User Guide - English

FUJITSU Software ServerView

Out-Of-Band RAID Management Pack V8.5 for Microsoft SCOM

June 2019 Edition

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1 Introduction

The PRIMERGY ServerView Suite from Fujitsu offers numerous ServerView integration modules which enable PRIMERGY servers to be integrated easily into other enterprise management systems.

This manual describes the *'Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack'* which provides additional Out-Of-Band RAID monitoring functionality for the integration of Fujitsu PRIMERGY Out-Of-Band Servers into Microsoft System Center Operations Manager (SCOM). The Out-Of-Band RAID Management Pack is an Add-On Management Pack to the base *'Fujitsu PRIMERGY Out-Of-Band Server - Base Management Pack'*.

Out-Of-Band within the context of this Management Pack and document means that no installed SCOM agent is required on the monitored PRIMERGY server and all communication for discovery and monitoring is done Out-Of-Band with the integrated Remote Management Controller (iRMC) of the PRIMERGY server. This allows integration and monitoring of servers running Operating System versions which are typically unsupported by SCOM. No additional software is needed on the monitored Server.

Out-Of-Band RAID monitoring is supported for selected RAID Adapters only and when the server is powered on and not in BIOS POST or Setup.

The RAID Management Pack uses the DMTF Redfish protocol to access the RAID specific information for component discovery and monitoring from the iRMC. Redfish support is available iRMC S5 based PRIMERGY servers and with iRMC S4 firmware version 9.x.

Monitored RAID components are displayed within SCOM by means of icons.

If errors are detected by the supported RAID Adapter the associated component will indicate the severity of the problem as warning (pre-fail) or error (failed) condition. This information is periodically evaluated by the monitors running on the SCOM server for the Out-Of-Band Server instance and the health state of the component is set accordingly. Furthermore, rules can be applied which trigger an appropriate action when a fault is detected, e.g. a mail describing the fault might be sent to hardware support.

For detailed analysis or additional information the iRMC Web Interface can be started directly.

The current ServerView Out-Of-Band Server Integration Pack for SCOM is provided on the latest PRIMERGY ServerView Suite DVD2 from Fujitsu or under:

http://download.ts.fujitsu.com/prim_supportcd/SVSSoftware/

1.1 Purpose and target groups

This manual is intended for system administrators, network administrators and service technicians who have a thorough knowledge of hardware and software. Likewise, a sound basic knowledge of the Microsoft System Center Operations Manager is required.

1.2 Changes since the last edition

1.2.1 Changes since version 8.4

The *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* V8.5 contains the following changes compared to the V8.4 version

- Add adapter and enclosure information to logical hardware elements to better identify the component in multi adapter environments.

1.3 ServerView Suite link collection

Via the link collection, Fujitsu provides their customers with numerous downloads and further information on the ServerView Suite and PRIMERGY servers

In "ServerView Suite" on the left side, links are offered on the following topics:

- Forum
- Service Desk
- Manuals
- Product information
- Security information
- Software downloads
- Training

The downloads include the following:

- Current software versions for the ServerView Suite and additional Readme files.
- Information files and update sets for system software components (BIOS, firmware, drivers, ServerView Agents and ServerView Update Agents) for updating the PRIMERGY servers via ServerView Update Manager or for locally updating individual servers via ServerView Update Manager Express.
- The current version of all documentation on the ServerView Suite.

All downloads from the Fujitsu web server are free of charge.

For PRIMERGY servers, links are offered on the following topics:

- Service Desk
- Manuals
- Product information
- Spare parts catalogue

Access to the ServerView link collection

You can reach the link collection of the ServerView Suite in various ways:

1. Via ServerView Operations Manager.

   ▶ Select *Help – Links* on the start page or on the menu bar.
   This opens the start page of the ServerView link collection.

2. Via the start page of the online documentation for the ServerView Suite on the Fujitsu manual server.

   The start page of the online documentation can be reached via the following link: http://manuals.ts.fujitsu.com

   ▶ In the selection list on the left, select *x86 servers*.

   ▶ Click the menu item *PRIMERGY ServerView Links*.
   This opens the start page of the ServerView link collection.

3. Via the ServerView Suite DVD2

   ▶ In the start window of the ServerView Suite DVD2, select the option *Select ServerView Software Products*.

- Click *Start* to open the page with the software products of the ServerView Suite.
- On the menu bar select *Links* to open the start page of the ServerView link collection.

1.4 Documentation for ServerView Suite

The documentation can be downloaded free of charge from the Internet. You will find the online documentation at http://manuals.ts.fujitsu.com under the link *x86 servers*.

For an overview of the documentation to be found under ServerView Suite as well as the filing structure, see the ServerView Suite sitemap (*ServerView Suite -Site Overview*).

1.5 Notational Conventions

The following notational conventions are used in this manual:

⚠	**Warning** This symbol is used to draw attention to risks which may represent a health hazard or which may lead to data loss or damage to the hardware
ℹ	**Information** This symbol highlights important information and tips.
▸	This symbol refers to a step that you must carry out in order to continue with the procedure.
italics	Commands, menu items, names of buttons, options, file names and path names are shown in italics in descriptive text.
<variable>	Angle brackets are used to enclose variables which are replaced by values.

Screen Output

Please note that the screen output shown in this manual may not correspond to the output from your system in every detail. System-related differences between the menu items available can also arise.

2 Integration requirements

Management station

- Microsoft System Center 2019 / 2016 / 2012 R2 / 2012 SP1 Operations Manager with latest updates
- SQL Server 2019 / 2016 / 2014 / 2012 / 2008.
  See the requirements for the relevant SCOM version
- Installed .NET Framework 4.5 or later is highly recommended
- Installed 'Fujitsu PRIMERGY Out-Of-Band Server - Base Management Pack'

Managed PRIMERGY servers

- Network access to the embedded Management Controller iRMC (integrated Remote Management Controller)
  - Out-of-band RAID monitoring:
    - iRMC S5 with firmware 1.23P or later is supported.
    - iRMC S4 with firmware 9.05F or later is supported.
- Local iRMC user account with Redfish Administrator privilege.
- Supported RAID Adapter for Out-Of-Band RAID monitoring.
- For a list of supported RAID Adapters see the following White Papers:
  iRMC S5:
  https://sp.ts.fujitsu.com/dmsp/Publications/public/wp-svs-irmcs5-oob-raid-hdd.pdf
  iRMC S4:
  https://sp.ts.fujitsu.com/dmsp/Publications/public/wp-SVS-ooB-RAID-HDD-en.pdf

3 Installation and uninstallation

3.1 Installing ServerView Integration Pack

The installation program *SVISCOM-OutOfBand.exe* for the Out-Of-Band Integration Pack (which contains multiple Management Packs) is located on the ServerView Suite DVD2 at

<DVDroot>\SVSSoftware\Software\Integration_Solutions\SCOM

Alternatively it is available as a download from:
http://download.ts.fujitsu.com/prim_supportcd/SVSSoftware/

The installation program first runs some basic checks then start the Installation Wizard. Follow the instructions displayed during the installation process.

3.1.1 Installed files

The default installation path on the management station is:

– %ProgramFiles%\Fujitsu\ServerView Suite\SCOM Integration

The following files are copied into the installation directories:

Folder	Files

Common sub folder	• *sv-intpack-scom-adm-en.pdf*
	• *Whitepaper SCOM OMS integration-en.pdf*
	• *OMS Views Subfolder:*
	  ○ ServerView® PRIMERGY Server Health.omsview
	  ○ ServerView® PRIMERGY Power Consumption.omsview
	  ○ ServerView® PRIMERGY Ambient Temperature.omsview
	  ○ ServerView® iRMC Login and AVR Started.omsview
	  ○ Windows Power Consumption.omsview

SVSICOM-OutOfBand sub folder	• *EULA_en.pdf* • *EULA_ja.pdf* • *Quick Installation Guide.pdf* • *sv-intpack-scom-outofband-en.pdf* • *sv-intpack-scom-outofband-perfmon-en.pdf* • *sv-intpack-scom-outofband-RAID-en.pdf (this file)*
Management Packs sub folder	• *Fujitsu.ServerView.Library.mp* • *Fujitsu.ServerView.Image.Library.mpb* • *Fujitsu.ServerView.IntegrationPackAdmin.mpb (optional)* • *Fujitsu.ServerView.Monitoring.Cloud.mpb (optional)* • *Fujitsu.Servers.PRIMERGY.OutOfBand.iRMC.mpb* • *Fujitsu.Servers.PRIMERGY.OutOfBand.mpb* • *Fujitsu.Servers.PRIMERGY.OutOfBand.PowerMgmtTask.mpb (optional)* • *Fujitsu.Servers.PRIMERGY.OutOfBand.PerfMon.mpb (optional)* • *Fujitsu.Servers.PRIMERGY.OutOfBand.PerfMon.Overrides.xml (optional)* • *Fujitsu.Servers.PRIMERGY.OutOfBand.PerfMon.Cloud.mpb (optional)* • *Fujitsu.Servers.PRIMERGY.OutOfBand.PerfMon.Cloud.Overrides.xml (optional)* • *Fujitsu.Servers.PRIMERGY.OutOfBand.RAID.mpb (optional)*

No automatic import of the installed Management Pack files is performed. You have to manually import the desired Management Packs into SCOM.

After installation start the SCOM console with the command *Microsoft.EnterpriseManagement.Monitoring.Console.exe /clearcache.*

In case other Fujitsu Integration Packs are also installed on the SCOM, the folder *Management Packs* may contain both the old *ServerView Core Library* (*Fujitsu.ServerView.Library.mp*) and the new *ServerView Core Library* (*Fujitsu.ServerView.Library.mpb*) after installation.

Please note that to install the new *ServerView Core Library* (*Fujitsu.ServerView.Library.mpb*) it is imperative not to also select the old *ServerView Core Library* (*Fujitsu.ServerView.Library.mp*) for import into SCOM. If both Libraries are selected, SCOM will refuse to import any of them.

3.1.2 Importing Management Packs

Management packs installed by the ServerView Out-Of-Band Server Integration Pack are located the folder 'Management Packs' within the installation folder. This folder holds all management packs from ServerView Integration Packs for System Center Operations Manager not only from the ServerView Out-Of-Band Server Integration Pack.

The *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* is an optional Management Pack which provides additional functionality for the Out-Of-Band monitoring of Fujitsu PRIMERGY Servers. If the Out-Of-Band Server does not have a supported Out-Of-Band RAID Adapter or if you do not need the additional functionality, the *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* can be removed from SCOM.

PRIMERGY Management Packs are imported in the usual way from the SCOM Console.

Close the SCOM Console once after importing management packs to avoid locked files.

3.2 Update to a new version

Update installation is currently not supported by the ServerView Out-Of-Band Server Integration Pack. The recommended process is a full uninstallation of the old version followed by the installation of the new version.

> The Management Packs of the ServerView Out-Of-Band Server Integration Pack themselves are usually update-compatible starting with version 8.3.
> New management packs can be imported on top of the old management packs.
>
> You can do this either manually or use the Fujitsu ServerView Administration Page. See *sv-intpack-scom-adm-en.pdf* for its usage.

