

IBM Elastic Storage System  
6.1.4

*Command Reference*



**Note**

Before using this information and the product it supports, read the information in [“Notices” on page 53.](#)

This edition applies to Version 6 release 1 modification 4 of the following product and to all subsequent releases and modifications until otherwise indicated in new editions:

- IBM Spectrum® Scale Data Management Edition for IBM® ESS (product number 5765-DME)
- IBM Spectrum Scale Data Access Edition for IBM ESS (product number 5765-DAE)

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# About this information

## Who should read this information

This information is intended for administrators of IBM Elastic Storage® System (ESS) that includes IBM Spectrum Scale RAID.

## IBM Elastic Storage System information units

IBM Elastic Storage System 5147-102 documentation consists of the following information units.

Information unit	Type of information	Intended users
Hardware Planning and Installation Guide	This unit provides ESS 5147-102 information including technical overview, planning, installing, troubleshooting, and cabling.	System administrators and IBM support team
Quick Deployment Guide	This unit provides ESS information including the software stack, deploying, upgrading, setting up call home, and best practices.	System administrators, analysts, installers, planners, and programmers of IBM Spectrum Scale clusters who are very experienced with the operating systems on which each IBM Spectrum Scale cluster is based
Service Guide	This unit provides ESS 5147-102 information including servicing and parts listings.	System administrators and IBM support team
Problem Determination Guide	This unit provides ESS 5147-102 information including events, replacing servers, issues, maintenance procedures, and troubleshooting.	System administrators and IBM support team
Command Reference	This unit provides information about ESS commands and scripts.	System administrators and IBM support team
IBM Spectrum Scale RAID: Administration	This unit provides IBM Spectrum Scale RAID information including administering, monitoring, commands, and scripts.	<ul style="list-style-type: none"><li>• System administrators of IBM Spectrum Scale systems</li><li>• Application programmers who are experienced with IBM Spectrum Scale systems and familiar with the terminology and concepts in the XD SM standard</li></ul>

IBM Elastic Storage System (ESS) 3500 documentation consists of the following information units.

Information unit	Type of information	Intended users
Hardware Planning and Installation Guide	This unit provides ESS 3500 information including technical overview, planning, installing, troubleshooting, and cabling.	System administrators and IBM support team

<b>Information unit</b>	<b>Type of information</b>	<b>Intended users</b>
Quick Deployment Guide	This unit provides ESS information including the software stack, deploying, upgrading, setting up call home, and best practices.	System administrators, analysts, installers, planners, and programmers of IBM Spectrum Scale clusters who are very experienced with the operating systems on which each IBM Spectrum Scale cluster is based
Service Guide	This unit provides ESS 3500 information including servicing and parts listings.	System administrators and IBM support team
Problem Determination Guide	This unit provides ESS 3500 information including events, replacing servers, issues, maintenance procedures, and troubleshooting.	System administrators and IBM support team
Command Reference	This unit provides information about ESS commands and scripts.	System administrators and IBM support team
IBM Spectrum Scale RAID: Administration	This unit provides IBM Spectrum Scale RAID information including administering, monitoring, commands, and scripts.	<ul style="list-style-type: none"> <li>• System administrators of IBM Spectrum Scale systems</li> <li>• Application programmers who are experienced with IBM Spectrum Scale systems and familiar with the terminology and concepts in the XDSM standard</li> </ul>

IBM Elastic Storage System (ESS) 3200 documentation consists of the following information units.

<b>Information unit</b>	<b>Type of information</b>	<b>Intended users</b>
Hardware Planning and Installation Guide	This unit provides ESS 3200 information including technical overview, planning, installing, troubleshooting, and cabling.	System administrators and IBM support team
Quick Deployment Guide	This unit provides ESS information including the software stack, deploying, upgrading, setting up call home, and best practices.	System administrators, analysts, installers, planners, and programmers of IBM Spectrum Scale clusters who are very experienced with the operating systems on which each IBM Spectrum Scale cluster is based
Service Guide	This unit provides ESS 3200 information including servicing and parts listings.	System administrators and IBM support team
Problem Determination Guide	This unit provides ESS 3200 information including events, replacing servers, issues, maintenance procedures, and troubleshooting.	System administrators and IBM support team
Command Reference	This unit provides information about ESS commands and scripts.	System administrators and IBM support team



<b>Information unit</b>	<b>Type of information</b>	<b>Intended users</b>
IBM Spectrum Scale RAID: Administration	This unit provides IBM Spectrum Scale RAID information including administering, monitoring, commands, and scripts.	<ul style="list-style-type: none"> <li>• System administrators of IBM Spectrum Scale systems</li> <li>• Application programmers who are experienced with IBM Spectrum Scale systems and familiar with the terminology and concepts in the XDSM standard</li> </ul>

IBM Elastic Storage System (ESS) 3000 documentation consists of the following information units.

<b>Information unit</b>	<b>Type of information</b>	<b>Intended users</b>
Hardware Planning and Installation Guide	This unit provides ESS 3000 information including technical overview, planning, installing, troubleshooting, and cabling.	System administrators and IBM support team
Quick Deployment Guide	This unit provides ESS information including the software stack, deploying, upgrading, and best practices.	System administrators, analysts, installers, planners, and programmers of IBM Spectrum Scale clusters who are very experienced with the operating systems on which each IBM Spectrum Scale cluster is based
Service Guide	This unit provides ESS 3000 information including events, servicing, and parts listings.	System administrators and IBM support team
Problem Determination Guide	This unit provides ESS 3000 information including setting up call home, replacing servers, issues, maintenance procedures, and troubleshooting.	System administrators and IBM support team
Command Reference	This unit provides information about ESS commands and scripts.	System administrators and IBM support team
IBM Spectrum Scale RAID: Administration	This unit provides IBM Spectrum Scale RAID information including administering, monitoring, commands, and scripts.	<ul style="list-style-type: none"> <li>• System administrators of IBM Spectrum Scale systems</li> <li>• Application programmers who are experienced with IBM Spectrum Scale systems and familiar with the terminology and concepts in the XDSM standard</li> </ul>

IBM Elastic Storage System (ESS) 5000 documentation consists of the following information units.

