server (Windows Server Core installations are not supported) • SQL Server • SharePoint Server or SharePoint Foundation
Exchange	<ul style="list-style-type: none"> • A supported version of Microsoft Exchange is installed on the Exchange servers. • A full supported version of Windows Server is installed on the Exchange servers. (Windows Server Core installations are not supported.) • On each Exchange Server, the Internet Information Services (IIS) Manager for Windows PowerShell must have <code>PSLanguageMode</code> set to FullLanguage in the Application settings for Windows PowerShell.

Table 1 System adapter prerequisites (continued)

Adapter	Prerequisites
SQL Server	<ul style="list-style-type: none"> • Ensure that your version of SQL Server is supported on your Windows version. • ESI and SQL Server must be connected to the same domain controller and you must have SQL Server Administrator login credentials.
Appsync	<ul style="list-style-type: none"> • A supported version of EMC AppSync is installed on the Windows server. • When installing the adapter as part of the ESI installation, you must use the same service name and port information that you used when installing Windows Server. • Your system must meet the following to use this adapter with Exchange databases: <ul style="list-style-type: none"> ▪ Your system meets the Exchange Adapter prerequisites. ▪ Mount and production hosts must have the same version of Windows installed. • Your system must meet the following to use this adapter with SQL Server databases: <ul style="list-style-type: none"> ▪ Your system meets the SQL Server Adapter prerequisites. ▪ SQL Server databases and transaction logs must be stored on disks in the same storage system. ▪ SQL Server databases must be online during replication. ▪ EMC recommends you use the same version of SQL Server on the production and mount hosts. ▪ Mount hosts must have SQL Server installed to recover databases from mounted copies.
RecoverPoint	<ul style="list-style-type: none"> • A supported version of Windows Server is installed. (Windows Server Core installations are not supported.) • A supported version of EMC RecoverPoint/SE or EMC RecoverPoint/EX is installed. • System.net.http.formatting DLL is installed on the ESI host controller. When you select to install the RecoverPoint Adapter as part of the ESI installation, this DLL is installed for you. • ESI RecoverPoint Adapter is installed on the ESI controller and a supported version of EMC RecoverPoint/SE or RecoverPoint/EX and the applicable splitters are set up for each supported EMC storage system. <p><i>EMC RecoverPoint Release Notes</i> on EMC Online Support provide more details about EMC RecoverPoint/SE and EMC RecoverPoint/EX.</p>

ESI system adapter installation

All ESI system adapters, other than the Unity and VNXe adapters, are installed by default with ESI. For the Unity and VNXe Adapters, you must select to install them during the installation of ESI.

If you changed the default during your installation of ESI or you did not select the Unity and VNXe Adapters, then reinstall ESI and confirm that the adapters are selected in the InstallShield Wizard Setup window.

Performing a new installation of ESI

Use these instructions if ESI has never been installed on your system.

Before you begin

Ensure that you have met all the requirements in [ESI system prerequisites on page 19](#) and [ESI system adapter prerequisites on page 19](#).

Procedure

1. Locate and double-click the latest version of `ESI.4.*.Setup.exe`.
2. In the **ESI InstallShield Wizard**, click **Next**.
3. Read and accept the EMC Software License Agreement, and then click **Next**.
4. In the **Prerequisites** window, confirm that your system meets the prerequisites, and then click **Next**.
5. In the **Setup** window, confirm or change the options to install, and then click **Next**.

Note

Some options, such as the ESI Service, are not selected by default. In the main Setup window or for each option, you can click **Change** to change the default installation paths.

6. In the **Publish Connection Information** window, select a connection service, and then click **Next**:
 - **Active Directory**—Uses Active Directory to persist connection settings.
 - **Active Directory Lightweight Directory Service**—Persists connection settings in a central location. For this option, type the Service Name and Service Port for connecting to the AD LDS instance.
 - **Local Server**—Connection settings will be stored locally (same as earlier versions of ESI). For example, MMC and PowerShell use the Windows user profile folder and ESI Service uses SQLCE to persist settings locally.
7. Do one of the following:
 - If you are not using Active Directory, skip to the next step.
 - If you are using Active Directory, in the **Configure Active Directory** window, specify the username and password of the Active Directory user account for ESI. The ESI installer uses this account to configure Windows Active Directory for ESI. The ESI username must include (that is, be qualified with) the domain name, as follows:
DOMAIN\Username.

8. Click **Install**.**Note**

If the installer detects that a later version of a redistributable file is already installed, it will not install the earlier version that is included with ESI and will prompt you with an error message that it failed. If you get this message, click **Yes**.

9. Click **Finish**.

10. If you are using Active Directory Services, you must configure AD DS or AD LDS for ESI supported applications. For more details, see [Setting up Directory Service integration for ESI applications on page 28](#).

Note

The ESI installer attempts to add a firewall exception rule to enable Remote Volume Management on the host where ESI is being installed. The installer also attempts to enable the remote PowerShell (PS Remoting) on the same host. If the installer encounters a problem during these steps, ESI instructs you to perform these steps manually after the installation is complete.

Additional adapter setup

Most ESI system adapters require no additional setup for use with ESI.

However, the following ESI system adapters do require some additional setup.

Table 2 Adapter setup

Adapter	Additional steps
AppSync	<ol style="list-style-type: none"> 1. Install the AppSync Server and connect it to ESI. 2. Add the AppSync system as a replication service. 3. In the AppSync console, add all ESI supported applications to AppSync Server, including Exchange database availability groups (DAGs), SQL Server instances, SQL AlwaysOn Availability Groups (AAGs), EMC storage systems, and EMC RecoverPoint appliances.
RecoverPoint	Use the instructions in the EMC RecoverPoint Release Notes, available on EMC Online Support, to install and set up EMC RecoverPoint/SE and EMC RecoverPoint/EX.

Reinstalling ESI

This procedure enables you to reinstall the current version of ESI to the same installation path to repair the installation or modify the options that are installed.

Procedure

1. If you plan to select either of the Active Directory options to publish connection information, remove all system connection settings before installing ESI:

- a. Remove all systems from ESI. [Removing systems from ESI on page 34](#) provides instructions.
 - b. Delete the following ESI settings file: `system drive:\Users\user name\AppData\Local\EMC\ESI\EMC Storage Integrator.settings`.
2. Follow the instructions in [Performing a new installation of ESI on page 22](#).

Upgrading from ESI version 3.x or later

Occasionally, upgrading to a newer version of ESI causes ESI to fail. If this happens, uninstall the previous version of ESI, and then install the newer version.

Procedure

1. If you plan to select either of the Active Directory options to publish connection information, you must remove all system connection settings before installing ESI as follows:
 - a. If you are using ESI Service, unpublish all systems from the ESI Service. See [Unpublishing systems on page 35](#).
 - b. Remove all systems from ESI. See [Removing systems from ESI on page 34](#).
 - c. Delete the following ESI settings file: `system drive:\Users\user name\AppData\Local\EMC\ESI\EMC Storage Integrator.settings`.
2. Follow the instructions in [Performing a new installation of ESI on page 22](#).

Uninstalling ESI

In some cases, you must uninstall ESI before upgrading to a newer version.

Procedure

1. Close all ESI applications, including ESI and the ESI PowerShell Toolkits.
2. In Windows Control Panel, open **Programs and Features**.
3. Select the EMC Storage Integrator program and click **Uninstall**. If you are upgrading from version 1.2, repeat this step until you remove all EMC Storage Integrator adapters and programs from the list.

Note

The uninstaller does not remove either the local store file or the Active Directory user container.

ESI home window

The main ESI GUI window provides a one-stop view of the storage systems, hosts, host clusters, and applications added to ESI.

The ESI interface has three panes:

- The left pane is the navigation pane.
- The center pane shows the details of the items selected in the navigation pane.
- The right pane is the **Actions** pane, which lists the possible actions based on the items selected in the navigation pane or the center pane.

Customize view settings

To show or hide items in the ESI home window, select **View > Customize** from the menu bar. The **Customize view** dialog box appears. Select or clear these check boxes to customize your view.

Table 3 Customize view options

Check box	View displayed if selected
Console tree	Left navigation pane.
Standard menus (Action and View)	Top menu bar: Action and View.
Standard toolbar	Icons in the second row of the menu bar: Back and Forward arrows, Up One Level in the Console Tree, Show/Hide Console Tree, Help, and Show/Hide Action Pane.
Status bar	Status bar at the bottom of the Home window.
Description bar	Description at the top of a pane. For example, if a VMAX storage system is selected, VMAX and the size and ID of the storage system are displayed.
Taskpad navigation tabs	ESI does not use MMC taskpad navigation tabs, so this selection does not provide any additional choices.
Action pane	Right Actions pane.
Menus	ESI does not have additional menu views.
Toolbar	ESI does not have additional toolbar views.

- To customize the center pane, such as to remove or add columns for a custom view, right-click a column and select actions from the menu. By default, not all of the information is displayed for some lists due to space limitations.
- A plus (+) or minus (-) symbol displayed next to a list item enables you to expand or reduce the information displayed.
- Use your mouse to adjust column width sizes.

CHAPTER 3

Setting up connections

This chapter includes the following topics:

- [Setting up Directory Services integration for ESI applications](#)..... 28

Setting up Directory Services integration for ESI applications

ESI can store connection settings locally or persist connection settings in a central location by integrating with Microsoft Active Directory Domain Services (AD DS) or Microsoft Active Directory Lightweight Directory Services (AD LDS). The Microsoft Active Directory Services use the Lightweight Directory Access Protocol (LDAP) for both AD DS and AD LDS. You can use AD DS or AD LDS for all supported applications and systems, such as ESI, MMC, ESI Service, and SQL Server.

Microsoft TechNet provides instructions on how to install and set up [AD DS](#) and [AD LDS](#).

Setting up AD DS

Before you begin

To use AD DS with ESI, confirm that Windows Server (2012 R2, 2012, or 2008 R2) Active Directory is installed on the Domain Controller of the AD domain.

Procedure

1. Confirm that you selected **Active Directory** in the **Publish Connection Information** window during the ESI installation.
2. Log in to the domain controller with domain administrator credentials.
3. Perform one of these procedures:
 - [Configuring Directory Services for ESI Service connections on page 29](#)
 - [Configuring Directory Services for ESI, MMC, and PowerShell connections on page 29](#)

Setting up AD LDS

Before you begin

To use AD LDS with ESI, confirm that Windows Server (2012 R2, 2012, or 2008 R2) Active Directory is installed on the Domain Controller of the AD domain. Confirm that an AD LDS instance is installed on the Windows Server.

Procedure

1. Log in to the domain controller with domain administrator credentials.
2. During the AD LDS installation, set up the following application directory partition for ESI: **DC=EMC, DC=Storage, DC=Integrator, DC-COM**.
3. Confirm that you selected **AD LDS** in the **Publish Connection Information** window during the ESI installation.
4. Confirm that the AD LDS instance schema has definitions for **msDS-App-Configuration** and **msDS-Settings**. If not, extend the AD LDS schema to get them by generating an LDIF file with `ADSchemaAnalyzer.exe`. Refer to [Microsoft TechNet](#) for instructions.
5. Perform one of these procedures:
 - [Configuring Directory Services for ESI Service connections on page 29](#)
 - [Configuring Directory Services for ESI, MMC, and PowerShell connections on page 29](#)

Configuring AD DS and AD LDS for ESI Service connections

Procedure

1. Use ADSI Edit to create an ESI Service container in the ESI AD store. Use the name of the computer that is running ESI Service, such as **CN=ESIService1**.

This new container enables ESI Service to store persistence settings in the ESI AD store.

2. Perform one of these steps:
 - If ESI Service is running on a remote computer, grant full control permissions to the computer account.
 - If the directory service and ESI Service are running on the same computer, grant full control permissions to the network service account.

ESI Service runs as a network service.

Configuring AD DS and AD LDS for ESI, MMC, and PowerShell connections

Procedure

1. Use ADSI Edit (`adsiedit.msc`) to connect to the domain controller active directory and create a container for this ESI store.

For example, for `mydomain.corp.com`, create **CN=ESI Object Connection Store,DC=mydomain, DC=corp, DC=com Distinguished Name**.

2. Create a container in the ESI store container with the domain user name for each user.
For example, for User 1, create a **CN=User1 Distinguished Name**.
3. Grant full control permissions for the users that own the ESI AD store.

CHAPTER 4

Managing storage systems

This chapter contains the following topics:

- [Adding storage systems](#) 32
- [Removing systems from ESI](#) 34
- [Publishing connections](#) 34
- [Using the PowerShell scripting tool](#) 36
- [Managing VMAX storage systems](#) 37
- [Managing Block storage](#) 38
- [Managing File storage](#) 53

Adding storage systems

Procedure

1. In the left pane of the ESI window, select **EMC Storage Integrator > Storage Systems**.
2. In the **Actions** pane, click **Add Storage System**.
3. In the **Add System** dialog box, specify the following for the storage system.

Option	Description
System Type	Type of storage system to add
Friendly Name	Short name for the storage system that is unique across different storage systems

Note

The credentials required for each storage system are different. Fields marked with an asterisk (*) in the ESI UI are required. The following tables list the storage system parameters for supported storage systems.

For Unity, VNXe, or VPLEX storage systems, specify the following.

Option	Description
Username	Username for the storage system.
Password	Password for the storage system.
Management Server IP Address	IP address for the storage system management server.
(VPLEX only) Port number	The default port number is automatically set. If the field is empty, you can leave it empty to use the default port.

For VNX-F or VNX-Block storage systems, specify the following.

Option	Description
Username	Username for the storage system.
Password	Password for the storage system.
SPA's IP Address	IP address of SP A.
SPB's IP Address	IP address of SP B.
Port Number	The default port number is automatically set. If the field is empty, you can leave it empty to use the default port. For VNX-Block, this is the control station port number.

For VMAX storage systems, specify the following.

Note

In the System Type field, the VMAX selection represents the group of VMAX storage systems supported with this release of ESI. Supported VMAX systems are listed in the [EMC Simple Support Matrix](#).

Option	Description
Array serial number	Serial number of the array.
SMI provider host	Hostname or IP address of the SMI-S provider.
SMI provider port	IP port of the SMI-S provider. You can accept the default port 5988 for HTTP or 5989 for HTTPS.
Use secured connection	Use a secure connection to the SMI-S provider.
Use Windows Authentication	Use Microsoft Windows authentication.
Username and Password	The username and password for the SMI-S provider. Not used and can be omitted.
Connection timeout (seconds)	Time limit for a connection to connect to the SMI-S provider.
Operation timeout (seconds)	Time limit for an operation to be completed.
Ignore server certificate name validation	Bypass security certificate name validation.

For XtremIO storage systems, specify the following.

Option	Description
Username	Username for the storage system.
Password	Password for the storage system .
Array serial number	Serial number of the array (optional) <ul style="list-style-type: none"> Specify the array serial number to add a specific cluster. Leave blank to add all clusters that belong to the XtremIO Management Server.
XMS IP Address	IP address of the XtremIO management server.
Port Number	The default port number is automatically set. If the field is empty, leave it empty to use the default port.

- Click **Test Connection** to test the connection before adding it.
- Click **Add**.

The storage system appears under **Available Systems** in the center pane.

- For VPLEX systems only, select the VPLEX system, and in the **Actions** pane click **Connect**.

The **VplexClusters** tab appears and shows the VPLEX cluster. Expand the VPLEX node under **Storage Systems** and select a cluster to show information for that particular VPLEX cluster.

Removing systems from ESI

Use the **Remove System** action to remove storage systems, applications, appliances, and other supported systems from ESI.

Procedure

1. In the left pane of the ESI window, select **EMC Storage Integrator** or **Storage Systems**.
2. In the center pane, select the storage system.
3. In the **Actions** pane, click **Remove System**.
4. Click **Yes**.

Publishing connections

Use the **Publish Connection** option to reuse the parameters required to add storage systems. This option enters the parameters automatically.

You can choose to publish storage system creation information to the following locations:

- **Another User:** Give a specified storage administrator or ESI user access to a specific set of supported EMC storage systems and related EMC RecoverPoint replication systems. Publish systems to a remote storage administrator.
- **The ESI Service:** Publish or register the supported storage systems so that the ESI Service and the ESI SCOM Management Packs can discover and monitor them.

Note

Because the ESI Service does not monitor replication systems, they cannot be published to the ESI Service.

Note

You can also use the `Add-EmcSystem` cmdlet in the ESI Service PowerShell Toolkit to publish supported storage systems.

Publishing storage systems

Publish one or more systems to a specified ESI user or to the ESI service.

Before you begin

If you are publishing a storage system to the ESI Service, ensure that the ESI Service is installed.

Procedure

1. In the left pane of the ESI window on the ESI host controller system, select **EMC Storage Integrator**.
2. In the **Actions** pane, click **Publish Connection**.
3. In the **Publish Connection Information** dialog box, set the following parameters.

Option	Description
Publish To Target	Select Another User or ESI Service .

Option	Description
User	If you selected Another User , type the username for access to the published systems.
Password	If you selected Another User , type a password for the specified user.
Target Host	If you selected ESI Service , type the IP address or name of the host system that is running the extension or service.
Default Port	If you selected ESI Service , clear to specify a different port number.
Port	If you selected ESI Service and cleared the Default Port check box, type a new port number.

- Click **Refresh** for a list of available systems.
- In the **Local – Storage and Replication Systems** pane, select the systems that you want to publish, and then click **Add**.
- Click **Publish** to accept the list of systems to publish in the **Target – Storage and Replication Systems** pane.

Note

This pane also lists systems that were previously published or registered with the ESI Service by using the ESI Service PowerShell Toolkit, the ESI PowerShell Toolkit, or this procedure.

After you finish

If you published storage systems to the ESI service, set up the security policy. See [Viewing and setting up the security policy on page 141](#)

Unpublishing storage systems

Unpublish or remove the connection information for selected systems from the ESI Service.

Before upgrading ESI, you must unpublish all systems from the ESI Service. You can use either:

- The **Publish Connection** action in the ESI GUI
- The `Get-EmcSystem` and `Remove-EmcSystem` cmdlets that are part of the ESI Service PowerShell Toolkit

Note

You cannot unpublish a system from another user after publishing it with the **Publish Connection** action or with the ESI PowerShell Toolkit. However, you can remove the systems by running ESI under the user's session and removing the system with the ESI **Remove System** action or the ESI PowerShell Toolkit.

Procedure

- In the left pane of the ESI window, select **EMC Storage Integrator** or **Storage Systems**.
- In the **Actions** pane, click **Publish Connection**.

- In the **Publish Connection Information** dialog box, set the following for the Service.

Option	Description
IP Address/Name	Type the IP address or name of the host system that is running the service.
Publish To	Select ESI Service as the connection information for the systems.
Default Port	Accept the default port or clear the checkbox to specify a different port number.
Port	If you clear the Default Port checkbox, type the port number for the service.

- Click **Refresh** for a list of published systems.
- In the **Target – Storage and Replication Systems** pane, select the systems that you want to unpublish, and then click **Remove**.
- Click **Publish** to accept the list of systems to unpublish.

Note

This pane also lists systems that were previously published or registered with the ESI Service by using the ESI Service PowerShell Toolkit or this procedure.

- Click **Close** to close the dialog box.

Using the PowerShell scripting tool

Use the PowerShell scripting tool to manage VNX, VNXe, Unity, and XtremIO block and file systems.

The PowerShell scripting tool enables you to create a partial PowerShell script that can be modified to repeat an action using different parameters.

Procedure

- Select the storage system or host, and select an action.
 - For storage systems, select **Create Shared Folder** or **Create Shared Folder Pool**.
 - For hosts, select **Create Shared Folder**, **Create Disk**, **Disconnect Disk**, or **Delete Disk**. For Unity and XtremIO systems, you can also select **Connect Disk**.

Note

Use the create disk operation only for an online disk.

- Continue through the wizard selecting the required parameters until the **Review input parameters** screen appears.
- Do one of the following:
 - Select **Script to clipboard** to copy the partial script for pasting into PowerShell.
 - Select **Script to file** to create a PowerShell file that you can save and modify.
- Click **Cancel** to exit the wizard.
- Paste the script into PowerShell and run the script.

The disk or shared folder is created.

Managing VMAX storage systems

Creating thin pools

With the VMAX Adapter, ESI only supports provisioning disks from thin pools for VMAX systems. Before creating, provisioning, and managing disks in ESI, you must create the thin pools with other EMC tools, such as the EMC Solutions Enabler SYMCLI or Unisphere for VMAX.

Creating and connecting disks

The VMAX Adapter enables you to use ESI to create disks for a VMAX host or cluster. You can change the drive letter and the path after the disk is created. To provision a LUN for a VMAX host or cluster, the VMAX system must be either locally connected to the host or to the cluster member nodes.

[Adding hosts on page 60](#) provides instructions for creating and connecting VMAX host disks with ESI.

Using FAST VP

The ESI VMAX Adapter supports EMC Fully Automated Storage Tiering for Virtual Pool (FAST[®] VP) policies for the VMAX family. FAST VP is a VMAX feature that combines virtual provisioning of thin pools with automated data movement between tiers, which is based on performance measurements and user-defined policies.

Each FAST VP policy can contain different tiers, including FC tiers, SATA tiers, and so on. A storage group represents a set of LUNs, storage volumes, or devices that you can apply to a FAST VP policy.

Use the ESI PowerShell FAST VP cmdlets to do the following tasks:

- Add and remove FAST VP policies to storage groups.
- Manage and remove storage groups.
- Add LUNs to and remove LUNs from storage groups.

ESI has the following limitations for FAST VP and VMAX systems:

- You must create storage pools, FAST VP policies, and tiers with other EMC tools, such as the EMC Solutions Enabler SYMCLI or Unisphere for VMAX.
- If LUNs in a storage group are not bound to at least one pool that is part of the policy tier, you cannot associate a FAST VP policy to the storage group.
- You cannot rebind LUNs to different storage pools for FAST VP.

Managing metas

The VMAX Adapter enables you to use ESI to expand and extend existing LUNs into metas and create new metas or meta volumes for a VMAX host or cluster. Metas are combined storage devices that can be grouped together to create a larger meta.

Metas represent meta volumes, composite LUNs, metadevices, meta LUNs, composite volumes, and metaheads. Meta members represent meta volume members, constituent LUNs, and composite LUN members.

To create and manage metas, use the ESI PowerShell Toolkit meta cmdlets.

ESI has the following limitations for expanding LUNs into metas and for creating and managing metas:

- Expanding a bound stripe meta volume results in the creation of a Business Continuity Volume (BCV), which has the same meta configuration to preserve data. During the expansion, the system creates a mirror relationship between the meta and the BCV, which means the meta and the BCV contain the same data. After the expansion, the storage system detaches the BCV from the meta and by default, ESI does not delete the device. You can manually delete the devices with EMC tools, such as EMC Solutions Enabler SYMCLI or Unisphere for VMAX, to manage disk space.
- The Expand-EmcLun cmdlet expands meta volumes, but does not expand thin meta LUNs.
- You cannot expand meta volumes that involve a clone, remote data facility (RDF), or snap session. However, you can expand existing bound LUNs by forming new metas with the New-EmcCompositeLun cmdlet.
- You cannot compress or shrink meta volumes.

Managing Block storage

Creating LUNs

Procedure

1. In the left pane of the ESI window, select the storage system.

2. In the **Actions** pane, click **Create LUN**.

The Create LUN wizard appears.

3. Select a storage pool, and then click **Next**.

4. On the **New LUN** page, set details for the new LUN or LUNs, and then click **Next**.

Option	Description
LUN Count	Number of LUNs to be created
Sequence Number	First number to append to the name for the first LUN. Note: For example, to create three LUNs with the appended numbers 15, 16, and 17, type 3 in the LUN Count field and type 15 in the Sequence Number field.
Name	Name of the LUN or LUNs
Description	Description of the LUN or LUNs
Size	Size and unit of measurement for each LUN
Service Node	Storage processor that hosts the LUN or LUNs
Provision Type	Select either Thick or Thin
Stop provisioning new LUNs when error occurs	Stop creating new LUNs if an error occurs during the process

5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Results

The new LUN or LUNs appear in the LUNs list for the specific storage system.

Viewing LUNs

View LUNs or the initiators to which each LUN is unmasked.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **LUNs** in the center pane.
3. Select the LUN from the list.
4. Click the plus (+) symbol to expand the LUN and view the initiators to which the LUN is unmasked.

Expanding LUNs

For VMAX3 and VNX block systems, expand both thin and thick pool LUNs with the ESI GUI. ESI supports expanding LUNs connected to a RAID group with the Managing metas cmdlets in the ESI PowerShell Toolkit.

Note

You cannot expand LUNs (volumes) for XtremIO storage systems in ESI.

Procedure

1. In the left pane of the ESI window, select the storage system.
 2. Click **LUNs** in the center pane.
 3. Select the LUN that you want to expand.
 4. In the **Actions** pane, click **Expand LUN**
The **Expand LUN** wizard appears.
 5. On the **New LUN Capacity** page, type an increased capacity for the LUN and select a unit of measurement.
 6. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Results

The expanded storage capacity is listed for the LUN in the **LUNs** tab.

Deleting LUNs

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **LUNs** in the center pane, and then select one or more LUNs to delete from the list.

Note

To select multiple LUNs, press and hold Ctrl and click the LUNs to delete. Each LUN is highlighted as it is selected.

3. In the **Actions** pane, click **Delete LUN**.
The Delete LUN wizard appears.
4. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Viewing LUN groups

Use the ESI GUI to view LUN groups for VNXe3200 systems only.

For each LUN group, you can view total capacity, total current allocation, thin provisioning setting, member LUNs, snapshots, hosts with LUN access, and hosts with snapshot access.

Procedure

1. In the left pane of the ESI window, select a VNXe3200 system.
2. Click **LUN Groups** in the center pane.
3. Select a LUN group from the list.
4. Click the plus (+) symbol to expand and view group details.

Creating volumes

In ESI, volumes are LUNs. The **Create LUN** wizard enables you to create the new volumes as LUNs.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. In the **Actions** pane, click **Create Volume**.
The Create LUN wizard appears.

3. Select a storage pool, and then click **Next**.
4. On the **New LUN** page, set details for the new volume or volumes, and then click **Next**.

Option	Description
LUN Count	Number of LUNs (volumes) to be created
Sequence Number	First number to append to the name for the first LUN (XtremIO volume). Note: For example, to create three LUNs with the appended numbers 15, 16, and 17, type 3 in the LUN Count field and type 15 in the Sequence Number field.
Name	Name of the volume or volumes
Description	Description of the volume or volume group or select Not Applicable if no description is required
Size	Size and unit of measurement for each volume
Service Node (grayed out)	Not applicable for XtremIO volumes

5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The new volume or volumes appear in the **Volumes** tab for the selected XtremIO storage system.

Viewing XtremIO volumes

Use the ESI GUI to view volume storage information for XtremIO systems. The **Volumes** tab includes volume name and ID, user (total) capacity, available capacity, parity type of XtremIO data protection (XDP), provision type, parent storage pool, Network Address Authority (NAA, required bits in the World Wide Name), and host name and IP address.

Procedure

1. In the left pane of the ESI window, select the XtremIO storage system.
2. Click **Volumes** in the center pane.
3. Select a volume from the list.
4. Click the plus (+) symbol to expand the volume and view the initiators to which the volume is unmasked.

Deleting volumes

Procedure

1. In the left pane of the ESI window, select the XtremIO storage system.
2. Click **Volumes** in the center pane, and then select one or more volumes to delete from the list.

Note

To select multiple volumes, press and hold Ctrl and click the volumes to delete. Each volume is highlighted as it is selected.

3. In the **Actions** pane, click **Delete Volume**.
The **Delete LUN** wizard appears.
 4. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Viewing masked LUNs and XtremIO volumes

View masked LUNs and masked XtremIO volumes in the ESI GUI for supported EMC storage systems. Masked LUNs and XtremIO volumes are provisioned and managed as logical storage system components in ESI.

Note

You must use the ESI PowerShell Toolkit to mask and unmask LUNs with ESI. For details, refer to Set-EmcLunAccess in [Powershell cmdlet storage system operations on page 167](#).

How you view masked LUNs depends on the type of storage system.

Note

You can also view masked LUNs with the ESI PowerShell Toolkit. Get-EmcLunMaskingView in [Powershell cmdlet storage system operations on page 167](#) provides details.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. In the center pane, select the appropriate tab for your storage system:

Option	Description
VNX-Block	Use the Storage Groups tab.
VMAX and VNXe3200	Use the LUN Masking Views tab.
XtremIO	Use the Masking Views tab.

The masked LUNs or volumes are displayed.

Creating snapshots

Create snapshots from the ESI GUI for VMAX3, VNXe, Unity, and UnityVSA systems.

Procedure

1. In the left pane of the ESI window, select a storage system.
2. Click **LUNs** in the center pane.
3. Select the LUN for which you want to create a snapshot.
4. Under **Actions**, click **Create Snapshot**.
The **Create Snapshot** wizard appears.
5. In the **New Snapshot** page, type a name for the new snapshot.
6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The snapshot is visible in the **Snapshots** tab.

7. (Optional) For VMAX systems, create a child snapshot from a snapshot that you created from the LUN.
 - a. Click the **Snapshots** tab and select the snapshot.
 - b. Go to step 4 and repeat the procedure.

Creating XtremIO snapshots

Create snapshots of XtremIO volumes, XtremIO consistency groups, and other XtremIO snapshots.

Procedure

1. In the left pane of the ESI window, select the storage system and select **Volumes**, **Snapshots** or **Consistency Groups**.
2. Under **Actions**, click **Create Snapshot**.

Note

You can also use the right-click menu to create snapshots.

The **Create Snapshot** wizard opens.

3. Type a snapshot name and snapshot suffix, and select **Read only** or **Writable** for the snapshot type, and then click **Next**.
4. On the **View Tags** page, from the list of available tags, select tags to add to the snapshot and then click **Next**.
5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

Click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The new snapshot appears in the **Snapshots** list for the specified XtremIO storage system.

Viewing snapshots

View snapshots from the ESI GUI for VMAX3, VNXe, Unity, UnityVSA, and XtremIO systems.

The **Snapshots** tab includes all the Snapshots for the storage system.

Procedure

1. In the left pane of the ESI window, select a storage system.
2. Click **Snapshots** in the center pane.
3. Select a snapshot from the list.
4. Click the plus (+) symbol to expand for more details.

Deleting snapshots

Delete snapshots for VMAX3, VNXe, XtremIO, Unity, and UnityVSA systems.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Snapshots** in the center pane.
3. Select the snapshot to be deleted.

Hold down the Ctrl key to select more than one snapshot.

Note

If the snapshot is a parent snapshot, you must delete the child snapshots before you can delete the parent snapshot.

4. In the **Actions** pane, click **Delete Snapshot**.

The **Delete Snapshot** wizard appears.

5. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Results

The snapshot is deleted and is no longer listed in the **Snapshots** tab.

Refreshing a volume, consistency group, or snapshot set from an XtremIO snapshot

Restores or refreshes a volume, consistency group, or snapshot set from a point-in-time snapshot.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Select **Volumes, Consistency Groups, or Snapshots** in the center pane.
3. In the **Actions** pane, click the refresh operation that you want to perform.

For consistency groups, you can also refresh from a snapshot tag.

The wizard opens and displays all valid snapshots.

4. Select the snapshot to refresh from and click **Next**.
5. Continue through the wizard, clicking **Next** and **Finish**.

If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Restoring a LUN from a VMAX3 snapshot

Procedure

1. In the left pane of the ESI window, select a VMAX3 storage system.
2. Click **Snapshots** in the center pane.
3. Select a snapshot of the LUN that you want to restore.
4. In the **Actions** pane, click **Restore Source from Snapshot**.

The **Restore Source from Snapshot** wizard appears.

5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Viewing snapshot LUNs

Procedure

1. In the ESI window, select the storage system with the snapshot LUN.
2. Click **LUNs** from the center pane to display a list of snapshot LUNs.
3. Click the plus (+) symbol to view LUN details.