Follow chapter 3.3 Uninstalling ServerView Integration Pack to uninstall the old ServerView Out-Of-Band Server Integration Pack.

Follow chapter 3.1 Installing ServerView Integration Pack to install the new ServerView Out-Of-Band Server Integration Pack.

3.3 Uninstalling ServerView Integration Pack

The ServerView Out-Of-Band Server Integration Pack is uninstalled via the following steps:

- Remove the corresponding override management packs if any from SCOM.
  To keep existing override settings, e.g. to re-use in a new version, the override management packs should be exported and saved.
- Remove the PRIMERGY Out-Of-Band Server Management Packs from SCOM.

  If other ServerView Integration Packs for System Center Operations Manager have been installed, the ServerView Library Management Packs cannot be uninstalled.

- Uninstall the ServerView Out-Of-Band Server Integration Pack from the SCOM server.

  To remove the Management Packs you need SCOM administrator rights. The old ServerView Out-Of-Band Server Integration Pack should be removed from all SCOM Remote Consoles.

3.4 Updating the ServerView Library Management Packs

The ServerView Library Management Pack and the ServerView Image Library Management Pack are used and referenced by all Fujitsu ServerView Integration Packs for System Center Operations Manager.

If a ServerView Integration Pack contains a newer version of one of the ServerView Library Management Packs this new version can usually be imported into SCOM without impact to any other Fujitsu ServerView Integration Management Packs.

In the rare case that a new version of one of the ServerView Library Management Packs is not compatible with the old version, it is necessary to uninstall all Fujitsu Management Packs including their Override Management Packs and reinstall all Fujitsu Management Packs from the folder ‘Management Packs’ together with the updated ServerView Library and ServerView Image Library Management Packs.

3.5 Restoring default View properties

The following steps are only recommended if you have updated from an earlier version of the Management Pack and the screenshots in the documentation show major differences to your local views (e.g. there are still major differences after you have set the view to its default via 'Personalize View' → 'Reset to Default').

The SCOM console saves view preferences in the local registry of the current user. When you delete an earlier version of the Management Pack these stored preferences will not be deleted by SCOM and as a result will be used again when an updated version of the Management Pack is installed. In case the definitions for the default view properties have been changed this might result in in a mismatch between the actual settings (even if the previous default settings have not been changed by the user) and the recommended default view. In order to restore the default view properties you have to manually delete the old settings from the registry and restart the SCOM console.

Changing or removing settings from the registry is only for experienced users. Always back up your data before doing any modification!

These view preferences are stored locally in the registry on the UI machine and override what is in the database with the management pack.

On the machine that has the UI installed remove this:

*HKEY_CURRENT_USER\Software\Microsoft\Microsoft Operations Manager\3.0\Console**GUIDViewname***

Where **GUIDViewname** is: GUID+ViewName

Here is an example of a user customization done on the 'Raid Adapter State' view:

672bd6c0-6961-1aba-5cff-16302bdc0d32Fujitsu.Servers.PRIMERGY.OutOfBand.RAID.Adapter.State.View

4 Properties of the Out-Of-Band RAID Management Pack

4.1 Management Packs

The *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* Bundle contains additional definitions for discovery and monitoring the RAID components of an Out-Of-Band Server via the integrated iRMC. This is independent from the installed Server Operating System (Windows/Linux/ESXi/BSD or any other operating system). The Management Pack Bundle cannot be modified or exported.

The file name of this package is *Fujitsu.Servers.PRIMERGY.OutOfBand.RAID.mpb.*

4.2 RAID Subsystem

The RAID Subsystem group object is the top level object for all RAID related objects of the Out-Of-Band Server. It is created during discovery when at least one supported RAID Adapter is found. The Out-Of-Band RAID Subsystem information of a managed Out-Of-Band Server consists of the following information:

- Supported RAID Adapters (e.g. 'FTS PRAID EP400i (0)')
- Logical Drives of the RAID Adapter
- Physical Disks connected directly to a port of the RAID Adapter (e.g. internal disks)
- Physical Disks connected to an enclosure on a port of the RAID Adapter (e.g. enclosure disks)
- Enclosures connected to a port of the RAID Adapter (e.g. internal backplanes or external Fujitsu ETERNUS Storage Systems)
- Optional Fans / Power Supplies and Temperature Sensors of an enclosure

For a detailed description of the presentation of the RAID components see section "Views" on page 34.

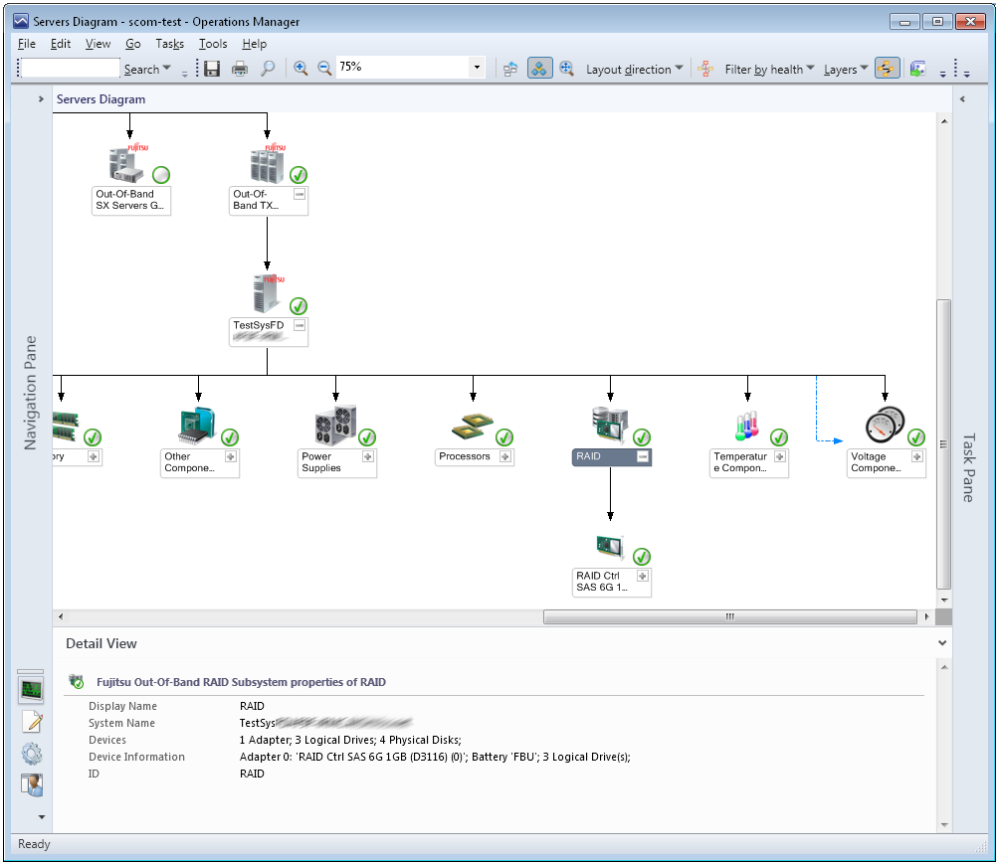


Figure 1 - Out-Of-Band Server with discovered RAID Subsystem

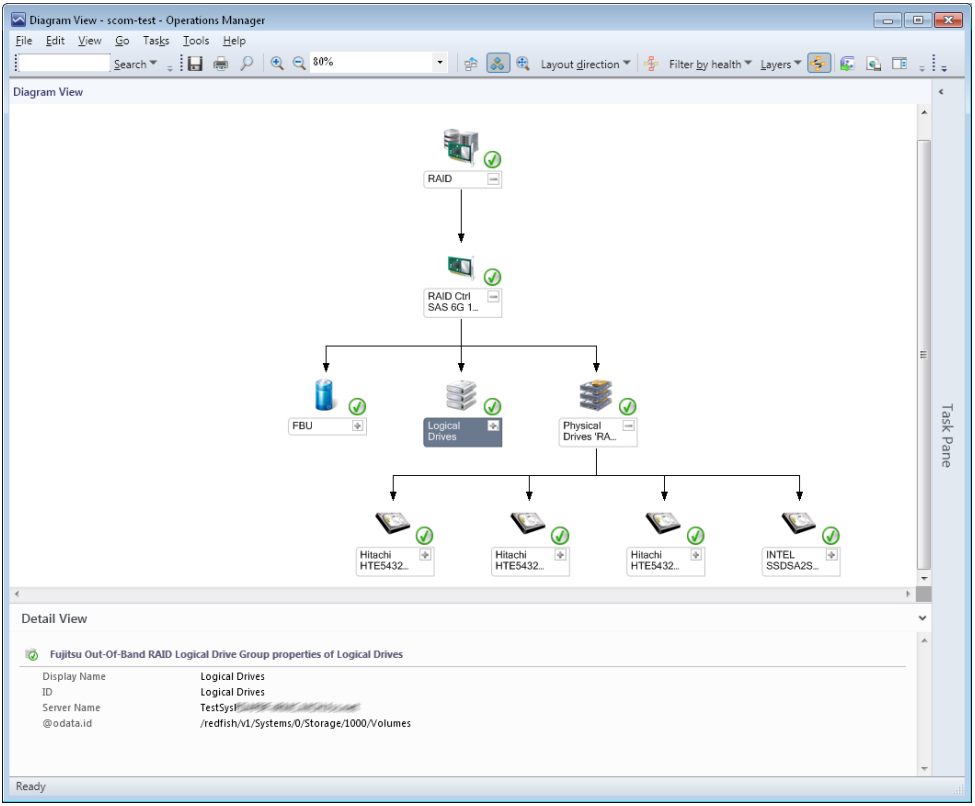


Figure 2 - Out-Of-Band Server RAID Subsystem diagram view of a simple configuration

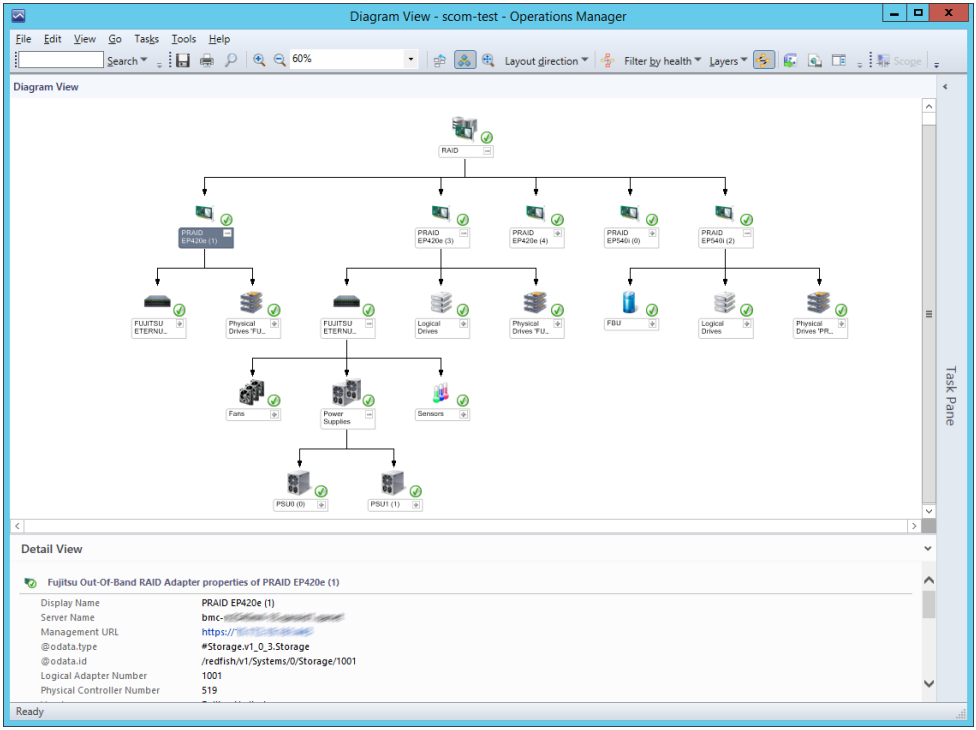


Figure 3 - Out-Of-Band Server RAID Subsystem with multiple Adapters and ETERNUS Enclosures

4.3 Discovering and monitoring RAID components of Out-Of-Band Servers

The discovery of the RAID components of a PRIMERGY Out-Of-Band Server runs for every discovered SCOM Fujitsu Out-Of-Band Server instance. The discovery script is evaluating the RAID Redfish data response from the iRMC and creates object instances as needed. The interval for the discovery can be configured with an override.