<b>Information unit</b>	<b>Type of information</b>	<b>Intended users</b>
Hardware Guide	This unit provides ESS 5000 information including system overview, installing, and troubleshooting.	System administrators and IBM support team

<b>Information unit</b>	<b>Type of information</b>	<b>Intended users</b>
Quick Deployment Guide	This unit provides ESS information including the software stack, deploying, upgrading, and best practices.	System administrators, analysts, installers, planners, and programmers of IBM Spectrum Scale clusters who are very experienced with the operating systems on which each IBM Spectrum Scale cluster is based
Model 092 storage enclosures	This unit provides information including initial hardware installation and setup, and removal and installation of field-replaceable units (FRUs), customer-replaceable units (CRUs) for ESS 5000 Expansion – Model 092, 5147-092.	System administrators and IBM support team
Model 106 storage enclosures	This unit provides information including hardware installation and maintenance for ESS 5000 Expansion – Model 106.	System administrators and IBM support team
Problem Determination Guide	This unit provides ESS 5000 information including setting up call home, replacing servers, issues, maintenance procedures, and troubleshooting.	System administrators and IBM support team
Command Reference	This unit provides information about ESS commands and scripts.	System administrators and IBM support team
IBM Spectrum Scale RAID: Administration	This unit provides IBM Spectrum Scale RAID information including administering, monitoring, commands, and scripts.	<ul style="list-style-type: none"> <li>• System administrators of IBM Spectrum Scale systems</li> <li>• Application programmers who are experienced with IBM Spectrum Scale systems and familiar with the terminology and concepts in the XDSM standard</li> </ul>

ESS Legacy documentation consists of the following information units.

<b>Information unit</b>	<b>Type of information</b>	<b>Intended users</b>
Quick Deployment Guide	This unit provides ESS information including the software stack, deploying, upgrading, and best practices.	System administrators, analysts, installers, planners, and programmers of IBM Spectrum Scale clusters who are very experienced with the operating systems on which each IBM Spectrum Scale cluster is based
Problem Determination Guide	This unit provides information including setting up call home, replacing servers, issues, maintenance procedures, and troubleshooting.	System administrators and IBM support team
Command Reference	This unit provides information about ESS commands and scripts.	System administrators and IBM support team

Information unit	Type of information	Intended users
IBM Spectrum Scale RAID: Administration	This unit provides IBM Spectrum Scale RAID information including administering, monitoring, commands, and scripts.	<ul style="list-style-type: none"> <li>System administrators of IBM Spectrum Scale systems</li> <li>Application programmers who are experienced with IBM Spectrum Scale systems and familiar with the terminology and concepts in the XDSM standard</li> </ul>

## Related information

### Related information

For information about:

- IBM Spectrum Scale, see [IBM Documentation](#).
- mmvdisk command, see [mmvdisk documentation](#).
- Mellanox OFED (MLNX\_OFED\_LINUX-4.9-5.1.0.2) Release Notes, go to [https://docs.nvidia.com/networking/display/MLNXOFEDv494170/MLNX\\_OFED+Documentation+Rev+4.9-4.1.7.0+LTS](https://docs.nvidia.com/networking/display/MLNXOFEDv494170/MLNX_OFED+Documentation+Rev+4.9-4.1.7.0+LTS).
- Mellanox OFED (MLNX\_OFED\_LINUX-5.4-3.0.3.0) Release Notes, go to <https://docs.nvidia.com/networking/display/MLNXOFEDv562090/Release+Notes>. (The Mellanox OFED 5.5.x is shipped with ESS 6.1.4.)
- IBM Elastic Storage System, see [IBM Documentation](#).
- IBM Spectrum Scale call home, see [Understanding call home](#).
- Installing IBM Spectrum Scale and CES protocols with the installation toolkit, see [Installing IBM Spectrum Scale on Linux® nodes with the installation toolkit](#).
- Detailed information about the IBM Spectrum Scale installation toolkit, see [Using the installation toolkit to perform installation tasks: Explanations and examples](#).
- CES HDFS, see [Adding CES HDFS nodes into the centralized file system](#).
- Installation toolkit ESS support, see [ESS awareness with the installation toolkit](#).
- IBM POWER8® servers, see [https://www.ibm.com/docs/en/power-sys-solutions/0008-ESS?topic=P8ESS/p8hdx/5148\\_22l\\_landing.htm](https://www.ibm.com/docs/en/power-sys-solutions/0008-ESS?topic=P8ESS/p8hdx/5148_22l_landing.htm)
- IBM POWER9™ servers, see [https://www.ibm.com/docs/en/ess/6.1.0\\_ent?topic=guide-5105-22e-reference-information](https://www.ibm.com/docs/en/ess/6.1.0_ent?topic=guide-5105-22e-reference-information).

For the latest support information about IBM Spectrum Scale RAID, see the IBM Spectrum Scale RAID FAQ in [IBM Documentation](#).

## Conventions used in this information

Table 1 on page xi describes the typographic conventions used in this information. UNIX file name conventions are used throughout this information.

Table 1. Conventions

Convention	Usage
<b>bold</b>	<p>Bo1d words or characters represent system elements that you must use literally, such as commands, flags, values, and selected menu options.</p> <p>Depending on the context, <b>bold</b> typeface sometimes represents path names, directories, or file names.</p>

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Table 1. Conventions (continued)

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Convention	Usage
<b>bold</b> <b>underlined</b>	<b>bold</b> <u>underlined</u> keywords are defaults. These take effect if you do not specify a different keyword.
<b>constant width</b>	Examples and information that the system displays appear in constant-width typeface.  Depending on the context, constant-width typeface sometimes represents path names, directories, or file names.
<i>italic</i>	<i>Italic</i> words or characters represent variable values that you must supply.  <i>Italics</i> are also used for information unit titles, for the first use of a glossary term, and for general emphasis in text.
<key>	Angle brackets (less-than and greater-than) enclose the name of a key on the keyboard. For example, <Enter> refers to the key on your terminal or workstation that is labeled with the word <i>Enter</i> .
\	In command examples, a backslash indicates that the command or coding example continues on the next line. For example: <pre>mkcondition -r IBM.FileSystem -e "PercentTotUsed &gt; 90" \ -E "PercentTotUsed &lt; 85" -m p "FileSystem space used"</pre>
{item}	Braces enclose a list from which you must choose an item in format and syntax descriptions.
[item]	Brackets enclose optional items in format and syntax descriptions.
<Ctrl-x>	The notation <Ctrl-x> indicates a control character sequence. For example, <Ctrl-c> means that you hold down the control key while pressing <c>.
item...	Ellipses indicate that you can repeat the preceding item one or more times.
	In <i>synopsis</i> statements, vertical lines separate a list of choices. In other words, a vertical line means <i>Or</i> .  In the left margin of the document, vertical lines indicate technical changes to the information.

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## How to submit your comments

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To contact the IBM Spectrum Scale development organization, send your comments to the following email address:

scale@us.ibm.com

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# Chapter 1. IBM Elastic Storage System commands

This topic includes descriptions of the IBM Elastic Storage System (ESS) commands.