Note

- ESI does not support creating snapshot LUNs from the ESI GUI, but you can create them using the ESI PowerShell toolkit. [Getting started with the ESI PowerShell toolkits on page 160](#) provides more details. You can then view and delete snapshot LUNs in the ESI GUI.
 - You cannot view or manage snapshot LUNs for VMAX or VMAX3 systems in the ESI GUI. You can manage VMAX (but not VMAX3) snapshot LUNs using the PowerShell Toolkit.
 - For a block storage system, when you create snapshot LUNs, ESI adds a new snapshot LUNs storage pool to the **Storage Pool** tab. This pool groups and presents all the snapshot LUNs created for that storage system in that special storage pool. This pool is only a group and is not an actual storage pool. [Viewing storage pools on page 49](#) provides details about storage pools.
-

Deleting snapshot LUNs

Procedure

1. In the ESI window, select the storage system with the snapshot LUN.
 2. Click **LUNs** from the center pane and select one or more snapshot LUNs from the list to delete.
-

Note

To select multiple snapshot LUNs, press and hold Ctrl and select each snapshot LUN. Each snapshot LUN is highlighted as it is selected.

3. In the **Actions** pane, click **Delete LUN**.
The **Delete LUN** wizard appears.
 4. Click **Yes** when prompted for confirmation.
 5. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

Click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Managing XtremIO tags

Use tags to assign named identifiers to any XtremIO object type within a cluster. The **Tags** column is displayed in all views, which enables enhanced object filtering and isolation capabilities for improved management and monitoring of XtremIO clusters.

You can create, modify, and delete tags using the **Actions** panel or by right-clicking an object to show the context menu.

Procedure

1. Select the **Tags** tab to show the existing tags.
 - To create a tag, in the **Actions** panel, click **Create Tags**, type a name for the tag and select the **Entity Type**.
 - To modify a tag, select the tag, click **Modify Tags**, and type a new name for the tag.
 - To delete a tag, select the tag, click **Delete Tags**.
2. Click **Next** to continue through the wizard, and then click **Finish**.

Managing XtremIO object types with tags

Add tags to XtremIO object types to enable enhanced filtering using the **Tags** column. You can add tags to volumes, consistency groups, snapshots, snapshot sets, initiator groups, initiators, and schedulers.

Before you begin

Create tags as described in [Managing XtremIO tags on page 46](#).

Procedure

1. Right-click an object type and select **Manage tags**.
2. Do one of the following:
 - To add tags to the selected object type, select the tag or tags to be added.
 - To remove tags from the selected object type, clear the tag or tags to be removed.
3. Click **Next** to continue through the wizard, and then click **Finish**.

Creating consistency groups

Use the ESI GUI to create consistency groups for VPLEX and XtremIO systems.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Consistency Groups** in the center pane.
3. In the **Actions** pane, click **Create Consistency Group**.
The **Create New Consistency Group** wizard appears.
4. Add a name for the consistency group and then click **Next**. If you are creating a consistency group for:
 - An XtremIO system, go to the next step.
 - A VPLEX system, go to step 7.
5. On the **View Tags** page, choose an available tag.
6. In **Add Volumes to Consistency Group** page, choose all available volumes that can be tagged to the consistency group.
7. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

After you finish

For VPLEX systems, add volumes to the consistency group, as described in [Managing volumes in a VPLEX consistency group on page 48](#).

Managing volumes in a VPLEX consistency group

Use the ESI GUI to add VPLEX volumes to or remove VPLEX volumes from an existing consistency group.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Consistency Groups** in the center pane.
3. Select the consistency group to which you want to add a volume or from which you want to delete a volume.
4. In the **Actions** pane, click either:
 - **Add Volume**
 - **Remove Volume**

Depending on your selection, either the **Add Volume to Consistency Group** wizard or **Remove Volume From Consistency Group** appears.

5. Select the volumes that you want to add to or remove from the consistency group.
 6. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Viewing consistency groups

Use the ESI GUI to view consistency groups for Unity and VPLEX systems.

You can view:

- For each Unity consistency group, the total capacity, total current allocation, thin provisioning setting, member LUNs, snapshots, hosts with LUN access, and hosts with snapshot access
- For each VPLEX consistency group, the consistency group name, number of volumes, visibility, and the storage at which cluster.

Procedure

1. In the left pane of the ESI window, select a Unity or a VPLEX system.

2. Click **Consistency Groups** in the center pane.
3. Select a consistency group from the list.
4. Click the plus (+) symbol to expand and view group details.

Viewing registered hosts

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Registered Hosts** in the center pane. The registered hosts are listed.
3. Click the plus (+) symbol to expand the registered host information.

Viewing service nodes for block storage systems

Each LUN is assigned an active service node. Service nodes can have multiple ports that can be either Fibre Channel (FC) or iSCSI.

Note

- For VPLEX systems, only FC ports are supported.
- XtremIO systems do not use service nodes.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Service Nodes** in the center pane.
3. Click the plus (+) symbol to expand the storage processor (SP) A or SP B list.
4. Click **Fibre Channel Target Ports** to view the FC target ports for each SP.
5. Click **iSCSI Target Ports** to view iSCSI target ports for each SP.

Viewing storage pools

You can view the storage pools for a selected storage system, the LUNs (XtremIO volumes) in each storage pool, and the initiators to which each LUN is unmasked.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Storage Pools** in the center pane.
3. Select a storage pool from the list.
4. Click the plus (+) symbol to expand the storage pool and view the LUNs in that storage pool.
5. Click the plus (+) symbol next to a LUN to view the initiators to which that LUN is unmasked.

Note

When you create snapshot LUNs for block storage systems, ESI adds a new storage pool for snapshot LUNs to the **Storage Pools** tab. This pool lists all snapshot LUNs created for that storage system. This pool is only a list and not an actual storage pool.

Note

Because XtremIO does not use storage pools, the entire XtremIO system is listed as a single storage pool in the **Storage Pools** tab.

Viewing VPLEX storage views

Procedure

1. In the left pane of the ESI window, select a VPLEX storage system.
2. Select a cluster.
3. Click **Storage Views** in the center pane.

The list provides information about the LUNs, host initiators, and hosts associated with the cluster.

Creating VPLEX virtual volumes

The **Create Virtual Volume** wizard enables you to create VPLEX virtual volumes.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Virtual Volumes** in the center pane.
3. In the **Actions** pane, click **Create Virtual Volume**.

The **Create Virtual Volume** wizard appears.

4. On the **Virtual Volume Settings** page, choose the settings for the virtual volume, and then click **Next**.

Option	Description
Virtual Volume Name	Name of the virtual volume to be created.
Create Distributed Volume	Creates a distributed volume. If enabled, the wizard displays additional pages to provide target cluster details.
Source cluster	Select the source cluster from the list box.
Create New Storage Volume	(Optional) Creates a new storage volume in the underlying storage array. If not selected, existing storage volumes are listed in a subsequent step.

5. On the **Storage System** page, select the storage array associated with the selected source cluster and then click **Next**.
6. On the **Storage Pool** page, select the storage pool and then click **Next**.
There is only one global storage pool.
7. Perform one of these steps:
 - If you enabled **Create New Storage** on the **Virtual Volume Settings** page, on the **New LUN** page, set the required parameters and then click **Next**.
 - Otherwise, on the **LUN** page, select a storage volume (LUN) from the list of existing storage volumes and then click **Next**.
8. On the **LUN Masking Settings** page, choose the initiator ports from the list of initiator ports of the VPLEX source cluster, and then click **Next**.

All the initiator ports are selected by default.

9. If you enabled **Create Distributed Volume** on the **Virtual Volume Settings** page, repeat step 5 through step 8 to provide the target cluster details.
10. Click **Next** to continue through the wizard, and then click **Finish**.

Note

Click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The new virtual volume appears in the list on the **Virtual Volumes** tab.

Viewing VPLEX clusters and virtual volumes

Procedure

1. In the left pane of the ESI window, select the VPLEX storage system.
2. Select a cluster.
3. Click **Virtual Volumes** in the center pane.

The list shows the details of the virtual volumes for the selected cluster.

Deleting VPLEX virtual volumes

Delete a single or multiple VPLEX virtual volumes from a cluster.

Procedure

1. In the left pane of the ESI window, select the VPLEX storage system and then select a cluster.
2. On the **Virtual Volumes** tab, select one or more volumes to delete from the list.
3. In the **Actions** pane, click **Delete Virtual Volume**.

The **Delete Virtual Volume** wizard appears.

4. Continue through the wizard, clicking **Next** and **Finish**.

If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The virtual volume is deleted from the list on the **Virtual Volumes** tab.

Viewing VPLEX initiators

Procedure

1. In the left pane of the ESI window, select the VPLEX storage system.
2. Select a cluster.
3. Click **Initiators** in the center pane.

Registering and unregistering VPLEX initiators

Procedure

1. In the left pane of the ESI window, select the VPLEX storage system and then select a cluster.
2. Click **Initiators** in the center pane.

The list of initiators indicates whether initiators are registered or unregistered with the VPLEX system.
3. Select an initiator from the list.
4. In the **Actions** pane, click either:
 - **Register** to register an unregistered initiator.
 - **Unregister** to unregister a registered initiator.

Depending on your selection, either the **Register Initiator** wizard or the **Unregister Initiator** wizard appears.
5. Continue through the wizards, clicking **Next** and **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Results

The list on the **Initiators** tab is updated accordingly.

Viewing XtremIO initiator groups

View details about initiator groups for XtremIO storage systems in ESI. The **Initiator Groups** tab includes the initiator group names and host bus adapter (HBA) IDs for each group.

Procedure

1. In the left pane of the ESI window, select an XtremIO storage system.
2. Click **Initiator Groups** in the center pane.
3. Select an initiator group from the list.
4. Click the plus (+) symbol to expand for more details, such as the HBA ID.

Viewing XtremIO storage controllers

You can view details about storage controllers for XtremIO storage systems in ESI. The **Storage Controllers** tab provides details about the FC and iSCSI target ports, such as iSCSI qualified name (IQN) or World Wide Name (WWN), IP address, availability, storage controller ID, and link status.

Procedure

1. In the left pane of the ESI window, select an XtremIO storage system.
2. Click **Storage Controllers** in the center pane.

3. Select a storage controller from the list.
4. Click the plus (+) symbol to expand the controller data and view specifics for FC and iSCSI target ports.

Creating and editing XtremIO schedules

Schedules determine when snapshots or consistency groups are created and how long they are retained.

You can create, view, and edit schedules for XtremIO volumes and consistency groups. Use this procedure to create schedules. To edit existing schedules, right-click the schedule, select **Modify**, and complete the wizard as described below.

Procedure

1. In the left pane of the ESI GUI, select the storage system for which you want to create a schedule.
2. In the center pane, select the **Volumes** tab to display the available volumes or the **Consistency Group** tab to display the available consistency groups.
3. In the **Actions** pane, click **Create Scheduler**.
4. In the wizard, provide the parameters for the new scheduler and click **Next**.

The options are as follows:

Option	Description
Scheduler State	Enable or Disable
Scheduler Type	Explicit (a specific time and date) or Interval (the time between snapshot or consistency group creation). Depending on which type you select, configure the times or intervals.
Keep Last	Number to keep
Keep for	Length of time
Suffix	Type a suffix for the snapshot.
Type	Writable or Read-only

5. Continue through the wizard and click **Finish**.

Results

The new schedule is listed in the **Schedules** tab.

Managing File storage

Creating shared folders

You can create one or more shared folders for file storage systems.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
3. In the **Actions** pane, click **Create Shared Folder**.

The **Create Shared Folder** wizard appears.

4. Select a file storage pool and click **Next**.
5. Continue through the wizard, setting parameters and clicking **Next**.

Note

Click **More Information** for more progress details. If a problem occurs while you are creating a shared folder, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The fields and descriptions are as follows:

Option	Description
Shared Folder Count	Number of shared folders to create
Sequence Number	The first number to append to the name for the first folder. For example, to create three folders with the appended numbers 15, 16, and 17, type 3 in the Shared Folder Count field and type 15 in the Sequence Number field.
Name	Name of the shared folder or folders
Path	Path to the shared folder or folders
Capacity	Size and unit of measurement for each folder
Service Node	Service node for the folder or folders
Provision Type	Select Thick or Thin
Stop provisioning new shared folders when error occurs	Stops creating new folders if an error occurs during the process

6. Click **Finish**.

Results

The new shared folder or folders appear under **Shared Folders**.

Viewing shared folders

Procedure

1. In the left pane of the ESI window, select the storage system.
2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
3. Click **Shared Folders** in the center pane.

The shared folders are listed.

Mounting shared folders

Procedure

1. Select the shared folder to mount and click **Mount shared folder**.
2. Provide the information required in the wizard, clicking **Next** and **Finish**.

3. Log off and log on to see the results of the operation.

Results

The shared folder is mounted on the selected host.

Deleting shared folders

Procedure

1. In the left pane of the ESI window, select the storage system.
2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
3. Click **Shared Folders** in the center pane and select one or more shared folders from the list.
4. In the **Actions** pane, click **Delete Shared Folder**.
The **Delete Shared Folder** wizard appears.
5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Unmounting shared folders

Procedure

1. Select **Network Disks** tab and select the mounted folder.
2. Click **Unmount Shared Folder** and continue through the wizard.
3. Log off and log on to see the results of the operation.

Creating shared folder pools

A shared folder pool is a container for shared folders. Grouping shared folders into a shared folder pool enables you to view and access folders from one place.

Before you begin

Create shared folders.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
3. In the **Actions** pane, click **Create Shared Folder Pool**.
The **Create Shared Folder Pool** wizard appears.
4. Select a file storage pool, and then click **Next**.
5. Continue through the wizard, typing the required parameters and clicking **Next**.

Note

Click **More Information** for more progress details. If a problem occurs while you are creating a shared folder pool, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

6. Click **Finish**.

Results

The new shared folder pool appears under **Shared Folder Pools**.

Viewing shared folder pools

Procedure

1. In the left pane of the ESI window, select the storage system.
2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
3. Click **Shared Folder Pools** in the center pane, and then select the shared folder pool from the list.
4. Click the plus (+) symbol to expand the shared folder pool and view the shared folders.

Extending shared folder pools

After creating a shared folder pool, you can extend or enlarge the size of the pool. The new size must be larger than the current size of the pool.

Procedure

1. In the left pane of the ESI window, select the storage system.
2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
3. In the **Actions** pane, click **Extend Shared Folder Pool**.
4. In the **Extend Shared Folder Pool** wizard, select a file storage pool, and then click **Next**.
5. Under **Shared Folder Pool Setting**, confirm the pool name, type a new larger size, and select the disk size measurement unit (MB, GB, or TB).
6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Deleting shared folder pools

Procedure

1. In the left pane of the ESI window, select the storage system.

2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
 3. Click **Shared Folder Pools** in the center pane, and then select one or more shared folder pools from the list.
 4. In the **Actions** pane, click **Delete Shared Folder Pool**.
The **Delete Shared Folder Pool** wizard appears.
 5. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Viewing file system service nodes

Procedure

1. In the left pane of the ESI window, select the storage system.
2. For storage systems that support both block and file protocols, select **File View** from the **Switch View** list box in the center pane.
3. In the center pane, click **Service Nodes**.
4. Click the plus (+) symbol to expand for more details.

CHAPTER 5

Managing hosts

This chapter contains the following topics:

- [Adding hosts](#)..... 60
- [Viewing registered hosts](#)..... 61
- [Removing hosts](#)..... 61
- [Applying host best practices](#)..... 61
- [Viewing SAN initiators](#)..... 61

Adding hosts

ESI requires that you add all supported systems as hosts before you can view or manage these systems in ESI.

Adding Windows system hosts

Procedure

1. In the left pane of the ESI window, click **Hosts**.
2. In the **Actions** pane, click **Add Windows System** or **Add Host**.
3. In the **Add Host** dialog box, specify the following.

Option	Description
IP address/Name	IP address or name of the host
Username and Password	Username and password for the host

Note

Instead of entering a username and password, you can select **Use current Windows credentials**.

4. Click **Test Connection** to test the connection.
5. Click **Add**.

The host appears in the center pane.

Adding Linux system hosts

Procedure

1. In the left pane of the ESI window, click **Hosts**.
2. In the **Actions** pane, click **Add Linux System**.
3. In the **Add Linux Host** dialog box, specify the following.

Option	Description
IP address/Name	IP address or name of the host
Port	Confirm the default value of 22. Note: If you change this, the connection will fail.
Authentication Type	Select Password to use your Linux password for authentication. Or select Key-based to use your Linux encryption key.
Password: Username and Password	Username and password for the host
Key based: • Username	Username for your Linux encryption key. Browse for or type the path for the key.

Option	Description
<ul style="list-style-type: none"> • Filepath • Passphrase 	Type the pass phrase for the key.

4. Click **Test Connection** to test the connection.
5. Click **Add**.

The host appears in the center pane.

Viewing registered hosts

Procedure

1. In the left pane of the ESI window, select the storage system.
2. Click **Registered Hosts** in the center pane. The registered hosts are listed.
3. Click the plus (+) symbol to expand the registered host information.

Removing hosts

Procedure

1. In the left pane of the ESI window, select **EMC Storage Integrator** or **Hosts**.
2. Select the host from the center pane.
3. In the **Actions** pane, click **Remove System**.
4. Click **Yes** to confirm that you want to remove the host.

Applying host best practices

This procedure applies to hosts for XtremIO arrays.

Procedure

1. In the left pane of the ESI GUI, select the host.
2. In the **Actions** pane, click **Apply Host Best Practice**.
3. In the wizard, select **HBA queue depth=256**, if required.
4. Continue through the wizard clicking **Next** and **Finish**.

Viewing SAN initiators

Procedure

1. In the left pane of the ESI window, select **Hosts**.
2. Select the host from the center pane.
3. Click **SAN Initiators**.

The SAN initiator details are listed.

CHAPTER 6

Managing host disks

This section contains the following topics.

- [Changing a host disk drive letter or path](#)..... 64
- [Connecting disks to a host](#)..... 64
- [Creating host disks](#).....65
- [Viewing host disks](#)..... 67
- [Expanding host disks](#)..... 67
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- [Connecting SCSI disks to a host](#)..... 75
- [Creating virtual disks](#).....76
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Changing a host disk drive letter or path

Procedure

1. In the left pane of the ESI window, select the host.
2. Click **Host Disks** in the center pane.
3. Select a disk from the list.
4. In the **Actions** pane, click **Change Drive Letter and Paths**.
The **Change Drive Letter and Paths** wizard appears.
5. Select the drive letter or mount point.
6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Results

The drive letter or mount path is changed.

Connecting disks to a host

Procedure

1. In the left pane of the ESI window, select the host.
2. Click **Host Disks** in the center pane.
3. Select a disk from the list.
4. In the **Actions** pane, click **Connect Disk**.
The **Connect Disk** wizard appears.
5. On the **Storage System** page, select the storage system, and then click **Next**.
The page that appears next depends on the type of system.
6. On the **Storage Pool** page, select the storage pool, and then click **Next**.
7. Perform one of these steps, depending on the system:
 - On the **LUN** page, select one or more LUNs, and then click **Next**.
 - For VPLEX systems, on the **Select a Virtual Volume** page, select one or more virtual volumes and then click **Next**.
8. On the **LUN Masking Settings** page, select the initiators and then click **Next**.
9. In the **Review Input Parameters** page, do one of the following:
 - For Unity and XtremIO systems:
 - Click **Script To Clipboard** to copy the partial script for pasting into PowerShell.
 - Click **Script To File** to create a PowerShell file that you can save and modify.

- Review the settings.
10. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Creating host disks

If the host is a virtual machine hosted on a hypervisor, review the notes in [Creating disks for virtual machines on page 86](#) before creating virtual disks for virtual machines. The hypervisor must appear in the **Hypervisors** section of the ESI main window and a hypervisor host must be added after the hypervisor is connected and listed in the **Hypervisors** section or the disk creation will fail.

Note

When creating host disks on XtremIO arrays, follow the recommendations in the **Create Disk** wizard to align with XtremIO best practices.

Procedure

1. In the left pane of the ESI window, select the host.
2. In the **Actions** pane, click **Create Disk**.
The **Create Disk** wizard appears.
3. Select the storage system, and then click **Next**.
 - If you selected a VPLEX system, go to the next step.
 - Otherwise, go to [Step 7 on page 65](#).
4. On the **Virtual Volume Settings** page, choose the settings for the virtual volume, and then click **Next**.

Option	Description
Virtual Volume Name	Name of the virtual volume to be created.
Create Distributed Volume	Creates a distributed volume. If enabled, the wizard displays additional pages to provide target cluster details
Source cluster	Select the source cluster from the list box.
Create New Storage Volume	(Optional) Creates a new storage volume in the underlying storage array. If not selected, existing storage volumes are listed in a subsequent step.

5. On the **LUN Masking Settings** page, select the initiators and click **Next**.
6. Select the storage system, and then click **Next**.
7. On the **Storage Pool** page, select a storage pool, and then click **Next**.
8. On the **New LUN** page, set the following details for one or more new LUNs, and then click **Next**.

The fields on the page depend on the selected system.

Option	Description
LUN Count	Number of disks to be created
Sequence Number	First number to append to the name for the first LUN Note: For example, to create three LUNs with the appended numbers 15, 16, and 17, type 3 in the LUN Count field and type 15 in the Sequence Number field.
Name	Name of the disk or disks
Description	Description for the disk or disks
Size	Size and unit of measurement for each disk
Service Node	Storage processor that hosts the disk or disks
Provision Type	Select either Thick or Thin
Stop provisioning new LUNS when error occurs	Stops creating new folders if an error occurs during the process.

9. For VPLEX systems, select the initiators and click **Next**.
10. On the **Disk Preparation Settings** page, set details for the disk or disks, and then click **Next**.

Option	Description
Partition Type	Type of partition to be created, either MBR (Master Boot Record) or GPT (GUID Partition Table)
Volume Size	Disk volume size
File System	For MBR partitions: <ul style="list-style-type: none"> • NTFS (New Technology File System) • For Linux only, Ext2, Ext3, or Ext4 For GPT partitions: NTFS is the only available option
Allocation Unit Size	Size of the allocation unit measured in bytes
Volume Label	Label for the volume
Drive Letter or Mount Path	Drive letter or a mount path for the disk or disks Note: For Linux, Mount Path is the only available option

11. Continue through the wizard, clicking **Next** and then **Finish**.

For XtremIO systems, on the **Review Input Parameters** page, you have the option to select:

- **Script To Clipboard** to copy the partial script for pasting into PowerShell.
- **Script To File** to create a PowerShell file that you can save and modify.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The disk or disks appear in the list of **Host Disks** for the specific host and in the LUNs list under **Storage Systems**.

Viewing host disks

Procedure

1. In the left pane of the ESI window, select **Hosts**. The list of available hosts appears in the center pane.
2. Select a host from the list.
3. Click **Host Disks**. The list of host disks is displayed.
4. Click the plus (+) symbol to expand the host disk information.

Expanding host disks

With ESI, you can expand host disks that meet the following criteria:

- The disk has only one volume. The volume can be expanded if the host is connected.
- The disk has an associated LUN that can either be expanded or is a file-based disk which is supported by VMware.

Note

With VMware systems, ESI does not support expanding RDM disks that are attached with virtual compatibility mode.

Procedure

1. In the left pane of the ESI window, select the host.
 2. In the center pane, click **Host Disk**, and then select a disk from the list.
 3. From the menu bar, select **Action > Expand Disk**.
 4. On the **New Disk Capacity** page, type the new capacity for the disk, select a unit of measurement, and then click **Next**.
 5. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The expanded storage capacity for the disk will display in the **Host Disks** tab.

Deleting host disks

Procedure

1. In the left pane of the ESI window, select the host.
2. In the center pane, click **Host Disks**, and then select the disk or disks to delete.

Note

Hold down the Ctrl key to select multiple disks.

3. In the **Actions** pane, click **Delete Disk**.

The **Delete Host Disk** wizard appears.

4. Click **Next** to continue through the wizard, and then click **Finish**.

For XtremIO systems, on the **Review Input Parameters** page, you have the option to select:

- **Script To Clipboard** to copy the partial script for pasting into PowerShell.
- **Script To File** to create a PowerShell file that you can save and modify.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Disconnecting disks from a host

Procedure

1. In the left pane of the ESI window, select the host.
2. Click **Host Disks** in the center pane, and then select the host disk from the list.
3. In the **Actions** pane, click **Disconnect Disk**.

The **Disconnect Host Disk** wizard appears.

4. Click **Next** to continue through the wizard, and then click **Finish**.

For XtremIO systems, in the **Review Input Parameters** page, you have the option to select:

- **Script To Clipboard** to copy the partial script for pasting into PowerShell.
- **Script To File** to create a PowerShell file that you can save and modify.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Creating pass-through SCSI disks

If the selected hypervisor supports pass-through SCSI disks, then selecting Passthrough SCSI is an option when you are creating a disk for a virtual machine. See [Creating raw device mapping disks on page 71](#) if the hypervisor supports a raw device mapping disk instead.

Procedure

1. In the left pane of the ESI window, select the host.
2. Select the host disk from the center pane.
3. In the **Actions** pane, click **Create Disk**.
The **Create Disk** wizard appears.
4. Select **Passthrough SCSI Disk** as the disk type, and then click **Next**.
5. On the **Storage System** page, select the storage system, and then click **Next**.
6. On the **Storage Pool** page, select the storage pool, and then click **Next**.
7. On the **New LUN** page, set the following details for the disk or disks, and then click **Next**.

Option	Description
LUN Count	Number of disks to be created
Sequence Number	First number to append to the name for the first LUN Note: For example, to create three LUNs with the appended numbers 15, 16, and 17, type 3 in the LUN Count field and type 15 in the Sequence Number field.
Name	Name of the disk or disks
Description	Description for the disk or disks
Size	Size and unit of measurement for each disk
Service Node	Storage processor that hosts the disk or disks
Provision Type	Select either Thick or Thin

8. On the **LUN Masking Settings** page, select the initiators and click **Next**.
9. On the **Hypervisor Settings** page, select the SCSI controller and SCSI controller location settings, and then click **Next**.

Note

For hypervisors, ESI does not support creating SCSI controllers. However, ESI uses existing SCSI controllers to create disks for virtual machines.

- On the **Disk Preparations Settings** page, set the following values for the disk or disks, and then click **Next**.

Option	Description
Partition Type	Type of partition to be created, either MBR (Master Boot Record) or GPT (GUID Partition Table)
File System	Partition Type of MBR or GPT is NTFS as the only available choice
Allocation Unit Size	Size of the allocation unit measured in bytes
Volume Label	Label for the volume
Drive letter or mount path	Drive letter or a mount path for the disk or disks

- Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Results

The disk or disks appear in the list of **Host Disks** for the specific host and in the **LUNs** list under **Storage Systems**.

Connecting pass-through SCSI disks to a host

Procedure

- In the left pane of the ESI window, select the host.
- Select the host disk from the center pane.
- In the **Actions** pane, click **Connect Disk**.
The **Connect Disk** wizard appears.
- On the **Select Disk Type** page, select **Passthrough SCSI Disk**, and then click **Next**.
- On the **Hypervisor Settings** page, select the controller and location settings, and then click **Next**.
- On the **Passthrough SCSI Disk** page, select the candidate disk, and then click **Next**.
- Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Creating raw device mapping disks

If the hypervisor supports raw device mapping (RDM) disks, the RDM is an available option when you are creating disks for a virtual machine. See [Creating pass-through SCSI disks on page 69](#) if the hypervisor uses pass-through SCSI disks instead.

Note

With VMware systems, ESI does not support expanding RDM disks that are attached with virtual compatibility mode.

Procedure

1. In the left pane of the ESI window, select the host.
2. In the **Actions** pane, click **Create Disk**.
The **Create Disk** wizard appears.
3. Select **Raw Device Mapping** as the disk type, and then click **Next**.
4. On the **Storage System** page, select the storage system, and then click **Next**.
5. On the **Storage Pool** page, select the storage pool, and then click **Next**.
6. On the **New LUN** page, set the following details for the new disk or disks, and then click **Next**.

Option	Description
LUN Count	Number of disks to be created
Sequence Number	First number to append to the name for the first LUN Note: For example, to create three LUNs with the appended numbers 15, 16, and 17, type 3 in the LUN Count field and type 15 in the Sequence Number field.
Name	Name of the disk or disks
Description	Description for the disk or disks
Size	Size and unit of measurement for each disk
Service Node	Storage processor that hosts the disk or disks
Provision Type	Select either Thick or Thin
Stop provisioning new LUNs when error occurs	Stops creating new LUNs if an error occurs during the process

7. On the **LUN Masking Settings** page, select the initiators and click **Next**.
 8. On the **Hypervisor Settings** page, set the following field values, and then click **Next**.
-

Note

For hypervisors, ESI does not support creating SCSI controllers. However, ESI uses existing SCSI controllers to create disks for virtual machines.

Option	Description
Controller	SCSI controller
Location	SCSI controller location
RDM Compatibility Mode	The type of compatibility (physical or virtual) Note: If you select Physical in the RDM Compatibility Mode field, the guest operating system can access the hardware directly.
Persistence	Types include: <ul style="list-style-type: none"> • Persistent: Changes are immediately and permanently written to the disks. • Independent Persistent: Independent disks are not affected by snapshots. • Independent Non Persistent: Changes to disks are discarded when you shut down your system or revert to the snapshot. <hr/> <p>Note</p> <p>With Physical mode, Persistent is the only available option.</p>
Disk Provisioning	Options if you create a virtual disk: <ul style="list-style-type: none"> • Thick Provision Eager Zeroed: All disk space is allocated and any previous content is deleted when the disk is created; this option might take longer than the other two options. • Thick Provision Lazy Zeroed: All disk space is allocated but existing content is not deleted when the disk is created. • Thin Provision: Allocates only the disk space that is currently needed.

9. On the **Disk Preparations Settings** page, set the following field values for the disk or disks, and then click **Next**.

Option	Description
Partition Type	Type of partition to be created, either MBR (Master Boot Record) or GPT (GUID Partition Table)
Volume Size	Disk volume size
File System	Partition Type of MBR or GPT is NTFS as the only available choice
Allocation Unit Size	Size of the allocation unit measured in bytes
Volume Label	Label for the volume
Drive letter or mount path	Drive letter or a mount path to the disk

10. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The disk appears in the list of **Host Disks** for the specific host and in the **LUNs** list under **Storage Systems**.

Connecting raw device mapping disks to a host

Procedure

1. In the left pane of the ESI window, select the host.
2. Select the host disk from the center pane.
3. In the **Actions** pane, click **Connect Disk**.

The **Connect Disk** wizard appears.

4. On the **Select Disk Type** page, select the disk type of **Raw Device Mapping**, and then click **Next**.
5. On the **VMware vSphere Settings** page, set the following field values, and then click **Next**:

Note

For hypervisors, ESI does not support creating SCSI controllers. However, ESI uses existing SCSI controllers to create disks for virtual machines.

Option	Description
Controller	SCSI controller
Location	SCSI controller location
RDM Compatibility Mode	Type of compatibility (physical or virtual) Note In physical mode, the guest operating system can access the hardware directly.
Persistence	Types include: <ul style="list-style-type: none"> • Persistent: Changes are immediately and permanently written to the disks. • Independent Persistent: Independent disks are not affected by snapshots. • Independent Non Persistent: Changes to disks are discarded when you shut down your system or revert to the snapshot.

Option	Description
	<p>Note</p> <p>In Physical mode, Persistent is the only available option.</p>
Disk Provisioning	<p>Select one of the following options if you are creating a virtual disk:</p> <ul style="list-style-type: none"> • Thick Provision Eager Zeroed: All disk space is allocated and any previous content is deleted when the disk is created; this option may take longer than the other two options. • Thick Provision Lazy Zeroed: All disk space is allocated but existing content is not deleted when the disk is created. • Thin Provision: Allocates only the disk space that is currently needed.

6. On the **Passthrough SCSI Disk** page, select the candidate disk, and then click **Next**.
7. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Creating SCSI disks

Note

The SCSI disk option is not available for VMAX storage systems when provisioning storage to virtual machines.

Procedure

1. In the left pane of the ESI window, select the host.
2. In the **Actions** pane, click **Create Disk**.
The **Create Disk** wizard appears.
3. Select **SCSI Disk** as the disk type, and then click **Next**.
4. On the **Storage System** page, verify the information, and then click **Next**.
5. On the **Storage Pool** page, select the storage pool, and then click **Next**.
6. On the **New LUN** page, set the following details for the new disk or disks, and then click **Next**.