If the RAID subsystem is present, detailed component information is collected and objects are created representing these RAID component. As top level object the RAID Subsystem is created below the Out-Of-Band Server as hosted object. Single components of this RAID subsystem are monitored using PowerShell scripts which evaluate the Health State data reported by the iRMC for the individual RAID component.

RAID data is only available if supported RAID Adapters are present in the designated PCIe Slots and the system power is on and the system is not in POST or BIOS/Setup phase. Please check the documentation for your PRIMERGY server which slot supports Out-Of-Band RAID Information and which RAID Adapter are supported.

4.3.1 Displayed properties of RAID components

Depending on the RAID component, different properties will be displayed based on the collected asset or inventory information. Status and other volatile component information will not be collected / stored for the object instances.

The properties of a discovered RAID component are displayed in the *Detail View* below a *Status* or a *Diagram* view.

4.3.1.1 RAID Adapter

The following properties of a RAID Adapter are displayed:

- *Display Name:* String containing vendor, product and adapter number
- *Adapter Number:* The logical RAID adapter number
- *Vendor:* The vendor of the RAID adapter
- *Product:* The product name of the RAID adapter
- *Serial Number:* The serial number of the RAID adapter
- *SAS Address:* The internal SAS address of the adapter
- *Protocol:* The internal access protocol the adapter is using (e.g. 'SAS1200')
- *Driver Name:* Name of the in-band (Operating System) driver (if available)
- *Driver Version:* Version of the in-band (Operating System) driver (if available)
- *Firmware Package Version:* Version of the adapter firmware package
- *Bus Type:* The bus type of the adapter
- *Vendor ID:* The PCI vendor Id of the adapter in hexadecimal notation
- *Device ID:* The PCI device Id of the adapter in hexadecimal notation
- *Sub Vendor ID:* The PCI Sub vendor Id (e.g. 1734 for Fujitsu)
- *Sub Device ID:* the PCI Sub Device ID of the adapter

- *Max Port Count:* The maximum port count used of the adapter
- *Boot Logical Drive Number:* The configured logical drive number the adapter reported to the BIOS to as boot option device.
- *SMART Support:* If SMART support has been enabled on the adapter
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.1.2 Logical Drive

The following properties of a RAID Adapter are displayed:

- *Display Name:* The configured name of the logical drive
- *Logical Size:* the size of the logical drive in Gigabytes Bytes
- *RAID Level:* The configured RAID level of the logical drive (e.g. RAID-0 / RAID-5 / RAID-10 etc.)
- *Stripe Size:* The configured stripe size of the logical drive (e.g. 64kByte)
- *Read Mode:* The configured Read Mode of the logical drive (e.g. 'read ahead')
- *Cache Mode:* The configured Cache Mode of the logical drive (e.g. 'direct')
- *Access Mode:* The configured access mode of the logical drive (e.g. 'read write')
- *Disk Cache Mode:* The configured disk cache mode of the logical drive (e.g. enabled / disabled)
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.1.3 Battery attached to a RAID Adapter

The following properties of a RAID Battery are displayed:

- *Display Name:* The name of the battery
- *Vendor:* The vendor of the battery
- *Manufacturing Date:* the manufacturing date of the battery
- *Serial Number:* Serial number of the battery
- *Design Voltage:* The nominal voltage of the battery in Volt
- *Design Capacity:* The capacity in Joule of the battery
- *Intelligent BBU:* Indicates if the battery has enclosed electronics or not
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.1.4 Physical Disk

The following properties of physical disk are displayed:

- *Display Name:* String containing vendor, product and slot number of the physical disk
- *Device Number:* The internal device number of the disk
- *Port Number:* The port this disk is attached to (direct or via an enclosure)
- *Enclosure Number:* The enclosure number this disk is contained in. For directly to a port attached (internal) disks this is 'N/A'
- *Slot Number:* The slot number of the disk. For a detailed description of assigned slot numbers please see the hardware documentation of your system or enclosure
- *Type:* The type of the physical disk (e.g. 'SATA' or 'SAS')
- *Media Type:* The media type of the physical disk (e.g. 'HDD' or 'SSD')
- *Vendor:* The vendor of the physical disk
- *Product:* The product name of the physical disk
- *Serial Number:* The serial number of the physical disk
- *Firmware Version:* The firmware version of the physical disk (if available)
- *Physical Size:* The raw physical size of the physical disk in Gigabytes (e.g. 160GB)
- *SAS Address:* The internal SAS address of the physical disk
- *Transfer Speed:* The theoretical maximum transfer speed of the physical interface in Gigabit per second (e.g.12 Gps)
- *PRM:* Rotation per Minute (e.g. 7200 rpm)
- *Foreign Configuration:* Indicates if the disk is from another RAID adapter and is foreign to the local adapter (e.g. 'No' / 'Yes')
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.1.5 RAID Enclosure

The following properties of a RAID enclosure are displayed:

- *Display Name:* combined string of vendor, enclosure model and enclosure number
- *Port Number:* The port number this enclosure is connected to
- *Enclosure Number:* The enclosure number
- *Vendor:* The vendor of the enclosure

- *Product:* The product name of the enclosure
- *Hardware Version:* The Hardware Version of the enclosure (if available)
- *SAS Address:* The internal SAS address of the enclosure
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.1.6 Enclosure Fan

The following properties of a RAID enclosure fan are displayed:

- *Display Name:* The name of the Fan
- *Location:* String describing the location of the fan within the enclosure
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.1.7 Enclosure Power Supply

The following properties of a RAID enclosure power supply are displayed:

- *Display Name:* The name of the Power Supply
- *Serial Number:* The serial number of the Power Supply (if available)
- *Part Number:* The part number of the Power Supply (if available)
- *Hardware Version:* The hardware version of the Power Supply (if available)
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.1.8 Enclosure Temperature Sensor

The following properties of a RAID Adapter are displayed:

- *Display Name:* The name of the sensor
- *Location:* String describing the location of the sensor within the enclosure
- *Management URL:* URL used for Out-Of-Band Server Monitoring

4.3.2 Health state of a RAID component

The health state of a RAID component of the Out-Of-Band server is determined by periodically running SCOM monitor scripts and the health state is then typically rolled up to the next instance. The component with the most severe error determines the final health state of the

RAID subsystem and the PRIMERGY Out-Of-Band server. This means component redundancy is not supported. Any redundancy evaluation and propagation is performed internally by the RAID Adapter itself.

4.3.3 RAID Health Roll-Up Monitors

Based on the specific redundancy and fault tolerance of a RAID subsystem the failure of one or more physical disk is propagated to the logical drive as degradation or failure by the RAID Adapter itself. Therefore the direct 1:1 health roll-up from any failed physical disk group to the RAID adapter is disabled by default since it would not represent the correct health state of the RAID system.

Note: this default setting can be changed with an override.

The Out-Of-Band RAID Management Pack defines the following default Health Roll-up monitors between single components and the next higher level host. The default settings can be changed with an override.

- RAID Subsystem → Out-Of-Band Server
- RAID Adapter → RAID Subsystem
- RAID Battery → RAID Adapter
- RAID Logical Drive Group → RAID Adapter
- RAID single Logical Drive → RAID Logical Drive Group
- RAID Physical Disk Group → RAID Adapter (Note: disabled by default, see note)
- RAID single Physical Disk → RAID Physical Disk Group
- RAID Enclosure → RAID Adapter
- RAID Enclosure Fan Group → RAID Enclosure
- RAID single Enclosure Fan → RAID Enclosure Fan Group
- RAID Enclosure Power Supply Group → RAID Enclosure
- RAID single Enclosure Power Supply → RAID Enclosure Power Supply Group
- RAID Enclosure Sensor Group → RAID Enclosure
- RAID single Enclosure Sensor → RAID Enclosure Sensor Group

4.3.4 RAID component diagram items

In SCOM diagram views Out-Of-Band Server RAID components are shown with their icons and the 'Details View' contains the actual values of the collected properties during discovery.

4.3.4.1 RAID Subsystem

This is a container group for all discovered RAID Adapters which build the RAID Subsystem of the Out-Of-Band Server. The base class is Fujitsu Health Collection and this object will also be shown in the 'Health Collection View' defined by the Fujitsu ServerView Core Library. The 'Devices' property contains a summary with the number of discovered RAID components. The 'Device Information' property contains more summary details about the discovered components.

Icon	Information	
	*Display Name:* *System Name:* *Devices:* *Device Information:*	'RAID' < e.g. 192.168.1.100> < e.g. 1 Adapter; 1 Logical Drive; 4 Physical Disks;> < e.g. Adapter 0: 'FTS PRAID EP400i (0)'; 1 Logical Drives; Port 0: Disk Types: '500 GB': 4>

4.3.4.2 RAID Adapter

For every discovered Out-Of-Band RAID Adapter an instance is created and the health state is monitored.

Only supported RAID adapters are discovered (e.g. on-board RAID solutions are typically not supported). Please consult your hardware documentation for your server to find if your RAID solution is supported or which RAID adapter products are supported for Out-Of-Band monitoring.

Icon	Information	
	*Display Name:* *Note: for a list of Adapter properties see 4.3.1.1*	< e.g. FTS RAID Ctrl SAS 6G 1GB (D3116C) (0)>'

4.3.4.3 RAID Battery

If your RAID adapter comes with a Battery Backup Unit (BBU) this Battery is internally monitored by the RAID adapter and will also be discovered and monitored by SCOM.

Icon	Information	
	*Display Name:* *Note: for a list of Battery properties see 4.3.1.3*	< e.g.'FBU'>'

4.3.4.4 RAID Logical Drive

Logical Drives are discovered and monitored in relation to the hosting RAID Adapter. They are grouped together in the 'Logical Drives' group object.

Logical Drives which span over multiple RAID Adapters are not supported.