Descriptions of these ESS commands follow:

- [“essaddnode command” on page 2](#)
- [“esscallhomeconf script” on page 4](#)
- [“esscallhomeevent command” on page 7](#)
- [“esscheckdisks command” on page 9](#)
- [“esscrchxml command” on page 11](#)
- [“essfindmissingdisks command” on page 13](#)
- [“essgencluster command” on page 14](#)
- [“essgennetworks command” on page 16](#)
- [“essinstallcheck command” on page 21](#)
- [“essnettest command” on page 23](#)
- [“essnodedetails command” on page 24](#)
- [“essrun command” on page 26](#)
- [“essruntask command” on page 35](#)
- [“essstoragequickcheck command” on page 36](#)
- [“essstress command” on page 37](#)
- [“essutils command” on page 40](#)

For information about ESS scripts, see [Chapter 2, “IBM Elastic Storage System scripts,” on page 49](#).

For information about these IBM Spectrum Scale RAID commands, see *IBM Spectrum Scale RAID: Administration*:

- mmaddcomp
- mmaddcompspec
- mmaddpdisk
- mmchcarrier
- mmchcomp
- mmchcomploc
- mmchenclosure
- mmchfirmware
- mmchpdisk
- mmchrecoverygroup
- mmcrrecoverygroup
- mmcrvdisk
- mmdelcomp
- mmdelcomploc
- mmdelcompspec
- mmdelpdisk
- mmdelrecoverygroup
- mmdelvdisk
- mmdiscovercomp
- mmgetpdisktopology
- mmlscomp
- mmlscomploc
- mmlscompspec
- mmlsenclosure
- mmlsfirmware

mmlspdisk  
mmlsrecoverygroup  
mmlsrecoverygroupevents  
mmsyncdisplayid

For information about these IBM Spectrum Scale RAID scripts, see *IBM Spectrum Scale RAID: Administration*:

chdrawer  
gnrhealthcheck  
mkrinput  
topselect  
topsummary

For information about other IBM Spectrum Scale commands, see *IBM Spectrum Scale: Command and Programming Reference*.

## essaddnode command

---

Adds a node (e.g. EMS) to a GPFS cluster.

### Synopsis

```
essaddnode -N ADD-NodeList { --cluster-node ClusterNode }  
[ --prefix Prefix ] [ --suffix Suffix ]  
[ --accept-license ] [ --no-fw-update ]  
[ --nodetype NodeType ]  
[ -h | --help ]
```

### Availability

Available with IBM Elastic Storage System (ESS).

### Description

The `essaddnode` command adds nodes to a GPFS cluster. It can be used to add an EMS or I/O server or ESS 3000 nodes to the cluster. This command must run on the EMS node when the EMS node is being added to the cluster. The EMS node must be upgraded to the correct software levels (such as RHEL and GPFS) before adding the node to the cluster. This command updates firmware levels in the SAS host adapter, firmware in the enclosure and drives.

### Parameters

#### **-h | --help**

Displays usage information about this command and exits.

#### **-N *ADD-NodeList***

Provides a comma-separated list of nodes to add to an existing GPFS cluster. In case of an EMS node, it must be the host name of the EMS (For example, `ems1`).

#### **--cluster-node *ClusterNode***

Provides the name of a node that exists in a GPFS cluster where nodes will be added. This node must be able to run GPFS administrative commands. For example, `--cluster-node essio1` where `essio1` is an existing node in the cluster. Either `--cluster-node` or `--cluster-group` must be provided.

#### **--nodetype *NodeType***

Indicates the type of the node being added. The default node type is `ems`. For EMS node, specify `ems`. For I/O server nodes, specify `gss`. For ESS 3000 nodes, specify `ess3k`.

**--prefix Prefix**

Provides the hostname prefix. PREFIX is used with the node names provided in the ADD-NODE-LIST to create the actual node names. Use = between --prefix and value if the value starts with -.

**--suffix Suffix**

Provides the hostname suffix. SUFFIX is used with the node names in the ADD-NODE-LIST to create the actual node names. For example, with an *ADD-NodeList* of gssio1,gssio2, and prefix A- and suffix -ib, node names A-gssio1-ib and A-gssio2-ib are used to form the actual node names. The node name must be resolvable. Use = between --suffix and the value, if the value starts with -.

**--accept-license**

Specifies that the applicable licensing terms are accepted. If not provided, user is prompted for license acceptance after addition of the node.

**--no-fw-update**

This option skips SAS adapter, storage enclosure and drive firmware update after addition of the nodes into the cluster.

**Exit status****0**

Successful completion.

**nonzero**

A failure has occurred.

**Security**

You must have root authority to run the `essaddnode` command.

**Examples**

1. This example shows EMS node `ems1` being added to the cluster. In the first example, group name of the existing cluster nodes is provided. In the second example, a node of the existing cluster is provided.

```
essaddnode -N ems1 --nodetype ems --accept-license --no-fw-wupdate
essaddnode -N ems1 --cluster-node gssio1 --nodetype ems --accept-license --no-fw-wupdate
```

2. This example shows the new I/O server nodes `gssio3` and `gssio4` being added to the existing cluster. In the first example, group name of the existing cluster nodes is provided. In the second example, a node of the existing cluster is provided. While adding I/O node, make sure to use --nodetype as `gss`. The `gss` node type indicates that the newly added node is an NSD server I/O node.

```
essaddnode -N gssio3 --nodetype gss --accept-license
essaddnode -N gssio4 --cluster-node gssio1 --nodetype gss --accept-license
```

**See also**

See also the following *IBM Spectrum Scale: Command and Programming Reference* topics:

- `mmaddnode`
- `mmchconfig`
- `mmchlicense`
- `mmcrnodeclass`
- `mmstartup`

**Location**

`/opt/ibm/ess/tools/bin`

# esscallhomeconf script

Performs ESS HW call home configuration

## Synopsis

```
esscallhomeconf [ -h | --help ] -E ESA-AGENT [ --prefix PREFIX ] [ --suffix SUFFIX ] {
  [--verbose ] [ --esa-hostname-fqdn ESA_HOSTNAME_FQDN ]
  [--stop-auto-event-report] [ -N NODE-LIST ] [ --show ]
  [--register {node,all } ] [--no-swcallhome] [ --icn ICN ]
  [--serial SOLN-SERIAL ] [ --model SOLN-MODEL ]
  [--proxy-ip PROXY-HOSTNAME ] [ --proxy-port PROXY-PORT ]
  [--proxy-userid PROXY-USERNAME ] [ --proxy-password PROXY-PASSWORD ]
  [--esa-config] [-m CUSTOMER_INFO_M]
  [-u CUSTOMER_INFO_U] [-n CUSTOMER_INFO_N]
  [-e CUSTOMER_INFO_E] [-t CUSTOMER_INFO_T]
  [-f CUSTOMER_INFO_F] [-j CUSTOMER_INFO_J]
  [-k CUSTOMER_INFO_K] [-g CUSTOMER_INFO_G]
  [-a CUSTOMER_INFO_A] [-Z CUSTOMER_INFO_Z]
  [-y CUSTOMER_INFO_Y] [-r CUSTOMER_INFO_R]
  [-b CUSTOMER_INFO_B] [-s CUSTOMER_INFO_S]
  [-i CUSTOMER_INFO_I] [-p CUSTOMER_INFO_P]
  [-w] [-Y]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

You can use the **esscallhomeconf** script to configure ESS for call home event generation by using the Electronic Service Agent (ESA). It is only applicable for ESS systems on PPC64 architecture. The call home event is generated when a disk failure event occurs in the attached enclosure and replacement is required.

**esscallhomeconf** or **esscallhomeevent** can communicate with ESA over a REST API and can generate events upload failure data when a disk replacement is required. I/O server nodes, EMS node, and attached enclosures are considered end point that can generate events. In this release, only disk replacement events in attached enclosures are supported.

**esscallhomeconf** also configures software call home along with hardware call home unless `--no-swcallhome` is specified. If you do not want to use software call home along with hardware call home, use the `--no-swcallhome` option.

The **esscallhomeconf** `--stop-auto-event-report` switch instructs ESA to not report automatic event and not create any PMR automatically for any hardware failure. The **callhomemon.sh** script must be configured as a part of `crontab` to report any event to ESA on periodic intervals. For more information, see `/opt/ibm/ess/tools/samples/callhomemon.sh` and *IBM Spectrum Scale Software call home documentation*.

## Parameters

### **-E ESA-AGENT**

Provides the node name on which the ESA agent is installed and running.

### **--prefix PREFIX**

Provides the hostname prefix. Use = between `--prefix` and value if the value starts with -.

### **--suffix SUFFIX**

Provides the hostname suffix. Use = between `--suffix` and value if the value starts with -.

### **--esa-hostname-fqdn ESA\_HOSTNAME\_FQDN**

Provides the fully qualified domain name of ESA server for the certificate validation.



- stop-auto-event-report**  
Stops report of automatic event to ESA if any hardware call home event is reported to the system.
- N NODE-LIST**  
Provides a list of nodes to configure.
- show**  
Shows call home configuration details.
- register {node,all}**  
Registers the endpoints (nodes, enclosure or all) with ESA.
- no-swcallhome**  
Specifies to not configure software call home while configuring hardware call home. The **esscallhomeconf** command configures software call home with hardware call home by default unless this option is specified.
- icn ICN**  
Provides the IBM customer number for software call home.
- serial SOLN-SERIAL**  
Provides the ESS solution serial number in the VPD file.
- model SOLN-MODEL**  
Provides the ESS model.  
Applicable only for PPC64BE models.
- proxy-ip PROXY-HOSTNAME**  
Provides the IP address or the hostname for the proxy configuration.
- proxy-port PROXY-PORT**  
Provides the port number for the proxy configuration.
- proxy-userid PROXY-USERNAME**  
Provides the user ID for the proxy configuration.
- proxy-password PROXY-PASSWORD**  
Provides the password for the proxy configuration.
- esa-config**  
Provides information for configuration of ESA by using CLI.
- m CUSTOMER\_INFO\_M**  
Specifies the name of the organization that owns or that is responsible for this system.
- u CUSTOMER\_INFO\_U**  
Specifies the country or the region where the system is located.
- n CUSTOMER\_INFO\_N**  
Specifies the name of the primary contact person in your organization who is responsible for this system.
- e CUSTOMER\_INFO\_E**  
Specifies the email address of the primary contact person. For example, myuserid@mycompany.com.
- t CUSTOMER\_INFO\_T**  
Specifies the telephone number on which the primary contact person can be reached.
- f CUSTOMER\_INFO\_F**  
Specifies the secondary contact person in your organization who is responsible for this system.
- j CUSTOMER\_INFO\_J**  
Specifies the email address of the secondary contact person. For example, myuserid@mycompany.com.
- k CUSTOMER\_INFO\_K**  
Specifies the name of the organization that owns or that is responsible for this system.
- g CUSTOMER\_INFO\_G**  
Specifies the country or region of the contact person.

- a CUSTOMER\_INFO\_A**  
Specifies the state or the province where the system is located.
- z CUSTOMER\_INFO\_Z**  
Specifies the postal code of the location where the system is located.
- y CUSTOMER\_INFO\_Y**  
Specifies the city where the system is located.
- r CUSTOMER\_INFO\_R**  
Specifies the address where the system is located.
- b CUSTOMER\_INFO\_B**  
Specifies the building where the system is located.
- s CUSTOMER\_INFO\_S**  
Specifies the telephone number where the system is located.
- i CUSTOMER\_INFO\_I**  
Specifies the IBM ID.
- p CUSTOMER\_INFO\_P**  
Specifies the port number on which the subsystem listens for incoming client requests. Default: 5024
- w**  
Adds firewall rules to access ESA UI from remote systems. Default: True
- Y**  
Accepts license agreement without displaying it. Default: False
- verbose**  
Provides the verbose output.
- h | --help**  
Displays usage information about this script and exits.

## Exit status

- 0**  
Successful completion.
- nonzero**  
A failure has occurred.

## Security

You must have root authority to run the `esscallhomeconf` script.

## Example

The following examples show configuring call home:

```
# ./esscallhomeconf -E ems1 --suffix=-ib --register node --esa-hostname-fqdn ems1.localdomain
2018-05-28T02:40:35.422902 Generating node list..
2018-05-28T02:40:36.129896 nodelist:      gssio1 gssio2
2018-05-28T02:40:36.129933 suffix used for endpoint hostname: -ib
End point gssio1-ib registered successfully with systemid 3ecc9e664c8ce85d6bba3f6c7c3ae523
End point gssio2-ib registered successfully with systemid da4b3bd9d127d9285a4f73a55c232ecd
ESA configuration for ESS Call home is complete.
Started configuring software callhome
Checking for ESA is activated or not before continuing.
Fetching customer detail from ESA.
Customer detail has been successfully fetched from ESA.
Setting software callhome customer detail.
Successfully set the customer detail for software callhome.
Enabled daily schedule for software callhome.
Enabled weekly schedule for software callhome.
Direct connection will be used for software calhome.
Successfully set the direct connection settings for software callhome.
Enabled software callhome capability.
Creating callhome automatic group
```

```
Created auto group for software call home and enabled it.
Software callhome configuration completed.
```

```
# esscallhomeconf -E ems3 -N ems3,ess_x86_64 \
--suffix=-te --register=all --no-swcallhome --esa-hostname-fqdn ems1.localdomain