Option	Description
Name	Name of the disk or disks
Description	Description for the disk or disks

Option	Description
Size	Size and unit of measurement for each disk
Service Node	Storage processor that hosts the disk or disks
Provision Type	Select either Thick or Thin

7. On the **Disk Preparation Settings** page, set the following details for the disk or disks, and then click **Next**.

Option	Description
Partition Type	Type of partition to be created, either MBR (Master Boot Record) or GPT (GUID Partition Table)
Volume Size	Disk volume size in MB
File System	Partition Type of MBR or GPT is NTFS by default
Allocation Unit Size	Size of the allocation unit measured in bytes
Volume Label	Label for the volume
Drive letter or mount path	Drive letter or a mount path for the disk or disks

8. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The disk or disks appear in the list of **Host Disks** for the specific host and in the LUNs list under **Storage Systems**.

Connecting SCSI disks to a host

Procedure

- In the left pane of the ESI window, select the host.
- Select the host disk from the center pane.
- In the **Actions** pane, click **Connect Disk**.
The **Connect Disk** wizard appears.
- On the **Select Disk Type** page, select **SCSI Disk**, and then click **Next**.
- On the **Storage System** page, review the details, and then click **Next**.
- On the **Storage Pool** page, select a storage pool, and then click **Next**.
- On the **LUN** page, select a LUN, and then click **Next**.
- On the **LUN Masking Settings** page, review the settings, and then click **Next**.
- On the **Review Input Parameters** page, review the settings, and then click **Next** to confirm them.

10. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

11. On the **Summary** page, click **Finish**.

Creating virtual disks

You can use ESI to create additional virtual disks for a virtual machine.

Before you begin

You must add the host before creating virtual disks. Before this option is available, the hypervisor that hosts the virtual machine must appear in the **Hypervisors** section on the main ESI windows and the virtual machine must be listed in the **Hosts** section. When you select the virtual machine in the **Hosts** section, the **Hypervisor** and **Hypervisor type** appear at the top of the center pane (gray information area). If these do not appear, the virtual machine might have been discovered before the hypervisor. If so, remove the virtual machine and add it again as a host.

Procedure

1. In the left pane of the ESI window, select the host.
 - The host has to be a virtual machine that correctly identifies the hypervisor.
2. Select the host disk from the center pane.
3. In the **Actions** pane, click **Create Disk**.
 - The **Create Disk** wizard appears.
4. Perform one of the following steps:
 - For Unity systems, select **Virtual Disk** as the disk type and then click **Next**
 - For all other systems, select **Virtual Hard Disk** as the disk type and then click **Next**.
5. On the **Create File-based Disk** page, set the following details and then click **Next**.

Option	Description
File Name	Name of the file, including the file extension of VHD, VHDX, or VMDK.
Size	Size of the file in GB.
File-based Disk Type	Select either Fixed or Dynamic (not available for Unity systems).
Location	Location of the virtual hard disk. For Unity systems, the location of the virtual volumes (VVols) datastore.

Note

The page that appears next depends on the type of host that you select:

- The **Hypervisor Settings** page appears if you selected a hypervisor host.
- The **VMware vSphere Settings** page appears if you selected a VMware vSphere host.

6. On either the **Hypervisor Settings** or **VMware vSphere Settings** page, set the following details, and then click **Next**.

Option	Description
Controller	Hypervisor or VMware controller
Location	SCSI controller location
Persistence (VMware Settings page only)	Types include: <ul style="list-style-type: none"> • Persistent: Changes are immediately and permanently written to the disks • Independent Persistent: Independent disks are not affected by snapshots • Independent Non Persistent: Changes to disks are discarded when you shut down your system or revert to the snapshot
Disk Provisioning (VMware Settings page only)	Select either Thick or Thin

7. Depending on the hypervisor, the **Disk Preparation Settings** page might appear. If the page appears and the disk does not require these values, skip this step. If the disk requires one or more of the values, set the applicable details, and then click **Next**.

Option	Description
Partition Type	Type of partition to be created, either MBR (Master Boot Record) or GPT (GUID Partition Table)
File System	NTFS is the default.
Allocation Unit Size	Size of the allocation unit measured in bytes
Volume Label	Label for the volume
Drive letter or mount path	Drive letter or a mount path to the disk Note: If you enter a drive letter and folder path that does not exist, ESI will create the specified folder path, and then create the disk.

8. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Connecting virtual disks to a host

Procedure

1. In the left pane of the ESI window, select the host.
2. Select the host disk from the center pane.
3. In the **Actions** pane, click **Connect Disk**.
The **Connect Disk** wizard appears.
4. On the **Select Disk Type** page, select **Virtual Disk**, and then click **Next**.
5. On the **Virtual Hard Disk** page, type the File Path, or browse to select it, and then click **Next**.
6. On the **Hypervisor Settings** page, select the controller and location settings, and then click **Next**.
7. On the **Review Input Parameters** page, review the settings, and then click **Next** to confirm them.
8. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

9. On the **Summary** page, click **Finish**.

CHAPTER 7

Managing host clusters

This chapter contains the following topics:

- [Adding host clusters](#) 80
- [Viewing host clusters and nodes](#) 80
- [Removing clusters from a host](#) 81
- [Creating cluster disks](#) 81
- [Connecting cluster disks to a host cluster](#) 82
- [Connecting cluster nodes to a host](#) 83
- [Disconnecting cluster disks from a host cluster](#) 83
- [Deleting cluster disks from a host cluster](#) 83
- [Changing a cluster disk drive letter or path](#) 84

Adding host clusters

Procedure

1. In the left pane of the ESI window, select **EMC Storage Integrator** or a host cluster.
 - If you selected **EMC Storage Integrator**, click **Add Host Cluster** in the **Actions** pane.
 - If you selected **Host Clusters**, click **Add Cluster System** in the **Actions** pane.
2. In the **Add Cluster** dialog box, specify the following for the cluster.

Option	Description
IP address/Name	IP address or name of the cluster
Username/Password	Username and password for the cluster
	<p>Note</p> <p>Alternatively, click Use current Windows credentials.</p>

3. Click **Test Connection** to test the connection before adding it.
4. Click **Add**.

The cluster appears in the **Available Systems** list.

Viewing host clusters and nodes

You can view cluster disks, cluster nodes, and SAN initiators of a host cluster.

Procedure

1. In the left pane of the ESI window, select **Host Clusters**.
2. Select the host cluster.
3. Click **Cluster Disks** from the center pane.

The cluster disks are listed.
4. Click the following tabs in the center pane to view host cluster details:
 - **Cluster Disks**
 - **Cluster Nodes**
 - **SAN Initiators**
5. Click the plus (+) symbols to expand the host cluster information.

Note

Click **Connect to Host** in the **Actions** pane or click the host node to connect to the host. This host must be added to ESI. If not, ESI prompts you to add the host.

Removing clusters from a host

Procedure

1. In the left pane of the ESI window, select **EMC Storage Integrator** or **Host Clusters**.
2. Select one or more clusters from the center pane.

Note

Hold down the Ctrl key to select multiple clusters.

3. In the **Actions** pane, click **Remove System**.
4. Click **Yes** to confirm your selection.

Creating cluster disks

Procedure

1. In the left pane of the ESI window, select the host cluster.
2. In the **Actions** pane, click **Create Cluster Disk**.
The **Create Cluster Disk** wizard appears.
3. In the **Storage System** list box, select a storage system, and then click **Next**.
4. On the **Storage Pool** page, select a storage pool, and then click **Next**.
5. On the **New LUN** page, set the following values for the new disk or disks, and then click **Next**.

Option	Description
LUN Count	Number of disks to be created
Sequence Number	First number to append to the name for the first disk Note: For example, to create three LUNs with the appended numbers 15, 16, and 17, type 3 in the LUN Count field and type 15 in the Sequence Number field.
Name	Name of the disk or disks
Description	Description of the disk or disks
Size	Size and unit of measurement for each disk
Service Node	Storage processor that hosts the disk or disks
Provision Type	Select either Thick or Thin Note: The Thin option is not available if the selected pool does not support thin LUNs.
Application	The type of application, such as Generic Storage . Note: This field appears only if a Unity or VNXe storage system is selected.

6. For VMAX3 systems only, on the **LUN Masking Settings** page, select the initiators.
7. On the **Cluster Parameters** page, select one of the following, and then click **Next**:

- **Cluster Group** and the name of a cluster group
- **Cluster Shared Volumes** for a shared disk

8. On the **Disk Preparation Settings** page, set the following values, and then click **Next**.

Option	Description
Partition Type	Type of partition to be created, either MBR (Master Boot Record) or GPT (GUID Partition Table)
File System	Partition Type of MBR or GPT is NTFS by default.
Allocation Unit Size	Size of the allocation unit in bytes
Volume Label	Label for the volume
Drive letter or mount path	Drive letter or mount path for the disk

9. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The cluster disk or disks appear in the **Cluster Disks** list for the specified cluster.

Connecting cluster disks to a host cluster

Procedure

1. In the left pane of the ESI window, select the host cluster.
2. In the **Actions** pane, click **Connect Cluster Disk**.
The **Connect Cluster Disk** wizard appears.
3. In the **Storage System** list box, select a storage system, and then click **Next**.
4. On the **Storage Pool** page, select a storage pool, and then click **Next**.
5. On the **LUN** page, select a LUN from the storage pool, and then click **Next**.
6. On the **Cluster Parameters** page, select one of the following, and then click **Next**:
 - **Cluster Group** and the name of a cluster group
 - **Cluster Group** and the name of a cluster group
7. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Connecting cluster nodes to a host

Procedure

1. In the left pane of the ESI window, select the host cluster.
2. Click **Cluster Nodes** from the center pane.
3. Select a cluster node from the list.
4. In the **Actions** pane, click **Connect**.

Disconnecting cluster disks from a host cluster

Procedure

1. In the left pane of the ESI window, select the host cluster.
2. Select the cluster disk from the list.
3. In the **Actions** pane, click **Disconnect Cluster Disk**.
The **Disconnect Cluster Disk** wizard appears.
4. On the **Disconnect Cluster Disk** page, click **Next**.
5. Click **Yes** to confirm your selection.
6. On the **Review Input Parameters** page, review the settings, and then click **Next** to confirm them.
7. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

8. On the **Summary** page, click **Finish**.

Deleting cluster disks from a host cluster

Procedure

1. In the left pane of the ESI window, select a host cluster.
2. Select one or more cluster disks to be deleted.

Note

Hold down the Ctrl key to select multiple clusters.

3. In the **Actions** pane, click **Delete Cluster Disk**.
The **Remove Cluster Disk** wizard appears.
4. Verify the cluster disk details, and then click **Next**.

5. Click **Yes** when prompted for confirmation again.
6. On the **Review Input Parameters** page, review the settings, and then click **Next** to confirm them.
7. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

8. On the **Summary** page, click **Finish**.

Changing a cluster disk drive letter or path

Procedure

1. In the left pane of the ESI window, select **Host Clusters**.
2. Click **Cluster Disks** in the center pane.
3. Select the cluster disk to change.
4. In the **Actions** pane, click **Change Drive Letter and Paths**.

The **Change Drive Letter and Paths** wizard appears.

5. Change the following values, and then click **Next**.

Option	Description
Drive Letter	Select from the available drive letters.
Mount Path	Click Browse and locate the path.

6. Click **Next** to continue through the wizard, and then click **Finish**.
-

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

The cluster disk appears in the Cluster Disks list with the new disk drive or path.

7. On the **Summary** page, click **Finish**.

The cluster disk appears in the Cluster Disks list with the new disk drive or path.

CHAPTER 8

Managing hypervisors

This chapter contains the following topics:

- [Managing virtual machines and disks](#)..... 86
- [Adding, viewing, and deleting hypervisors](#).....92

Managing virtual machines and disks

Creating disks for virtual machines

ESI supports Microsoft Hyper-V and VMware vSphere hypervisors. The disk options in ESI vary depending on what the hypervisor supports.

The following table shows the storage options that are supported by ESI for each hypervisor.

Table 4 Disk options

Disk option	Microsoft Hyper-V	VMware vSphere
Pass-through disk	Yes (Pass-through SCSI)	Yes (Raw Device Mapping)
File-based or virtual disk	Yes (VHD or VHDX file)	Yes (VMDK file)
Datastore		Yes
SCSI disk		Yes
Host disk	Yes	
Cluster shared volumes	Yes	

You can create the these disk types for virtual machines:

- SCSI Disks (VMware vSphere) See [Creating SCSI disks on page 74](#)
- Virtual disks (Hyper-V and VMware vSphere) See [Creating virtual disks on page 76](#)
- Pass-through SCSI disks (Hyper-V) See [Creating pass-through SCSI disks on page 69](#)
- Raw device mapping (RDM) disks (VMware vSphere) See [Creating raw device mapping disks on page 71](#)

Note

- For hypervisors, ESI does not support creating new SCSI controllers. However, ESI uses existing SCSI controllers to create disks for a virtual machine.
 - For hypervisors, if the Virtual disk option is not available, confirm that the applicable hypervisor appears as a connected hypervisor in the **Hypervisors** section in the main ESI window. When you select the virtual machine in the **Hosts** section, the **Hypervisor** and **Hypervisor Type** should appear at the top of the center pane (gray information area). If these do not appear, the virtual machine might have been discovered before the hypervisor. If so, remove the virtual machine and add it again as a host.
 - The order of the pages and steps vary slightly in the **Create Disk** wizard, depending on the disk type that you select.
-

Creating hypervisor SCSI LUNs

Create a hypervisor SCSI LUN from a volume.

Procedure

1. In the left pane of the ESI window, select **Hypervisors** and one of the hypervisor servers.
2. Click **SCSI LUNs** in the center pane.
3. In the **Actions** pane, click **Create Disk**.
The **Create Disk** wizard appears.
4. Perform one of these steps:
 - For a VPLEX system, go to the next step.
 - Otherwise, go to [Step 7 on page 87](#).
5. Select a VPLEX storage system and click **Next**.
6. In the **Virtual Volume Settings** page, choose the settings for the virtual volume, and then click **Next**.

Option	Description
Virtual Volume Name	Name of the virtual volume from which the SCSI LUN will be created.
Create Distributed Volume	Creates a distributed virtual volume. If enabled, the wizard displays additional pages to provide target cluster details.
Select cluster	Select the volume from a particular cluster.
Create New Storage Volume	(Optional) Creates a new virtual volume in the underlying storage array. If not selected, existing virtual volumes are listed in a subsequent step.

7. On the **LUN Masking Settings** page, select a hypervisor initiator and click **Next**.
8. On the **Storage System** page, select the underlying array and click **Next**.
9. On the **Storage Pool** page, select the storage pool and then click **Next**.
There is only one global storage pool.
10. Perform one of these steps:
 - If you enabled **Create New Storage Volume** on the **Virtual Volume Settings** page, on the **New LUN** page, set the required parameters and then click **Next**.
 - Otherwise, on the **LUN** page, select a storage volume (LUN) from the list of existing storage volumes and then click **Next**.
11. On the **LUN Masking Settings** page, choose one or more ports from the list of initiator ports of the VPLEX source cluster, and then click **Next**.
All the initiator ports are selected by default.
12. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Connecting SCSI LUNs

Procedure

1. In the left pane of the ESI window, select **Hypervisors** and one of the hypervisor servers.
2. Click **SCSI LUNs** in the center pane and select a disk from the list.
3. In the **Actions** pane, click **Connect Disk**.
The **Connect Disk** wizard appears.
4. On the **Storage System** page, select the storage system and click **Next**.
5. On the **Select a VirtualVolume** page, select on or more virtual volumes to connect to the hypervisor node and click **Next**.
6. On the **LUN Masking Settings** page, choose from the list of initiator ports and then click **Next**.
7. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Disconnecting or removing SCSI LUNs

The **Disconnect SCSI Disk** wizard and **Delete SCSI Disk** enable you to manage SCSI disks.

Procedure

1. In the left pane of the ESI window, select **Hypervisors** and one of the hypervisor servers.
2. Click **SCSI LUNs** in the center pane and select a disk from the list.
3. In the **Actions** pane, perform one of these steps:
 - To disconnect the SCSI disk, click **Disconnect SCSI Disk**.
 - To delete the SCSI disk, click **Delete SCSI Disk**.

Depending on your choice, either the **Disconnect SCSI Disk** wizard or the **Delete SCSI Disk** wizard appears.

4. Continue through the wizard, clicking **Next** and **Finish**.

Managing virtual machines in ESI

Procedure

1. In the left pane of the ESI window, select **Hypervisors** and one of the hypervisor servers.
2. Click **Virtual Machines** in the center pane and select a virtual machine from the list.
3. In the **Actions** pane, click **Connect to Host**.

Note

If the virtual host is already in ESI, click **Connect to Host** to open the pane that displays the host information.

4. Click **Yes** to confirm that you want to manage this virtual machine host in ESI. The **Add Host** dialog box appears.
5. Review the details for the IP address or host name.

Note

[Adding hosts on page 60](#) provides more information about adding a host.

6. Click **Test Connection** to test the connection before adding it.
7. Click **Add**.
The host name appears in the center pane.

Attaching virtual disks

Procedure

1. In the left pane of the ESI window, select **Hypervisors** and one of the hypervisor servers.
2. Click **Virtual Machines** in the center pane and select a virtual machine from the list.
3. In the **Actions** pane, click **Attach Disk**.
The **Attach Disk** wizard appears.
4. Identify the disk to attach by selecting one of the following options:
 - **Virtual hard disk** - see [Attaching a virtual hard disk on page 90](#)
 - **Virtual hard disk and create a virtual disk or LUN** - see [Attaching a virtual hard disk and creating a virtual disk or LUN on page 90](#)
 - **Pass-through SCSI disk** - see [Attaching a pass-through SCSI disk on page 91](#)
 - **Pass-through SCSI disk and create a virtual disk or LUN** - see [Attaching a pass-through SCSI disk and creating a virtual disk or LUN on page 91](#)

Note

If you create a virtual disk or LUN during this process, select **Create Virtual Disk or LUN**. The pages for each disk option are different.

Attaching a virtual hard disk

Procedure

1. On the **Select Disk Type** page, select **Virtual Hard Disk**, and then click **Next**.
2. On the **Virtual Hard Disk** page, type the File Path, or browse to select it, and then click **Next**.

The **Hypervisor Settings** or **VMware Settings** page appears.

3. Select the controller and location settings, and then click **Next**.
4. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Note

[Creating virtual disks on page 76](#) provides more details on virtual hard disk and hypervisor settings.

Attaching a virtual hard disk and creating a virtual disk or LUN

Procedure

1. On the **Select Disk Type** page, select **Virtual Hard Disk**.
2. Select **Create Virtual Hard Disk or LUN**, and then click **Next**.
3. On the **Virtual Hard Disk** page, select a file name, location, size, and type **fixed** or **dynamic**, and then click **Next**.

The **Hypervisor Settings** or **VMware Settings** page appears.

4. Select the controller and location settings, and then click **Next**.
5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Note

[Creating virtual disks on page 76](#) provides more details on virtual hard disk and hypervisor settings.

Attaching a pass-through SCSI disk

Procedure

1. On the **Select Disk Type** page, select **Passthrough SCSI Disk** and then click **Next**.
2. On the **Passthrough SCSI Disk** page, select the candidate disk from the list, and then click **Next**.

The **Hypervisor Settings** or **VMware Settings** page appears.

3. Select the controller and location settings, and then click **Next**.
4. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Note

[Creating pass-through SCSI disks on page 69](#) provides more details.

Attaching a pass-through SCSI disk and creating a virtual disk or LUN

Procedure

1. On the **Select Disk Type** page, select **Passthrough SCSI Disk**.
2. Select **Create Virtual Hard Disk or LUN**, and then click **Next**.
3. On the **Storage System** page, review the details, and then click **Next**.
4. On the **Storage Pool** page, select the storage pool for the disk, and then click **Next**.
5. On the **New LUN** page, specify the LUN count, sequence number, name, description, and other details for the new LUN, and then click **Next**.

The **Hypervisor Settings** or **VMware Settings** page appears.

6. Select the controller and location settings, and then click **Next**.
7. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Note

[Creating pass-through SCSI disks on page 69](#) provides more details.

Removing virtual disks from a hypervisor

Procedure

1. In the left pane of the ESI window, select **Hypervisors** and one of the hypervisor servers.
2. Click **Virtual Machines** in the center pane and select a virtual machine.
3. Click the plus (+) symbol to view the disks in the virtual machine.
4. Select one or more disks to be removed and click **Remove System** in the **Actions** pane.
5. Click **Yes** to confirm that you want to remove the virtual disks.

The **Remove Virtual Disk** wizard appears.

6. Select **Delete the corresponding virtual file or the passthrough SCSI disk** if you also want to delete the file or disk.
7. Confirm the list of disks to be removed.
8. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Adding, viewing, and deleting hypervisors

Adding hypervisor servers

You can add a Microsoft Hyper-V or VMware vSphere hypervisor server.

Procedure

1. In the left pane of the ESI window, select **EMC Storage Integrator** or **Hypervisors**.
2. In the **Actions** pane, click **Add Hypervisor**.
3. In the **Add New Server** dialog box, set the following values.

Option	Description
Server	Host name or IP address of the server that you are adding
Type	Select one of the following hypervisor types: <ul style="list-style-type: none"> • Microsoft Hyper-V • VMware vSphere
Current Credentials or Specify Credentials	Use existing server credentials or New username and password for that server

4. Click **Test Connection** to test the connection before adding it.
5. Click **Add**.

The server name appears in the center pane.

Viewing hypervisor hosts

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. Click **Hosts** in the center pane.
Hosts details, such as host names, IP addresses, cluster and datacenter names, and the username, appear.

Viewing hypervisor datastores

You can view all datastores for a hypervisor or view datastores for a specific cluster.

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. Click **Datastores** in the center pane.
A list of datastores appears. Datastores are identified as VMFS5 and virtual datastores are identified as VVOL types.
3. Select a datastore from the list and then click the plus (+) symbol.
Datastore information, such as LUNs, storage IDs, capacity, and provision types, appears.

Viewing datastores for a specific cluster

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. From the left pane, click the plus (+) symbol for the hypervisor, and then click **Datacenter - ESI**.
3. Click the plus (+) symbol for **Datacenter - ESI** and then click the plus (+) symbol for **Cluster**.
4. Select a cluster from the list, and then click **Datastores**.
The datastore information appears for the cluster.

Creating a hypervisor datastore

Create a datastore from a virtual volume.

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. Click **Datastores** in the center pane.

3. In the **Actions** pane, click **Create Datastore**.

The **Create Datastore** wizard appears.

4. In the **Select Disk Type** page, choose whether to create the datastore from a new or existing virtual volume and click **Next**.

5. Select the storage system and click **Next**.

6. Select a storage pool and click **Next**.

This page does not appear for VPLEX storage systems.

7. Perform one of the following steps:

- If you selected to use an existing LUN:
 - For VPLEX systems, in the **Select a Virtual Volume** page, select a virtual volume and click **Next**.
 - For all other systems, in the **Select a LUN** page, select a LUN and click **Next**.
- If you selected to use a new LUN:
 - For VPLEX systems, in the in the **Virtual Volumes Settings** page, specify the virtual volume name, select the cluster, and enable **Create New Storage Volume**, and then click **Next**.
 - For other systems, in the **New LUN** page, specify the LUN name, description, and size, and then click **Next**.

8. In the **LUN Masking Settings** page, select the hypervisor initiators and click **Next**.

9. Proceed through the wizard to create a new LUN for the virtual volume. until you reach the **Datastore Preparation Settings** page.

10. In the **Datastore Preparation Settings** page, type the name of the datastore.

11. Continue through the wizard, clicking **Next** and **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Viewing hypervisor virtual volumes

View virtual volumes for Unity and UnityVSA on an ESX hypervisor.

Procedure

1. Select an ESX hypervisor in the left pane of the ESI GUI.
2. Select the **Virtual Volumes** tab.

Details for all virtual volumes are displayed.

Viewing hypervisor virtual machines

View the virtual machines for a hypervisor or view virtual machines for a specific cluster.

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.

2. Click **Virtual Machines** in the center pane, and then select a virtual machine from the list.
3. Click the plus (+) symbol.
Disk information for the virtual machine appears.

Viewing virtual machines for a specific cluster

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. In the left pane, click the plus (+) symbol for the hypervisor, and then click **Datacenter - ESI**.
3. Click the plus (+) symbol for **Cluster**.
4. Select a cluster from the list, and then click **Virtual Machines**.
Disk information is displayed for the virtual machines in the selected cluster.

Viewing hypervisor SAN initiators

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. In the left pane, click the plus (+) symbol for the hypervisor, and then click **Datacenter - ESI**.
3. Click the plus (+) symbol for **Datacenter - ESI** and then click the + symbol for **Cluster**.
4. Select a cluster from the list, and then click **SAN Initiators**.
The SAN initiator details appear.

Viewing hypervisor SCSI LUNs

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. In the left pane, click the plus (+) symbol for the hypervisor, and then click **Datacenter - ESI**.
3. Click the plus (+) symbol for **Datacenter - ESI** and then click the plus (+) symbol for **Cluster**.
4. Select a cluster from the list, and then click **SCSI LUNs**.
The SCSI LUN details appear.

Deleting hypervisor servers

Procedure

1. In the left pane of the ESI window, select **Hypervisors**, and then select one of the hypervisor servers.
2. In the **Actions** pane, click **Remove System**.

3. Click **Yes** to confirm your selection.

Note

When you remove a hypervisor server from ESI, you must remove all the hosts that are managed by that hypervisor server. Then, you must add the hosts in ESI again to perform any provisioning operations on those hosts.

CHAPTER 9

Managing SharePoint farms and web applications

This section provides an overview of the SharePoint adapter and instructions for managing SharePoint farms and web applications.

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- [Viewing SharePoint farms](#).....98
- [Creating SharePoint web applications](#)..... 99
- [Removing SharePoint farms](#)..... 101
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Adding SharePoint farms

Procedure

1. In the left pane of the ESI window, select **EMC Storage Integrator** or **Applications > SharePoint**.
2. In the **Actions** pane, click **Add Application**.
3. In the **Applications** dialog box, set the following values:

Option	Description
Farm Friendly Name	Type a name to identify the farm.
Local Farm	<ul style="list-style-type: none"> • If ESI is running on the same server as the farm, select Local Farm. • Clear this check box to connect to a remote farm. <hr/> <p>Note</p> <p>If Local Farm is not selected and the database server name matches the local server as the ESI host, ESI assumes that you are adding a local farm and ignores all of the field values except for the Friendly Name.</p>
Database Server	Type the database server name.
Configuration Database	<ul style="list-style-type: none"> • Type the farm name of the configuration database. • Get these details from the SQL Server or SharePoint administration.
Integrated Security	Select to use Microsoft Windows Authentication.
User Name and Password	Clear the Integrated Security check box to use SQL Server Authentication, and then type a username and password.

4. To confirm that the values are correct, click **Test Connection**.
5. Click **Add**.

The farm is added to the list in the **Applications** window. However, ESI is not yet connected to the farm.

Viewing SharePoint farms

Procedure

1. In the left pane of the ESI window, select **Applications > SharePoint**.
2. Click the farm name to activate the connection.
3. Click **Web Applications** to list the web applications in the farm.
4. Click the plus (+) symbol to expand a web application and view **Site Collections** and **Content Databases**.
5. Click **Storage** to view the content databases that are mapped to the storage systems used by the farms.

6. Click the plus (+) symbol to view database storage details.

Creating SharePoint web applications

Procedure

1. In the left pane of the ESI window, select **Applications > Applications** and then applicable SharePoint farm.
2. In the **Actions** pane, click **New SharePoint Web Application**.
The **ESI SharePoint Provisioning Wizard** appears.
3. For **SharePoint Information**, set the following values.

Option	Description
Selected Farm	The farm selected in step 1 appears in this field. Note: If the farm has more than one SQL Server, they will also be listed in the Database Server list box.
New IIS Web Site	For a local farm, select this check box, and then type a name to create a new web application. This field is not available if this is a remote farm. Note: If you do not want to create a new web application, clear the New IIS Web Site check box.
Database Server	Confirm or change the default corresponding database server.
SQL Server Instance	Confirm or change the default SQL Server instance.

Note

You cannot create SharePoint web applications for remote farms in ESI.

For **Application Pool Security Settings**, set the following values.

Option	Description
User Name	Confirm or change the default SharePoint username that has access to the configuration database.
Password	Password for the user who has access to the configuration database.
Confirm Password	Type the password again to confirm it.

4. Click **Next**.

If SQL Server is running on a virtual machine, the **Select Disk Type** page appears. If the **Database Storage** page appears, skip to step 7.

For the **Virtual Hard Disk** type, skip to step 7. Otherwise, the **Database Storage** page appears.

5. In the **Disk Type** field, select the applicable disk type, and then click **Next**.

Note

Unless a Windows-based hypervisor is an option, the **SCSI Disk** type is the only choice.

For the **Virtual Hard Disk** type, skip to step 7. Otherwise, the **Database Storage** page appears.

6. If the **Database Storage** page appears, set the following field values for new LUNs, and then click **Next**.

Option	Description
Database Name	Database name
Data File Folder: Drive Letter or Mount Path	Drive letter or mount path for the data file folder
Log File Folder: Drive Letter or Mount Path	Drive letter or mount path for the log file folder

7. On the **Create File-based Disk** page, set the following values for new LUNs, and then click **Next**.

Option	Description
File Name	Complete file name (including the VHD or VHDX extension) of the file to be used as a hard drive.
Folder	Folder on the hypervisor machine in which the file should be created.
Size	Size of the file in GB.
File-based Disk Type	Select either Fixed or Dynamic .

8. On the **Disk and Database Size Information** page, set the following values, and then click **Next**.

Option	Description
Data File Initial Size	Initial size of the data file.
Log File Initial Size	Initial size of the log file.
Database Maximum Size	Maximum size of the database.
Database Growth Rate	Database growth rate.
Data Disk Size	Size of the data disk.
Log Disk Size	Size of the log disk. Note: The Log Disk Size field is unavailable when only one disk is being created for both folders. This occurs when the same drive letter or mount path is selected for both the data and log folders on the Database Storage page.

9. On the **Database Security** page, confirm that the **Server Name** and **SQL Instance Name** are correct.

- If SQL Server is configured for Windows Authentication, confirm that the **Integrated Security** check box is selected.
- If **Integrated Security** is selected, set the following values, and then click **Next**.

Option	Description
Database User Name	SQL Server username.
Password	SQL Server password .
Confirm Password	Type the password again to confirm it.

10. Click **Next**.

The **Remote Blob Storage (RBS) Information** page appears.

11. In the **Storage System** list box, select a storage system to host the SharePoint storage, and then click **Next**.

12. On the **Storage Pool Information** page, select the required storage pool and service node, and then click **Next**.

Storage Pools: Select a storage pool or RAID group to host SharePoint storage.

Service Node: For a service node, select the applicable node.

13. On the **Review Parameters** page, review the settings, and then click **Next** to confirm them.

14. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

15. On the **Summary** page, click **Finish**.

Removing SharePoint farms

Procedure

1. In the left pane in ESI, select **Applications > SharePoint**.
2. In the center pane, select the SharePoint farm.
3. In the **Actions** pane, click **Remove Application**.
4. In the **Remove Farm** dialog box, click **Yes**.

Configuring remote SQL Servers

If you are using ESI to connect to a remote SharePoint farm, the SQL Server computer and other servers in the farm are distinct from the machine on which ESI is running.

Use the following procedure to complete these tasks:

- Set up the login mode

- Set up SQL Server
- Set up the firewall
- Confirm the connection

Procedure

1. Set up login mode:

Option	Description
SQL Authentication	If the remote SQL Server computer is configured for SQL Authentication, then confirm the data complies with the defined guidelines. This should be simple, assuming that the machine running ESI is authenticated or trusted in the domain to which the farm belongs.
Windows Authentication	If the remote SQL Server is configured for Windows Authentication, then it is possible that the user who logged in to the ESI machine is in the same domain as the one used by SQL Server.

Note

ESI supports domain-based farm deployments, which require that SQL Server and SharePoint be installed in the same Windows domain as the ESI host controller.