Icon	Information	
	*Display Name:*	'Logical Drives'
	*Display Name:* *Note: for a list of Logical Drive properties see: 4.3.1.2*	< e.g. 'LogicalDrive_6 (6)' >)

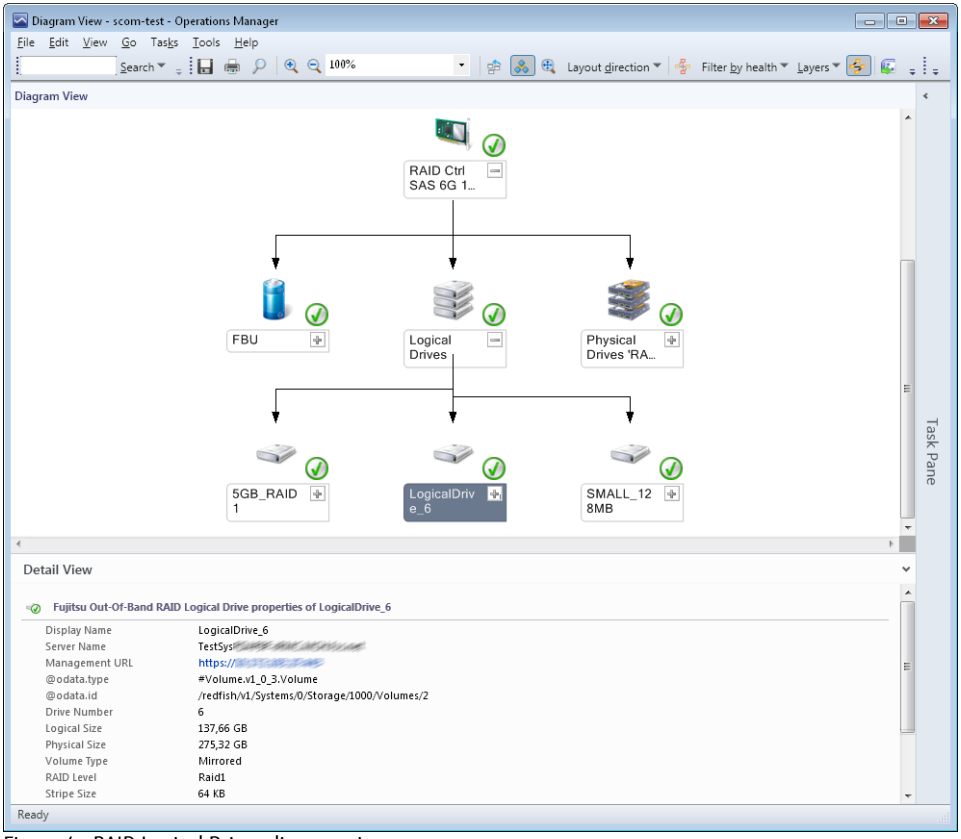


Figure 4 - RAID Logical Drives diagram view

4.3.4.5 RAID Physical Disks

Physical Disks are discovered and monitored in relation to the either the Port of the hosting RAID Adapter they are directly connected to, or in relation to the RAID enclosure they are contained. For every port containing physical disks and every RAID enclosure a group object is discovered.

Based on the specific redundancy and fault tolerance of a RAID subsystem the failure of one or more physical disk is propagated to the logical drive as degradation or failure by the RAID Adapter itself. Therefore the direct 1:1 health roll-up from any physical disk group to the RAID adapter is disabled by default since it would not represent the correct health state of the RAID system.

Note: this default setting can be changed with an override.

Icon	Information	
	*Display Name:*	'Physical Disks '
	*Display Name:* *Note: for a list of Physical Disk properties see: 4.3.1.4*	< e.g. ' SEAGATE ST9146803SS (1:4)' >)

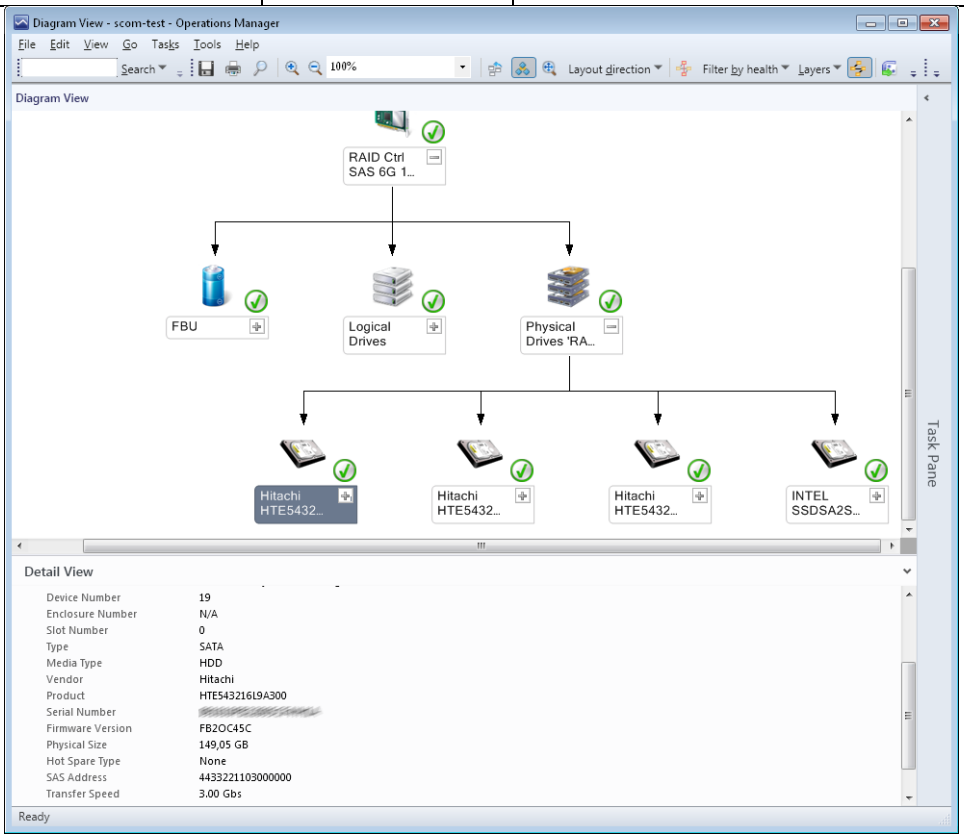


Figure 5 - RAID Physical Disks connected to a Port Diagram View

4.3.4.6 RAID Enclosure

RAID enclosures are connected to a port of the RAID Adapter. They can be either internal enclosures (e.g. backplanes for 24 disk drives with an integrated SES processor device) or external enclosures.
Supported external enclosures are Fujitsu ETERNUS JX40, JX40 S2, JX60 and JX60 S2.

Icon	Information	
	*Display Name:* *Note: for a list of Enclosure properties see 4.3.1.5*	< e.g.'FUJITSU ETERNUS JX40 (1:1)'>'

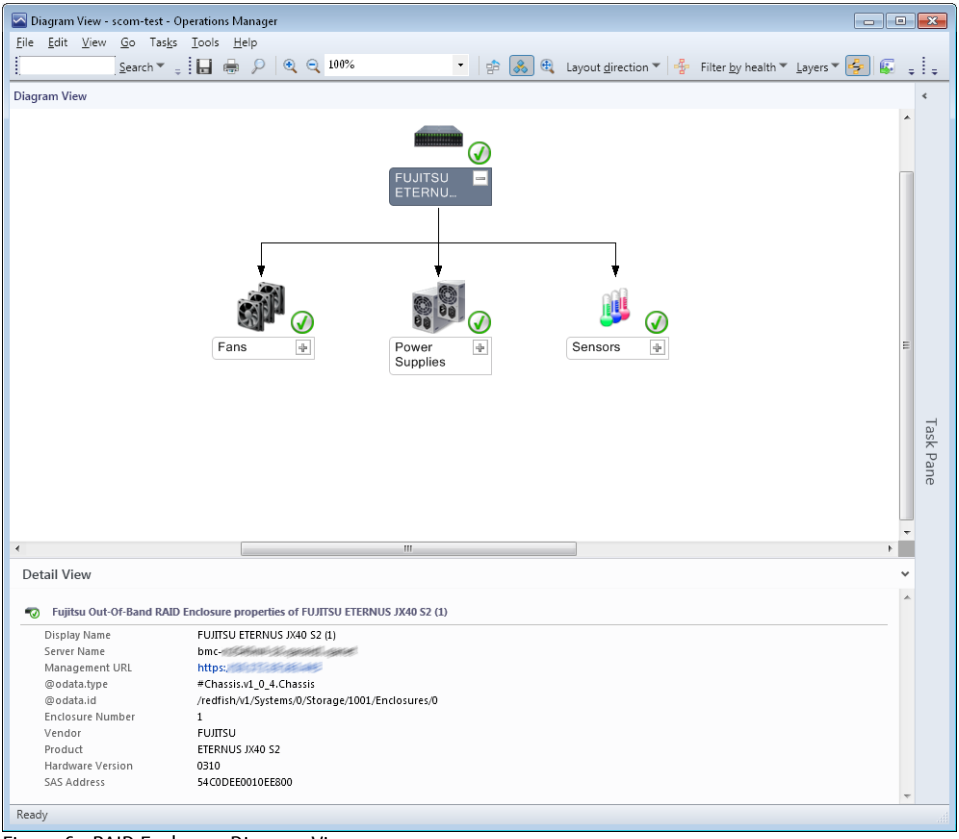


Figure 6 - RAID Enclosure Diagram View

4.3.4.7 RAID Enclosure Fans

Fan modules of selected Fujitsu ETERNUS enclosures are discovered and their health state is monitored.
Supported external enclosures are Fujitsu ETERNUS JX40, JX40 S2, JX60 and JX60 S2.

Fans which are not populated are discovered as 'not present' component by default. Not present components are used to indicate possible build-to-order configurations of the RAID enclosure and are not monitored.

Note: This can be changed with an override for the discovery.