2017-01-23T05:34:42.005215 Generating node list...
2017-01-23T05:34:42.827295 nodelist: ems3 essio31 essio32
2017-01-23T05:34:42.827347 suffix used for endpoint hostname: -te
End point ems3-te registered successfully with systemid 37e5c23f98090750226f400722645655
End point essio31-te registered successfully with systemid 35ae41e0388e08fd01378ae5c9a6ffef
End point essio32-te registered successfully with systemid 9ea632b549434d57baef7c999dbf9479
End point enclosure SV50321280 registered successfully with systemid
600755dc0aa2014526fe5945981b0e08
End point enclosure SV50918672 registered successfully with systemid
92aa6428102b44a4a1c9a293402b324c
ESA configuration for ESS Callhome is complete.
```

## Location

/opt/ibm/ess/tools/bin

## esscallhomeevent command

Use the **esscallhomeevent** command to send call home events to the Electronic Service Agent (ESA).

## Synopsis

```
esscallhomeevent [ --systemid EVENTSID ]
[ --event { postRGTakeover | postRGRelinquish | rgOpenFailed | rgPanic
| pdFailed | pdRecovered | pdReplacePdisk | pdPathDown | daRebuildFailed
| nodeEvent | disk_call_home | node_call_home | test | test_call_home
| bootDrvFail | bootDrvMirDegraded | bootDrvMirFailed | bootDrvMissing
| bootDrvSmtFailed | canFanFailed | canFailed | canTempBusFailed
| canTempSensorFailed | coinBatLow | coinBatMissing | cpuMissing
| cpuSpeedWrong | dimmMissing | dimmSizeWrong | dimmSpeedWrong
| fanFailed | fanSpeedHigh | fanSpeedLow | pairCanFailed | psHighCurrent
| psHighVoltage | psFailed | psFanFailed | tempBusFailed | tempSensorFailed
| voltBusFailed | voltSensorFailed | bootdrive_mirror_degraded
| bootdrive_mirror_failed | bootdrive_missing | bootdrive_smart_failed
| can_fan_failed | canister_failed | can_temp_bus_failed
| can_temp_sensor_failed | coin_battery_low | coin_battery_missing
| cpu_unit_missing | cpu_unit_speed_wrong | dimm_module_missing
| dimm_module_size_wrong | dimm_module_speed_wrong | fan_failed
| fan_speed_high | fan_speed_low | pair_canister_failed | power_high_current
| power_high_voltage | power_supply_failed | ps_fan_failed | temp_bus_failed
| temp_sensor_failed | voltage_bus_failed | voltage_sensor_failed } ]
[ --eventName EVENTNAME ] [ --eventId EVENTID ] [ --myNode MYNODE ]
[ --rgName RENAME ] [ --rgErr RGERR ]
[ --rgReason RGREASON ] [ --daName DANAME ]
[ --pdName PDNAME ] [ --pdLocation PDLOCATION ]
[ --pdFru PDFRU ] [ pdWwn PDWwN ] [ --pdState PdState ]
[ --daRemainingRedundancy DAREMAININGDEDUNDANCY ]
[ --compName COMPNAME ] [ --compId COMPID ]
[ --eventDesc EVENTDESC ] [ --compSerial COMPSERIAL ]
[ --verbose ] [ --show ] [ --upload UPLOADFILES ]
[ --collector COLLECTOR ] [ --heartbeatnode HEARTBEATNODE ]
[ --esa-hostname-fqdn ESA_HOSTNAME_FQDN ]
[ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

You can use the **esscallhomeevent** command to send call home events to the ESA agent.

## Parameters

### **-h | --help**

Displays usage information about this command and exits.

### **-systemid *EVENTSID***

Specifies the system ID of the event.

**--event {postRGTakeover, postRGRelinquish, rgOpenFailed, rgPanic, pdFailed, pdRecovered, pdReplacePdisk, pdPathDown, daRebuildFailed, nodeEvent, disk\_call\_home, node\_call\_home, test, test\_call\_home, bootDrvFail, bootDrvMirDegraded, bootDrvMirFailed, bootDrvMissing, bootDrvSmtFailed, canFanFailed, canFailed, canTempBusFailed, canTempSensorFailed, coinBatLow, coinBatMissing, cpuMissing, cpuSpeedWrong, dimmMissing, dimmSizeWrong, dimmSpeedWrong, fanFailed, fanSpeedHigh, fanSpeedLow, pairCanFailed, psHighCurrent, psHighVoltage, psFailed, psFanFailed, tempBusFailed, tempSensorFailed, voltBusFailed, voltSensorFailed, bootdrive\_mirror\_degraded, bootdrive\_mirror\_failed, bootdrive\_missing, bootdrive\_smart\_failed, can\_fan\_failed, canister\_failed, can\_temp\_bus\_failed, can\_temp\_sensor\_failed, coin\_battery\_low, coin\_battery\_missing, cpu\_unit\_missing, cpu\_unit\_speed\_wrong, dimm\_module\_missing, dimm\_module\_size\_wrong, dimm\_module\_speed\_wrong, fan\_failed, fan\_speed\_high, fan\_speed\_low, pair\_canister\_failed, power\_high\_current, power\_high\_voltage, power\_supply\_failed, ps\_fan\_failed, temp\_bus\_failed, temp\_sensor\_failed, voltage\_bus\_failed, voltage\_sensor\_failed}**

Specifies event for call home.

### **--eventName *EVENTNAME***

Specifies the event name.

### **--eventId *EVENTID***

Specifies the unique event ID. Applicable for hardware call home events only.

### **--myNode *MYNODE***

Specifies the node that generates the event.

### **--rgName *RGNAME***

Specifies the recovery group (RG) name associated with the event.

### **--rgErr *RGERR***

Specifies the RG error information.

### **--rgReason *RGREASON***

Specifies the RG reason.

### **--daName *DANAME***

Specifies the declustered array (DA) name that is associated with the event.

### **--pdName *PDNAME***

Specifies the physical disk (pdisk) name.

### **--pdLocation *PDLOCATION***

Specifies the pdisk location.

### **--pdFru *PDFRU***

Specifies the pdisk field replaceable unit (FRU).

### **--pdWwn *PDWWN***

Specifies the pdisk unique worldwide name (WWN).

### **--pdState *PDSTATE***

Specifies the physical disk (pdisk) state.

### **--deRemainingRedundancy *DAREMAININGREDUNDANCY***

Specifies the remaining redundancy of the associated DA.

### **--compName *COMPNAME***

Specifies the component name.