2. Set up SQL Server:

- a. On the SQL Server machine, navigate to **Start > All Programs > SQL Server *version* > Configuration Tools > SQL Server Configuration Manager**.
- b. In the left side of the MMC console, expand **SQL Server Network Configuration**.
- c. Click **Protocols for *Name***.
The name might be MSSQLSERVER or a different name, depending on your installation.
- d. In the main MMC view, double-click **TCP/IP** and confirm that it is enabled.
- e. In TCP/IP properties, click **IP Address**.
- f. Confirm that the IP address is correct. For a virtual environment, you may need to correct the address.
- g. Confirm that the port number is **1433**. If the port number is different, make a note of the port number that SQL Server uses.
- h. Click **Apply**, and then click **OK**.
- i. In the left pane of MMC, confirm that TCP/IP is enabled under SQL Native Client.

3. Set up the firewall.

- a. On the computer that is running SQL Server, which is the same computer on which you applied the SQL settings, enable port 1433 in the firewall.
- b. If the selected port is not 1433, then enable the port that you noted.
- c. Confirm that TCP/IP is enabled for the port.

4. If a machine other than the one configured earlier is running SQL Server, then open SQL Server Management Studio and confirm the connection:

- a. On the small toolbar above the left pane, click **Connect Object Explorer**.
- b. Complete the applicable details by using the correct server name. You can then connect to the remote server and browse the databases.
- c. Confirm the configuration by opening Visual Studio.
- d. In **Server Explorer**, click **Connect to Database**.
- e. Type the remote SQL server name or IP address.
- f. Click **Test Connection**.

CHAPTER 10

Managing Exchange forests

This section provides instructions for managing Exchange forests.

- [Adding and viewing Exchange forests](#).....106
- [Removing Exchange forests](#).....106

Adding and viewing Exchange forests

Before you begin

Add one or more Exchange on-premises forests or organizations in ESI. ESI does not support Exchange online forests.

Because Exchange limits a single DAG to a maximum of 16 servers, this is the maximum supported in ESI.

You can view all Exchange entities in a forest, including DAGs, mailbox servers, databases, and database copies.

ESI discovers and associates database copies to corresponding host disks in ESI. View the status of the database copies and associated disks in the ESI GUI or with the ESI PowerShell Toolkit. You can also use the `Get-EmcMailboxServer` and `Get-EMCHostSystem` cmdlets to associate Exchange mailbox servers with the corresponding host systems.

Procedure

1. In the left pane of the ESI window, select **Applications > Exchange**.
2. In the **Actions** pane, click **Add Exchange**.

The **Add Exchange** forest dialog box appears.

3. Set the following field values for the forest.

Option	Description
Friendly Name	Short name for the forest that is unique across the different forests
FQDN or URL	Fully Qualified Domain Name (FQDN) or URL of an Exchange server name or URL that is in the forest
User login Username	Administrator user name for the forest
User login Password	Administrator password for the forest
Use current Windows Credential	Accept or change it to use the current credentials of the ESI host system

4. Click **Add** to add the forest.

The forest and related servers appears in the Available Systems list in the center pane.

Note

Click **Test Connection** to test if the field settings are correct before adding the forest.

Removing Exchange forests

Procedure

1. In the left pane of the ESI window, select **Applications > Exchange > Applicable Mailbox Server** and the applicable mailbox forest.

2. In the **Actions** pane, click **Remove System**.
3. In the **Remove System** dialog box, click **Yes** to remove the forest and related servers.

CHAPTER 11

Managing Microsoft SQL Server databases and availability groups

This section provides instructions for managing SQL Server databases and availability groups.

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Adding SQL Servers

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server**.
2. In the **Actions** pane, click **Add SQL Servers**.
3. In the **SQL Servers** dialog box, do one of the following:
 - Select **I have a range of Servers** and type the IP addresses to define the range.
 - Select **I will provide a list of IPs** and type a list of one or more IP addresses or names (one IP or name per line). Click **Browse** to locate the server name.
4. Click **Start Scanning** to locate and list the properties for the specified range of servers.
By default, all accessible SQL Server instances are set to be added.
5. Clear the check box for specific servers that you do not want to add.
6. Click **Add**.

The server appears in **All groups**.

Note

If the "Failed to connect to one or more SQL Server" message appears, one or more SQL Server instances rejected the attempt to open a connection with Windows Authentication. Confirm that firewall and remote settings for the SQL Server instances are set up according to Microsoft documentation and that the instances support Windows Authentication. Servers that cannot be accessed are identified as **Unknown** in the **Virtual Machine** column.

Viewing SQL Servers

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server Groups**.
2. The center pane displays the following:
 - **All groups**, which displays data for the selected SQL Server group, including all connected SQL Servers, related instances, databases, and connected storage. Click a group to display the group details in the center pane.
 - **Servers and Storage**, which lists the data for the selected group. For example, for servers, you can view server IDs, instance IDs, database IDs, total visible memory, total storage, and other details.
 - **AlwaysOn**, which lists the servers, server instances, databases in availability groups, and other details about groups that support the SQL Server AlwaysOn feature. For example, you can view the databases, candidate databases (primary groups), and replicas for a specific availability group, and their roles, failover mode, connection states, and other related details.
 - **Script Execution**, which provides the following tasks:
 - For AlwaysOn availability groups, add and remove replicas.

- For databases, create and delete databases and add or remove databases to or from AlwaysOn availability groups.

Note

Click the plus (+) symbol to view more details.

To customize the center pane, such as columns, right-click a column in the center pane and select the action from the menu.

Creating SQL Server databases

You can use ESI to create and configure new SQL Server databases.

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server > Groups**.
2. In **All Groups**, select the SQL Server and instance for the database.
3. Click **Script Execution** and then click **Create Database**.
4. On the **Create Database** page, specify the following.

Option	Description
Use Selected Instance Storage	Select this option to use the instance you selected in All groups for the database.
Data Storage	Do one of the following: <ul style="list-style-type: none"> • Select Create New Storage and click Go to create a new disk and specify the disk details. • If using a selected instance, select the disk folder for the data storage and click Go.
Log Storage	Do one of the following: <ul style="list-style-type: none"> • Select Create New Storage and click Go to create a new disk and specify the disk details. • Select an existing disk and click Go.
Use Selected Server or Instance	Select to use the selected server or instance for storage.
Server	Select the server for the new database or databases.
Instance	Select the instance for the new database or databases.
Database Name	Type a unique database name.
File Name	Type a unique file name for the database or databases.
Folder(s)	Type a folder path for the database or databases.
Bulk Create	Do one of the following: <ul style="list-style-type: none"> • Select Create Multiple Databases to create multiple databases. • Leave the default of 1 to create one database.

5. Confirm or change the following default settings for the new database or databases.

Option	Description
Bulk Create Create a folder for each database	Default is False .
Number of Databases to Create	Defaults to the Bulk Create number value set in step 4.
Database Data File Growth Rate	Default is 1 .
Data Growth Rate Type	Default is MB .
Default Log File Size	Default is 1 .
Log File Growth Rate	Default is 10 .
Log Growth Rate Type	Default is Percentage .
Maximum Data File Size	Default is 1 .
Maximum Log File Size	Default is based on the Log Storage setting in the previous step.
Use Separate Data and Log Disks	Default is False .
Misc Remember My Settings	Default is True .
Server and Instance Create Database on Default Instance	Default is True .
T-SQL Show Script Before Creating Database	Default is True , which displays the T-SQL script after you click Create database .

6. Click **Create database** to create the database.

7. When the **Created Database** message appears, click **OK**.

Creating SQL Server availability groups

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server > Groups**.
2. In **All Groups**, select the SQL Server for the group.
3. Click **Script Execution** and then click **Create Availability Group**.
4. On the **Create Availability Group** page, specify the following.

Option	Description
Availability Group Name	Type a unique name for the availability group.
Primary Server	Select the server to be the primary replica in the DAG. Only instances with AlwaysOn enabled are available.
Primary Instance	Select the instance to be the primary replica instance in the group.

Option	Description
Database	Select one or more databases to add to the availability group. Only databases with full backups are available.
Replica Server	Select the server to be the secondary replica server in the availability group.
Replica Instance	Select the instance to be the secondary replica instance in the availability group. Only instances with AlwaysOn enabled are available.
Shared Network Location	Browse to or type a shared network path in UNC format that is accessible by the primary and secondary servers in the DAG. Local paths are not supported.
Show script	Select to show the T-SQL script, which appears after adding the availability group.

5. Click **Create Availability Group**.
6. If an added availability group message appears, click **OK**.

Adding a SQL Server database to an availability group

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Servers Group**.
2. In **All groups**, select the SQL Server that contains the database.
3. Click **Script Execution** and then click **Add Database to Availability Group**.
4. Confirm or specify the following.

Option	Description
Server	SQL Server in the availability group
Instance	SQL Server instance in the availability group
Availability Group	Availability group for which to add the database
Candidate Database	Candidate database to add to the group.
Show script	Select to show the T-SQL script, which appears after adding the database.

5. Click **Add Database**.
6. If the **Added database to availability group** message appears, click **OK**.

Removing SQL Server databases from availability groups

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server Groups**.
2. In **All groups**, select the group from which to delete the database.
3. Click **Script Execution** and then click **Remove Database from Availability Group**.
4. On the **Remove Database from Availability Group** page, confirm or select the following.

Option	Description
Server	SQL Server in the availability group
Instance	SQL Server instance in the availability group
Availability Group	Availability group from which to remove the database
Availability Database	Database to remove from the group
Show script	Select to show the T-SQL script, which appears after removing the database

5. Click **Remove Database**.
6. When the database removed message appears, click **OK**.

Deleting SQL Server databases

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server Groups**.
2. In **All groups**, select the group from which to delete the database.
3. Click **Script Execution** and then click **Delete Database**.
4. On the **Delete Database** page, confirm the correct server and instance are selected.
5. Select the database name, select **Show script** to show T-SQL script, and then click **Delete**.
6. When the database deleted message appears, click **OK**.

Adding replicas to SQL Server availability groups

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server Groups**.
2. In **All Groups**, select the SQL Server and instance for the replica.
3. Click **Script Execution** and then click **Add Replica**.
4. On the **Add Replica** page, specify the following.

Option	Description
Server	SQL Server in the availability group
Instance	SQL Server instance in the availability group
Availability Group	Availability group for the database replica
Candidate Replica Server	Candidate server for the replica
Candidate Replica Instance	Candidate instance for the replica
Show Script	Select to show the T-SQL script, which appears after adding the replica.

5. Click **Add Replica**.
6. When the added replica message appears, click **OK**.

Removing SQL Server replicas

Procedure

1. In the left pane of the ESI window, select **Applications > SQL Server > Groups** .
2. In **All Groups**, select the SQL Server and instance for the replica.
3. Click **Script Execution** and then click **Remove Replica**.
4. On the **Remove replica** page, confirm or specify the following:

Option	Description
Server	The SQL Server that contains the replica
Instance	SQL Server instance that contains the replica
Availability Group	Availability group from which to remove the replica
Availability Replica	Replica to remove from the group.
Show script	Select to show the T-SQL script, which appears after removing the replica.

5. Click **Remove replica**.
6. When the removed replica message appears, click **OK**.

Using T-SQL script

In the **Script Execution** tab, you can use the **Show Script** field to view, edit, and run script changes with T-SQL.

The T-SQL script appears on the page after the task is completed. You can then edit and execute any script changes for the following tasks:

- Add or remove SQL Server replicas
- Create or delete SQL Server databases
- Create or delete SQL Server availability groups
- Add or remove SQL Server databases to or from availability groups

CHAPTER 12

Managing AppSync applications

This section provides instructions for managing databases and protecting databases using AppSync service plans.

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- [Mounting database copies from AppSync databases](#).....118
- [Unmounting database copies](#).....119
- [Protecting databases with service plans](#).....120
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Viewing AppSync databases

In ESI, you can view AppSync Application Server instances and databases, including SQL Server databases and Exchange databases, registered storage, registered hosts, and registered EMC RecoverPoint systems.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. When the **Protection Switch View** is selected, you can click the following to view AppSync system details:
 - **SQL Server Databases:** View database names, host IP addresses, instance names, database files, database copies, and service plans, as well as mount hosts, copy mount status, copy storage type, and copy backup type
 - **Exchange Databases:** View database names, host IP addresses, instance names, database files, database copies, and service plans, as well as mount hosts, copy mount status, copy storage type, and copy backup type
 - **Storage:** View storage system names, display (friendly) names, usernames, IP addresses, and models
 - **Registered Hosts:** View host system names, display (friendly) names, usernames, and OS versions
 - **RecoverPoint Systems:** View RecoverPoint site IP addresses, site names, and site versions
4. When the **Service Plan Switch View** is selected, click the Service Plan type and the following tabs to display AppSync details for the selected service plan.

Option	Description
SQL Server Databases	Database subscriptions, database copies, settings, and events tabs with related details, such as server names, instance names, database names, service plan settings, and log events
Exchange Databases	Database subscriptions, database copies, settings, and events tabs with related details, such as server names, instance names, database names, service plan settings, and log events

5. Click the plus (+) symbols to expand details.

Mounting database copies from AppSync databases

In ESI, you can mount AppSync database copies on VNX or RecoverPoint target hosts.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. Select **Protection Switch View**, select a database, and expand the database to view the AppSync database copies.
4. Select a database copy and select **Mount** in the **Actions** pane.

5. In the **Mount Database Copy** wizard, specify the following, and then click **Next**.

Option	Description
Mount	Select to mount without recovering the database copy
Mount and Recover (SQL Server only)	Select to mount the database copy to recover the specified instance
Mount on Server	Select the server on which to mount the copy
Mount with access	Select Read-only or Read-write for the mounted copy
Mount Path	Select Default path (displayed on screen) or a new path
Recovery Instance (SQL Server only)	Select the database instance to recover with the selected copy to mount
Recovery Type (SQL Server only)	Select the applicable type: Recovery , NoRecovery , or Standby
Database Name Suffix	Type a suffix name for the recovered database

Note

Some of the field options in the wizard are only available for SQL Server database copies.

6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Unmounting database copies

Unmount AppSync database copies from VNX or RecoverPoint target hosts.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. Select **Protection Switch View**, select a database, and expand the database to view the AppSync database copies.
4. Select a database copy and select **Unmount** in the **Actions** pane.
5. In the **Unmount Database Copy** wizard, confirm the selected database copy to unmount and click **Next**.
6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Protecting databases with service plans

To protect an AppSync database, the **Protect Now** action creates a copy of a selected application database and enables you to choose the type of service plan to protect the database.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. Select **Protection Switch View** and select a database.
4. In the **Actions** pane, select **Protect Now**.
5. In the **Protect Database** wizard, select the AppSync service plan to use, and then click **Next**.
6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Restoring database copies

Restore a selected database by using the specified database copy. You can only restore database copies that are unmounted.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. Select **Protection Switch View**, select a database, and expand the database to view the AppSync database copies.
4. Select a database copy and select **Restore** in the **Actions** pane.
5. In the **Restore Database Copy** wizard, confirm the selected copy to restore and click **Next**.
6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Subscribing databases to AppSync service plans

In ESI, you can subscribe Exchange and SQL Server databases to AppSync Service plans.

AppSync provides the following built-in service plans:

- The Bronze plan creates and manages local copies.
- The Silver plan creates and manages remote copies.
- The Gold plan creates and manages local and remote copies.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. In the **Protection Switch View**, select and expand the AppSync Database.
4. In the **Actions** pane, click **Subscribe Service Plan**.
5. In the **Subscribe AppSync Service Plan** wizard, specify the service plan to which to subscribe and click **Next**.
6. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Unsubscribing databases from AppSync service plans

Unsubscribe Exchange and SQL Server databases from AppSync Service plans.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. In the **Protection Switch View**, select and expand the AppSync Database.
4. Click **AppSync Service Plans** and then select the service plan from which to unsubscribe the database.
5. In the **Actions** pane, click **Unsubscribe Service Plan**.
6. In the **Unsubscribe AppSync Service Plan** wizard, confirm the selected service plan and click **Next**.
7. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Expiring database copies

In ESI, you can expire (remove) a database copy from an AppSync database. You can only expire database copies that are unmounted.

Procedure

1. In the left pane of the ESI window, select the AppSync replication service.
2. In the **Actions** pane, click **Connect**.
3. Select **Protection Switch View**, select a database, and expand the database to view the AppSync database copies.
4. Select a database copy and select **Expire** in the **Actions** pane.
5. In the **Expire Database Copy** wizard, confirm the selected copy to expire, and then click **Next**.
6. On the **Review Input Parameters**, review the parameters, and then click **Next**.
7. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

8. On the **Summary** page, click **Finish**.

CHAPTER 13

Managing RecoverPoint applications

This section provides instructions for managing consistency groups, replica copies, and replica snapshots.

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- [Viewing consistency groups](#)..... 124
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Adding RecoverPoint consistency groups

A consistency group is a group of one or more replica sets that can be backed up together and recovered together as a unit or a set. Consistency groups can include both local and remote replica copies, and usually include as many replication sets as there are volumes in the production storage to replicate.

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups**.
3. From the **Actions** pane, click **Add Consistency Group**.

The **Add Consistency Group** wizard appears.

4. On the **Consistency Group** page, type a name for the new consistency group.
5. On the **Review Input Parameters** page, review the settings, and then click **Next** to confirm them.
6. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

7. On the **Summary** page, click **Finish**.

Click **Consistency Groups** in the center pane to view details for the new consistency group.

Viewing consistency groups

Procedure

1. In the left pane of the ESI window, select a replication service.
2. In the **Actions** pane, click **Connect**.
3. Click **Consistency Groups** in the center pane.
4. Select a consistency group from the list.
5. Click the following to view replica details for the consistency group:
 - Replica Sets
 - Replica Copies
 - Replica Links
6. Click the plus (+) symbols to expand the replica details.

Managing consistency groups

Add volumes or LUNs to an existing consistency group or remove volumes or LUNs from an existing consistency group.

Procedure

1. Select a storage system in the left pane and click **Consistency Group** in the center pane.
2. Right-click a consistency group and select **Add Volume** (or **Add LUN**) or **Remove Volume** (or **Remove LUN**).
3. In the wizard, select or clear the volumes to be added or deleted and click **Next**.
4. Click **Next** to continue through the wizard and then click **Finish**.

Applying bookmarks to consistency groups

A RecoverPoint bookmark is a text label that you can apply to a snapshot to uniquely identify it at any point in time. For multiple consistency groups, you must apply a parallel bookmark.

You can create bookmarks manually or automatically at regular intervals. Bookmarks are useful to mark specific events, such as an application update or for a failover. All bookmarks are listed in the copy journal.

You can only bookmark a snapshot for a consistency group that is enabled and actively transferring.

You can set a consolidation policy for the bookmark, which specifies the time the bookmark must survive either daily, weekly, or monthly consolidations. This setting helps to manage the journal and space required for consolidations.

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups** and either select:
 - A single consistency group
 - Two or more consistency groups
3. In the **Actions** pane, click either:
 - **Apply Bookmark**, if you selected a single consistency group
 - **Apply Parallel Bookmark**, if you selected multiple consistency groups
 The **Apply Bookmark** wizard appears.
4. In the **Apply Bookmark** wizard, specify the following, and then click **Next**.

Option	Description
Bookmark	Unique name for the bookmark
Mark as	Select either: <ul style="list-style-type: none"> • Crash-Consistent for immediate recovery to the time of a crash with no data loss • Application Consistent for recovery consistent with application settings for failovers.

Option	Description
Define a Consolidation Policy for this Snapshot	Select to define the consolidation policy.
Never consolidate this snapshot	Select to prevent ESI from consolidating the snapshot with this bookmark
This snapshot must survive Daily (Weekly or Monthly) consolidations	Select to keep the bookmark snapshot from consolidation until after Daily, Weekly, or Monthly RecoverPoint snapshot consolidations

- Click **Next** to continue through the wizard and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Deleting consistency groups

Procedure

- In the left pane of the ESI window, select a replication service.
- Click **Consistency Groups** in the center pane, and then select a consistency group from the list.
- In the **Actions** pane, select **Delete consistency group**.
The **Delete Consistency Group** wizard appears.
- Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Adding replica copies to a consistency

Add local and remote replica copies to a consistency group. The first copy is the production copy. You can then add a local copy or a remote copy, or both local and remote copies.

Procedure

- In the left pane of the ESI window, select a replication service.
- Click **Consistency Groups**.
- From the **Actions** pane, click **Add Replica Copy**.
The **Add Replica Copy** wizard appears.

4. On the **Replica Copy** page, specify the following and click **Next**.

Option	Description
Name	Name for the replica copy
Replication Site	Replication site that you want to use
Journal Size	Size in GB for the journal LUN
Link Mode	<p>If this is not the production copy, select Asynchronous or Synchronous:</p> <ul style="list-style-type: none"> • Select Asynchronous for write transactions to be acknowledged locally at the source side and then sent to the target side. Asynchronous replicas can be the fastest option without degrading the performance of host applications. This mode is typically used for remote copies. • Select Synchronous for host applications to wait for an acknowledgment from a replica before continuing. Synchronous can be slower than asynchronous, but offers less risk of data loss. This mode is typically used for local copies.

5. On the **Journal Storage System** page, select a storage system from which the journal LUN will be created, and then click **Next**.
6. On the **Journal Storage Pool** page, select a storage pool from which the journal LUN will be provisioned, and then click **Next**.
7. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

8. Click **Consistency Groups** > **Replica Copies** in the center pane to view details for the new replica copy or copies.

Failing over to a replica copy

Use the **Failover to Replica Copy** action to fail over to a specific replica copy in a single consistency group only.

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups** and select a consistency group.
3. In the **Actions** pane, click **Failover to Replica Copy**.
4. On the **Replica Copy** page, select a replica copy, and then click **Next**.
5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Deleting replica copies

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups** in the center pane and select a consistency group from the list.
3. Click **Replica Copies** and select a replica copy.
4. In the **Actions** pane, select **Delete Replica Copy**.

The **Delete Replica Copy** wizard appears.

5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Adding replica sets

Create a replica set, which is a source LUN and the local and remote copies that are managed by a replication cluster, and perform continuous backup for the source LUN.

You can use the **Add Replica Set** wizard to create replica sets that contain production, local, and remote copies. The order of the pages and steps vary in the wizard, based on which type or types of copies that you created.

Note

You must have at least one replica link before you can create a replica set.

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups**.
3. From the **Actions** pane, click **Add Replica Set**. The **Add Replica Set** wizard appears.
4. On the **Replica Set** page, type a name for the replica set and then click **Next**.
5. For the production copy, do the following:
 - a. On the **Production Copy Storage System** page, select a storage system, review the connection information, and then click **Next**.
 - b. On the **Production Copy Storage Pool** page, select a storage pool, and then click **Next**.

- c. On the **Production Copy LUN** page, select a LUN, and then click **Next**.
6. If the consistency group contains a local copy, do the following:
 - a. On the **Local Copy Storage System** page, select a storage system, review the connection information, and then click **Next**.
 - b. On the **Local Copy Storage Pool** page, select a storage pool, and then click **Next**.
 - c. On the **Local Copy LUN** page, select a LUN, and then click **Next**.
7. If the consistency group contains a remote copy, do the following:
 - a. On the **Remote Copy Storage System** page, select a storage system, review the connection information, and then click **Next**.
 - b. On the **Remote Copy Storage Pool** page, select a storage pool, and then click **Next**.
 - c. On the **Remote Copy LUN** page, select a LUN, and then click **Next**.
8. On the **Review Input Parameters** page, review the settings, and then click **Next** to confirm them.
9. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

10. On the **Summary** page, click **Finish**.

Click **Consistency Groups** > **Replica Sets** in the center pane to view details for the new replica set.

Deleting replica sets

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups** in the center pane and select a consistency group from the list.
3. Click **Replica Sets** and select a replica set.
4. In the **Actions** pane, select **Delete Replica Set**.
The Delete Replica Set wizard appears.
5. Click **Next**, and then click **Yes** when prompted for confirmation.
6. On the **Review Input Parameters** page, review the settings, and then click **Next** to confirm them.
7. On the **Progress** page, click **Next**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

8. On the **Summary** page, click **Finish**.

Enabling image access for replica snapshots

You can search for a particular snapshot and apply that snapshot for RecoverProduction or Failover. You can use the Enable Image Access action to enable access to a replica copy image or snapshot so that it is available for a failover. Replication changes are not propagated to the copy while image access is enabled.

Note

When image access for replica snapshots is enabled, ESI automatically uses the RecoverPoint Image Access mode of **Logged Access**. This mode ensures the snapshot resides on the replica LUN and not the journal. This is the only supported mode in ESI and cannot be changed.

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups** and select a consistency group.
3. Click **Replica Copies** and select the target copy with the snapshot.
4. In the **Actions** pane, click **Enable Image Access**.

The **Enable Image Access for Snapshot** wizard appears.

5. On the **Select an Image** page, specify the following and click **Next**.

Option	Description
Copy Name	Select the snapshot to enable access.
Image Access Scenario	Select the applicable scenario: <ul style="list-style-type: none"> • Failover to ReplicaCopy • RecoverProduction from ReplicaCopy
Image to access	Select the applicable image: <ul style="list-style-type: none"> • Latest image • An image from the image list • A specific point in time or bookmark • Previous Image • Current Image • Next Image

6. If you select **A specific point-in-time or bookmark**, specify the following and click **Next**.

Option	Description
Point-in-time	Select the specific date and time, including microseconds.
Bookmark	Select Exact and specify the unique name of the bookmark.
Image type	Select the applicable type: <ul style="list-style-type: none"> • All images • All images with bookmarks • All images with system bookmarks • All images with user bookmarks
Max. range	Select the maximum range number of hours or minutes.

7. On the **Replica Snapshots** page, select a snapshot from the list, and then click **Next**.
8. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Disabling image access for replica snapshots

After you enable a snapshot for image access, you can disable the access for system updates, such as replication changes, which are not propagated to the copy while image access is enabled. After changes are propagated, you can then reenabling image access for replica snapshots. See [Enabling image access for replica snapshots on page 130](#).

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Consistency Groups** and select a consistency group.
3. Click **Replica Copies** and select the target copy with the snapshot.
4. In the **Actions** pane, select **Disable Image Access**.

ESI displays a progress message while disabling image access to the selected target copy.

Recovering production for replicas

Use the **RecoverProduction for Replica Copy** action in ESI to restore a specific copy as a production copy. This restoration action starts from the selected snapshot (point of time) and restores the production source from this copy. The production source data that is newer than the selected point in time is rolled back and rewritten with version in the copy. The copy's journal is preserved and remains valid.

Procedure

1. In the left pane of the ESI window, select a replication service.

2. Click **Consistency Groups** and select a consistency group.
3. In the **Actions** pane, click **RecoverProduction for Replica Copy**.
4. On the **Replica Copy** page, specify the following, and then click **Next**.

Option	Description
Bookmark	Unique name for the bookmark
Mark as	Do one of the following: <ul style="list-style-type: none"> • Select Crash-Consistent for immediate recovery to the time of a crash with no data loss. • Select Application Consistent for recovery consistent with application settings for failovers.
Define a Consolidation Policy for this Snapshot	Select to define the consolidation policy
Never consolidate this snapshot	Select to prevent ESI from consolidating the snapshot with this bookmark
This snapshot must survive Daily (Weekly or Monthly) consolidations	Select to keep the bookmark snapshot from consolidation until after Daily, Weekly, or Monthly RecoverPoint snapshot consolidations

5. Click **Next** to continue through the wizard, and then click **Finish**.

Note

In the **Progress** page of the wizard, click **More Information** for more progress details. If a problem occurs while you are creating a LUN, an error message appears along with options to resume or roll back the process. After the error is resolved, click **Resume** to resume the process. Click **Rollback** to revert to the previously executed step.

Viewing replication clusters

A replication cluster is a group of RecoverPoint replication services grouped together so that they are aware of each other and can back up linked storage systems.

Procedure

1. In the left pane of the ESI window, select a replication service.
2. Click **Replication Clusters** in the center pane.
3. Click **Systems** or **Connected Storage Systems** to view details.
4. Click the plus (+) symbols to expand the replication cluster details.

CHAPTER 14

Managing storage with Microsoft SCOM

This chapter contains the following topics:

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- [ESI Service and Management Packs best practices](#)..... 134
- [ESI Service overview](#)..... 135
- [Installing the ESI Service](#)..... 136
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- [Installing the ESI SCOM Management Packs](#)..... 143
- [Using the ESI Monitoring Management Pack](#)..... 149
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ESI Service and ESI SCOM Management Packs overview

The ESI Service and the ESI SCOM Management Packs work in conjunction with Microsoft System Center Operations Manager for centralized discovery and monitoring of all supported EMC storage systems and storage-system components.

Note

ESI Service must be installed and set up on the ESI host system. The ESI Service has the same requirements as the ESI host controller.

The ESI Service and ESI SCOM Management Packs support the same EMC Unity, VMAX family, VNX, VNXe3200, and XtremIO systems that are supported in ESI. Supported versions are listed in the [EMC Simple Support Matrix](#) and prerequisites are listed in the Release Notes.

The ESI SCOM Management Packs also support EMC VPLEX systems.

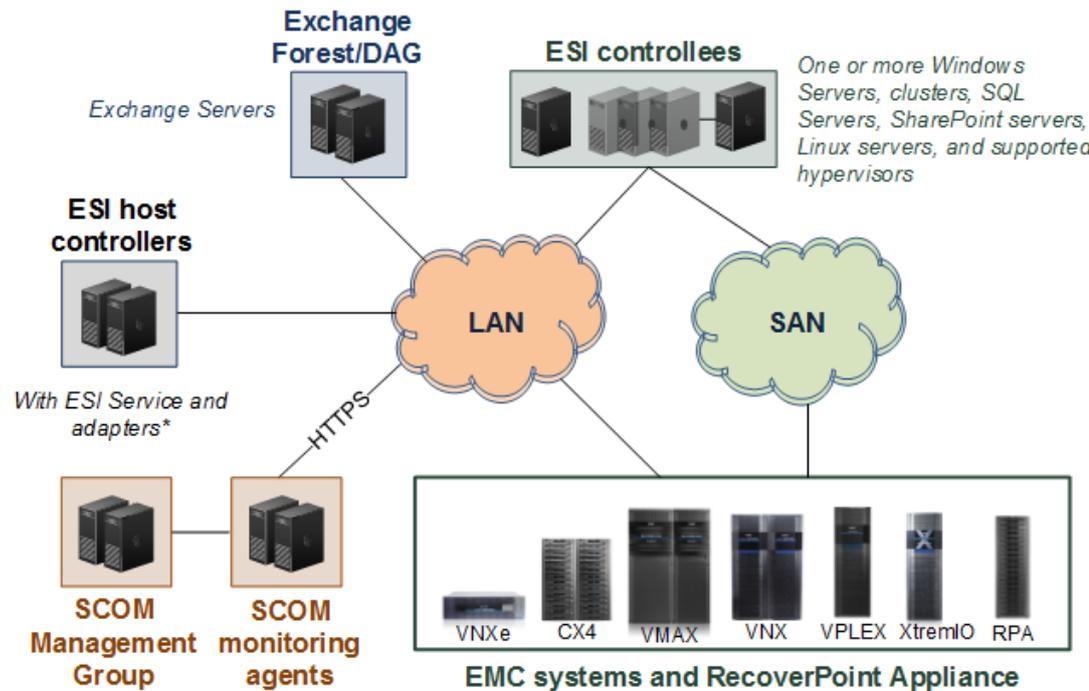
ESI SCOM Management Packs do not currently support VNXe3100, VNXe3150, VNXe3300, or VNXe1600 systems.

ESI Service and Management Packs best practices

Follow these recommended best practices for optimum performance and scalability:

- For performance and scalability, install ESI on a controller host machine that is dedicated to ESI and separate from the SCOM Management Group machines.
- For load balancing, use multiple SCOM agents to monitor a large number of storage systems. Also, set up multiple SCOM agents to communicate with one or more ESI hosts running the ESI Service.
- To achieve the best scalability, assign storage systems with a large number of components to different SCOM agents running on your most resourceful computers.
- The **Number of Entities** column in SCOM displays information about the number of entities that the ESI Service uses. To view this column, replace *ESI Service IP* and *HTTPS port* with the applicable values and open this link in a web browser: `https://ESI Service IP:HTTPS port/esi/console/RegisteredSystems`.
- For information about the number of entities that SCOM monitors, open the SCOM Operations Console, connect to the SCOM Management Group, and then select **Operations Manager > Agent Performance > Module Count**.