Icon	Information	
	*Display Name:*	'Fans'
	*Display Name:* *Note: for a list of Fan properties see: 4.3.1.6*	< e.g. 'FAN0 PSU1 (1)' >
	*Display Name:* *Status:*	< e.g. 'FAN0 PSU2 (2)' > 'Not installed'

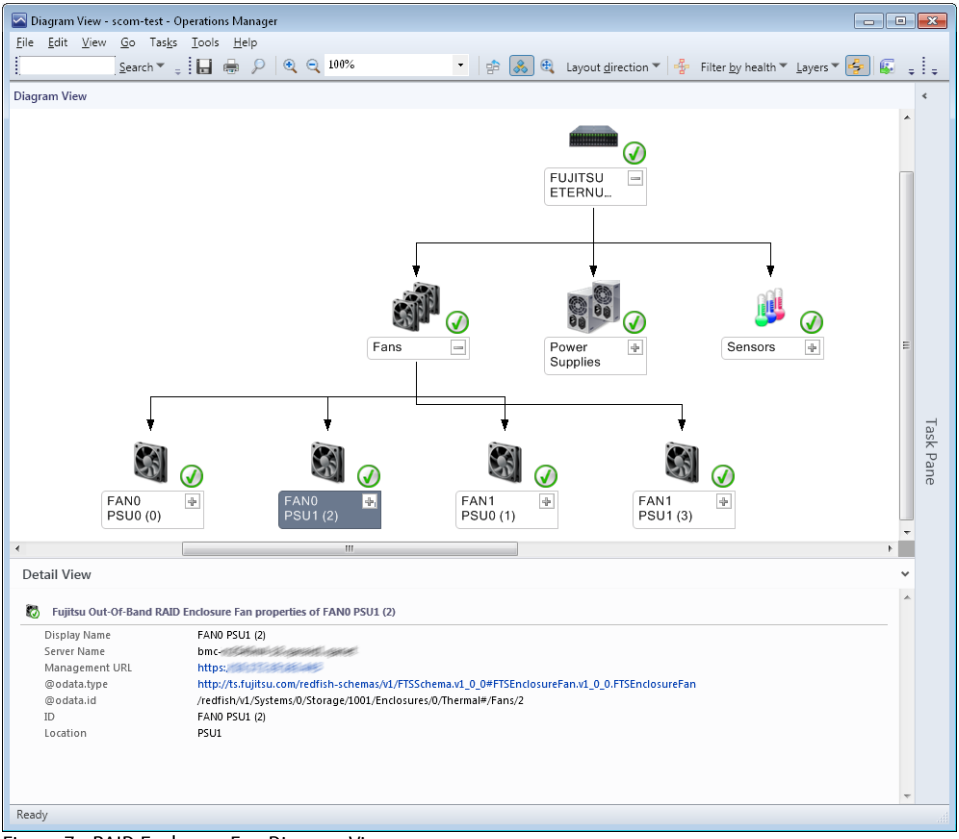


Figure 7 - RAID Enclosure Fan Diagram View

4.3.4.8 RAID Enclosure Power Supplies

Power Supplies of selected Fujitsu ETERNUS enclosures are discovered and their health state is monitored.
Supported external enclosures are Fujitsu ETERNUS JX40, JX40 S2, JX60 and JX60 S2.

Power Supplies which are not populated are discovered as 'not present' component by default. Not present components are used to indicate possible build-to-order configurations (e.g. for additional redundancy) of the RAID enclosure and are not monitored.

Note: This can be changed with an override for the discovery.

Icon	Information	
	*Display Name:*	'Power Supplies'
	*Display Name:* *Note: for a list of Power Supply properties see 4.3.1.7:*	< e.g. 'PSU0 (0') >
	*Display Name:* *Status:*	< e.g. 'PSU1 (1) >' 'Not installed'

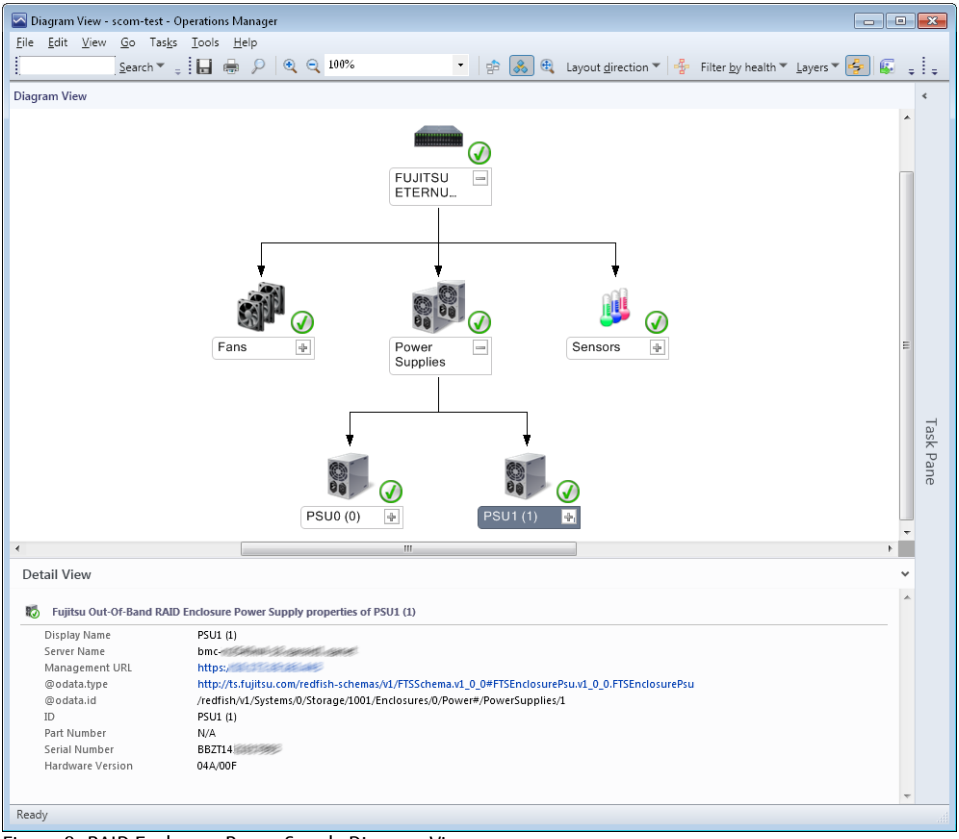


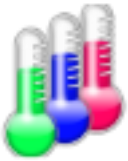
Figure 8- RAID Enclosure Power Supply Diagram View

4.3.4.9 RAID Enclosure (Temperature) Sensors

Sensor Devices of selected Fujitsu ETERNUS enclosures are discovered and their health state is monitored. These are typically Temperature Sensors, but other Enclosure Sensor types are also possible.
Supported external enclosures are Fujitsu ETERNUS JX40, JX40 S2, JX60 and JX60 S2.

Sensors which are not populated are discovered as not present component by default. Not present components are used to indicate possible build-to-order configurations (e.g. for additional redundancy) of the RAID enclosure and are not monitored.

Note: This can be changed with an override for the discovery.

Icon	Information	
	*Display Name:*	'Sensors'
	*Display Name:* *Location:*	*< e.g. 'Sensor (2)'>* *< e.g. 'PSU (1) inlet'>*
	*Display Name:* *Location:*	*< e.g. 'Sensor (2)'>* *< e.g. 'Backplane middle'>*

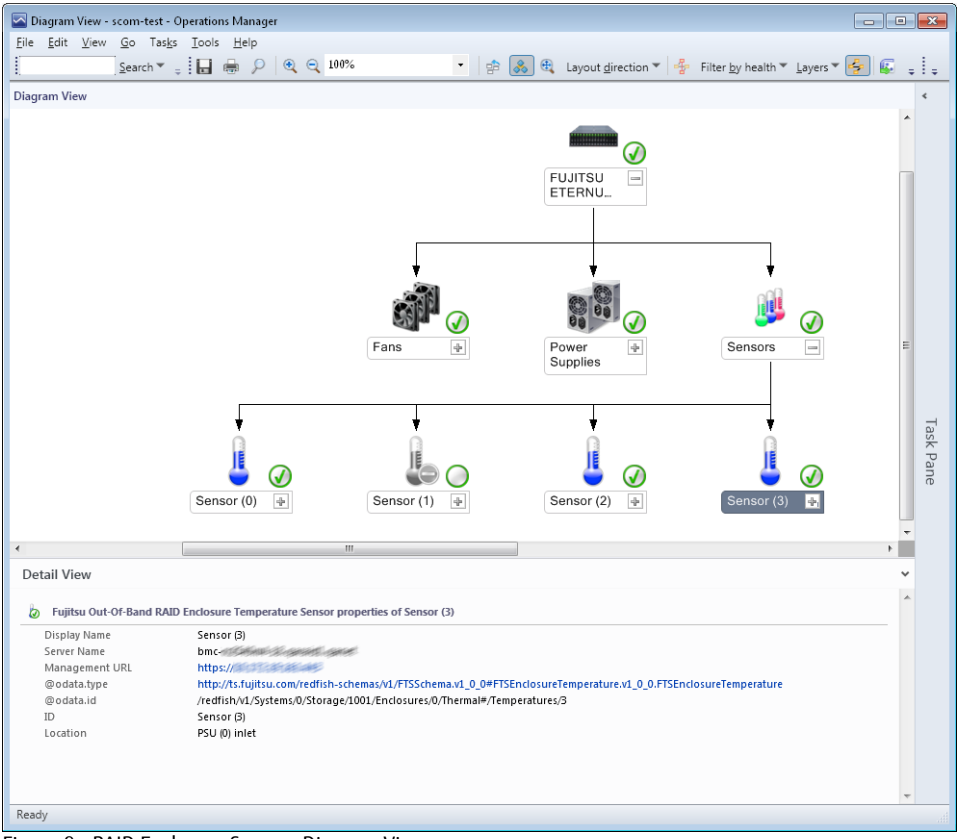


Figure 9 - RAID Enclosure Sensors Diagram View

4.3.5 Updating or changing the configuration of the RAID subsystem

When you add or remove a RAID component of the Out-Of-Band Server (e.g. add additional physical disks) these changes are visible within SCOM only after the new or changed configuration has been discovered.

By default, the RAID configuration of an Out-Of-Band Server is discovered automatically every 6 hours. The discovery interval can be changed with an override.

Set the server in maintenance mode for a brief period. Once the maintenance mode has elapsed, SCOM automatically discovers the hardware components again. Alternatively change

the discovery interval to force an update by performing a (temporary) override for the 'Management Pack Object Type: Discovery' → 'Target: Fujitsu Out-Of-Band RAID Subsystem'.

4.3.6 Monitoring RAID component Health State

RAID components are monitored by means of a PowerShell Script which evaluates the Health Status information of every reported RAID component within the RAID Redfish data.

By default monitoring this script is called at regular intervals (default is 300 seconds; settable via override).

When the component returns to the OK state, the alert is resolved and is no longer displayed in the *Active Alerts* view (see page 34).

While separate monitors have been defined for RAID Adapters / RAID Battery / Logical Drives / Physical Disks and Enclosure Processor / Fans / Power Supplies / Sensors objects, all RAID Monitors share the same Data Source and SCOM internally uses Cookdown to reduce the overhead when running multiple workflows per object. So only a single instance of the script is run to determine the health state of *all* RAID components together.

Keep this in mind when overriding the monitoring interval of single monitors and if possible change all of them to the same value to preserve the Cookdown optimization.

4.3.7 Monitoring Health State Valid

In addition to the component health state monitors there is an additional monitor for the RAID subsystem which checks if the RAID health state information is valid. When the system is powered off or in POST or BIOS Setup phase, no RAID information can be retrieved from the RAID Adapter and displayed health information from SCOM is stale. In order to signal this condition on the SCOM GUI, the health state for the RAID subsystem will be set to Warning and an alert will be generated by default. This can be changed with an override.

4.3.8 Monitoring Repeated Communication Problems

In addition to the health state monitors Out-Of-Band RAID Management Pack also contains a monitor for multiple event log entries within a certain time period in relation to the RAID

component. If the RAID information cannot be retrieved from the iRMC an event log entry is created (see section 5.2). If there are multiple events within the specified period of time with the same event number from the same Out-Of-Band Server IP the Health State of the Communication Monitor Object is set by this monitor and a Warning alert is generated.