- compId***COMPID*  
Specifies the component ID.
- eventDesc***EVENTDESC*  
Specifies the event description.
- compSerial***COMP SERIAL*  
Specifies the component serial number.
- verbose**  
Specifies the verbose output.
- show**  
Specifies the endpoint and event details.
- upload** *UPLOADFILES*  
Specifies the list of upload files and their location for the event.
- collector** *COLLECTOR*  
Specifies the command or script to generate the upload file. There is no default value.
- heartbeatnode** *HEARTBEATNODE*  
Specifies the heartbeat that is sent from the heartbeat node to ESA agent. This can be any node or enclosure.
- esa-hostname-fqdn** *ESA\_HOSTNAME\_FQDN*  
Provides the fully qualified domain name of ESA server for the certificate validation.

## Security

You must have root authority to run the `esscallhomeevent` command.

## Exit status

- 0**  
Successful completion.
- nonzero**  
A failure occurs.

## Example

This examples shows how to send call home events to the ESA agent.

```
esscallhomeevent --eventName ReplaceDisk --event
pdReplacePdisk --systemid 37a6259cc0c1dae299a7866489dff0bd
```

## Location

/opt/ibm/ess/tools/bin

## esscheckdisks command

Checks attached disks for errors under various I/O operations.

## Synopsis

```
esscheckdisks { --enclosure-list Ensloure-List --disk-list DiskList | --show-enclosure-list }
                [ --iotest Io-Test ] [ --ioengine Io-Engine ]
                [ --batch-size Batch-Size ] [ --duration Test-Duration ]
                [ --write-enable ] [ --iopath Io-Path ] [ --confirm ]
                [ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

The `esscheckdisks` command checks the attached drives for disk errors under various I/O operations before configuring (part of recovery group) them. At the end of the test, the number of errors (and net performance) per device is reported. This test is typically run on the EMS node. It can also be run on the I/O server node with the `--local` option. If any disk shows error (non-zero error count), it needs to be addressed before adding the drive in the recovery group. This is not a performance tool and performance statistics shown are approximate and relative to other disks in the same batch of the run. When run from the EMS node, summary results are saved in the `/temp/checkdisk` directory of the EMS node.

## Parameters

### **--enclosure-list** *Ensloure-List*

Specifies a list of enclosures on which to run the test. Use all to specify all attached enclosures.

### **--disk-list** *DiskList*

Specifies a list of disks to be tested, for example: `sdh, sdx, sdm`.

Disks are not checked for potential write to local disks such as `sda` when `--write-enable` option is provided. `--enclosure-list` and `--disk-list` are mutually exclusive.

### **--show-enclosure-list**

Displays a list of enclosures attached to I/O server nodes.

This list, or a subset of it can be used to provide input to `--enclosure-list`. Program exits after displaying the list.

### **--iotest** *IoTest*

Specifies a comma-separated list of I/O operations for testing. Valid values are `r` (sequential read), `w` (sequential write), `R` (random read), `W` (random write), and `a` (all). The default is `r` (sequential read).

I/O tests are run in the sequence they are provided. For example, `r,w,W,R,w,r`. If `a` is provided alone or as a part of a sequence, the given sequence is replaced with `r , w , R , W`.

### **--ioengine** *Io-Engine*

Specifies the I/O engine to use.

Valid values are `g` for `gpfsp perf`, `d` for `dd`, or `s` for `shred`.

### **--batch-size** *Batch-Size*

Specifies the batch size (number of disks tested at a time) of the test. Specify 0 for all attached drive in a single batch. Default batch size is 60. Maximum batch size must be limited to 120.

### **--duration** *Test-Duration*

Specifies the duration of the test in seconds. Default is 30 seconds. Specify 0 to start and exit **esscheckdisks** while the I/O engine is running. It can be used to sequentially write to the end of the disk.

### **--write-enable**

Enables read-write I/O operations to the drive. Default is read-only. For any test sequence that involves write operation, `--write-enable` must be specified.

### **--iopath** *Io-Path*

Specifies a comma-separated list of I/O paths for test. Default is `0,1` indicating both paths. Applicable for PPC64 or PPC64LE systems only.

### **--confirm**

Runs disk checks without prompting even if recovery group descriptor exists.

### **-h | --help**

Displays usage information about this command and exits.

## Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

## Restrictions

This command must be run on a system where there is no GPFS cluster configured.

This command must not be run on a system that has GPFS recovery groups.

## Security

You must have root authority to run the `esscheckdisks` command.

## Examples

This example shows `esscheckdisks` command running on node `gssio1` and performing all tests (including write) in drives in all enclosures. Run:

```
esscheckdisks --iotest a --write-enable
```

The system displays output similar to this:

```
# [root@ess3k4a ~]# ESSENV=INSTALL esscheckdisks --enclosure-list all --iotest a --write-enable
2020-06-23T02:21:41.529854 Start running check disks
2020-06-23T02:21:41.781865 Disk check will be performed for host: ess3k4b
2020-06-23T02:21:42.415534 System architecture is x86_64
2020-06-23T02:21:42.415651 By default Path 0 will be taken for x86_64 types of node.
2020-06-23T02:21:42.415680 Path Lists: 0

2020-06-23T02:21:42.583868 Taking inventory of nvme disks
2020-06-23T02:21:49.646858 Using IO Engine: gpfsp perf
2020-06-23T02:21:49.656844 Starting r test for 12 of 12 disks. Path: 0, duration 30 secs
2020-06-23T02:22:24.718011 Check disk analysis for r test Complete
2020-06-23T02:22:24.718170 Using IO Engine: gpfsp perf
2020-06-23T02:22:24.719774 Starting w test for 12 of 12 disks. Path: 0, duration 30 secs
2020-06-23T02:22:59.785114 Check disk analysis for w test Complete

2020-06-23T02:22:59.785235 Using IO Engine: gpfsp perf
2020-06-23T02:22:59.786783 Starting R test for 12 of 12 disks. Path: 0, duration 30 secs
2020-06-23T02:23:34.851447 Check disk analysis for R test Complete
2020-06-23T02:23:34.851573 Using IO Engine: gpfsp perf
2020-06-23T02:23:34.853185 Starting W test for 12 of 12 disks. Path: 0, duration 30 secs
2020-06-23T02:24:09.918940 Check disk analysis for W test Complete
```

## Location

`/opt/ibm/ess/tools/bin`

## esscrchxml command

Creates an XML file for call home.

## Synopsis

```
esscrchxml [ -N NODE-LIST ]
[ --prefix PREFIX ] [ --suffix SUFFIX ]
[ --callhomexml CALLHOME-XML ] [ --crvpd ]
[ --serial SOLN-SERIAL ] [ --model SOLN-MODEL ]
[ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

Use the **esscrchxml** command to create an XML file for call home.

## Parameters

### **-h | --help**

Specifies the help message and exit.

### **-N NODE-LIST**

Specifies the list of nodes on which to run tests.

### **--prefix PREFIX**

Specifies the host name prefix.