The following figure represents how one SCOM Management Group that is running the ESI SCOM Management Packs connects to multiple SCOM agents, which connect through HTTPS to one or more ESI Services.

Figure 1 ESI for Windows Suite setup with SCOM Management Group and monitoring agents

* ESI host controllers: One or more ESI host servers are connected to the same Windows domain as the ESI controllees, EMC systems, EMC RecoverPoint, SCOM monitoring agents, and Exchange DAG

ESI Service overview

The ESI Service is the communications link between ESI and the ESI SCOM Management Packs.

You can use the ESI Service to view and report on all registered systems and system components connected to the ESI host system. ESI Service then pushes this data to SCOM. You can also use the ESI Service as a stand-alone tool without SCOM to collect, view, and report this same system data.

The ESI Service PowerShell Toolkit is also installed as part of the ESI Service. Use this toolkit to set up the ESI Service to communicate with the ESI SCOM Management Packs. [Getting started with the ESI PowerShell toolkits on page 160](#) provides details.

The ESI Service provides the following functionality:

- A common repository for all registered storage systems and related storage system connection information
- Configures and securely stores the settings and access control policies for all of the registered storage systems
- Authorization of storage system access with the Windows Authentication access control settings
- An entity graph, a meta-model, and a query engine for discovering systems and related components
- An HTTP API for remotely accessing the entity graph and remotely viewing policy and configuration information and operations

Installing the ESI Service

During the ESI installation, you can choose to install the ESI Service on the same ESI host system. When you install the ESI Service, the ESI Service PowerShell Toolkit is also installed on the ESI host system.

[Installing ESI on page 17](#) provides instructions for installing ESI.

You can use the ESI Service PowerShell Toolkit to set up or update the ESI Service entity graph, service configuration, and system registration information. [Getting started with the ESI PowerShell toolkits on page 160](#) and [ESI Service PowerShell cmdlet list on page 165](#) provide details.

Setting up ESI Service for SCOM

The ESI installer automatically enables a Windows firewall rule for the ESI Service, sets up the SSL certificate, and sets the service to listen to two IP ports on the ESI host system.

Procedure

1. If using Microsoft Active Directory services, confirm that you created an ESI Service user account within the Active Directory domain as described in [Setting up Directory Services integration for ESI applications on page 28](#).
2. If necessary, change the HTTP connection defaults as described in [Setting up the Run As profile for the EMC SI Monitoring account on page 145](#) and [Setting up the Run As profile for the EMC SI Service Monitoring account on page 145](#).
3. Confirm that the correct HTTP connections are set up as described in [Changing HTTP connection defaults on page 136](#).
4. Register or publish all applicable systems with the ESI Service as described in [Publishing storage systems on page 34](#).
5. View and set up the security policy for the ESI Service as described in [Viewing and setting up the security policy on page 141](#).
6. If necessary, [change the security policy on page 141](#), which by default is set to every 30 minutes. This is how often the ESI Service checks for registered systems and collects data about the registered systems and system components.

Changing HTTP connection defaults

By default, the installer sets up the HTTP port 54500 and HTTPS port 54501 connections. You can change the defaults for the ESI Service by using the following procedures:

- [Setting up new IP ports with a new domain certificate on page 139](#)
- [Setting up default IP ports with a new domain certificate on page 138](#)
- [Setting up new IP ports with a new domain certificate on page 139](#)
- [Confirming the HTTP connections on page 140](#)

Note

All of these procedures require a Windows command prompt and not a PowerShell command prompt.

Setting up new IP ports with the default certificate

Procedure

1. To delete the reserved URLs, on the ESI host machine, open a command prompt and type:

```
netsh http delete urlacl "http://+:54500/esi/"
netsh http delete urlacl "https://+:54501/esi/"
```

2. Choose new IP port numbers. To get a list of used IP ports for your ESI Service, on the ESI Service machine at a Windows command prompt, type:

```
netstat -an
```

The industry standard is to choose an available port that is between port numbers 49152 and 65535.

3. To reserve the new URLs, replace *HttpPort* and *HttpsPort* with the new port numbers by typing:

```
netsh http add urlacl url="http://+:HttpPort/esi/" user="NT
AUTHORITY\NETWORK SERVICE"
netsh http add urlacl url="https://+:HttpsPort/esi/" user="NT
AUTHORITY\NETWORK SERVICE"
```

For example:

```
netsh http add urlacl url="http://+:56560/esi/" user="NT AUTHORITY
\NETWORK SERVICE"
netsh http add urlacl url="https://+:57570/esi/" user="NT AUTHORITY
\NETWORK SERVICE"
```

4. Delete the existing firewall rule for default ports:

```
netsh advfirewall firewall delete rule name="ESI Service"
```

5. To add the new firewall rule for the new ports, type:

```
netsh advfirewall firewall add rule name="ESI Service" dir=in
action="allow" protocol="TCP" localport=HttpPort, HttpsPort
```

Replace *HttpPort* and *HttpsPort* with the new port numbers

For example:

```
netsh advfirewall firewall add rule name="ESI Service" dir=in
action="allow" protocol="TCP" localport=<56560>,<57570>
```

6. To unbind the existing IP ports from the SSL certificate, type:

```
netsh http delete sslcert ipport=0.0.0.0:54501
```

7. To bind the ports with the new certificate:

- For Windows Server 2012, search and open **Manage computer certificates**.
- For Windows Server 2008, at a command prompt, type `mmc.exe`.

8. Select **File > Add/Remove Snap-in**, select **Certificates**, and then click **Add**.

9. In the **Certificates snap-in** dialog box, select **Computer account**, click **Next**, select **Local computer**, and then click **Finish**.

10. In **Certificates (Local Computer) > Personal > Certificates**, double-click the new certificate to open it.
11. Select **Details**, select **Thumbprint**, and then highlight and copy the thumbprint.
12. At a command prompt, type:


```
netsh http add sslcert ipport=0.0.0.0:HttpsPort certhash=Thumbprint
appid="{4024FDC3-B30D-43CA-8707-A50940B4BD14}"
```

 In place of *Thumbprint*, paste your new certificate thumbprint and remove all spaces between the thumbprint numbers and letters. Replace *HttpsPort* with the applicable port number and keep *appid* the same.
 For example:


```
netsh http add sslcert ipport=0.0.0.0:57570
certhash=0794721c36f00902c6b9b6cb687f7a6b2997925d appid="{4024FDC3-
B30D-43CA-8707-A50940B4BD14}"
```
13. To set the registry keys and change the ports, navigate to the **HKEY_LOCAL_MACHINE \SOFTWARE\EMC\WSI\Service** folder and change the value of the **Port** key to the new HTTP port number and the **SSLPort** value to the new HTTPS port number. For example:


```
Port: 12345    SSLPort: 23456
```
14. To restart the ESI Service, perform either step:
 - Go to **Services** and restart the **ESI Service**
 - Type:


```
net stop esiservice
net start esiservice
```

 For details about the port setup, refer to [Confirming the HTTP connections on page 140](#).

Setting up default IP ports with a new domain certificate

Procedure

1. On the ESI host machine, create a new domain certificate.
Refer to your Windows documentation for more information.
2. To stop the ESI Service, open a Windows command prompt and type:


```
net stop esiservice
```
3. To unbind the existing IP ports from the ESI Service SSL certificate, type:


```
netsh http delete sslcert ipport=0.0.0.0:54501
```
4. To bind the ports with the new certificate:
 - For Windows Server 2012, search and open **Manage computer certificates**.
 - For Windows Server 2008, at a command prompt, type `mmc.exe`.
5. Select **File > Add/Remove Snap-in**, select **Certificates**, and then click **Add**.
6. In the **Certificates snap-in** dialog box, select **Computer account**, click **Next**, select **Local computer**, and then click **Finish**.
7. In **Certificates (Local Computer) > Personal > Certificates**, double-click the new certificate.

8. Select **Details**, select **Thumbprint**, and then highlight and copy the thumbprint.

9. At a command prompt, type:

```
netsh http add sslcert ipport=0.0.0.0:54501 certhash=Thumbprint
appid="{4024FDC3-B30D-43CA-8707-A50940B4BD14}"
```

In place of *Thumbprint*, paste your new certificate thumbprint and remove all spaces between the thumbprint numbers and letters and keep **appid** the same.

For example:

```
netsh http add sslcert ipport=0.0.0.0:54501
certhash=0794721c36f00902c6b9b6cb687f7a6b2997925d appid="{4024FDC3-
B30D-43CA-8707-A50940B4BD14}"
```

10. To restart the ESI Service, at the Windows command prompt, type:

```
net start esiservice
```

For details about port setup, refer to [Confirming the HTTP connections on page 140](#).

Setting up new IP ports with a new domain certificate

Procedure

1. To delete the reserved URLs, on the ESI host machine, open a Windows command prompt and type:

```
netsh http delete urlacl "http://+:54500/esi/"
netsh http delete urlacl "https://+:54501/esi/"
```

2. Choose new IP port numbers. Get a list of used IP ports for your ESI Service, on the ESI Service machine at a Windows command prompt, type:

```
netstat -an
```

The industry standard is to choose an available port that is between port numbers 49152 and 65535.

3. To reserve the new URLs, type:

```
netsh http add urlacl url="http://+:HttpPort/esi/" user="NT
AUTHORITY\NETWORK SERVICE"
netsh http add urlacl url="https://+:HttpsPort/esi/" user="NT
AUTHORITY\NETWORK SERVICE"
```

Replace *HttpPort* and *HttpsPort* with the new port numbers.

For example:

```
netsh http add urlacl url="http://+:12345/esi/" user="NT AUTHORITY
\NETWORK SERVICE"
```

4. To delete the existing firewall rule for default ports, type:

```
netsh advfirewall firewall delete rule name="ESI Service"
```

5. To add the new firewall rule for the new ports, type:

```
netsh advfirewall firewall add rule name="ESI Service" dir=in
action="allow" protocol="TCP" localport=HttpPort, HttpsPort
```

Replace *HttpPort* and *HttpsPort* with the new port numbers

For example:

```
netsh advfirewall firewall add rule name="ESI Service"
dir=in action="allow" protocol="TCP" localport=56560,57570
```

6. To unbind the existing default IP ports from the SSL certificate, type:

```
netsh http delete sslcert iport=0.0.0.0:54501
```

7. Create a new domain certificate. Refer to Windows documentation for more information.

8. To bind the ports with the new certificate:

- For Windows Server 2012, search and open **Manage computer certificates**.
- For Windows Server 2008, at a command prompt, type `mmc.exe`.

9. Select **File > Add/Remove Snap-in**, select **Certificates**, and then click **Add**.

10. In the **Certificates snap-in** dialog box, select **Computer account**, click **Next**, select **Local computer**, and then click **Finish**.

11. In **Certificates (Local Computer) > Personal > Certificates**, double-click the new certificate.

12. Select **Details**, select **Thumbprint**, and then highlight and copy the thumbprint.

13. At a command prompt, type:

```
netsh http add sslcert iport=0.0.0.0:HttpsPort
certhash=Thumbprintappid="{4024FDC3-B30D-43CA-8707-A50940B4BD14}"
```

In place of *Thumbprint*, paste your new certificate thumbprint and remove all spaces between the thumbprint numbers and letters. Also, replace *HttpsPort* with the applicable port number and keep *appid* the same

For example:

```
netsh http add sslcert iport=0.0.0.0:57570
certhash=0794721c36f00902c6b9b6cb687f7a6b2997925d appid="{4024FDC3-
B30D-43CA-8707-A50940B4BD14}"
```

14. To set the registry keys and change the ports, navigate to the **HKEY_LOCAL_MACHINE \SOFTWARE\EMC\WSI\Service** folder and change the value of the **Port** key to the new HTTP port number and the **SSLPort** value to the new HTTPS port number. For example:

```
Port: 56560    SSLPort: 57570
```

15. To restart the ESI Service, perform one of the following steps:

- Go to **Services** and restart the **ESI Service**.
- Type:

```
net stop esiservice
net start esiservice
```

For details about the port setup, refer to [Confirming the HTTP connections on page 140](#).

Confirming the HTTP connections

Procedure

1. Open a web browser that supports Windows Authentication and browse to the ESI Service console with the applicable IP port numbers:

- For an HTTP connection with the default IP port numbers, go to `http://ESI Service IP:54500/esi/console`, replacing *ESI Service IP*.
 - For an HTTP connection with new port numbers, replace *ESI Service IP* and *new HTTP port*, and go to `http://ESI Service IP:new HTTP port/esi/console`, replacing *ESI Service IP*.
 - For a secured HTTPS connection with the default IP port numbers, go to `https://ESI Service IP:54501/esi/console`, replacing *ESI Service IP*.
 - For a secured HTTPS connection with new port numbers, go to `https://ESI Service IP:new HTTPS port/esi/console`, replacing *ESI Service IP* and *new HTTPS port*.
2. In the Services applet on the ESI host system, confirm that the ESI Service is installed and started as a network service.
 3. On the ESI host system, confirm that the **ESIService-SSL or your new domain certificate** is listed in the `\Personal\Certificates` folder on the local computer. Refer to at [How to: View Certificates with the MMC Snap-in](#) for information about how to view certificates.
 4. On the host, open the **Start** menu and search for **firewall** to locate the Windows firewall.
 5. In the search results, select **Windows Firewall with Advanced Security**.
 6. Select **Inbound rules**, and confirm that **ESI Service** is listed and enabled as the new ESI Service firewall rule for the default 54500 and 54501 ports or your new port numbers.
 7. After confirming HTTP connections, publish systems to the ESI Service. See [Publishing storage systems on page 34](#).

Viewing and setting up the security policy

The ESI Service authorizes every API call based on the Windows identity of the caller. Authorization is granted based on the caller's role membership.

The following Service roles are defined by the ESI Service. If these roles are changed, the ESI Service will not work.

- Administrator role group members can invoke configuration commands on the ESI Service and query the Entity Graph for discovered systems and system components.
- Monitor role group members can only query the Entity Graph to view discovered systems and system components and set the system refresh interval policy.
- The ESI Service Administrator can add principal names (security groups or users) to one of these ESI Service roles. Adding a security principal to a Service role enables the administrator to delegate access control to one or more users who can add or modify members of the group. After you add the group to the Monitor role, any user who belongs to this group can make an ESI Service call.

Note

As an exception to the role assignments, the ESI Service automatically grants the Administrator role to the local administrator group on the host that is running the ESI Service. This allows any local administrator to manage the ESI Service without being explicitly added; however, the user must be running elevated credentials if UAC is enabled.

View the security policy

You can view the security policy in on of the following ways:

- Open a web browser that supports Windows Authentication and browse to the ESI Service console. If you have changed the default port numbers, replace the following default numbers with your assigned ports:
 - For an HTTP connection, go to `http://localhost:54500/esi/console`.
 - For a secured HTTPS connection, go to `https://localhost:54501/esi/console`.
- At a PowerShell command prompt, type the following and press Enter:


```
Get-EmcServicePolicy
```

Set the security policy for a user

At a PowerShell command prompt, type the following where you replace `<domain name>`/`<principal name>` with the applicable domain name and principal name that you want to add to the Monitor role, and then press Enter:

```
Add-EmcUser "domain name\principal name" Monitor
```

Note

The cmdlet fails if the principal name is invalid. Also, if you want to add the principal name to the Administrator role, replace Monitor in the command above with Administrator.

Next step

After setting up the security policy, you can change the refresh interval. See [Changing the system refresh interval on page 142](#).

Changing the system refresh interval

The System Refresh Interval setting enables you to set how often the ESI Service polls all registered storage systems and populates the entity graph with all discovered storage systems and system components. The ESI Management Packs use this information to confirm and update to the most current data about discovered components.

By default, this interval is set to poll the storage systems every 30 minutes for new information. This setting, combined with the ESI Monitoring management pack interval number, sets the frequency for receiving monitor updates in SCOM. For example, if this interval is set to 30 minutes and the ESI Monitoring interval override is set to 10 minutes, an updated health state can take up to 40 minutes. The time intervals can affect the data performance. [Changing discovery interval overrides on page 156](#) provides details about the Monitor interval override.

To change the system refresh interval for the ESI Service:

Procedure

1. Open a PowerShell command prompt, type this command, and then press Enter to import the ESI Service PowerShell module:

```
Import-Module ESIServicePSToolkit
```

2. Type this command and press Enter to get the current setting in minutes:

```
Get-EmcServicePolicy
```

3. Type this command, replacing 30 with the preferred number of minutes, and then press Enter:

Set-EmcServicePolicy -RefreshIntervalInMinutes 30

ESI SCOM Management Packs overview

The ESI SCOM Management Packs enable you to manage EMC storage systems with SCOM by providing consolidated and simplified dashboard views of storage entities.

These views enable you to:

- Discover and monitor the health status and events of your EMC storage systems and system components in SCOM
- Receive alerts for any possible problems with disk drives, power supplies, storage pools, and other types of physical and logical components in SCOM

The ESI SCOM Management packs include the following files:

- **EMC.SI.Library.mp**: Defines properties for supported storage systems and system components and their relationships.
- **EMC.SI.Discovery.mp**: Contains all of the discoveries for all of the ESI storage systems and system components. At a set interval, the ESI Service creates and updates the collection of classes and relationships that are defined in the library. It discovers all registered storage systems and all of their physical and logical components. Collected data is stored in the System Center Operations Manager database.
- **EMC.SI.Monitoring.mp**: Contains the monitors, rules, and diagnostics for the storage systems and the physical and logical system components. These include disk drives, power supplies, and logical components, such as storage pools and storage volumes. It also monitors the available capacity of some components. Alerts generate when abnormal conditions are detected or the available capacity limit has been reached for a component. Data is stored in the System Center Operations Manager database and data warehouse.
- **EMC.SI.Presentation.mp**: Presents all registered storage systems, systems components, and view definitions that appear in the SCOM console.
- **EMC.SI.Reporting.mp**: Reports on the health and capacity of the storage systems and system components. For example, you can view a report for available storage capacity, storage pool capacity, and snapshot pool capacity in a storage environment. You can also view a report on the most common alerts that were generated during the previous week.
- **EMC.SI.Customization.xml**: Contains all of the overrides and customizations for your specific storage environment. Import this management pack only during an initial installation. If you import it again, you will lose all of your overrides and customizations. The version number of this management pack is 1.0.0.0, which is different from the other management packs. You can increment the version number when you make changes.

Installing the ESI SCOM Management Packs

The ESI Zip file, which is available on EMC Online Support, contains the ESI SCOM Management Packs installer. The management packs must be installed on the SCOM Management Group that is connected to the ESI SCOM monitoring agents. The ESI SCOM agents are connected to the same Windows domain as the ESI host system that has the ESI Service installed.

Installing and importing the ESI SCOM management packs

Procedure

1. On the SCOM Management Group server that is connected to the ESI SCOM agents, download the ESI Zip file.
2. In the ESI Zip file, locate and double-click the `ESI SCOM ManagementPacks.*.Setup` file.

The management pack files are installed by default to the `C:\Program Files (x86)\EMC\ESI SCOM Management Packs` folder.
3. On the **Administration** tab of the SCOM console, right-click and click **Export**.
4. Export the `EMC Storage Integrator Customization` and `EMC Storage Integrator Exchange High Availability Extension Monitoring Customization XML` files.
5. If you are upgrading from ESI version 2.1, select all the EMC Storage Integrator management packs, right-click, and then click **Delete**.
6. Import the latest version of each ESI management pack file in SCOM

Note

[How to Import a Management Pack in Operations Manager 2007](#) and [How to Import an Operations Manager Management Pack](#) on Microsoft TechNet for more details about importing the management packs.

7. Right-click and click **Import**.
8. Import the `EMC Storage Integrator Customization` and `EMC Storage Integrator Exchange High Availability Extension Monitoring Customization XML` files that you exported in step 4 in SCOM.

Setting up ESI SCOM Management Packs

Before you begin

Ensure that you have completed the steps in [Installing the ESI SCOM Management packs on page 143](#).

Procedure

1. See [Confirming the connection between SCOM agents and ESI Service on page 145](#) to confirm the connection.
2. See [Setting up the Run As profile for the EMC SI Monitoring account on page 145](#) to access the ESI Service.
3. If necessary, set up optional overrides:
 - If you have more than one SCOM agent connecting to one or more ESI Services, see [Setting up the system filter file on page 146](#) to set up the system filter file.
 - To skip the client certificate error message for your specific setup, see [Setting up the ignore client certificate error override on page 148](#) to set the client certificate error override.
 - If the ESI Service must connect to the ESI Service with a web proxy server, see [Setting up the HTTP proxy on page 147](#) to set up the HTTP proxy.

4. Complete the steps in [Setting up the required ESI Service Host override and discovery on page 148](#) to set up the host and enable discovery of the ESI Service.
5. For additional monitoring of the ESI Service, see [Setting up the ESI Service Monitoring Account on page 145](#) to set up the monitoring account.
6. See [Using the ESI Monitoring Management Pack on page 149](#) to set up the management packs.

After you complete these setup steps, refer to [Setting up optional management pack overrides on page 155](#) for information about optional overrides.

Confirming the connection between SCOM agents and ESI Service

Before setting up the agents, confirm the connection between the SCOM agents and ESI Service:

Procedure

1. On the SCOM Agent computer, open this link: `https://<ESI Service IP>:<HttpsPort>/esi/console/graph/Entities?class=StorageSystem`. Replace *ESI Service IP* and *HttpsPort* with the applicable values.
2. Confirm that the load time displayed at the bottom of the page is less than one second. Repeat this step a few times for consistent results.

Setting up the Run As profile for the EMC SI Monitoring account

For the EMC SI Monitoring Account Run As profile, create and set up the Run As profile for each SCOM agent that needs to connect to ESI Service. Refer to [Microsoft TechNet](#) for detailed instructions.

To set up an EMC SI Monitoring Account Run As profile for a SCOM agent to connect to each ESI Service:

Procedure

1. Create a Windows Run As account from the Windows account that is used in the Monitoring Role for the ESI Service.
2. In the EMC SI Monitoring account, assign the Windows Run As account to the related SCOM agent that will connect to the ESI Service.

Setting up the Run As profile for the EMC SI Service Monitoring account

You can set up an EMC SI Service (ESI Service) Monitoring account Run As profile to monitor the ESI Windows Service. If you install a SCOM agent on the ESI controller host, this agent can discover and monitor the health state of the ESI Service.

The SCOM agent periodically checks if the ESI Service is running and checks the application event log for any events written by the ESI Service. This agent also raises alerts if the ESI Service is not running, if any events that indicate problems with the ESI Service occur, or if any expected events are not received.

Some errors are only detected and reported with a SCOM agent installed on the ESI host controller.

If your SCOM environment uses a Default Action account that is a local administrator, then the action account has the necessary settings.

However, if your SCOM environment uses a low privilege account as the Default Action account, you might need to use a special account to monitor the ESI Service. If you do, then you must work with a SCOM administrator to create the Run As account. You might also need to create a Windows account to monitor the service.

The SCOM account that monitors the ESI Service must have the **Allow log on locally** enabled, which enables the account to read the Application Event log and use WMI (Windows Management Instrumentation) to query the status of the service.

Refer to SCOM documentation on Microsoft TechNet for details on agent installation considerations and instructions.

Setting up the SCOM agent registry

Before enabling the discovery of ESI Service, you must change Value to decimal 5120 in the following registry key for each SCOM agent that will monitor EMC systems.

Procedure

1. Open Windows Registry Editor.
2. Locate the following subkey:

```
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services
\HealthService\Parameters\Persistence Version Store Maximum
Type: REG_DWORD
Name: Persistence Version Store Maximum
Value: Number of 16-kilobyte pages
```

3. Change the value to decimal 5120.

Setting up optional ESI Service discovery overrides

Based on your specific environment, you can set up the following optional discovery overrides for the ESI Service:

- [Setting up a system filter file on page 146](#)
- [Setting up the HTTP proxy on page 147](#)
- [Changing the HTTPS to HTTP override on page 147](#)
- [Setting the Ignore client certificate error override on page 148](#)
- [Setting basic authentication overrides on page 148](#)

After setting up these optional overrides, then set up the required ESI Service Host override.

Setting up a system filter file

If you are using more than one SCOM agent to connect to one or more ESI Services, set up a system filter file for each SCOM agent. The filter file tells the SCOM agent which system to monitor. This text file must be set up on each SCOM agent with the ESI Service Registered Systems Friendly Name for all the supported systems. Confirm that each system appears in a single list.

To set up the system filter file on a SCOM agent for an ESI Service:

1. On the SCOM agent, open Notepad.
2. Type the **ESI Service Registered Systems Friendly Name** of each supported system being monitored by this agent. Use one name per line in the text file.
3. Save the file to a location on the SCOM agent machine. Confirm that the Windows domain account set up in the **Run As Account** has at least read access to this file.
4. Enter the full path to this file in the **Filter File Path** override field for the ESI Service Discovery management pack.

Setting up the HTTP proxy

If the SCOM agent must connect to the ESI Service through a web proxy server, provide the following information for the Proxy Server and Bypass List overrides in the EMC SI Service Discovery for each related SCOM agent:

- **Proxy server:** proxy server string. For example:
`proxy_server:80`
- **Bypass List:** domain bypass list string. For example, the following represents that the discovery can bypass the proxy server when the host name ends with .emc.com:
`. *.emc.com`
- If the overrides above are not set, then the proxy settings are obtained from the registry. This assumes the proxy configuration tool, `Proxycfg.exe` has been run. If `Proxycfg.exe` has not been run, then the ESI Service can be accessed directly.

Changing the HTTPS to HTTP override

The SCOM agent always tries to connect to the ESI Service by using an HTTPS connection. By default, if the HTTPS connection fails, the SCOM agent cannot communicate with the ESI Service.

If you want the ESI Service to connect with an HTTP connection instead of an HTTPS connection, set the **HTTPS to HTTP Override** to **True** for the ESI Service connection.

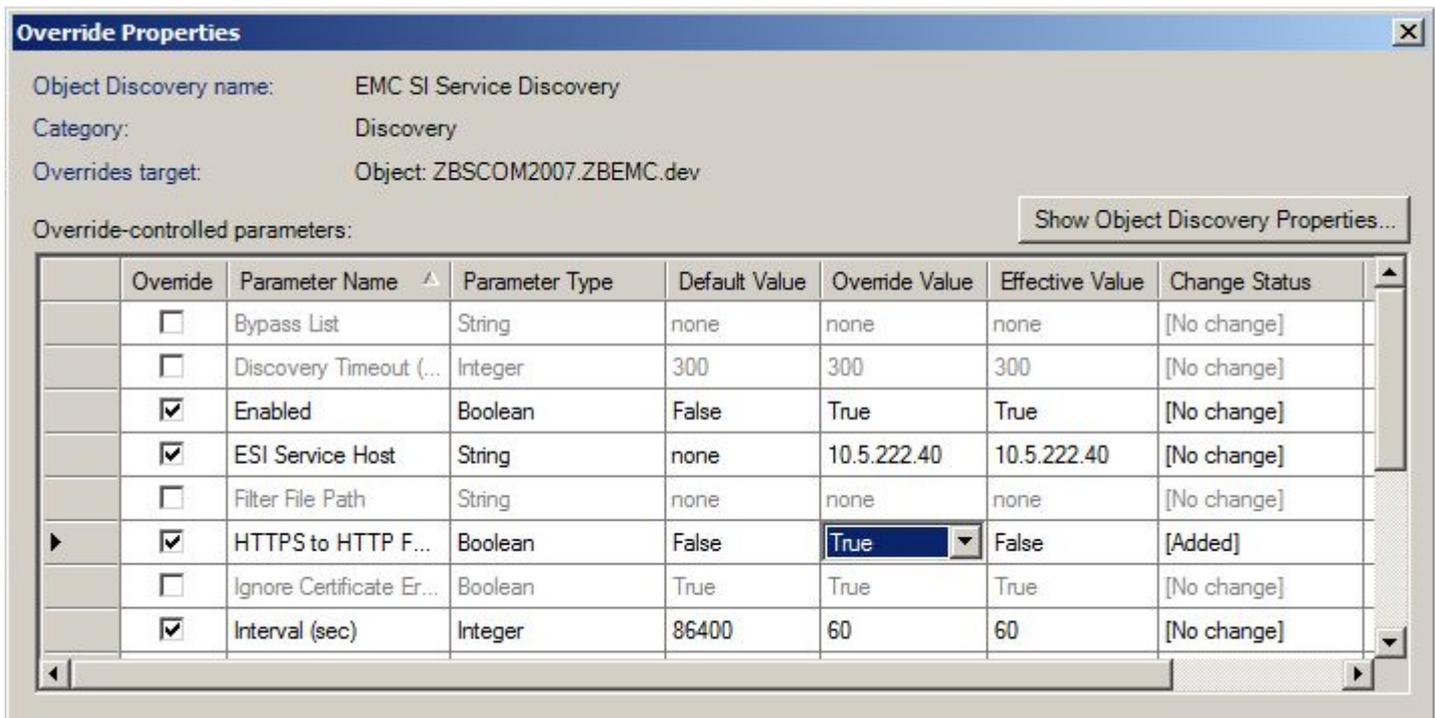
Note

If you set up the override, secure the SCOM agents. With this override, SCOM sends the username and password as text, which can be hijacked. This option is a data security risk.

To change the HTTPS to HTTP override:

1. Open the SCOM Operations Console and connect to the SCOM Management Group.
2. From the menu bar, select **Go > Authoring**.
3. In the left pane, select **Object Discoveries**.
4. Locate and double-click the **EMC SI Service Discovery**.
5. Open the **Overrides** properties and select to **Override > For a specific object of class: Windows Computer**.
6. In the **Select Object** dialog box, select the SCOM proxy agent that you want to connect to the ESI Service, and then click **OK**.
The **Override Properties** page appears.
7. Select **Override** for the HTTPS to HTTP Fallback override to enable it.
8. Change the value of the **Override Value** field to **True** and click **OK**.
9. Click **Close** to save the change.

Figure 2 HTTPS to HTTP Override



Setting the ignore client certificate error override

You can set an override to ignore the client certificate when the SCOM agent connects to the ESI Service. To set up this override, follow the steps in [Set up HTTPS to HTTP override on page 147](#) and set the **Ignore Certificate Error** override to **True**.

Setting basic authentication overrides

If one or more SCOM agents are not on the same domain or trusted domain as the ESI Service, use basic authentication. To use basic authentication, set up the User Name and Password overrides for the EMC SI Service Discovery.

Note

This override is a data security risk, because SCOM stores the username and password as text, so any user with SCOM console access or access to the file system on the agent can view and hijack the account credentials. If you set up the basic authentication overrides, secure the SCOM agents to avoid this risk.

Setting up the required ESI Service Host override and discovery

Set up the ESI Service Host override and enable the discovery of the ESI Service for each SCOM agent.

Before you begin

Perform this procedure after:

- [Setting up the SCOM agent registry on page 146](#)
- [Setting up optional management pack overrides on page 155](#)

Procedure

1. Open the SCOM Operations Console and connect to the SCOM Management Group.

2. From the menu bar, select **Go > Authoring**.
3. In the left pane, select **Object Discoveries**.
4. Locate and double-click **EMC SI Service Discovery** and the **EMC SI Service Discovery Properties** page appears.
5. Click **Overrides** and select **Override > For a specific object of class: Windows Computer**.
6. In the **Select Object** dialog box, select the SCOM proxy agent that you want to connect to the ESI Service from the list and click **OK**.
The **Override Properties** page appears.
7. Confirm the **Enabled** parameter name override is selected and that the override value is set to **True**.
8. Change the override value for the **ESI Service Host** parameter to the IP address of the computer hosting the ESI Service.
9. If the default port number of 54500 or 54501 for the ESI Service has been changed, change the port parameter default value to the correct port number.
10. In the **Select destination management pack** list box, select the **EMC Storage Integrator Customizations** management pack.
11. Click **Apply** and confirm the changed values.
12. Click **OK**.

Note

If you change the Interval or Discovery Timeout (sec) values, discovery performance might be affected.

13. After completing this setup, export and save a copy of the `EMC.SI.Customization.xml` file as a backup of your customization values. If you lose a needed customization, you can import this backup copy to recover your set customizations. This file is installed with version number 1.0.0.0. You can increment the version number when you make changes.