The monitor will reset itself to a healthy state if there are no more event log entries written within a configurable timespan (the default value is 1000 seconds which is slightly larger than 3 times the default RAID monitoring period of 300 seconds).

Note: the settings for this monitor can be changed with an override.

When you change the configuration for a hardware component or the component status monitor keep in mind that you also might also need to re-configure the values for the associated repeated communication monitor.

Repeated Communication Problem	Repeat Count	Time Interval in Seconds	Remarks
RAID	3	3600 (1 hour)	Detected and logged during RAID Discovery and Monitoring.

4.4 Views

The health state in all views is displayed by the usual health state icons of the Operations Manager.

The views of the *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* integrate into the existing view structure of the *Fujitsu PRIMERGY Out-Of-Band Server - Base Management Pack* structure. Additional entries below the 'PRIMERGY Out-Of-Band Servers' node are created and will be removed when the *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* is un-installed.

4.4.1 Servers Health View

This view presents an overview about all Out-Of-Band Servers and the health of the subsystems which are propagated to the Server object.

This view is part of the *Fujitsu PRIMERGY Out-Of-Band Server - Base Management Pack*.

Since the RAID subsystem is hosted by the Out-Of-Band Server object the overall status of the RAID subsystem can be displayed within the 'Servers Health State' view.

In order to view the RAID subsystem status this column must be added manually to the view via the 'Personalize View' context menu.

Servers Health (12)

State	Name	Model	Serial Number	Fujitsu Out-Of-Ba Processor Group	Fujitsu Out-Of-Bar Memory Group	Fujitsu Out-Of-Ba Fan Group	Fujitsu Out-Of-Bar Power Supply Group	Fujitsu Out-Of-Ba Temperatu Componen Status	Fujitsu Out-Of-Ban Voltage Component Status	Fujitsu Out-Of-Bar Other Componen Status	Fujitsu Out-Of-Ban RAID Subsystem
Critical	FK-[redacted]	PRIMERGY RX2540 M1	YLV[redacted]	Healthy	Critical	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
Critical	iRM[redacted]	PRIMERGY RX4770 M4	YM[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Critical	Healthy	
Warning	RX2[redacted]	PRIMERGY RX2560 M1	YM[redacted]	Healthy	Healthy	Warning	Healthy	Healthy	Healthy	Healthy	
Warning	Tes[redacted]	PRIMERGY TX140 S2	YLN[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Warning
Warning	iRM[redacted]	CELSIUS C740	YM[redacted]	Healthy	Healthy	Warning	Healthy	Healthy	Healthy	Healthy	
Warning	WIN[redacted]	PRIMERGY RX2560 M2	YM[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Warning	Healthy
Healthy	bm[redacted]	PRIMERGY RX2540 M4	YM[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
Healthy	iRM[redacted]	PRIMERGY RX2540 M1	YLV[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	
Healthy	iRM[redacted]	PRIMERGY RX4770 M4	YM[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
Healthy	RX2[redacted]	PRIMERGY RX2520 M1	YLS[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	
Healthy	RX2[redacted]	PRIMERGY RX2530 M1	YLT[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	
Healthy	iRM[redacted]	PRIMERGY RX4770 M4	YM[redacted]	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy

Figure 10 - Out-Of-Band Servers Health with activated RAID status column

4.4.2 Active Alerts Views

The *Active Alerts* views display all alerts which are assigned to the class the particular view targets. Active Alerts Views are included in the dashboard views of the specific RAID components health views.

Only alerts which have the resolution state *Not Closed* are displayed.

The following causes can trigger an alert:

- If a RAID component *monitor* is in the Critical or Warning state and the corresponding 'generate alert' property of the monitor is enabled by default or by an override.
  Monitor alerts are normally 'auto-resolving': As soon as the cause has been resolved, the alert is no longer displayed in the view.
- An event for which a *rule* is defined in the Management Pack is entered in the Windows Event Log of a monitored server. These alerts remain in the display until they are explicitly closed.

Alerts which are placed in the resolution state *Closed* no longer appear in the *Active Alerts* view.

For all alerts of the Out-Of-Band RAID Management Pack Alarm Suppression is enabled. In this case, the alert is only reported once. Any next alert of this type causes the *Repeat Count* to be increased. To display the *Repeat Count* column use the *Personalize View* setting.

4.4.3 Health Collection State View

A Health Collection View provides some summary information regarding the grouped sub items with the *Devices* and *Device Information* property. The *Out-Of-Band RAID Management Pack* provides the following RAID subsystem specific Health Collection information and will be listed in the Health Collection State View which is part of the ServerView Core Library:

Health Collection	Devices	Device Information
RAID	Total Number of Adapters, Logical Drives, Physical Drives, Enclosures < e.g. '1 Adapter; 1 Logical Drive; 4 Physical Disks' >	List of <Adater Number: Adapter Name; Number of physical drives within a group with a specific size> < e.g. Adapter 0: 'FTS PRAID EP400i (0)'; 1 Logical Drives; Port 0: Disk Types: '500 GB': 4 >

4.4.4 Views defined by the Out-Of-Band RAID Management Pack

When integrating the *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* a new node *RAID Health* is created below the *PRIMERGY Out-Of-Band Servers* node in the Monitoring pane of the SCOM Console.

The views installed by the *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack* target and display RAID components of the managed server and are standard dashboard views containing a 'State View' pane, an 'Alerts View' pane and a Details View' pane for the specific RAID component class object or alert detail.

The following views are displayed in this node:

- Adapter Health
- Battery Health
- Logical Drive Health
- Physical Disk health
- RAID Subsystem Health
- RAID Enclosure Health node with
    - Enclosure Health
    - Fan Health
    - Power Supply health
    - Temperature Sensors Health

4.4.4.1 Overall RAID Subsystem Health View

This view represents the overall RAID subsystem state of the Out-Of-Band Servers and lists active alerts.

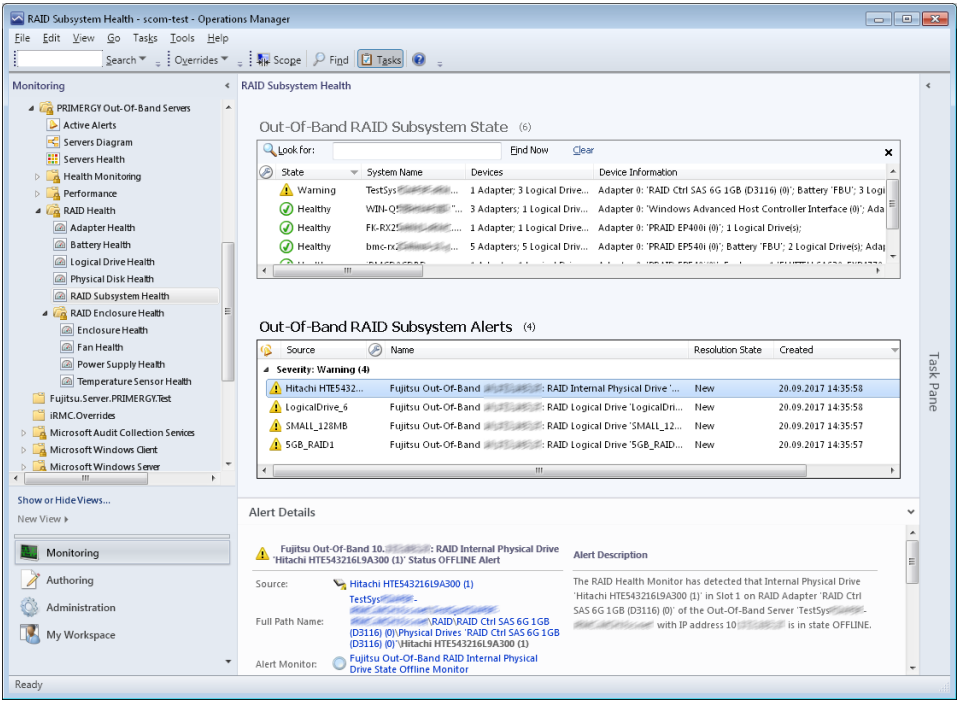


Figure 11 - RAID Overall Status Health View

4.4.4.2 Adapter Health View

This view shows the status of all discovered RAID adapters as well as the hosted child objects of the RAID adapter.

Based on the specific redundancy and fault tolerance of a RAID adapter the failure of one or more physical disk is propagated to the logical drive as degradation or failure by the RAID Adapter itself. Therefore the direct 1:1 health roll-up from any failed physical disk group to the RAID adapter is disabled by default since it would not represent the correct health state of the RAID system.

Note: this default setting can be changed with an override.

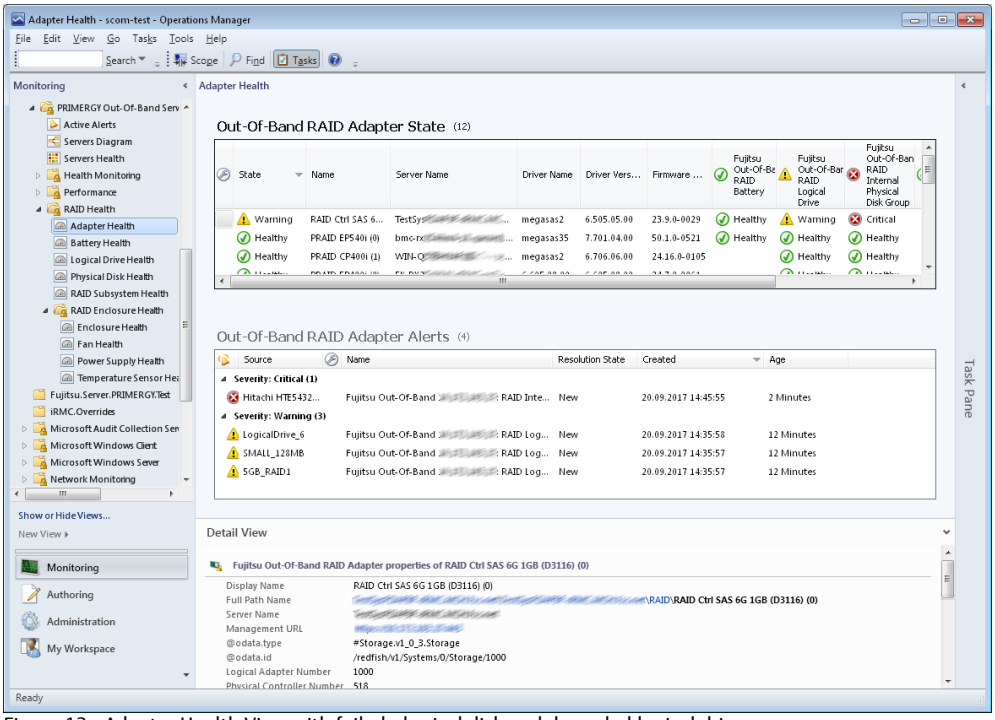


Figure 12 - Adapter Health View with failed physical disk and degraded logical drive

4.4.4.3 Logical Drive Health View

This view shows all discovered Logical Drives.