**Note:** Use an equal sign (=) between **--prefix** and *PREFIX* if *PREFIX* starts with a hyphen (-).

### **--suffix SUFFIX**

Specifies the host name suffix.

**Note:** Use an equal sign (=) between **--suffix** and *SUFFIX* if *PREFIX* starts with a hyphen (-).

### **--callhomexml CALLHOME-XML**

Specifies the ESS call home XML file name and location. The default value is `/tmp/esssch<serial>.xml`, where `<serial>` is the ESS solution serial number (see *SolnModel*).

### **--crvpd**

Creates the vital product data (VPD) file.

### **--serial SOLN-SERIAL**

Specifies the ESS solution serial number.

### **--model SOLN-MODEL**

Specifies the ESS model.

### **--onscreen**

Shows the XML file on stdout.

## Security

You must have root authority to run the `esscrchxml` script.

## Exit status

**0**

Successful completion.

**nonzero**

A failure occurs.

## Example

This example shows how to generate a call home XML file:

```
esscrchxml -N ems1,ess_x86_64
```

## Location

`/opt/ibm/ess/tools/bin`



# essfindmissingdisks command

---

Checks the disk paths and cabling connectivity.

## Synopsis

```
essfindmissingdisks { -N NodeList }  
                    [ --prefix Prefix ] [ --suffix Suffix ] [ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

The `essfindmissingdisks` command checks for incorrect and missing cable connections between I/O server nodes and storage enclosures. The command checks for:

- Paths to disks
- Proper cable connections

## Parameters

### **-N *NodeList***

Specifies a comma-separated list of nodes to run the check.

You must specify the `-N` or `-G` parameter.

### **--prefix *Prefix***

Specifies the hostname prefix. Use *Prefix* with *NodeList* to generate node names when you run the check. Use `=` between `--suffix` and value if the value starts with `-`.

### **--suffix *Suffix***

Specifies the hostname suffix. Use *Suffix* with *NodeList* to generate node names when you run the check. For example:

- Node list `gssio1,gssio2`
- Prefix `A-`
- Suffix `-ib`
- Node names `A-gssio1-ib` and `A-gssio2-ib`

The newly formed node name must be resolvable to corresponding IP address. Use `=` between `--suffix` and value if the value starts with `-`.

### **-h | --help**

Displays usage information about this command and exits.

## Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

## Security

You must have root authority to run the `essfindmissingdisks` command.

## Examples

Following example shows **essfindmissingdisks** running on node `gssio1`.

```
essfindmissingdisks -N gssio1
```

The system displays output similar to this:

```
essfindmissingdisks -N gssio1
2021-03-10T14:56:37.014399 [INFO] Start find missing disk paths
2021-03-10T14:56:39.126262 [INFO] nodelist: gssio1
2021-03-10T14:56:39.126399 [INFO] May take long time to complete search of all drive paths
2021-03-10T14:56:39.735788 [INFO] Checking missing disk paths from node gssio1
gssio1: GNR server: name gssio1.gpfs.net arch ppc64le model 8247-22L serial 213B99A
gssio1 Enclosure G59T00Z sees 24 disks (2 SSDs, 22 HDDs)
gssio1 Enclosure G59P022 sees 24 disks (0 SSDs, 24 HDDs)
gssio1 Enclosure G5AM00D sees 24 disks (0 SSDs, 24 HDDs)
gssio1 Enclosure G582L01 sees 24 disks (0 SSDs, 24 HDDs)
gssio1: GNR server disk topology: ESS GS4 HDD (match: 100/100)
gssio1: GNR configuration: 4 enclosures, 2 SSDs, 0 empty slots, 96 disks total, 6 NVRAM
partitions
2021-03-10T14:57:19.690596 [INFO] Finish search for missing disk paths. Number of missing
disk paths: 0
[PASS] essfindmissingdisks passed successfully
```

## Location

`/opt/ibm/ess/tools/bin`

## essgencluster command

---

Creates an ESS cluster from a node-list or node-group

## Synopsis

```
essgencluster [ -h | --help ] -C ClusterName -N NodeList [ --subnet Subnets ]
[ --cluster-type CLUSTER_TYPE ] [ --prefix Prefix ] [ --suffix Suffix ]
[ --no-fw-update]
```

## Availability

Available with the Elastic Storage Server.

## Description

Use the `essgencluster` to create an ESS cluster containing the servers listed in *NODE-LIST* or *NODE-GROUP*. This command creates the cluster, applies applicable license acceptance, applies configuration changes for ESS application, creates a node-class with the group name of the nodes, updates host-adapter, storage enclosure, and disk firmware. At the successful completion, the member nodes are also started.

## Parameters

### **-h | --help**

Displays usage information about this command and exits.

### **-C *ClusterName***

Specifies the name of the GPFS cluster. You must specify this parameter.

### **-N *NodeList***

Specifies a comma-separated list of nodes for the disk path check.

**--subnet Subnets**

Specifies one or more subnet names in a comma-separated list. This parameter is used to populate the GPFS subnet parameter.

**--cluster-type CLUSTER\_TYPE**

Provides cluster type. Valid values are `ess3k`, `ess5k`, and `ess5x`.

**--prefix Prefix**

Specifies the hostname prefix. This prefix value is applied to the node names that are provided in *Node-List* or name of nodes in *Node-Group*. The combined node name is used as the hostname for any GPFS cluster creation. Use an equal sign (=) between --prefix and supplied value if the prefix begins with a hyphen (-).

**--suffix Suffix**

Specifies the hostname suffix. This suffix value is applied to the node names that are provided in *Node-List* or names of nodes in *Node-Group*. The combined nodename (with PREFIX and SUFFIX) is used as the hostname for any GPFS cluster creation. For example, a *Node-List* of `gssio1`, `gssio2`, with a prefix value of `A-` and a suffix value of `-ib`, and with host names `A-gssio1-ib` and `A-gssio2-ib` can be used to create the GPFS cluster. The newly formed node name must be resolvable. Use an equal sign (=) between --suffix and value if the suffix begins with a hyphen (-).

**--no-fw-update**

Indicates that you do not want to apply firmware updates for the host adapter, storage enclosures, and drives. This option skips the SAS adapter, the storage enclosure, and the drive FW update that occurs after the GPFS cluster creation.

**Note:** The ESS cluster is configured by default with a callback script for GNR events. This script is invoked when any of the following events occurs: *postRGTakeover*, *postRGRelinquish*, *rgOpenFailed*, *rgPanic*, *pdFailed*, *pdRecovered*, *pdReplacePdisk*, *pdPathDown*, and *daRebuildFailed*. See `mmaddcallback` command for further details on callback events. A brief description of callback events are recorded in the `/var/log/messages` file. The `gnrcallback350.sh` file located at `/opt/ibm/gss/tools/samples` directory and can be customized to take addition actions (such as sending an email). The callback can be deleted using `mmdelcallback` command.

**Exit status****0**

Successful completion.

**nonzero**

A failure has occurred.

**Security**

You must have root authority to run the `essgencluster` command.

**Examples**

This example shows generation of cluster `test01` using node group `ess_x86_64`. Here the node list for the cluster creation is obtained from group `ess_x86_64`. If the `ess_x86_64` contains nodes `gssio1` and `gssio2` then cluster will be formed using these nodes.