Note

How to Monitor Using Overrides on Microsoft TechNet provides more information about creating overrides.

Using the ESI Monitoring Management Pack

The ESI Monitoring Management Pack can discover and monitor many different system components using SCOM agents. The monitoring agent retrieves data from the ESI Service by using a RESTful HTTPS connection, which in turn retrieves the data from the supported (registered) systems. The monitoring data is added to the SCOM database.

The ESI Monitoring Management Pack views the components of EMC systems as a topology map. The health of each level depends on the health of the components that roll up to the component.

At the lowest level, the SCOM Management Group monitors the physical and logical components, such as disk drives, power supplies, storage volumes, and virtual volumes. The ESI management packs monitor the operational state of the components. For

example, when one or more storage or virtual volumes are in an unhealthy state, then the unhealthy state is rolled up to the storage groups containing the volumes.

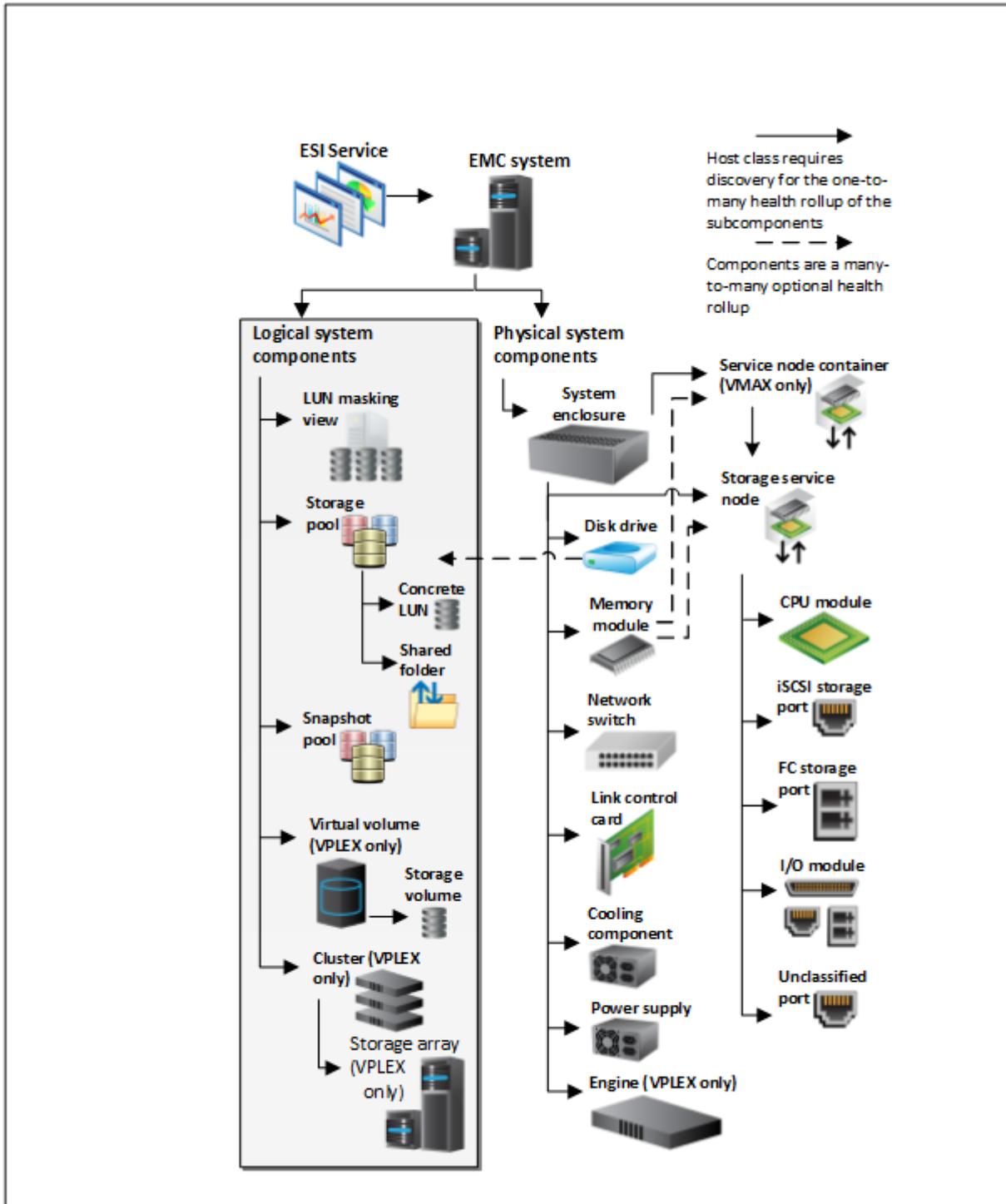
The ESI Monitoring Management Pack provides the following monitors:

Monitor	Action at the set interval
Monitoring physical component health on page 152 check the health of the system physical components, such as the disk drives and power supplies.	Check the operational status of all of the physical components of a specific class and raise alerts when abnormal conditions are detected.
Monitoring logical component health on page 154 check the health of the logical components, such as the storage pools, storage volumes, and virtual volumes.	Check the operational status of all of the logical components of a specific class and raise alerts when abnormal conditions are detected.
Monitoring capacity on page 154 check the available capacity of a number of physical and logical system components.	Check the available and subscribed capacity of the components and issue alerts if limits are met or exceeded. These monitors also collect data for SCOM displays and reports.
Viewing monitors on page 155 and rule.	Check the execution of the management pack components and generate alerts when errors occur.

The EMC Storage Integrator Monitoring Management Pack monitors all systems that are registered to the ESI Service and all of the physical and logical system components. The following figure shows which system components are monitored and the health rollup component relationships.

If you are supporting mission-critical applications on VMAX and VNX storage systems, you can also set up fault monitoring, fault reporting, call home, and remote diagnostics features to ensure redundancy for VNX and VMAX arrays.

Figure 3 EMC System Components Monitored by the ESI Monitoring Management Pack



Monitoring physical component health

When a warning or critical error occurs in a physical component, the health status of the affected component changes and generates an alert. You can use the alert description and product knowledge to troubleshoot the issue.

If a physical component fails and disappears from the data collected by ESI Service, an alert is generated to investigate the failure. You can use this alert to determine the root cause of a failure. You can also use the physical component count values that are stored in the database to detect long term trends.

The following rules are available for each component:

- Two collection rules save the count values to the database (DB) and data warehouse (DW) for the specified physical components of a specified class per parent instance.
- One warning alert is generated and updated in the active alerts folder in SCOM if a physical-component count changes. If the alert rule for the specified physical component is enabled, the rule collects data every 90 minutes and calculates the total component count. Multiple alert generations are suppressed to reduce the number of alerts generated for the same failure.

The first table below lists the collection and alert rules that are enabled by default and the second table lists the rules that are disabled by default. The total counts for enclosures and LUN storage service nodes includes all of the components in the class hierarchy. The disabled rules are optional for investigating problem alerts. You can enable one or more of the disabled rules when a physical component or hardware problem requires investigation.

Table 5 Enabled component collection and alert rules

Physical component	Enabled collection and alert rules
Enclosure	EMC SI Enclosure Physical Components Total Count Collection Rule (DB) EMC SI Enclosure Physical Components Total Count Collection Rule (DW) EMC SI Enclosure Physical Components Total Count Alert Rule
LUN storage service node	EMC SI LUN Storage Service Node Physical Components Total Count Collection Rule (DB) EMC SI LUN Storage Service Node Physical Components Total Count Collection Rule (DW) EMC SI LUN Storage Service Node Physical Components Total Count Alert Rule
Cluster (VPLEX)	EMC SI VPLEXCluster Count Collection (DB) EMC SI VPLEXCluster Collection (DW) EMC SI VPLEXCluster Alert Rule
Cooling component	EMC SI Cooling Component Count Collection (DB) EMC SI Cooling Component Count Collection (DW) EMC SI Cooling Component Count Alert Rule
Disk drive	EMC SI Disk Drive Count Collection(DB) EMC SI Disk Drive Count Collection(DW) EMC SI Disk Drive Count Alert Rule
Engine (VPLEX)	EMC SI Engine Count Collection (DB)

Table 5 Enabled component collection and alert rules (continued)

Physical component	Enabled collection and alert rules
	EMC SI Engine Count Collection (DW) EMC SI Engine Count Alert Rule
FC storage port	EMC SI Fc Storage Port Count Collection (DB) EMC SI Fc Storage Port Count Collection (DW) EMC SI Fc Storage Port Count Alert Rule
iSCSI storage port	EMC SI iSCSI Storage Port Count Collection (DB) EMC SI iSCSI Storage Port Count Collection (DW) EMC SI iSCSI Storage Port Count Alert Rule
Link control card	EMC SI Link Control Card Collection (DB) EMC SI Link Control Card Collection (DW) EMC SI Link Control Card Count Alert Rule
Memory module	EMC SI Memory Module Count Collection (DB) EMC SI Memory Module Count Collection (DW) EMC SI Memory Module Count Alert Rule
Power supply	EMC SI Power Supply Count Collection (DB) EMC SI Power Supply Count Collection (DW) EMC SI Power Supply Count Alert Rule

Table 6 Disabled component collection and alert rules

Physical component	Disabled collection and alert rules
CPU module	EMC SI CPU Module Count Collection (DB) EMC SI CPU Module Count Collection (DW) EMC SI CPU Module Count Alert Rule
Device	EMC SI Storage Device Count Collection (DB) EMC SI Storage Device Count Collection (DW) EMC SI Storage Device Count Alert Rule
Extent (VPLEX)	EMC SI Extent Count Collection (DB) EMC SI Extent Count Collection (DW) EMC SI Extent Count Alert Rule
I/O module	EMC SI IO Module Count Collection (DB) EMC SI IO Module Count Collection (DW) EMC SI IO Module Count Alert Rule
Storage array (VPLEX back-end storage system)	EMC SI Storage Array Collection (DB) EMC SI Storage Array Collection (DW) EMC SI Storage Array Alert Rule
Storage service node	EMC SI Storage Service Node Count Collection (DB) EMC SI Storage Service Node Count Collection (DW)

Table 6 Disabled component collection and alert rules (continued)

Physical component	Disabled collection and alert rules
	EMC SI Storage Service Node Count Alert Rule
Storage volume	EMC SI Storage Volume Count Collection (DB) EMC SI Storage Volume Count Collection (DW) EMC SI Storage Volume Count Alert Rule
Network switch	EMC SI Network Switch Count Collection(DB) EMC SI Network Switch Count Collection(DW) EMC SI Network Switch Count Alert Rule
Unclassified port	EMC SI Unclassified Port Count Collection (DB) EMC SI Unclassified Port Count Collection (DW) EMC SI Unclassified Port Count Alert Rule
Virtual volume (VPLEX)	EMC SI Virtual Volume Count Collection (DB) EMC SI Virtual Volume Count Collection (DW) EMC SI Virtual Volume Count Alert Rule

Monitoring logical component health

When a warning or critical error occurs in a logical component (such as a storage or virtual volume), the health state of the affected component changes and generates an alert. You can use the alert description and product knowledge to decide what action is necessary.

If a logical component fails and disappears from the data collected by ESI Service, an alert is generated to investigate the failure. You can use this alert to determine root cause of a failure. You can also use the logical component count values that are stored in the database to detect long term trends.

The collection and alert rules that are enabled and disabled by default for system components are described in [Monitoring physical component health on page 152](#).

Monitoring capacity

The available capacity of storage and snapshot pools and groups are monitored. Alerts are generated when certain thresholds are exceeded. These monitors allow a storage administrator to ensure that adequate capacity is available on a system.

The following table shows the default thresholds for the capacity monitors. If the thresholds are not appropriate for your environment, you can override them, either for all instances of the monitors or for specific snapshot, storage pools, or virtual volume.

Table 7 Capacity monitoring threshold values:

Capacity monitors	Warning Thresholds	Error Thresholds
Snapshot Pool available capacity	20%	10%
Storage Pool available capacity	20%	10%

Table 7 Capacity monitoring threshold values: (continued)

Capacity monitors	Warning Thresholds	Error Thresholds
Storage Pool subscribed capacity	70%	90%

Viewing monitors

In the **Monitoring** tab of the **Operations Console**, the EMC Storage Integrator folder contains views for monitoring the supported systems and the ESI Service:

- The top **Active Alerts** view lists the open alerts for all of the systems.
- The **Overall Topology** view displays a hierarchical diagram of all the monitored systems.
- The **ESI Service Overall Health** and the **ESI Windows Service Overall Health** views list the health state and active alerts for the ESI Service and ESI Windows Service.
- Each physical and logical component has an **Overall Health** view showing health state and active alerts.
- The **Diagnostics** folder contains views that are related to the health of the management pack monitoring facilities. The **Monitoring Delays, Errors and Timeouts** view displays events and alerts for monitoring failures, which include: ESI Service authorization problems, communication timeouts, and problems with resource availability on the monitoring agents. The other views display performance data for the ESI Service. Some of the rules collecting this data are disabled by default, so some data might be unavailable. If you have monitoring problems, EMC Support might ask that you enable one or more of these rules for diagnostic tests.

Setting up monitoring maintenance mode

When a monitored object, such as a disk drive or power supply, goes offline for maintenance, the ESI Service detects the condition and might generate numerous alerts and notifications.

To prevent ESI Service and the ESI SCOM Management Packs from creating alerts and notifications, you can set the monitored object to maintenance mode.

When an object is in maintenance mode, alerts, notifications, rules, monitors, automatic responses, state changes, and new alerts are suppressed by SCOM.

For more information on setting a monitored object to maintenance mode in SCOM, refer to *How to Put a Monitored Object into Maintenance Mode in Operations Manager 2007 or Operations Manager Maintenance Mode (for 2012)* on [Microsoft TechNet](#).

Setting up optional management pack overrides

You can use the procedures in this section to temporarily change intervals during a customization or when making significant storage environment changes. You can also use the following procedures to reduce network traffic and increase network performance for your specific storage environment:

- [Disabling performance data collection on page 156](#)
- [Changing discovery interval overrides on page 156](#)

- [Changing monitoring interval overrides on page 157](#)

After changing intervals and each time you make changes to your overrides and customizations, export and save a copy of the EMC.SI.Customization.xml file as a backup of your customization values. If you lose a needed customization, you can import this backup copy to recover your specific customizations.

How to Monitor Using Overrides on Microsoft TechNet provides more information on creating overrides.

Disabling performance data collection

To reduce network traffic or to improve performance on servers with slow WAN links, disable the rules that collect performance data.

Each performance counter has two rules, one for the:

- Operational database
- Data warehouse

If you disable an operational database rule or data warehouse rule, you cannot view performance data in the Operations console or in reports.

Note

You must enable the rules again before you use the views or run any performance data reports.

Procedure

1. Open the SCOM Operations Console and connect to the SCOM Management Group.
 2. Select **Go > Authoring**.
 3. In the left pane, select **Rules**.
 4. Change the scope to **EMC SI Snapshot Pool** and **EMC SI Storage Pool**.
 5. Select and double-click the rule that you want to disable.
-

Note

The collection rules for the operational database include (DB) in the name. Collection rules for the data warehouse include (DW) in the name.

6. Open the **Override properties** and select to edit the overrides for **all objects of class**.
7. Select the **EMC Storage Integrator Customizations** management pack.
8. Change the **Enabled** property to **False**.
9. Click **Apply** and verify the changed values.
10. Click **OK**, and then click **Close**.
11. Repeat this procedure for each rule that you want to disable.

Changing discovery interval overrides

When you install a new system or make changes to an existing system, the ESI Service takes a set amount of time to send these changes to the ESI management packs on the SCOM agents.

To trigger the discovery of new changes, you can toggle the Enabled override setting for the EMC SI Service Discovery:

Procedure

1. Open the **Override Properties** window for the EMC SI Service Discovery.
2. Clear the **Enabled** override check box and click **Apply**.
3. Then, before closing the window, select the **Enabled** override check box to reset the override. This triggers the discovery of all changes to components regardless of the interval values.

The default intervals for the discovery of new components vary depending on the component. If you want SCOM to discover newly added components more quickly than the set interval, you can temporarily change the interval setting. Then you can see the changes more quickly in SCOM. And after the changes are discovered, you can change it back to the preferred setting for your storage environment.

To change the discovery interval:

4. Open the SCOM Operations Console and connect to the SCOM Management Group.
5. Select **Go > Authoring**.
6. In the left pane, select **Object Discoveries**.
7. Locate and double-click the EMC Discovery for the desired object class.
8. Open the Override properties and select to edit the overrides **for all objects of class**.
9. Change the **Interval (sec)** property to the preferred value. The default values vary depending on the specific object or component.

Note

- You can temporarily reduce the interval to 600 or more seconds (10 minutes) to enable quick discovery of new components.
 - Do not change the **Discovery Timeout (sec)** value. If you reduce it, discoveries can fail before all of the data is retrieved. If you increase it, performance problems can occur.
-

10. Select the **EMC Storage Integrator Customizations** management pack.
11. Click **Apply** and verify the changed values.
12. Click **OK**, and then click **Close**.

Changing monitoring interval overrides

By default, the monitors communicate with the ESI Service approximately every six minutes to check the status of the systems. In a large storage environment, the ESI controller host, the SCOM agent, or the SCOM Management Group machines might experience a resource (CPU or memory capacity) shortage. Increasing the monitoring interval alleviates this type of shortage.

The ESI Service interval setting combined with the ESI Service system refresh interval number is the maximum frequency for receiving monitor updates in SCOM. For example, with this interval set to 600 seconds (about 10 minutes) and the ESI Service system refresh interval set to 30 minutes, an updated health state can take up to 40 minutes. The time intervals can affect the data performance. [Changing the system refresh interval on page 142](#) provides details on the ESI Service interval.

Refer to *How to Monitor Using Overrides* on Microsoft TechNet for more details.

Procedure

1. Open the SCOM Operations Console and connect to the SCOM Management Group.
2. From the menu bar, select **Go > Authoring** or select **Authoring** from the lower left pane.
3. From the left pane, select **Monitors**.
4. Locate and double-click the EMC component and monitor that you want to change.
5. Open the Overrides properties and select one of the following choices:
 - For all objects of class: to override the rule for all objects
 - For a specific object of class: to override for a specific object.
6. Select the **EMC Storage Integrator Customizations** management pack.
7. Change the **Interval (sec)** property to your preferred time. The default value is 600 seconds (about 10 minutes).
8. Click **Apply** and verify the changed values.

Note

Do not change the **Timeout Value (sec)**. If you reduce it, monitors can fail before all of the data is retrieved. If you increase it, performance problems can occur.

CHAPTER 15

Managing storage with the PowerShell Toolkits

This chapter contains the following topics:

- [Getting started with the ESI PowerShell toolkits](#)..... 160
- [Getting help at the command line](#).....160
- [Importing the modules](#)..... 161
- [Using PowerShell objects](#)..... 161
- [Examples](#)..... 162
- [ESI PowerShell cmdlet list](#)..... 165

Getting started with the ESI PowerShell toolkits

ESI for Windows includes:

- ESI PowerShell Toolkit
- ESI Service PowerShell Toolkit

The toolkits are written for the PowerShell platform, which is developed by Microsoft specifically for Windows System Management automation.

ESI PowerShell Toolkit

The ESI PowerShell Toolkit enables you to provision and manage storage to Microsoft Windows hosts that use EMC storage. This toolkit includes a set of PowerShell cmdlets to manage EMC storage systems from the PowerShell command line. The ESI PowerShell Toolkit provides access to most of the provisioning functionality offered by the ESI MMC application and shares a common configuration set with the MMC application.

The ESI PowerShell Toolkit provides cmdlets provision block storage and to manage:

- Connections to host and storage systems
- Disk devices in hypervisor environments, such as VMware vSphere and Microsoft Hyper-V
- Block device snapshots for EMC VNX, VNXe, and Unity storage systems
- XtremIO snapshots and RecoverPoint profiles

[ESI PowerShell commandlets list on page 165](#) provides links to the cmdlets based on functionality.

ESI Service PowerShell Toolkit

The ESI Service PowerShell Toolkit provides cmdlets for setting up the ESI Service for use with the ESI System Center Operations Manager (SCOM) Management Packs.

The toolkit provides cmdlets for setting up the ESI Service to:

- Get the storage system entity data and entity relationships for the entity graph.
- Configure service security.
- Register EMC storage systems.

System prerequisites

The ESI PowerShell Toolkit is installed as part of the ESI product. The ESI Service PowerShell Toolkit is installed when you install the ESI Service. The toolkits have the same system prerequisites as ESI, including that a supported version of Microsoft Windows PowerShell be installed and enabled as a Windows feature on each system that is running the toolkit.

Getting help at the command line

Detailed cmdlet information is available at the command line.

To view cmdlet details at the command line, type the following from the Windows PowerShell command line, replacing *cmdlet name* with a specific cmdlet name:

```
get-help cmdlet name -full
```

For example, to get help about the `Get-EmcLun` cmdlet, at the PowerShell command line, type:

```
get-help Get-EmcLun -full
```

Importing the modules

To use the ESI PowerShell toolkits, with Windows Server 2008 R2, you must run the toolkit launcher and then import the corresponding toolkit module. With Windows Server 2012, modules are imported automatically and you can omit this step.

Run the launcher and import the ESI PowerShell Toolkit

During the core ESI installation, the ESI PowerShell Toolkit is installed on the same system in a default EMC folder.

To run the launcher and import the ESI PowerShell Toolkit module:

Procedure

1. Open a Windows PowerShell command prompt in either the interactive or scripting environment.
2. At the PS C:\> command prompt, type the following and press Enter to run each command separately:

```
cd "C:\Program Files\EMC\EMC Storage Integrator\ESIPSToolKit" .
\ESIPSToolKitLauncher.ps1 import-module ESIPSToolkit
```

Import the ESI Service PowerShell Toolkit

During the ESI installation, when you select to install the ESI Service, the ESI Service PowerShell Toolkit is installed on the same system in a default EMC folder.

To import the ESI Service PowerShell Toolkit module:

Procedure

1. Open a Windows PowerShell command prompt in either the interactive or scripting environment.
2. At the PowerShell C:\> command prompt, type the following and press Enter to run each command separately:

```
cd "C:\Program Files\EMC\EMC Storage Integrator
\ESIServicePSToolKit" import-module ESIServicePSToolkit
```

Using PowerShell objects

The ESI PowerShell toolkits accept objects as inputs, which can be standard objects, such as strings and integers. In many instances, these inputs have useful properties that can be accessed using dot notation. A full list of these objects and their properties is beyond the scope of this topic.

Defining and accessing variables

PowerShell enables you to create objects and store them in variables. For example, an ESI LUN object can be created and stored in a variable by using the `Get-EmcLun` command:

```
$lun = Get-EmcLun "My LUN"
```

This LUN object is used with the `Set-EmcLunAccess` cmdlet to present the LUN to a host:

```
Set-EmcLunAccess -LUN $lun -HostSystem $myhost -Available
```

Retrieving object information

Use the `Get-Member` cmdlet to access information about the properties and methods supported by an object. The `Get-Member` cmdlet accepts pipeline inputs. You can pipe an object returned by a cmdlet to `Get-Member` to determine the properties and methods of the object.

Standard object descriptions

The following table lists common PowerShell objects.

Object	Description
Boolean	Represents a true or false value. For true, type 1 or \$true. For false, type 0 or \$false.
Int32	Represents a 32-bit signed integer. Signed integers are either positive or negative.
Int64	Represents a 64-bit signed integer. Signed integers are either positive or negative.
SecureString	Represents an encrypted string for private data.
String	Represents a set of alphanumeric characters. A string that contains the space character must be enclosed by quotation marks. For example: <code>Get-EmcLun "My Basic LUN"</code>
UInt32	Represents a 32-bit unsigned integer. Unsigned integers cannot be negative.
UInt64	Represents a 64-bit unsigned integer. Unsigned integers cannot be negative.

Examples

Provisioning a new storage volume

The following script is an example of how to:

- Create a new 100 GB thin LUN on a VNX storage pool.
- Present the LUN to a Windows 2008 R2 host and initialize the disk.
- Create an NTFS volume and mount it on an available drive letter. The following example requires that the storage system and host are connected and available.

Example script

```
PS C:\Users\administrator.BROOKSDOM> import-module esipstoolkit
PS C:\Users\administrator.BROOKSDOM> $pool = Get-EmcStoragePool
"VM Pool"
```

```
Block storage system: [Name = APM00111102550. UserFriendlyName
= VNX5100]. Lun Pools are not initialized. Refreshing Lun
Pools.
```

```

PS C:\Users\administrator.BROOKSDOM> $system = Get-
EmcHostSystem NEC-BLADE6

PS C:\Users\administrator.BROOKSDOM> $lun = New-EmcLun -Pool
$pool -CapacityInMB 102400 -Thin

TaskStatus: Started
10% : Creating the LUN...
100% : The specified LUN has been created...
TaskStatus: Completed

PS C:\Users\administrator.BROOKSDOM> Set-EmcLunAccess -Lun $lun
-HostSystem $system -Available

TaskStatus: Started
10% : Unmasking the LUN to the specified host(s)...
100% : The specified LUN has been unmasked to the specified
initiators...
TaskStatus: Completed

PS C:\Users\administrator.BROOKSDOM> $hdisk=Get-EmcHostDisk -
Host: NEC-BLADE6. Refreshing MultiPath software information.
Host: NEC-BLADE6. Retrieving disk information from Virtual Disk
Service.

WARNING: Unable to find host disk(s) with the given parameters

PS C:\Users\administrator.BROOKSDOM> $hdisk=Get-EmcHostDisk -
HostSystem $system -Lun $lun

PS C:\Users\administrator.BROOKSDOM> Initialize-EmcHostDisk -
HostSystem $system -HostDisk $hdisk -PartitionStyle GPT

TaskStatus: Started
10% : Initializing the disk...
100% : The specified disk has been initialized...
TaskStatus: Completed

PS C:\Users\administrator.BROOKSDOM> $vol =New-EmcVolume -
HostSystem $system -HostDisk $hdisk -FileSystemType NTFS -Labe
l TestVolume

TaskStatus: Started
10% : Provisioning the volume...
100% : The specified volume has been provisioned...
TaskStatus: Completed

PS C:\Users\administrator.BROOKSDOM> Get-
EmcAvailableDriveLetter -HostSystem $system

A, B, D, E, F, ... (up to Z, except for default C)

PS C:\Users\administrator.BROOKSDOM> Set-EmcVolumeMountPoint -
HostSystem $system -Volume $vol -DriveLetter Z

TaskStatus: Started
10% : Mounting the volume...

```

```
100% : The specified volume has been mounted...
TaskStatus: Completed
PS C:\Users\administrator.BROOKSDOM>
```

Removing a storage volume

Remove a volume from a host and delete the LUN where it resides.

Because the LUN identity might be unknown, map the Windows volume to the storage LUN.

Example script

```
PS C:\Users\administrator.BROOKSDOM> import-module esipstoolkit
PS C:\Users\administrator.BROOKSDOM> $system = Get-EmcHostSystem NEC-
BLADE6

PS C:\Users\administrator.BROOKSDOM> $vol = Get-EmcHostVolume -
HostSystem $system -ID TestVolume

Host: NEC-BLADE6. Refreshing MultiPath software information.

Host: NEC-BLADE6. Retrieving disk information from Virtual Disk
Service.

PS C:\Users\administrator.BROOKSDOM> $hdisk = Get-EmcHostDisk -Volume
$vol

PS C:\Users\administrator.BROOKSDOM> $lun = Get-EmcLUN -HostDisk
$hdisk
```

```
Associating the specified host disk with its corresponding storage
system...
PS C:\Users\administrator.BROOKSDOM> Remove-EmcVolumeMountPoint -
HostSystem $system -Volume $vol
TaskStatus: Started
10% : Unmounting the volume...
100% : The specified volume has been unmounted...
TaskStatus: Completed
```

```
PS C:\Users\administrator.BROOKSDOM> Set-EmcHostDiskOnlineState -
HostDisk $hdisk -Offline
```

```
TaskStatus: Started
10% : Bringing the disk offline...
100% : The specified disk has been brought offline...
TaskStatus: Completed
```

```
PS C:\Users\administrator.BROOKSDOM> Set-EmcLunAccess -HostSystem
$system -Lun $lun -Unavailable
```

```
TaskStatus: Started
10% : Masking the LUN from the initiators...
100% : The specified LUN has been masked from the specified
initiators...
TaskStatus: Completed
```

```
PS C:\Users\administrator.BROOKSDOM> Update-EmcSystem -HostSystem
$system
```

```
Refreshing disks of host system '[Name: NEC-BLADE6, IP address:
172.20.1.106.]'
Host: NEC-BLADE6. Refreshing MultiPath software information.
Host: NEC-BLADE6. Retrieving disk information from Virtual Disk
Service.
```

```
PS C:\Users\administrator.BROOKSDOM> Remove-EmcLun -Lun $lun
```

```
Confirm
Are you sure you want to perform this action?
Performing operation "Remove-EmcLun" on Target "LUN 44".
[Y] Yes [A] Yes to All [N] No [L] No to All [S] Suspend [?] Help
(default is "Y"):
```

```
y
```

```
TaskStatus: Started
10% : Destroying the LUN...
100% : The specified LUN has been destroyed...PS C:\Users
\administrator.BROOKSDOM>
TaskStatus: Completed
```

ESI PowerShell cmdlet list

This topic lists the available ESI PowerShell cmdlets, grouped by operation type.

To get syntax, parameters, and examples for a specific cmdlets, type the following at the PowerShell command prompt:

```
get-help cmdlet name -full
```

The cmdlets support these operations:

- [Connection operations on page 165](#)
- [Storage system operations on page 167](#)
- [Host operations on page 173](#)
- [Hypervisor operations on page 174](#)
- [Application operations on page 175](#)
- [AppSync replication operations on page 176](#)
- [RecoverPoint replication operations on page 177](#)
- [ESI Service operations on page 178](#)

Powershell cmdlets connection operations

Connect-EmcSystem

Connects or adds the host, cluster, and storage systems to ESI. The Connect-EmcSystem cmdlet is used to connect the host, cluster, and storage systems to ESI from the specified creation BLOB. You can use this cmdlet along with the Get-EmcHostSystemCredential, Get-EmcClusterSystemCredential, and Get-EmcStorageSystemCredential cmdlets to get the creation BLOB.

Disable-EmcPublisherCertificateValidation

Disables server SSL certificate validation when using SSL to communicate with the specified ESI service. The publish commands use a secure channel (SSL) when connecting to the specified ESI service by specifying an HTTPS URL in the Set-EmcPublisherEndpointUrl cmdlet or via the -ServiceURL parameter. This command

disables the validation of the server certificate while establishing the SSL connection. This is necessary if the specified ESI service is configured to use a self-signed certificate.

Enable-EmcPublisherCertificateValidation

Enables server Disconnect-EmcHostSystemSSL certificate validation when using SSL to communicate with the specified ESI service. The publish commands use a secured channel (SSL) when connecting to the specified ESI service by specifying an HTTPS URL in the Set-EmcPublisherEndpointUrl cmdlet or via the -ServiceURL parameter. This command disables the validation of the server certificate while establishing the SSL connection. This is necessary if the specified ESI service is configured to use a self-signed certificate.

Disconnect-EmcClusterSystem

Disconnects cluster systems.

Disconnect-EmcHostSystem

Disconnect host systems.

Disconnect-EMCStorageSystem

Disconnects storage systems.

Disconnect-EMCSystem

Disconnects clusters, hosts, and storage systems.

Get-EmcClusterSystemCredential

Gets the encrypted connection string or BLOB, based on the specified parameters. You can use this cmdlet with the Connect-EmcSystem cmdlet to connect cluster systems to ESI. The Get-EmcClusterSystemCredential cmdlet creates a BLOB or encrypted string based on the specified parameters. The cmdlet prompts you to specify the cluster name, IP address, and credentials. The cmdlet then creates a BLOB with these credentials. You can use the BLOB to connect cluster systems to ESI by using the Connect-EmcSystem cmdlet. You can also click Test Connection in ESI to test the connection with the specified parameters. Current Credential is selected by default for authentication. If you are using another credential, click Specify Credential and type the username and password.