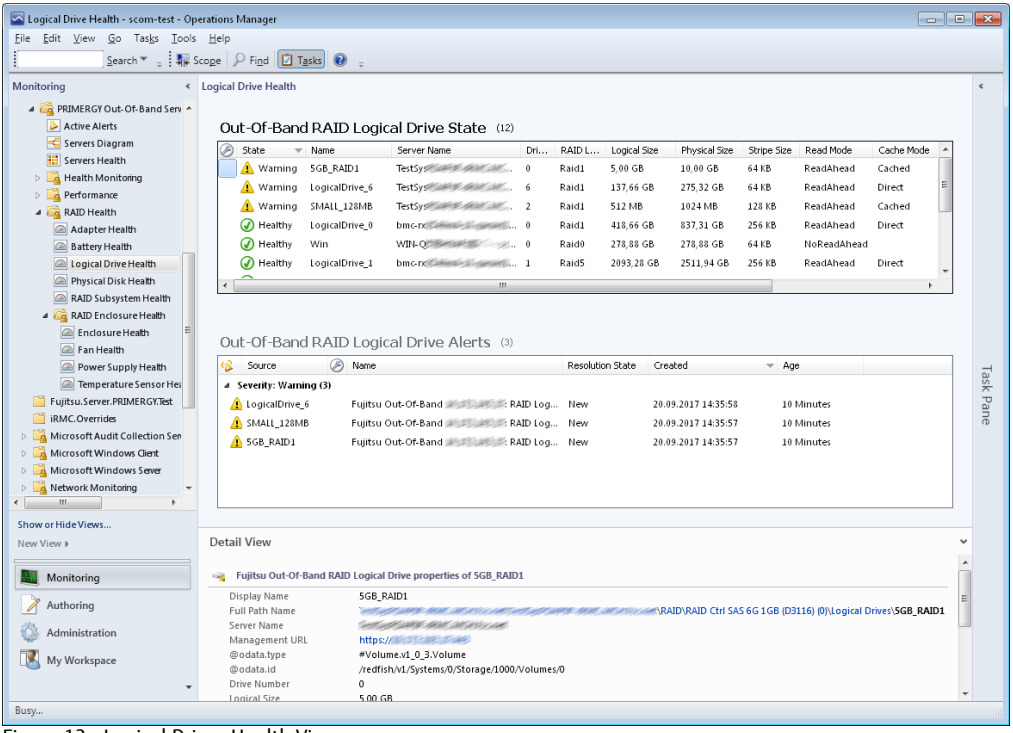


Figure 13 - Logical Drives Health View

4.4.4.4 Physical Disk Health View

This view shows all discovered physical Disks.

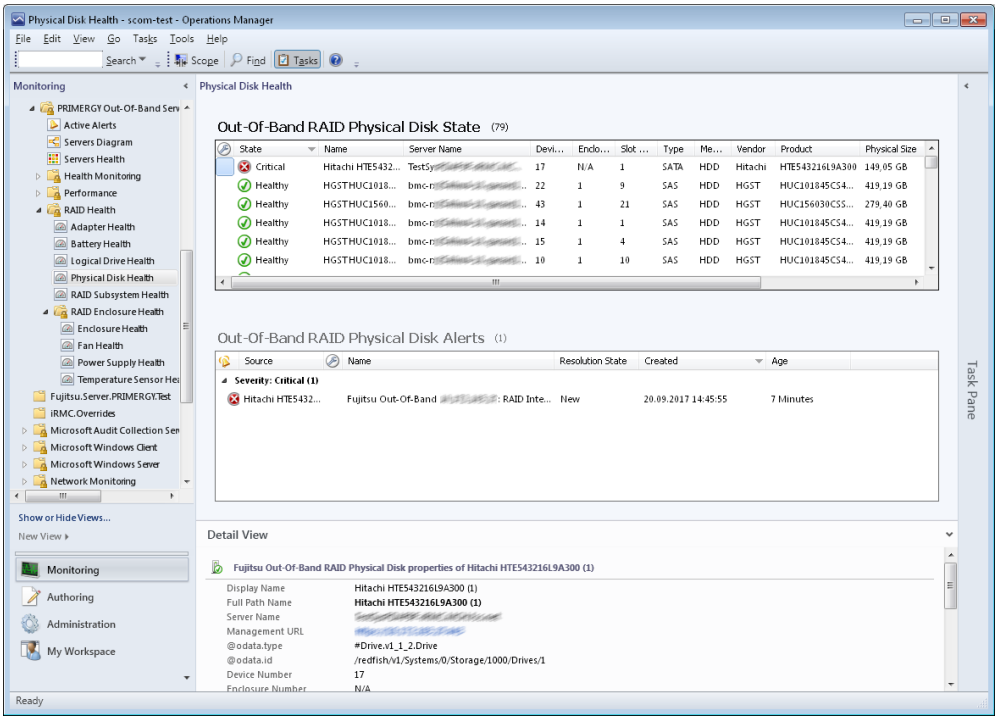


Figure 14 - Physical Disk Health View

4.4.4.5 Enclosure Health View

The 'RAID Enclosure Health' folder contains RAID enclosure component specific views. As a sample, the enclosure health view is shown in the screenshot, the remaining views are also component specific.

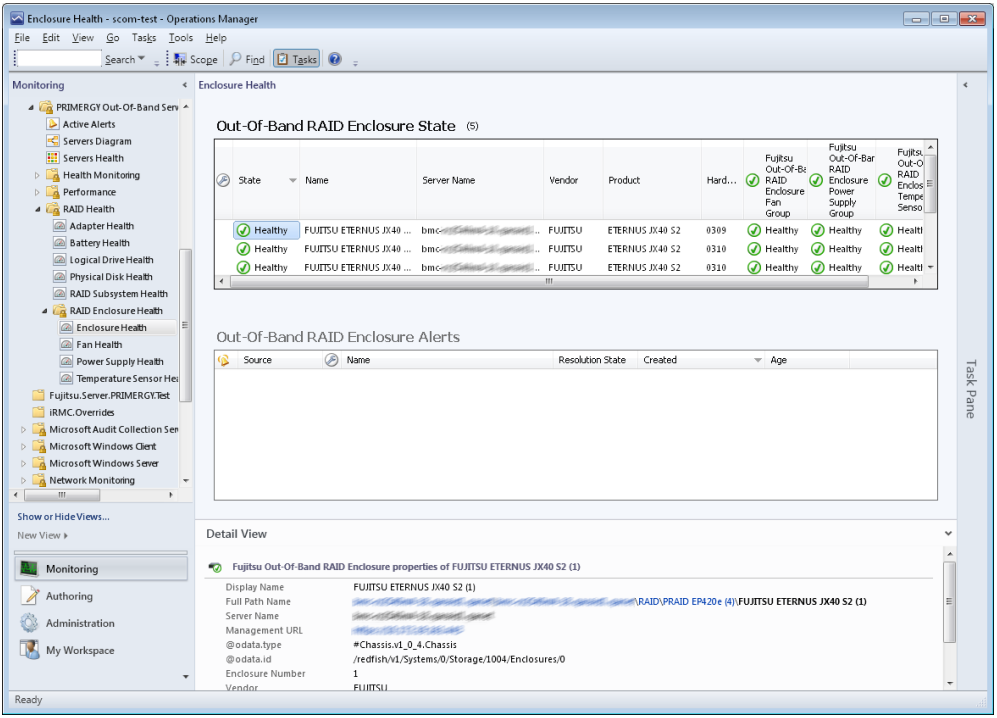


Figure 15 - Enclosure Health View

4.5 Health Explorer

The Health Explorer can be started from various views. It shows the components and dependencies in a tree structure. When components are in the *Warning* or *Critical* state, the corresponding subdirectories are automatically expanded in the display.

Two different displays are possible in the right-hand window of the Health Explorer: *Knowledge* and *State Change Events*. Information on what the monitor displays and which actions (resolutions) are possible and recommended is provided under the *Knowledge* tab.

All state transitions (*OK* <-> *Degraded* <-> *Error*) of the component selected from the navigation window on the left are displayed under the *State Change Events* tab. The state change is only shown for the first component responsible for the state change.

If the state is not *OK*, the component is placed in the *Degraded* or *Error* state and the faulty instance(s) are listed in the Health Explorer. If two or more components show different health states, the instance with the severest error determines the overall status of the group.

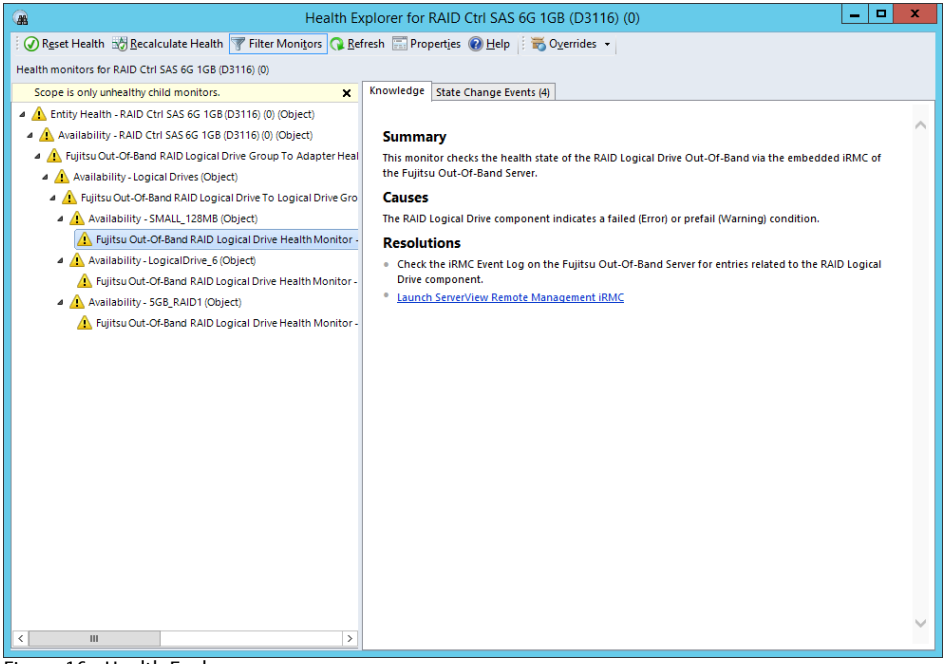


Figure 16 - Health Explorer

4.6 Tasks

Tasks are actions which can be displayed and executed in different views in the context of the object the task targets. They are displayed in the *Actions* window when a target object is highlighted or selected.

There are no tasks defined for the Out-Of-Band RAID components.

4.7 Events and alerts

This section applies only to alerts for which rules are defined in the Management Pack(s).

Alerts remain visible in the *Active Alerts* view until they are explicitly closed (assigned the resolution state *Closed*).

4.7.1 Enabling and disabling alerts

To change the default settings override them in the Authoring section of the SCOM Console. The overrides must then be stored in a custom Management Pack which is writable.

4.8 Knowledge Base

A Knowledge Base is provided for the events and alerts. Depending on the alert various possible resolutions / actions after error are displayed.

5 Appendix

5.1 Supported PRIMERGY servers

The *Fujitsu PRIMRGY Out-Of-Band Server - RAID Management Pack* is an Add-On Management Pack to the *Fujitsu PRIMERGY Out-Of-Band Server - Base Management Pack*, so the requirements for the Out-Of-Band Server to be supported in SCOM apply also to the *Fujitsu PRIMERGY Out-Of-Band Server - RAID Management Pack*. Out-Of-Band RAID information relies on the iRMC RAID information available via the DMTF Redfish protocol.

Please refer to the iRMC Firmware release notes for detailed information on PRIMERGY support.

Updating to the latest iRMC firmware is recommended.

5.2 Entries in the Operations Manager's Event Log

The PowerShell Scripts for discovering and monitoring components of the Fujitsu PRIMERGY Out-Of-Band Servers write messages to the Operations Manager's Event Log when an error occurs.

These entries can be found on the monitored servers under the name *Health Service Script*, while the message text specifies which Script generated the message.

Rules defined in the Management Pack check the event log for the above mentioned entries, which, if present, are displayed in the *Active Alerts* view.

The following table lists the used error numbers from the Out-Of-Band RAID Management Pack:

Error Number	Script Name	Description
8803	RaidDiscovery.ps1	Used to log generic problems encountered during Discovery Script execution, like exceptions or no data.

Error Number	Script Name	Description
8807	RaidHealth.ps1	Used to log generic problems encountered during Monitor Script execution, like exceptions or no data.
8839	RaidDiscovery.ps1 RaidHealth.ps1	No RAID Information available. If this is a repeated event, an alert will be generated.
8299	All (Logging/Tracing)	Error parsing trace/logging XML configuration file.
8399	All (WebRequest)	SSL Certificate Error (CA related)
8499	All (WebRequest)	SSL Certificate Error (CN related)
8599	All (WebRequest)	Used to indicate 'no response' from the iRMC after retries. This is typically the case when the https handshake is aborted internally within 5 seconds and retries could not solve the problem.
8699	All (WebRequest)	Used to indicate invalid credentials for the iRMC access.
8799	All (WebRequest)	Used to indicate a timeout when accessing an iRMC resource, e.g. when the iRMC is not reachable from the network.
8999	All (WebRequest)	Used to indicate 'iRMC Busy'. The Web Server has responded with the 503 HTTP status code (Service Unavailable). This HTTP response is returned when there is no connection slot available to handle the request or the iRMC is out of resources.

5.3 Creating test entries in the Windows Event Log

To check whether an rule alert is enabled, disabled, or recognized, you can create test entries for these events in the Event Log of the relevant server using PowerShell.

The easiest way of doing so is by using the Operations Manager Shell.

See also https://msdn.microsoft.com/en-us/library/bb437630.aspx for details of the parameters.

- Open a 'Operations Manager Shell' window
- In this Power Shell window type the following commands (replace parameters as needed)
  - `$ScriptApi = New-Object -comObject "MOM.ScriptAPI"`
  - `$ScriptApi.LogScriptEvent("Event Source String" , 4711, 2, "Event Message String")`

5.4 Creating log files

Log files can be created for error analysis. The log files are stored in the subdirectory *SVISCOM\SVISCOM-OutOfBand* of the directory entered in the system environment variable *TEMP*. Usually this is the *C:\Windows\TEMP* directory (where *C:* represents the system partition in this example).

Logging options are defined in the file *SVISCOM-OutOfBand.xml* in this folder. If the file does not exist or was created by an older version of the Management Pack, a copy of the file with the name *SVISCOM-OutOfBand.xm_* is generated on the SCOM server in the *%TEMP%\SVSCOM\SVISCOM-OutOfBand* folder.

Note that changes to the logging options will only be added to the *SVISCOM-OutOfBand.xm_* file. *SVISCOM-OutOfBand.xml* from an older version of the ServerView Out-Of-Band Server Integration Pack may need to be updated accordingly.

*SVISCOM-OutOfBand.xm_* contains debug options for all discovery and monitoring features of the management pack. See *SVISCOM-OutOfBand.xm_*on the SCOM server for details.

In the case of error analysis using log files proceed as follows.

- Rename *SVISCOM-OutOfBand.xm_* on the SCOM server to *SVISCOM-OutOfBand.xml*. If *SVISCOM-OutOfBand.xml* already exists, check that all options of *SVISCOM-OutOfBand.xm_* also exist in the existing version of *SVISCOM-OutOfBand.xml*.
- Check the debug options (documented in detail within the *SVISCOM-OutOfBand.xm_* file) for each feature to be monitored and set to the desired value.

The following log files are created as required:

- *RaidDiscoveryTrace_<servername>.log*
- *RaidHealthTrace_<servername>.log*

- *WARNINGTrace_<servername>.log*
- *ERRORTrace_<servername>.log*

These files must be sent to Fujitsu Support for further analysis.

If you wish to disable the creation of log files again, delete or rename *SVISCOM-OutOfBand.xml* or change the logging options within the file.

Note that the *WARNINGTrace_* and *ERRORTrace_* files will only be created on demand if the scripts detect a warning or error condition during script execution and any logging is enabled for the Out-Of-Band server.

5.4.1 Currentness of log files

When Fujitsu Management Packs are imported log files are generated promptly only if the initialization file is already available.

If the management pack already is imported log files are generated depending on the execution interval if the discovery or monitoring scripts.

In the worst case, 24 hours are necessary for all log files to be generated.

The server and component discovery is executed by default every 4 hours.

After the component discovery was successful, monitoring is run every 5 minutes.

Alternatively:

To create a current set of discovery log files, put the server in maintenance mode for a short time and let SCOM exit the maintenance mode. SCOM executes the server and component discovery automatically after maintenance mode has ended

5.5 Troubleshooting

5.5.1 Use the iRMC Web Interface to examine a PRIMERGY Server

If the RAID subsystem of an Out-Of-Band Server seems to have a problem (e.g. the PRIMERGY Overall State is bad) and the cause of this problem cannot be determined via SCOM, it may help to use the iRMC Web Interface for closer examination, especially examining the System Event Log and/or the internal Event Log. The System Event Log also contains a list of known root causes and recommended actions for Major and Critical Events.

You can always click on the 'Management URL' displayed for all Out-Of-Band Server components, including the RAID components.

5.5.2 Enable / Disable Windows Installer Logging (Debug)

In case there are problems with the installation procedure refer to the Microsoft knowledge base article (http://support.microsoft.com/kb/223300) that describes how to enable and disable logging.

5.6 Hints and known issues

- Since the RAID Management Pack uses the DMTF Redfish protocol to access the RAID specific information from the iRMC make sure you have enabled the Redfish Role for the used iRMC user account:

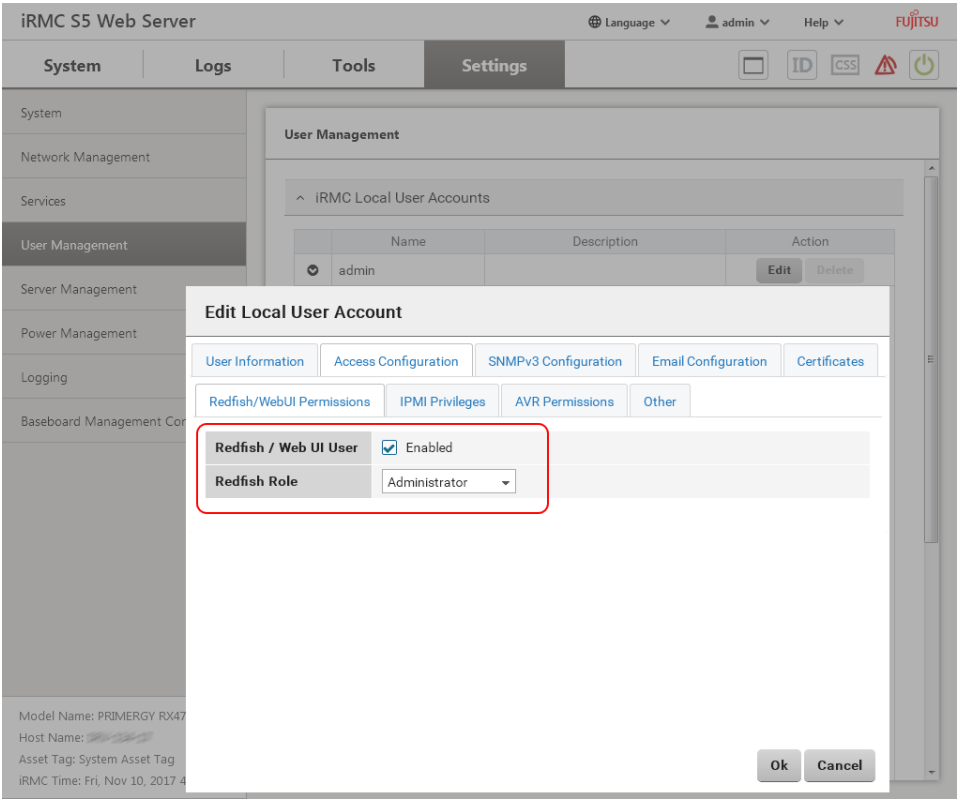


Figure 17 - Redfish Role Configuration for an iRMC S5 user

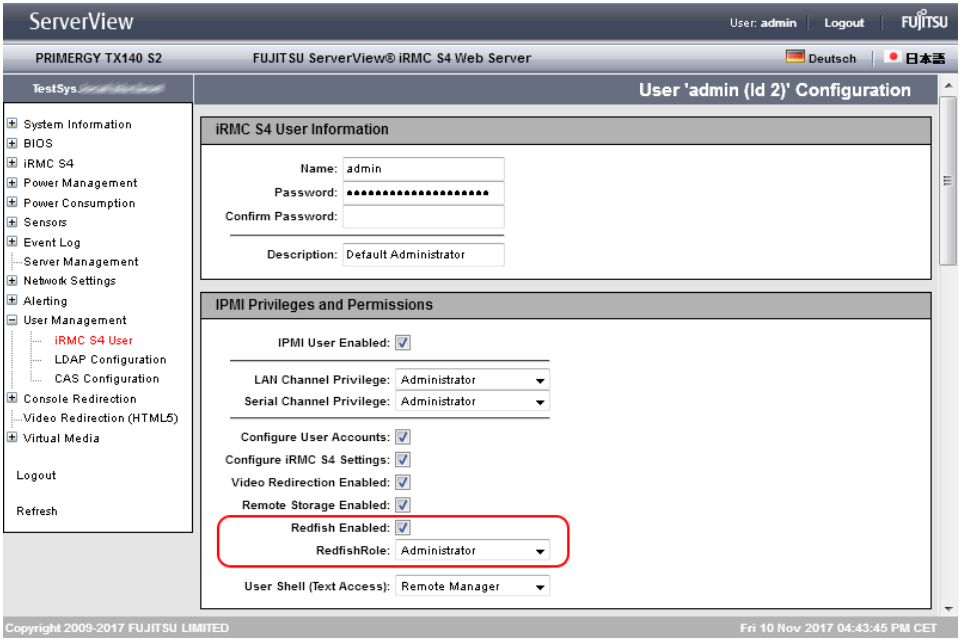


Figure 18 - Redfish Role configuration for an iRMC S4 user