Get-EmcLinuxHostSystemCredential

Gets the encrypted connection string or BLOB, based on the specified connection (system object creation) parameters for a Linux system. You can use the BLOB with the Connect-EmcSystem cmdlet to connect or add Linux host systems to ESI. You can use the BLOB with the Connect-EmcSystem cmdlet to connect or add Linux host systems to ESI. This cmdlet creates a BLOB (encrypted string) from the specified connection (system object creation) parameters. It prompts the user for host name, IP address, and connection. Use the BLOB to connect or add a Linux host system to ESI with the Connect-EmcSystem cmdlet. Password authentication is a default selection. If you are using key-based authentication, then use the key-based username, file path, and pass phrase.

Get-EmcPublisherConnectionInfo

Gets the list of systems currently registered with the specified ESI service.

Get-EmcPublisherEndpointOptions

Gets the current options used to connect to the specified ESI service.

Get-EmcPublisherSupportedSystem

Gets all the system types that are available for registration with the specified ESI service.

Get-EmcHostSystemCredential

Gets the encrypted connection or system object creation parameters BLOB, which you can use along with the Connect-EmcSystem cmdlet to connect host systems to ESI.

Get-EmcStorageIntegratorVersion

Gets the specific software version of ESI that is installed. This cmdlet gets EMC Storage Integrator version details including: product name, product version, and company name.

Get-EmcStorageSystemCredential

Gets the encrypted connection or system object creation parameters BLOB, which is used along with the Connect-EmcSystem cmdlet to connect storage systems to ESI.

Get-EmcSupportedSystemsCreationRequirement

Gets the list of creational parameters required to add or connect to a system in ESI.

Publish-EmcPublisherConnectionInfo

Publishes the connection information of the specified system to the specified ESI service.

Publish-EmcPublisherUserConnectionInfo

Publishes the connection information for the specified system to the specified user.

Set-EmcPublisherEndpointUrl

Sets the URL to the specified ESI service on the current session.

Test-EmcSystemConnectedToBlockStorageSystem

Verifies the connectivity of a host system or replication system to a block storage system. This cmdlet only works with VNX and VMAX block storage systems. The cmdlet does not work with VNXe storage systems.

Unpublish-EmcPublisherConnectionInfo

Unpublishes the connection information for the specified system to the specified ESI service. This cmdlet unregisters the specified system from the specified ESI service.

Update-EmcSystem

Updates the specified host, storage, or cluster systems. The Update-EMCSystem cmdlet updates the specified host, cluster, or storage systems. For the host system, the cmdlet updates the host disks. For the cluster system, it updates the cluster disks. For the block storage system, it updates the LUNs.

Powershell cmdlets storage system operations

This section lists FAST VP, Meta management, and general storage system operations.

FAST VP Operations

Add-EmcFastVpPolicy

Adds or associates the specified storage group to the specified FAST VP policy.

Add-EmcLunsToVmaxStorageGroup

Adds one or more LUNs to the specified VMAX storage group. Clears the host disk signatures and assigns new ones.

Get-EmcFastVpPolicy

Gets the FAST VP policies that are associated with the specified storage system or VMAX storage group.

Get-EmcStorageTier

Gets the storage tiers for the specified storage system or the specified FAST VP policy.

Get-EmcVmaxStorageGroup

Gets all storage groups for the specified VMAX storage system.

New-EmcVmaxSnapshot

Creates a VMAX3 snapshot.

New-EmcVmaxStorageGroup

Adds LUNs to the specified VMAX storage group.

Remove-EmcFastVpPolicy

Removes the specified FAST VP policy from the specified storage groups.

Remove-EmcLunsFromVmaxStorageGroup

Removes LUNs from a VMAX storage group.

Remove-EmcVmaxSnapshot

Removes or deletes the specified VMAX3 snapshot.

Restore-EmcVmaxSnapshot

Restores a VMAX3 snapshot back to its source.

Remove-EmcVmaxStorageGroup

Deletes the specified storage group that is not associated to any FAST VP policies.

Meta management operations

Expand-EmcCompositeLun

Expands capacity of the composite LUN.

Get-EmcAvailableCandidatesForLunComposition

Gets all the LUNs which are qualified to be a member LUN of the specified meta, meta volume, or composite LUN.

Get-EmcCompositeLun

Gets all composite LUNs from the specified storage system.

Get-EmcCompositeLunMember

Gets one or more meta or composite LUN members of the specified composite LUN head.

Get-EmcUnboundLun

Gets all the unbound LUNs that are not bound to any storage pool from the specified storage system.

New-EmcCompositeLun

Creates a meta or composite LUN from the specified LUNs. To compose or form a meta or composite LUN, at least two LUNs are required and the first LUN becomes the metahead.

Remove-EmcCompositeLun

Removes (destroys) the composite LUN from the storage system.

General storage system operations

Add-EmcUnityConsistencyGroupMember

Adds one or more members to a consistency group. A consistency group has three types of members: LUNs, hosts that have access to LUNs in the group, and hosts that have access to snapshots of LUNs in the group. This command is used to add any of these members to the consistency group. This command is applicable only for Unity systems.

Add-EmcVnxLunGroupMember

Adds one or more members to a LUN group. A LUN group has three types of members: LUNs, hosts that have access to LUNs in the group, and hosts that have access to snapshots of LUNs in the group. This command is used to add any of these members to the LUN group. This command is applicable only for VNXe3200 systems.

Add-EmcVplexConsistencyGroupVirtualVolume

Adds a VPLEX virtual volume to a specified VPLEX consistency group.

Add-EmcXtremIOTagEntity

Adds the specified tag to the specified consistency groups, initiators, initiator groups, snapshots, snapshot sets, and volumes .

Copy-EmcVnxAdvancedSnapshot

Copies VNX advanced snapshot to a new VNX advanced snapshot.

Dismount-EmcUnitySnapshot

Dismounts a Unity LUN or Consistency group snapshot to prevent host access.

Dismount-EmcVnxAdvancedSnapshot

Dismounts or detaches the VNX advanced snapshot with its associated snapshot mount point LUN.

Dismount-EmcVnxSnapshot

Dismounts a VNXe LUN or LUN group snapshot to prevent host access.

Expand-EmcFileBasedDisk

Expands the size of a file-based disk.

Expand-EmcLun

Expands the capacity of a LUN.

Expand-EmcVNXSharedFolderPool

Expands the capacity of a Shared Folder Pool. This command applies to Shared Folder Pools on a VNX file system.

Get-EmcLun

Gets the list of LUNs for the specified storage system or systems.

Get-EmcLunMaskingView

Gets a list of LUN masking views. A LUN masking view object contains the information that a set of LUNs are unmasked to a set of initiators and the corresponding HLU (host logical unit) information of the unmasked LUNs with respect to those initiators.

Get-EmcScsiLun

Gets the list of VMware SCSI LUNs.

Get-EmcSharedFolder

Gets the list of shared folders available from a file storage system.

Get-EmcSnapshotLun

Gets the list of snapshot LUNs.

Get-EmcSnapshotPool

Gets the list of snapshot pools. This cmdlet is not supported for XtremIO systems.

Get-EmcStoragePool

Gets the list of storage pools. For VNX File storage pools, use Get-EmcVNXFileStoragePools.

Get-EmcStorageRegisteredHost

Gets a list of registered hosts for a specified storage system. This cmdlet is not supported for VMAX storage systems.

Get-EmcStorageRegisteredInitiator

Gets the list of host initiators that are registered on the storage systems. This cmdlet is not supported for VMAX storage systems.

Get-EmcStorageServiceNode

Gets the list of storage service nodes.

Get-EmcStorageSystem

Gets the list of storage systems.

Get-EmcSupportedSystem

Gets the list of supported systems.

Get-EmcUnityConsistencyGroup

Gets consistency groups on the connected Unity systems. Consistency groups enable consistent snapshots of multiple LUNs and are used to grant hosts access to LUNs and to snapshots of LUNs in the group.

Get-EmcUnityConsistencyGroupMember

Gets the members of a consistency group. A consistency group has three types of members: LUNs, hosts that have access to LUNs in the group, and hosts that have access to snapshots of LUNs in the group. The -IncludeLuns, -IncludeLunHosts, and -IncludeSnapshotHosts parameters return only those specific types of members. If omitted, the cmdlet returns all member types.

Get-EmcUnityFileSystem

Gets the file systems on connected Unity systems. File systems contain shares which are exposed to hosts. They are allocated from pools and hosted in NAS servers. This command is for Unity systems only.

Get-EmcUnitySnapshot

Gets the snapshots on connected Unity systems. You can retrieve snapshots of a particular source LUN or consistency group with the Source parameter.

Get-EmcTargetPort

Gets the list of target ports.

Get-EmcVnxAdvancedSnapshot

Gets the list of VNX advanced snapshots.

Get-EmcVnxAdvancedSnapshotMountPoint

Gets the list of VNX advanced snapshot mount points.

Get-EmcVnxFileSystem

Gets the file systems on connected VNXe3200 systems. File systems contain shares which are exposed to hosts. They are allocated from pools and hosted in NAS servers. This command is for VNXe3200 systems only.

Get-EmcVnxLunGroup

Gets LUN groups on the connected VNXe systems. LUN groups enable consistent snapshots of multiple LUNs and are used to grant hosts access to LUNs and to snapshots of LUNs in the group.

Get-EmcVnxLunGroupMember

Gets the members of a LUN group. A LUN group has three types of members: LUNs, hosts that have access to LUNs in the group, and hosts that have access to snapshots of LUNs in the group. The -IncludeLuns, -IncludeLunHosts, and -IncludeSnapshotHosts parameters return only those specific types of members. If omitted, the cmdlet returns all member types.

Get-EmcVnxSnapshot

Gets the snapshots on connected VNXe systems. You can retrieve snapshots of a particular source LUN or LUN group with the Source parameter.

Get-EmcVNXFileStoragePool

Gets the list of VNX file storage pools used by the VNX storage system to provision shared folder pools. Applies to VNX arrays only.

Get-EmcVplexClusters

Gets VPLEX clusters on the connected VPLEX systems.

Get-EmcVplexConsistencyGroup

Gets VPLEX consistency groups on the connected VPLEX systems.

Get-EmcVplexInitiators

Gets VPLEX initiators on the connected VPLEX systems.

Get-EmcVplexPorts

Gets VPLEX ports on the connected VPLEX systems.

Get-EmcVplexServiceNodes

Gets VPLEX service nodes on the connected VPLEX systems.

Get-EmcVplexStorageViews

Gets VPLEX storage views on the connected VPLEX systems.

Get-EmcVplexVirtualVolume

Gets VPLEX virtual volumes on the connected VPLEX systems.

Get-EmcXtremIOBrick

Gets a list of X-Brick information from the XtremIO storage system.

Get-EmcXtremIOInitiator

Gets a list of initiators for the specified XtremIO storage system.

Get-EmcXtremIOInitiatorGroup

Gets a list of initiator groups for the specified XtremIO storage system.

Get-XtremIOSnapshotScheduler

Gets all the schedulers from the XtremIO storage array

Get-EmcXtremIOSnapshotSet

Gets the list of snapshot sets for the specified XtremIO system.

Get-EmcXtremIOtag

Gets all the tags from the XtremIO storage array.

Get-EmcXtremIOtagVolume

Gets all tags associated with the specified volume.

Mount-EmcUnitySnapshot

Mounts a Unity LUN or consistency group snapshot so it is visible to hosts in the snapshot access list for the LUN or consistency group.

Mount-EmcVnxAdvancedSnapshot

Mounts/attaches the VNX advanced snapshot with the specified snapshot mount point LUN.

Mount-EmcVnxSnapshot

Mounts a VNXe LUN or LUN group snapshot so it is visible to hosts in the snapshot access list for the LUN or LUN group.

New-EmcLun

Creates an ESI LUN object.

New-EmcSharedFolder

Creates a file shared folder object.

New-EmcSnapshotLun

Creates a snapshot LUN. For XtremIO systems, ignore the `SnapshotPool` and `Retention` parameters.

New-EmcStorageRegisteredHost

Registers a host for a specified storage system.

New-EmcStorageRegisteredInitiator

Registers a host initiator on a specified storage system.

New-EmcUnityConsistencyGroup

Creates a consistency group on a Unity system. Consistency groups enable consistent snapshots of multiple LUNs and are used to grant hosts access to LUNs and snapshots of LUNs in the group.

New-EmcUnitySnapshot

Creates a snapshot on a Unity system. Unity allows snapshots of LUNs, consistency groups, and file systems.

New-EmcVnxAdvancedSnapshot

Creates a VNX advanced snapshot from a Lun and snapshot mount point (SMP).

New-EmcVnxAdvancedSnapshotMountPoint

Creates a VNX advanced snapshot mount LUN from a source LUN.

New-EmcVnxLunGroup

Creates a LUN group on a VNXe system. LUN groups enable consistent snapshots of multiple LUNs and are used to grant hosts access to LUNs and snapshots of LUNs in the group.

New-EmcVnxSnapshot

Creates a snapshot on a VNXe system. VNXe allows snapshots of LUNs, LUN groups, and file systems.

New-EmcVNXSharedFolderPool

Creates a VNX file storage shared folder pool object.

New-EmcVplexConsistencyGroup

Creates a consistency group on a VPLEX system.

New-EmcVplexDistributedVirtualVolume

Creates a VPLEX distributed virtual volume on the connected VPLEX systems.

New-EmcVplexLocalVirtualVolume

Creates a VPLEX local virtual volume on the connected VPLEX systems.

New-EMCXtremIOSnapshotScheduler

Creates a scheduler with the specified properties.

New-EmcXtremIOSnapshotSet

Creates a snapshot set from a single volume, multiple volumes, a consistency group, or snapshot set.

New-EmcXtremIOtag

Creates a tag with the specified name.

Register-EmcVplexInitiators

Registers or unregisters a specified initiator on the connected VPLEX systems.

Register-EmcVplexVirtualVolume

Registers a specified virtual volume on the connected VPLEX systems.

Remove-EmcCifsSharedFolderMountPoint

Removes or unmounts a specified shared folder.

Remove-EmcFileBasedDisk

Deletes a file-based disk from a hypervisor.

Remove-EmcLun

Removes or destroys the LUN from the storage system.

Remove-EmcSharedFolder

Removes or destroys the shared folder from the storage system.

Remove-EmcSnapshotLun

Removes the snapshot LUN.

Remove-EmcStorageRegisteredHost

Removes the registered host from the storage system where it is registered.

Remove-EmcStorageRegisteredInitiator

Removes the specified host initiator from the storage system where the initiator host is registered.

Remove-EmcUnityConsistencyGroup

Deletes a consistency group from a Unity system.

Remove-EmcUnityConsistencyGroupMember

Removes one or more members from a consistency group. This command is used to remove LUNs, LUN access hosts, or snapshot access hosts from a consistency group from a Unity system.

Remove-EmcUnitySnapshot

Deletes a snapshot from a Unity system.

Remove-EmcVnxAdvancedSnapshot

Removes or deletes the specified VNX advanced snapshot.

Remove-EmcVnxLunGroup

Deletes a LUN group from a VNXe system.

Remove-EmcVnxLunGroupMember

Removes one or more members from a LUN group. This command is used to remove LUNs, LUN access hosts, or snapshot access hosts from a LUN group.

Remove-EmcVnxSnapshot

Deletes a snapshot from a VNXe system.

Remove-EmcVNXSharedFolderPool

Removes or destroys the shared folder pool for a specified VNX storage system.

Remove-EmcVplexConsistencyGroup

Deletes a consistency group from a VPLEX system.

Remove-EmcVplexConsistencyGroupVirtualVolume

Deletes specified virtual volumes from a VPLEX consistency group.

Remove-EmcVplexVirtualVolume

Deletes specified virtual volumes from a VPLEX system.

Remove-EMCXtremIOSnapshotScheduler

Removes the scheduler from the list of schedulers on the XtremIO array.

Remove-EmcXtremIOSnapshotSet

Removes a snapshot set from a specified XtremIO system. Removing a snapshot set deletes all the snapshot volumes associated with the snapshot set.

Remove-EmcXtremIOtag

Removes the specified tag from the list of tags.

Remove-EmcXtremIOtagVolume

Removes the specified tag from the specified volume.

Restore-EmcSnapshotLun

Restores a snapshot LUN.

Restore-EmcUnitySnapshot

Restores a Unity snapshot back to its source.

Restore-EmcVnxAdvancedSnapshot

Restores the VNX advanced snapshot to source LUN.

Restore-EmcVnxSnapshot

Restores a VNXe snapshot back to its source.

Restore-EmcXtremIOSnapshots

This command is used to reassign or restore a snapshot, volume, consistency group, or snapshot set, and to create a backup of snapshots if required.

Set-EmcCIFSSharedFolderMountPoint

Mounts a shared folder onto a host system.

Set-EmcLun

Sets the storage service node for the specified LUN. For VNX storage systems only, it sets the storage tiering policy and LUN compression and compression rate for the specified LUN.

Set-EmcLunAccess

Masks or unmask a LUN to a host, cluster, FC, or iSCSI initiator.

Set-EmcVNXLunAllocationPolicy

Modifies the VNX Allocation Policy of a LUN.

Set-EmcVplexUnmaskLun

Unmasks a LUN to the specified VPLEX host.

Set-EMCXtremIOSnapshotScheduler

Updates the scheduler with the specified properties.

Set-EmcXtremIOtag

Renames the specified tag.

Update-EmcVnxAdvancedSnapshot

Updates the VNX advanced snapshot.

Powershell cmdlets host operations

Add-EmcHostDiskToCluster

Adds a disk to a cluster.

Clear-EmcHostDiskSignature

Clears the host disk signatures and assigns new ones.

Expand-EmcHostVolume

Expands the volume of a host.

Find-EmcHostDisk

Finds the ESI host disk associated with an ESI LUN, host LUN identifier, or VM disk configuration on a host or cluster system.

Get-EmcAvailableDriveLetter

Gets the available drive letters on a host system or cluster system.

Get-EmcCifsNetworkShare

Gets the list of network shares used by a specified host.

Get-EmcClusterDisk

Gets the list of cluster disks.

Get-EmcClusterGroup

Gets the list of cluster groups.

Get-EmcClusterNode

Gets the list of cluster nodes.

Get-EmcClusterSystem

Gets connected cluster systems. A cluster system can be added to ESI using the `Get-EmcClusterSystemCredential` and `Connect-EmcSystem` cmdlets.

Get-EmcHostBusAdapter

Gets the list of host bus adapters for the specified hosts.

Get-EmcHostDisk

Gets a list of host disk objects.

Get-EmcHostLunIdentifier

Gets the host LUN identifier.

Get-EmcHostSystem

Gets connected host systems.

Get-EmcHostVolume

Gets the list of host volumes.

Initialize-EmcHostDisk

Initializes a host disk by bringing the disk online and setting a specified partition style in a host or cluster system.

New-EmcVolume

Creates a volume.

Remove-EmcHostDiskFromCluster

Removes a disk from a cluster.

Remove-EmcVolumeMountPoint

Removes or unmounts the specified volume.

Set-EmcHostDiskOnlineState

Changes the online state of the specified disk.

Set-EmcHostDiskReadOnlyState

Changes the read-only state for the specified disk.

Set-EmcVolumeMountPoint

Sets the drive letter or mount path for the volume.

Powershell cmdlets hypervisor operations

Add-EmcFileBasedDiskToVirtualMachine

Adds or attaches a file-based disk to a virtual machine.

Add-EmcPassthroughDiskToVirtualMachine

Adds or attaches a pass-through disk to a virtual machine.

Get-EmcAvailablePassthroughDiskCandidate

Gets available pass-through disk candidates to attach or add to a virtual machine for a specified hypervisor.

Get-EmcAvailableScsiControllerLocation

Gets the list of available SCSI controllers for a virtual machine that you can use to attach file-based or pass-through disks.

Get-EmcDatastore

Gets the list of VMware datastores.

Get-EmcESXCluster

Gets the list of VMware ESX clusters.

Get-EmcESXHost

Gets the list of VMware ESX hosts.

Get-EmcHyperVSystem

Gets the list of connected Hyper-V systems.

Get-EmcHyperVSystemCredential

Gets the credentials for Microsoft Hyper-V to connect ESI.

Get-EmcVcenterSystem

Gets the list of vCenter systems.

Get-EmcVirtualMachineScsiController

Gets the SCSI controllers from the virtual machine configurations.

Get-EmcVirtualVolume

Gets the virtual volumes for an ESX Hypervisor or a vCenter system.

Get-EmcVMwareSystemCredential

Gets the encrypted connection parameters BLOB or the system object creation parameters for VMware systems. Use this cmdlet and the `Connect-EmcSystem` cmdlet to add or connect storage systems to ESI. It creates a BLOB or encrypted string by using the specified connection or system object creation parameters. ESI prompts you for the server IP address and credentials and then uses these parameters to create a BLOB. You can use the BLOB to connect or add VMware systems to ESI by using the `Connect-EmcSystem` cmdlet. Click **Test Connection** in ESI to test the connection with the specified parameters.

Get-EmcVirtualDiskConfiguration

Gets the virtual disk configuration for the specified host disk of a virtual machine, which can be either a file-based or pass-through disk.

Get-EmcVirtualMachineConfiguration

Gets the virtual machine configuration.

Get-EmcVirtualMachineHypervisor

Gets the virtual machine hypervisor.

New-EmcFileBasedDisk

Creates a file-based disk for a specified hypervisor.

New-EmcDatastore

Creates a new datastore.

Remove-EmcDatastore

Deletes the specified datastore.

Remove-EmcVirtualDiskFromVm

Removes a file-based or pass-through disk from the virtual machine.

Powershell cmdlets application operations

This section lists the cmdlets available for Microsoft Exchange and SQL Server.

Exchange operations

Get-EmcExchangeCmdletOutput

Gets results of some standard Microsoft PowerShell cmdlets for Exchange. This is not an ESI cmdlet.

Get-EmcExchangeSystem

Gets information about the Exchange system.

Get-EmcExchangeSystemCredential

Gets the encrypted connection string or BLOB. You can use this cmdlet with the Connect-EmcSystem cmdlet to connect or add host systems to ESI.

Get-EmcMailboxDatabase

Gets one or more mailbox database objects from a server, forest, or organization.

Get-EmcMailboxDatabaseCopy

Gets one or more mailbox database copy objects from a server or organization.

Get-EmcMailboxDatabaseCopyStatus

Gets the health and status information for one or more mailbox database copies.

Get-EmcMailboxServer

Gets the list of mailbox database servers. If no parameters are specified, it gets a complete list of the mailbox servers in the entire organization.

SQL server operations

Add-EmcDatabaseToAvailabilityGroup

Adds one or more databases to given AlwaysOn Availability Group. This command is used for adding a SQL Server Databases to an existing Availability Group.

Add-EmcReplicaToAvailabilityGroup

Adds a secondary replica to given AlwaysOn Availability Group. An Availability Group can have up to four secondary replica. This command is used to add a secondary replica to an existing Availability Group.

Get-EmcDatabaseAvailabilityGroup

Gets the configuration settings, status, and other information about a database availability group (DAG).

Get-EmcSqlServerAvailabilityGroup

Adds a secondary replica to given AlwaysOn Availability Group. An Availability Group can have up to four secondary replica. This command is used to add a secondary replica to an existing Availability Group.

Get-EmcSqlServerDatabase

Gets databases present in given SQL Server. Lists down databases in a given SQL Server Instance. For each database, details, including the data file path and log file path, are shown.

Get-EmcSqlServer

Gets details of given SQL Server. This command shows the details of a given SQL Server.

Get-EmcSqlServerCredential

Gets connection information. Prompts the user for the connection details and the credentials required to connect to the SQL Server.

New-EmcSqlServerAvailabilityGroup

Creates a new AlwaysOn Availability Group. This command creates a new SQL Server AlwaysOn Availability Group with given details of Primary and Secondary Replica along with databases to be added.

New-EmcSqlServerDatabase

Creates a new database in given SQL Server. Creates a new SQL Server database with the given details such as name of the database, file paths for data file, and log file.

Remove-EmcDatabaseFromAvailabilityGroup

Removes one or more databases from given AlwaysOn Availability Group. This command is used for removing SQL Server databases from an existing Availability Group.

Remove-EmcReplicaFromAvailabilityGroup

Removes a secondary replica from given AlwaysOn Availability Group. An Availability Group can have up to four secondary replica. This command is used to remove a secondary replica from an existing Availability Group.

Remove-EmcSqlServerAvailabilityGroup

Removes an Availability Group from given SQL Server. This command is used to remove an AlwaysOn Availability Group from given SQL Server.

Remove-EmcSqlServerDatabase

Removes one or more databases from given SQL Server. This command is used to remove one or more databases from given SQL Server.

Powershell cmdlets AppSync replication operations

Dismount-EmcAppSyncCopy

Dismounts a copy of a SQL Server database or an Exchange database for AppSync replication in ESI.

Get-EmcAppSyncCopy

Gets the copies of SQL Server databases or Exchange databases according to the specified criteria.

Get-EmcAppSyncExchangeDatabase

Gets the Exchange databases according to the specified criteria.

Get-EmcAppSyncExchangeServer

Gets the Exchange servers according to the specified criteria.

Get-EmcAppSyncManifest

Gets the manifest information of the specified AppSync system.

Get-EmcAppSyncRegisteredHost

Gets the hosts that are registered with the specified AppSync system.

Get-EmcAppSyncRegisteredRecoverPointSystem

Gets the RecoverPoint systems that are registered on the specified AppSync system.

Get-EmcAppSyncRegisteredStorageSystem

Gets the storage systems that are registered on the specified AppSync system.

Get-EmcAppSyncServicePlan

Gets the service plans according to the specified criteria.

Get-EmcAppSyncServicePlanSubscription

Gets the subscription information of the specified service plan.

Get-EmcAppSyncSqlServerDatabase

Gets the SQL Server databases according to the specified criteria.

Get-EmcAppSyncSqlServerInstance

Gets the SQL Server instances on the specified AppSync system.

Get-EmcAppSyncSystemAlert

Gets the alerts for the specified AppSync system.

Mount-EmcAppSyncExchangeDatabaseCopy

Mounts an Exchange database copy according to the specified criteria.

Mount-EmcAppSyncSqlServerDatabaseCopy

Mounts the SQL Server database copy according to the specified criteria.

New-EmcAppSyncExchangeDatabaseCopy

Protects the specified Exchange database by making a copy according to the criteria set by the specified service plan.

New-EmcAppSyncServicePlanCopies

Runs the specified service plan and creates copies of applications that subscribe to that service plan.

New-EmcAppSyncServicePlanSubscription

Subscribes the specified SQL Server database or Exchange database to the specified service plan.

New-EmcAppSyncSqlServerDatabaseCopy

Protects the specified SQL Server database by making a copy according to the criteria set by the specified service plan.

Remove-EmcAppSyncCopy

Expires or removes the specified SQL Server database copy or Exchange database copy.

Remove-EmcAppSyncServicePlanSubscription

Removes the specified subscription.

Restore-EmcAppSyncExchangeDatabaseCopy

Restores the source Exchange database by using the specified copy.

Restore-EmcAppSyncSqlServerDatabaseCopy

Restores the source SQL Server database by using the specified copy.

Update-EmcAppSyncSystem

Updates the AppSync system by discovering applications.

Powershell cmdlets RecoverPoint replication operations

Add-EmcXtremIOConsistencyGroupVolume

Adds XtremIO volumes to a specified XtremIO consistency group.

Disable-EmcReplicaCopy

Disables a replica copy to stop the replication of that copy.

Disable-EmcReplicaCopyImageAccess

Disables a replica copy image access so that it is not available for mounting. Replication changes are again propagated to the copy.

Disconnect-EmcReplicationService

Disconnects replication services.

Enable-EmcReplicaCopy

Enables a replica copy to start replication on that copy.

Enable-EmcReplicaCopyImageAccess

Enables a replica copy image access so that it can be available for mounting. Replication changes are not propagated to the copy while image access is enabled. When image access is enabled for replica snapshots, ESI automatically uses the RecoverPoint Image Access mode of Logged Access. This mode ensures the snapshot resides on the replica LUN and not the journal.

Get-EmcConsistencyGroup

Retrieves consistency groups that are used to protect LUNs.

Get-EmcReplicaCopy

Gets the list of replica copies that specify the copies within a consistency group.

Get-EmcReplicaCopySnapshots

Gets the list of snapshots for the specified replica copy.

Get-EmcReplicaLink

Gets the list of replica links that specify the replication connection and direction between two replica copies within a consistency group.

Get-EmcReplicaLun

Gets the replica LUNs for replication.

Get-EmcReplicaSet

Gets replica sets that contain the LUNs for the replication of source LUNs.

Get-EmcReplicationService

Gets the list of replication services. The replication service is the primary object for managing replication clusters, sites, and systems.

Get-EmcReplicationServiceCluster

Gets the list of replication clusters, which contains all the replication sites and systems in a replication service.

Get-EmcReplicationServiceCredential

Gets the encrypted connection string or BLOB. You can use this cmdlet along with the Connect-EmcSystem cmdlet to connect or add replication services to ESI.

Get-EmcReplicationServiceSite

Gets the list of replication sites, which contains all of the replication systems in the site.

Get-EmcReplicationSystem

Gets the list of replication systems. A replication system is an individual replication appliance that performs and facilitates replication.

Get-EmcXtremIOConsistencyGroup

Gets the list of consistency groups for the specified XtremIO system.

Move-EmcProductionReplicaCopy

Performs a permanent failover to the specified replica copy, after which the copy becomes the new production copy.

New-EmcBookmark

Creates a RecoverPoint bookmark for the specified consistency group.

New-EmcConsistencyGroup

Creates a new consistency group, which is a group of one or more replica sets.

New-EmcParallelBookmark

Creates a parallel bookmark for multiple consistency groups.

New-EmcReplicaCopy

Creates a new replica copy for a consistency group.

New-EmcReplicaLink

Creates a new replica link between two replica copies.

New-EmcReplicaSet

Creates a new replica set for a consistency group.

New-EmcXtremIOConsistencyGroup

Creates a new consistency group on an XtremIO system.

Remove-EmcConsistencyGroup

Deletes a consistency group and removes all associated resources for that consistency group.

Remove-EmcReplicaCopy

Deletes a replica copy from a consistency group and removes and masks LUNs for that replica copy.

Remove-EmcReplicaSet

Deletes a replica set from a consistency group and removes and masks LUNs for that replica set.

Remove-EmcXtremIOConsistencyGroup

Deletes a consistency group from a specified XtremIO array.

Remove-EmcXtremIOConsistencyGroupVolume

Removes an XtremIO volume from an existing consistency group.

Set-EmcRecoverProductionCopy

Recovers the production copy by using the specified replica copy. This recovers the production to correct file or logical corruption by rolling the production back to a previous point-in-time.

Powershell cmdlets ESI Service operations

Add-EmcSystem

Registers storage systems with the ESI Service.

Add-EmcUser

Adds an authorized user to the ESI Service. The ESI Service can only be accessed by authorized users. This command adds a Windows user or security group with the specified role to the ESI Service.

Disable-EMCServerCertificateValidation

Disables the server certificate validation when using SSL to communicate with the ESI Service.

Enable-EMCServerCertificateValidation

Enables the server certificate validation when using SSL to communicate with the ESI Service.

Get-EmcEntity

Gets one or more Entity objects from the Entity Graph of an ESI Service instance.

Get-EmcEntityClass

Gets the class names of entity objects in the Entity Graph of an ESI Service instance.

Get-EmcEntityRelationship

Gets one or more Entity relationship objects from the Entity Graph of an ESI Service instance. An Entity relationship represents a directional link between two Entity objects in an Entity Graph, where one Entity is the source and the other a target. This command returns entity relationship objects that satisfy the specified parameters.

Get-EmcSecurityRole

Gets the security roles for the ESI Service.

Get-EmcServiceConnectionOptions

Gets the current options for connecting to the ESI Service. Returns the current Service URL and other options for the ESI Service connection.

Get-EmcSystem

Lists all of the registered storage systems for the ESI Service.

Get-EmcSystemType

Lists all system types that are available for registration with the ESI Service.

Get-EmcUser

Gets the authorized users of the ESI Service.

Remove-EmcSystem

Unregisters (removes the registration of) a specified storage system with the ESI Service.

Remove-EmcUser

Removes an authorized user from the ESI Service. This command removes a Windows user or security group that has been granted one or more roles in the ESI Service. It can remove a single role or all roles for a user.

Set-EmcServicePolicy

Sets the system refresh interval service policy for the ESI Service.

Set-EmcServiceUrl

Sets the URL to the ESI Service for the current session. By default, the commands in the ESI Service PowerShell Toolkit connect to an instance of the ESI Service running on the local host. This command allows you to specify a URL to another ESI Service instance.

CHAPTER 16

Troubleshooting

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Troubleshooting EMC systems and hypervisors

This section describes known problems and limitations for storage systems and hypervisors.

Symptom	Prevention, resolution, or workaround
ESI does not provision LUNs in oversubscribed storage pools.	The ESI GUI does not support oversubscribed storage pools. Use ESI PowerShell Toolkit to provision LUNs in oversubscribed storage pools.
When a valid description is typed in the Storage Pool Description field, the description might not appear in the column on the Storage Pool tab.	This is a known problem. The description display is for more information and is not critical for system operations.
<ul style="list-style-type: none"> ESI fails to connect to Windows clusters or failover clusters. ESI cannot create, delete, or disconnect a cluster disk. 	<ul style="list-style-type: none"> Confirm that the clusters are healthy, which is an ESI requirement. Before deleting or disconnecting a cluster disk, remove disk resource dependencies.
Ping system timeout fails.	Set the timeout value according to your network status in ESI.
You are unable to connect to a Windows server.	<ul style="list-style-type: none"> Check that firewall rules are enabled on both controller and controllee hosts. Check that remote PowerShell is enabled on both controller and controllee hosts. Check that DNS is configured correctly.
Rescan fails to find a LUN.	<ul style="list-style-type: none"> Check that the FC Zoning is configured correctly. Check that the iSCSI initiator is logged in to the target port. Check that the multipath software is configured correctly.
<ul style="list-style-type: none"> Storage-related data does not display in the host view, cluster view, or SharePoint view. The Storage pools in the create disk wizard do not load and the wizard is blank. 	<ul style="list-style-type: none"> ESI shows storage related information for a disk or shared folder only when the corresponding storage systems are registered. Verify that the corresponding storage systems are registered with ESI (under Storage Systems). If not, register these storage systems. The storage system might be taking longer than the default time-out value of 60 seconds. Set a higher time-out value (in seconds) in the following Registry key: Key: HKLM\SOFTWARE\EMC\WSI\Config DWORD Value Name: DefaultOperationTimeout

Symptom	Prevention, resolution, or workaround
<p>One of the following error messages occurs:</p> <ul style="list-style-type: none"> Unable to get host system with given parameters. EmcVdsProxyService is not available. The operation 'RemoveHostSystem' is unsuccessful. 	<p>This might occur when trying to connect ESI to a Windows host by using ESI PowerShell cmdlets that are running within a remote PowerShell session. ESI does not support running the cmdlets within a remote PowerShell session on the ESI controller host.</p>
<ul style="list-style-type: none"> When a storage system is added to ESI, it is not listed in PowerShell. When a storage system is added in PowerShell, it is not listed in ESI. 	<p>Log out of the other application and then reopen it to refresh the list.</p>
<p>PowerShell scripts from earlier versions of ESI that use the <code>Connect-EmcSystem</code> PowerShell cmdlet fail with the "Parameter ConnectionName is needed to create the Host System Object" error.</p>	<p>For <code>ConnectEmcSystem</code>, use <code>ConnectionName</code> instead of <code>HostSystemName</code> for the <code>Creation</code> parameter.</p>
<ul style="list-style-type: none"> The <code>Set-EmcLunAccess</code> PowerShell cmdlet fails. An unmasking operation fails. 	<p>Before unmasking a LUN or using the cmdlet, ESI requires that you register all iSCSI and FC HBAs or host initiators used to unmask LUNs on the storage system.</p>
<p>Retrieval of host disks failed: Operation RefreshDisks failed on VDS proxy... error occurs.</p>	<p>When the VDS load operation uses the target host FQDN, this name resolution error occurs. To resolve this error, you must configure the Windows host file on the ESI controller host system with both the short (NETBIOS) and long (FQDN) host names.</p>
<p>For XtremIO systems, errors occur when using the following cmdlets:</p> <ul style="list-style-type: none"> <code>Get-EmcStorageRegisteredHost</code> <code>Get-EmcStorageRegisteredInitiator</code> <code>New-EmcStorageRegisteredHost</code> <code>New-EmcStorageRegisteredInitiator</code> <code>Remove-EmcStorageRegisteredHost</code> <code>Remove-EmcStorageRegisteredInitiator</code> 	<p>ESI does not support using the ESI PowerShell cmdlets related to registering hosts for XtremIO.</p>
<p>In ESI, right-clicking a tree node does not display all the menu options.</p>	<p>This is the default behavior of the MMC framework. Select an item, and then right-click to display the menu options.</p>
<p>When creating a disk, ESI fails or creates the incorrect volume size.</p>	<p>If you create a host disk and ESI fails or creates the incorrect volume size, you might need to increase the disk size.</p>

Symptom	Prevention, resolution, or workaround
If the file system type is FAT32, provisioning a storage volume fails.	FAT32 file system type for volumes is no longer supported in this release.
When you specify both the <code>-ID</code> and <code>-ConcreteLun</code> parameters together with the <code>Get-EmcLun</code> ESI PowerShell cmdlet, an <code>AmbiguousParameterSet</code> exception error occurs.	The <code>-ConcreteLun</code> switch parameter specifies the Concrete LUN type as an optional parameter, through which only Concrete LUNs can be filtered out. Do not use this parameter with the <code>-ID</code> parameter. This parameter supports only block storage systems.
When you create a virtual hard disk or pass-through SCSI disk for a virtual machine, no IDE controllers are listed.	ESI does not support IDE-based disks. Use hypervisors to create IDE-based disks.
For hypervisors, you cannot create new SCSI controllers for virtual machines.	ESI does not support creating new SCSI controllers for creating disks for virtual machines. Use the hypervisor to create new SCSI controllers. Then use ESI to create and attach the disks for virtual machines with these SCSI controllers.
For hypervisors, the Connect to Host action leads to the following error message: <code>Can't retrieve IP from MAC address:...or host name is empty.</code>	<p>Confirm the following:</p> <ul style="list-style-type: none"> • The virtual machine is a part of a reachable domain. • The supported Windows operating system is installed on that virtual machine. • The IP of that virtual machine is configured correctly. • The ESI-mandatory firewall settings are configured correctly if you want to manage the virtual machine in ESI.
For VMware, you cannot expand RDM disks that are attached with virtual compatibility mode.	For VMware systems, ESI does not support RDM disks that are created with virtual compatibility mode. Use ESI to provision disks without the virtual compatibility mode setting.
For a VMware ESX host that is connected with ESI to a virtual machine, when expanding a file-based disk on the virtual machine, the operation fails with an <code>Access to resource settings on the host is restricted to the server that is managing it</code> error message.	This is a VMware restriction for expanding file-based disks, which requires the operation to only succeed when only the vCenter host is connected and the ESX host is disconnected from ESI. Try removing the ESX host and adding the vCenter hypervisor again in ESI. Then try the expand operation again.
For VNX systems, the local administrator account status appears as Offline .	This occurs when a VNX storage array is added with a global account without administrator rights or a local administrator account, and the status is shown as Offline . VNX systems require administrator accounts with a global scope.
For VNX systems, unable to connect a host disk.	If the VNX storage array does not have Access Logix enabled, the host disk connection fails. VNX block storage systems must have Access Logix enabled on a

Symptom	Prevention, resolution, or workaround
	storage array before you connect a host disk on a Windows host.
For VNX systems, advanced snapshot LUNs can be viewed on the LUNs tab in the ESI GUI, but are not listed in ESI PowerShell.	You can view advanced snapshot LUNs in the ESI GUI. Even though the snapshots exist, you cannot currently view the list with the <code>Get-EmcSnapshotLuns</code> cmdlet.
For VNXe and Hyper-V, when you use the <code>New-EmcLun</code> cmdlet to create a LUN for Hyper-V, a "LUN does not exist" error occurs.	Update your VNXe system to version 2.3.1.20364.
For Unity and VNXe, a snapshot cannot be promoted.	If the resource has no access to the snapshot, a snapshot cannot be promoted for a host. Set up host access to the snapshot, and then the snapshot can be promoted for that host.
When adding a Unity or VNXe system, the <code>System cannot find the file specified</code> error appears when you click Test Connection .	The Unity or VNXe Unisphere CLI is not available on the controller host where ESI is running. Download and install Unisphere CLI from the EMC Online Support website. After installing Unisphere CLI on the controller host, try adding the system again.
When creating volumes for XtremIO, the Login Status is Unknown on the LUN Masking Settings page in the Create Disk wizard.	ESI cannot display the port addresses for all zoned storage system ports for XtremIO systems in the ESI GUI.

Troubleshooting the ESI VMAX Adapter

This section describes known problems and limitations for the ESI VMAX Adapter.

Symptom	Prevention, resolution, or workaround
When creating disks with the Create Disk wizard for VMAX, <code>no appropriate storage system found</code> appears as the only option on the Storage System page.	ESI does not support provisioning disks for host systems (VMware, Windows, and so on) with only iSCSI initiators (HBAs) on VMAX storage systems.
A Symmetrix system with serial not found: 123400688 error occurs when you are adding VMAX systems.	<ul style="list-style-type: none"> When adding VMAX systems to ESI, if you did not include the initial zeroes at the beginning of the serial number, an error will occur. Ensure that you include all of the required twelve digits, which might include a prefix of zeroes. For example: 000123400688.
Unable to apply a FAST VP policy to an existing storage group.	Try binding the existing LUN or storage pool in the policy storage tier with the Unisphere SYMCLI commands or SMC.

Symptom	Prevention, resolution, or workaround
Fails to add a LUN to an existing meta, meta volume, or composite LUN.	<ul style="list-style-type: none"> • Confirm that the LUN is bound. • Confirm that the specified meta volume is striped and the correct size is specified for the LUN.
The <code>Expand-EmcLun</code> cmdlet fails.	<ul style="list-style-type: none"> • Check that the specified capacity is the exact number of bytes for LUN sizes. • For striped meta volumes, check that the specified capacity is the exact multiple for the stripe size.
<p>The following tasks are not available:</p> <ul style="list-style-type: none"> • Cannot create, view, or remove snapshot LUNs in ESI. • When using the following ESI PowerShell cmdlets, results are incomplete or incorrect: <ul style="list-style-type: none"> ▪ <code>Get-EmcSnapshotLun</code> ▪ <code>New-EmcCandidateSnapshotLun</code> ▪ <code>New-EmcSnapshotLun</code> ▪ <code>Remove-EmcSnapshotLun</code> ▪ <code>Restore-EmcSnapshotLun</code> 	<p>These tasks and cmdlets are not available, because snapshot LUNs for VMAX systems are not supported in this release. Support for snapshot LUNs for VMAX is planned for a future release of ESI.</p>

Troubleshooting the ESI SharePoint Adapter

This section describes known problems and limitations for troubleshooting the ESI SharePoint Adapter.

Symptom	Prevention, resolution, or workaround
SharePoint provisioning fails when you create a web application or a SQL Server database in ESI.	<ul style="list-style-type: none"> • Verify the SQL Server authentication method and try again. Integrated Security may be used instead of SQL Authentication, or vice versa. • Verify the username and password and try again. • The provisioning wizard lists all SQL instances that are installed on the server. Ensure that the correct SQL instance is selected and that the authentication mechanism matches.
SharePoint cannot connect to the named instance when the named and default instances are on the SQL server to which SharePoint connects remotely.	<p>In a multi-server deployment where ESI and SharePoint Central Admin are on a computer that is distinct from the SQL server computer, ESI and SharePoint connect to SQL Server remotely. If the SQL Server computer has a named instance in addition to the default one, the connection to the named instance may fail. To validate the deployment scenario, ensure that SQL Management Studio can connect remotely to the target SQL Server instance.</p>

Symptom	Prevention, resolution, or workaround
	The recommended setup is to have the remote SQL Server computer with either the default instance or the named instance, but not both. If the SQL Server computer must have both the default and named instances, then SharePoint access should be limited to the default instance.
ESI cannot open a farm.	<ul style="list-style-type: none"> • Ensure that the SharePoint Foundation 2010 SP1 or SharePoint Server 2010 SP1 API is installed on the ESI host computer. • Verify that the SQL Server or configuration database name are spelled correctly and try again. • If the ESI Server cannot join the farm domain controller because of an authentication failure, verify the domain settings and try again. • Verify that the network connection to the farm is available and functioning and try again. • Verify the SQL Server authentication method that is used and try again. Integrated Security may be used instead of SQL Authentication, or vice versa. • Verify that the correct SQL instance is used. If the farm is remote, the full SQL Server and instance name is required in the same format used by SQL Server.

Troubleshooting the ESI Exchange Adapter

This section describes known problems and limitations for troubleshooting the Exchange Adapter.

Symptom	Prevention, resolution, or workaround
During discovery of Exchange DAGs, mailbox servers, or mailbox databases, the assignment statements are not allowed in a restricted language mode or data section error appears.	<p>On the Exchange mailbox server that connects to ESI, you might need to set an application setting for Windows PowerShell.</p> <p>On the Exchange mailbox server, open the Internet Information Services (IIS) Manager for Windows PowerShell and in the Application Settings, and set the PSLanguageMode to FullLanguage.</p> <p>After changing the IIS setting, restart IIS to apply the change. To restart IIS on the server, click Start > Run > IISReset > OK.</p>
Cannot locate the EDB file disk ID or log folder disk ID.	Confirm that ESI can discover the storage LUNs by adding the mailbox server as a host system in ESI and enumerating host volumes with mount points as EDB file and log folders.

Symptom	Prevention, resolution, or workaround
	If the storage LUN information is not discovered, then the storage system may need to be reconnected or the connection refreshed in ESI.

Troubleshooting the SQL Server Adapter

This section describes known problems and limitations for troubleshooting the ESI SQL Server Adapter.

Symptom	Prevention, resolution, or workaround
ESI sets the virtual machine state as Unknown and displays the following connection message: <code>Failed to connect to one or more SQL Servers.</code>	This connection message occurs if ESI scans a server and the firewall is blocking the ESI connection or you are not authenticated to access the SQL Server instance. If you select to add the unknown instances, the servers with no detected SQL Server instances are listed as Unknown in ESI.
When you add a SQL Server database to an availability group, the following error occurs: <code>Cannot drop the database database ID, because it does not exist or you do not have permission."</code>	<ul style="list-style-type: none"> • Confirm that the ESI host is connected with the correct permissions. • You might have specified a local path for the Shared Network Location field. Shared Network Location must be a Universal Naming Convention (UNC) path.
When you modify auto-generated T-SQL for bulk-create databases, ESI does not display a successful completion message.	ESI might not display any messages when you modify auto-generated T-SQL in ESI. This is a known issue that does not require a workaround.

Troubleshooting the ESI RecoverPoint Adapter

This section describes known problems and limitations for troubleshooting the ESI RecoverPoint Adapter.

Symptom	Prevention, resolution, or workaround
When enabling image access to a replica copy, the following error appears: <code>The specified replica copy has no valid snapshot, which is required to enable access to the copy.</code>	Check that the replica copy is enabled, and that the link state is in an active state.
After failing over to a remote replica copy, when enabling the replica copy that used to be the local copy, the at least one of the enabled replica copies doesn't have a	Manually create a link from the new production copy to the copy that used to be the local copy. You can do this with the <code>New-EmcReplicaLink</code> PowerShell cmdlet.

Symptom	Prevention, resolution, or workaround
defined link to the production copy error appears.	
When using VMAX with the Exchange Integration, after adding a mailbox database copy on the remote site and adding subsequent copies, the device is involved in a RecoverPoint Rcopy session and cannot be modified" or "a specified device is involved in a Remote Copy session and cannot be modified errors might appear.	<p>The copies are in a RecoverPoint session, so the SMI-S provider prevents all write operations. Do one of the following:</p> <ul style="list-style-type: none"> • Use the ESI GUI or PowerShell Toolkit to disable the replica copy manually, add the copies on the remote site, and then enable the replica copy. For other subsequent copies, repeat these steps. • Alternatively, only add subsequent copies on the local site and maintain only one remote copy on the remote site.

Troubleshooting the ESI Service and ESI SCOM Management Packs

This section describes known problems and limitations for troubleshooting the ESI Service and ESI SCOM Management Packs.

Symptom	Prevention, resolution, or workaround
When upgrading to the latest version of the ESI SCOM Management Packs, reimporting the management packs in SCOM fails.	When upgrading, SCOM requires that you delete the existing ESI version 2.1 SCOM Management Packs from SCOM before you can install and import the latest version of the SCOM Management Packs. Installing the ESI SCOM Management Packs on page 143 provides instructions.
After upgrading ESI and importing the latest version of the ESI SCOM Management Packs, your override settings for the ESI SCOM management packs no longer exist in SCOM.	<p>The EMC.SI.Customization.xml management pack file contains your SCOM overrides and customizations. When importing the management packs into SCOM, you might have overridden this file and lost your settings. You can reimport the latest backup copy of this file to retrieve your customizations.</p> <hr/> <p>Note</p> <p>This file is installed with version number 1.0.0.0. You can increment the version number when you make changes.</p> <hr/> <p>How to Import a Management Pack in Operations Manager 2007 and How to Import an Operations Manager Management Pack on Microsoft TechNet provides instructions for importing the management packs.</p>
After upgrading ESI, EMC.WinApps.Service.Director	If you are using AD or AD LDS, you might not have unpublished all systems from the ESI Service before

Symptom	Prevention, resolution, or workaround
<p>yServicesSystemDb.* errors occur in your ESI Service event log.</p>	<p>upgrading. Clean up the AD container used for the ESI Service, restart the service, and then republish the systems to the ESI Service.</p>
<p>SCOM degrades the health state of the snapshot pool for reserved LUN pools of VNX block systems, regardless of the true health state of the reserved LUN pool in Unisphere, which causes a warning error and generates an alert.</p>	<p>Unisphere does not provide an operational status for reserved LUN pools, so SCOM defaults to "unknown" for the health state of the snapshot pool. This unknown state in SCOM degrades the health of the system, which generates an incorrect warning error and alert in SCOM.</p> <p>Disable the health monitor for the snapshot pools in SCOM to avoid this incorrect warning error and alert. How to Enable or Disable a Rule or Monitor on Microsoft TechNet provides instructions.</p>
<ul style="list-style-type: none"> • SCOM does not discover or monitor some or all system components. • Event 104 appears in the SCOM agent event log, which includes basic connection information and an HTTPS link to EMC SI Service that cannot be completed. • EMC SI Service Discovery in SCOM cannot connect to the ESI Service, or the connection time is unacceptable. • Workflow processes are timing out. 	<ul style="list-style-type: none"> • Confirm that the firewall settings are correct for both the SCOM agent and ESI Service. • Enable and use EMC SI Windows Service Monitoring to confirm that the ESI Service is running on the ESI host. • Open this link on the SCOM Agent machine: <code>https://ESI Service IP:https port/esi/console/graph/Entities?class=StorageSystem</code>, replacing <i>ESI Service IP</i> and <i>https port</i> with the applicable values. Then confirm that the load time displayed at the bottom of the page is less than one second. Repeat this step a few times for consistent results. • Confirm that the SCOM agent connects successfully with the ESI Service. The connection information and link are provided in Event 104. Use the credentials specified in Setting up the EMC SI Monitoring Profiles for the SCOM agent on page 145. <p>Open the HTTP link provided in the Event 104 description and confirm that the event completes in less than two minutes. If the connection fails, investigate the cause and update EMC SI discovery overrides accordingly. Changing the discovery interval overrides on page 156 provides more details for changing the overrides.</p>
<ul style="list-style-type: none"> • The list of physical or logical components displayed in the views is not current. • SCOM does not discover new system changes. 	<p>If the components do not appear after the set interval refresh time has passed, clear and reset the Enabled override properties setting for the EMC SI Service Discovery in SCOM:</p> <ol style="list-style-type: none"> 1. Open the EMC SI Service Discovery Overrides Properties window. 2. Clear the check box for the Enabled override setting and click Apply. 3. Select the Enabled check box again. <p>This override change triggers the discovery process. Check the Operations Manager event log on the SCOM</p>

Symptom	Prevention, resolution, or workaround
	agent for two sequences: Event 1201 followed by Event 1210 . If these occurred, then the discoveries should be current.
<p>The Subscribed Capacity Presentation view in SCOM does not display the system serial numbers.</p>	<p>Create a group for each system and a favorite view for the group:</p> <ol style="list-style-type: none"> 1. In Operations Manager, go to Authoring > Groups > Create a new Group, enter a name, and select EMC Storage Integrator Customizations management pack to save changes. 2. Select Dynamic Members > Create/Edit rules and select EMC SI Storage System > Add. 3. Select Serial Number Equals <i>serial number</i> and click Create. 4. To create a view for the group, select My Workspace > Favorite Views > New > Performance View. Type a name for the view and select collected by specify rules > Storage Pool Available Capacity Performance Collection and click Create. <p>Only the pools of the specified systems are displayed.</p>
<ul style="list-style-type: none"> • Updates for the component health status take more than 40 minutes to update in the SCOM views. • Long delays exist between changes in health of components and the changes being updated in SCOM views. 	<ul style="list-style-type: none"> • Confirm that the related SCOM agent is running without performance problems. If errors occur, troubleshoot them as described in the previous resolution. • Reduce the ESI Service System Refresh Interval, which is set to 30 minutes by default. Changing the system refresh interval on page 156 has more details. • Reduce the Interval override for monitors that experience latency, which by default is set to six minutes. • Changing discovery interval overrides on page 156 has more details.
<p>One or more systems do not appear in the SCOM view and are not discovered by SCOM.</p>	<ul style="list-style-type: none"> • Confirm that the related SCOM Agent successfully connects to the ESI Service. • Confirm that the system is registered with the ESI Service. • Confirm that the System Filter file exists on the related SCOM agent and has the correct list of ESI Service Registered System Friendly Names.
<ul style="list-style-type: none"> • SCOM agent is experiencing performance problems due to a large number of monitored component instances. 	<p>Increase the local data queue on the SCOM agent machine by updating the Registry key:</p>

Symptom	Prevention, resolution, or workaround
<ul style="list-style-type: none"> • List of discovered components is not complete. Health state of components is not current and other suggestions do not work. • Event 6022 from the Health Service Script does not appear in the Operations Manager event log on the SCOM agent machine for more than 15 minutes. • Performance counters related to the CPU or memory usage are typically hitting the maximum limits. • Event 21411 from the Health Service modules appears and includes the "process will be dropped because it has been waiting in the queue for more than 10 minutes" message. • Event 1101 from the Health Service appears multiple times in the Operations Manager Event log on the SCOM agent computer. 	<ol style="list-style-type: none"> 1. Replace <MG> with the SCOM management group name and size, which can be between the default 15360 (15 MB) and 102400 (100 MB): HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\HealthService\Parameters\Management Groups\<MG>\MaximumQueueSizeKb 2. Restart the HealthService. <p>Try the Flush Health Service and Cache task. To do this:</p> <ol style="list-style-type: none"> 1. In Operations Manager, go to Monitoring > Operations Manager > Agent-Details > Agent Health State. In Agent State view, click the SCOM agent machine. 2. In the Health Service Tasks section of the Actions pane, run the Flush Health Service and Cache task. <p>Adding resources to share the monitoring can improve data and I/O performance for large storage environments. Add more SCOM agents or more ESI Services to share the monitoring of multiple systems with heavy traffic. With more than one SCOM agent to monitor one or more ESI Services, you can assign fewer systems to each SCOM agent or each ESI Service. Use the System Filter file to assign systems to different SCOM agents.</p> <p>Sample event logs on page 193 can also provide assistance with diagnosing issues.</p>
<ul style="list-style-type: none"> • SCOM agent changes to a gray state or the discovery is not complete within an acceptable time. • Too many LUN masking views are being discovered. • SCOM does not discover all of the storage groups. • The system has more storage groups than SCOM discovers. 	<p>The discovery override for the EMC SI Storage Group limits the number of discovered instances in SCOM. Confirm that the override has the correct limit. The maximum limit for this override is 5000. To improve performance, change the discovery override to a smaller number.</p>
<ul style="list-style-type: none"> • The ESI Service or the SCOM agents have connection problems. • Time-out error message Event 104 or Event 21402 occurs. 	<p>Check the Operations Manager event log for any events and connect to ESI Service from a web browser on the SCOM agent computer. Refer to Changing HTTP connection defaults on page 136 for more details. Sample event logs on page 193 include an Event 21402 log example.</p>
<p>Proxy Monitoring is not available (grayed out) in Operations Console and Event 623 occurs in Operations Manager.</p>	<p>If the Proxy Monitoring agent is monitoring systems with a large number of components, distribute system monitoring to more proxy agents . Alternatively, make</p>

Symptom	Prevention, resolution, or workaround
	the registry change as described in One or more management servers and their managed devices are dimmed in the Operations Manager Console of Operations Manager .
SCOM does not discover a VPLEX system.	<p>Check event logs for ESI Service errors and also confirm the following:</p> <ul style="list-style-type: none"> • SCOM Management Pack is set up with the correct ESI Service host and SSL port 54501. • ESI Service is running. • The user is in an administrator group (if UAC is enabled, the web browser must be launched with Run As Administrator). • The remote connection to ESI Service uses one of the following: <ul style="list-style-type: none"> ▪ http://<host>:54500/esi/console ▪ https://<host>:54501/esi/console • The firewall settings are correct for both the SCOM agent and ESI Service. • The SSL Certificate on the ESI Service host is set up correctly: Get-ChildItem cert:\LocalMachine\My • The latest service packs and cumulative updates are deployed on the SCOM agents and clients. • SCOM server and agent systems meet the minimum system requirements.
Event 21114 occurs in the Operations Manager event log.	Confirm that <code>HKLM\System\CurrentControlSet\Services\HealthService\Parameters\Persistence Version Store Maximum</code> has been changed to 5120 (decimal).
A VPLEX system does not appear in SCOM for the SCOM monitoring agent.	Check the event log for event 104 and confirm that the ESI Service connection information is set up correctly in SCOM.
VPLEX discovery times out.	<ul style="list-style-type: none"> • The SCOM agent might be monitoring too many systems. Check the event log for events: 6024, 2114, 21402. • Use the System Filter file to assign systems to specific SCOM agents.

Sample event logs

The key information is highlighted as bold text in the following event log examples. The events generated from the monitoring agent **Operation Manager** event log and alerts are also added to the **Monitoring Delays, Errors and Timeouts** view in the **Diagnostics** folder.

The following is an example of an event log with connection problems. In this example, Event 21402 occurred because of a disk drive component problem. By locating the problem component class, you can then decide which component monitor to

troubleshoot and maybe change that specific time-out interval override while resolving the problem:

```

Log Name:      Operations Manager
Source:        Health Service Modules
Date:          9/19/2012 1:24:59 PM
Event ID:      21402
Task Category: None
Level:         Warning
Keywords:      Classic
User:          N/A
Computer:      PATHENDGSCOM.PATHENDG.emc.com
Description:

Forced to terminate the following process started at 1:24:43 PM
because it ran past the configured time-out 600 seconds.

Command executed:  "C:\Windows\system32\cscript.exe" /nologo
"GetEntityStatus.js" 10.5.222.40 7001
c85793d1108ee9f4c30a970941593d7c966a2748 DiskDrive none none
True True false 0

Working Directory:  C:\Program Files\System Center Operations
Manager 2007\Health Service State\Monitoring Host Temporary
Files 1\126109\
    
```

One or more workflows were affected by this.

```

Workflow name: many
Instance name: many
Instance ID: many
Management group: JerryAir
    
```

The following is an example of an event log that has overloaded resources:

```

Event 21411
Level Warning
Source Health Service Modules

The process will be dropped because it has been waiting in the
queue for more than 10 minutes.

Command executed:  "%windir%\system32\cscript.exe" /nologo
"DiscoverLunStorageServiceNode.js" {934DBB77-5CDA-4EF8-
E2D5-37DE605B11A9} {A86B6475-C74D-7AF0-1B69-AEA88050B9EF}
ZBSCOM2007.ZBEMC.dev 10.5.222.40 7001
3f08b7000dc65c9f29417af195d75cac12f5ea3e
6bec6ca7f35635f45d6d5f54c6e4d7996f3e37b8 none none True False 0

Working Directory:
    
```

One or more workflows were affected by this.

```

Workflow name: EMC.ESI.LunStorageServiceNodeDiscoveryRule
Instance name: Bus 1 Enclosure 1
Instance ID: {A86B6475-C74D-7AF0-1B69-AEA88050B9EF}
    
```

Management group: ZBDEV

Troubleshooting Active Directory Services

This section describes known problems, limitations, or suggestions for troubleshooting the use of Microsoft Active Directory Domain Services (AD DS) and Active Directory Lightweight Directory Services (AD LDS) with applications supported by ESI.

Symptom	Prevention, resolution, or workaround
<p>The following error occurs when you add systems to ESI Applications that use AD LDS: ERROR: EMC.WinApps.Fx.Common.Directory.EsiDirectoryException: Protocol = 'Ldap', Result = 'NotExist'. NoSuchAttribute 00000057: LdapErr: DSID-0C090D11, comment: Error in attribute conversion operation, data 0, v23f0 - System.DirectoryServices.Protocols.DirectoryOperationException: The requested attribute does not exist.</p>	<p>Confirm that you configured the AD LDS instance schema with msDS-App-Configuration and msDS-Settings. If not, extend the AD LDS instance on page 28 to get these, and retry the operation.</p>
<p>The following error occurs when you add systems to ESI Applications that use AD DS: ERROR: EMC.WinApps.Fx.Common.Directory.EsiDirectoryException: Protocol = 'Ldap', Result = 'NotExist'. NoSuchObject 0000208D: NameErr: DSID-03100213, problem 2001 (NO_OBJECT), data 0, best match of: 'DC=EMC,DC=Storage,DC=Integrator,DC=COM' --> System.DirectoryServices.Protocols.DirectoryOperationException: The object does not exist.</p>	<ul style="list-style-type: none"> • For ESI, MMC, and the ESI PowerShell Toolkit, confirm the container for the user exists. • For ESI Service, confirm a container exists for each ESI Service machine name. • Confirm that ESI has read and write permissions for the container and it is accessible to ESI. Setting up Directory Services integration for ESI applications on page 28 provides details.

ESI logs

ESI log details include the following:

- ESI Controller Default log location: C:\Users\administrator.ESIAD\AppData\Local\EMC\ESI\Logs
- Default log level: Verbose (Valid log levels: Verbose, Information, Warning, Error, Critical)
- Log level settings: C:\Program Files\EMC\EMC Storage Integrator\EMC.WinApps.GUI.Mmc.dll.config
- To change the log level, edit the initializeData parameter as shown in the Log level setting.

Figure 4 Log level setting

```

6 .....<source name="WSICentralSource">
7 .....<listeners>
8 .....<clear />
9 .....<add type="EMC.WinApps.Fx.Diagnostics.FxTraceListener, EMC.WinApps.Fx.Common" name="tex
10 .....<traceFilePath="%LOCALAPPDATA%\EMC\ESI\Logs"
11 .....<prefix="ESITrace"
12 .....<traceOutputOptions="DateTime, ProcessId, ThreadId"
13 .....<singleFileLengthLimit="1024000"
14 .....<totalFileLengthLimit="409600000">
15 .....<filter type="System.Diagnostics.EventTypeFilter" initializeData="Information" />
16 .....<!-- Other valid settings for traceOutputOptions: ProcessId, ThreadId. Multiple value
17 .....<!--<filter type="EMC.WinApps.Fx.Diagnostics.AdapterTraceFilter, EMC.WinApps.Fx.Common
18 .....</add>
19 .....<!--<add type="System.Diagnostics.ConsoleTraceListener" name="consoleListener" />-->
20 .....</listeners>
21 .....</source>

```

EMC Sales and Customer Service contacts

EMC support, product, and licensing information can be obtained as follows:

- Product information: For documentation, release notes, and software updates, or for information about EMC products, licensing, and service, go to [EMC Online Support](#) (registration required).
- Technical support: Go to EMC Customer Service on the EMC Online Support website. To open a service request through EMC Online Support, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or to answer any questions about your account.