```
essgencluster -C test01 -G ess_x86_64
```

The node names in the `NODE-GROUP` `ess_x86_64` are typically used for management tasks. High speed network such as Infiniband or 10Gbit Ethernet is used for the data/clustering network. In such a case you can create the cluster as follows:

```
essgencluster -C test01 -G ess_x86_64 --suffix=-10g
```

Here, the node names `gssio1-10g` and `gssio2-10g` are used for the cluster creation. Where `gssio1-10g` and `gssio2-10g` must be resolvable into a valid IP addresses in the high speed network.

## See also

See also the following *IBM Spectrum Scale: Command and Programming Reference* topics:

- `mmchconfig`

## Location

`/opt/ibm/ess/tools/bin`

## essgennetworks command

Create a bonded ESS network Perform ESS bond creation and convert interface conversion for VPI adapters.

## Synopsis

```
essgennetworks { -N Node-List } [ --prefix Prefix ] [ --suffix Suffix ]
[ --interfaces Interfaces ] [--assignip ASSIGNIP]
[ --create-bond | --delete-bond | --add-slave ]
[ --gateway Gateway ] [--bond Bondname ] [--miimon Miimon ]
[ --vlan Vlan ]
[ --mode { balance-rr,active-backup,balance-xor,broadcast,
802.3ad,balance-tlb,balance-alb } ]
[ --hash-policy {layer2+3,layer3+4 } ] [ --netmask Crid ]
[ --iPoIB ] [--create-bridge-for-vm]
[ --bridge-type {mgmt} ] [ --query ] [--enableRDMA]
[ --disableRDMA ] [--enableRoCE] [--disableRoCE]
[ --configureRouteForRoCE]
[ --roceRoutingTableId ROCEROUTINGTABLEID]
[ --roceRoutingTableName ROCEROUTINGTABLENAME]
[ --verbsPortsFabricBond VERBSPORTSFABRICBOND]
[ --verbsPortsFabricIface VERBSPORTSFABRICIFACE]
[ --devices Devices ]
[ --change { InfiniBand,Ethernet } ] [ --port { P1,P2 } ]
[ --mtu { 1500,2044,4092,9000 } ] [ --verbose ] [ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

Use **essgennetworks** to create a high speed network by using **nmcli**. This command is applicable to any network with Ethernet and InfiniBand interfaces. This command also analyzes the `/etc/hosts` file in the EMS node and (based on the input that is provided in that file) it creates a bonded connection on the high speed interfaces that are in the target node. If new slave interfaces are added (or up) after the bond is created, they can be added to the bond.

By default, this script does the following configuration:

- Miimon is set to 100
- Bonding mode is set to 802.3ad (LACP)
- `Xmit_hash_policy` is set to `layer2+3`

Any other bond options contain the default value, which includes the `lacp_rate` (the default value is slow). For proper network operation, the Ethernet switch and InfiniBand switch settings in the networking infrastructure must match the I/O server node interface bond settings.

This command also support VPI adapter interface switching between InfiniBand vs Ethernet. You can use `--change` option and select target interface type either InfiniBand or Ethernet and select the target port which need conversion to different type of protocol. There is a switch named `--device` which allows user to select a particular device onto which conversion of the interface required to be performed. Host should be rebooted once the conversion is over in order to get the new type of interface type to get

reflected. Make sure the MTS (Mellanox Tools Services) should be running on node before doing any type of interface type conversion. Conversion of interface type is only supported for ESS 3000 type of ESS servers.

## Parameters

### **-N *Node-List***

Specifies a list of nodes for network operations .

### **--prefix *Prefix***

Specifies the hostname prefix.

Use an equal sign (=) between --prefix and value if the value starts with a hyphen (-).

### **--suffix *Suffix***

Specifies the hostname suffix.

Use an equal sign (=) between --suffix and value if the value starts with a hyphen (-).

### **--interface *Interface***

Specifies a list of interfaces for bonding. If the list is not provided, by default all high-speed interfaces are taken.

### **--assignip *ASSIGNIP***

Assigns IP address to provide interface in the --interface switch.

### **--create-bond**

Creates a bonded interface.

### **--delete-bond**

Deletes a bonded interface.

### **--add-slave**

Adds the slave interfaces to an existing bond. This is useful when more high-speed links are up or added since the bond creation.

### **--gateway *Gateway***

Specifies a gateway for the network. By default it will not configure any gateway on network interface until specified.

### **--bond *Bondname***

Specifies the name of the bond. The default is bond0.

### **--miimon *Miimon***

Provides a miimon value for bond. The default is miimon=100. Consider miimon=1000 if you are planning to use bond for RoCE.

### **--vlan *Vlan***

Sets VLAN\_ID for the interface or bond.

### **--mode {*balance-rr, active-backup, balance-xor, broadcast, 802.3ad, balance-tlb, balance-alb*}**

Specifies mode for the bonded interface. The default is 802.3ad (recommended).

### **--hash-policy {*layer2+3, layer3+4*}**

Specifies the xmit hash policy for 802.3ad and balanced-xor. The default value is layer2+3.

### **--netmask *Crid***

Specifies the CIDR or network mask for the interface. The default is /24. The network mask should be specified in the format of CIDR.

### **--verbose**

Provides more verbose output. The default is false.

### **--ipoib**

Enables IPoIB (IP over InfiniBand, in case InfiniBand network present). By default, False. It will also enables RDMA for Infiniband.

**--create-bridge-for-vm**

For VM communication, create a management or high-speed bridge. Depending on the type of bridge, management or High Speed IP will be moved to the bridge.

**--bridge-type {mgmt}**

For VM communication, create a management or high-speed bridge. Depending on the type of bridge, management or High Speed IP will be moved to the bridge.

**--query**

Queries the port type of the Mellanox interface.

**--enableRDMA**

Enables RDMA over the Infiniband Network.

**--disableRDMA**

Disables RDMA over the Infiniband Network.

**--enableRoCE**

Enables RoCE over the Ethernet Network.

**--disableRoCE**

Disables RoCE over the Ethernet Network.

**--configureRouteForRoCE**

Configures routing for RoCE over the Ethernet Network. It will be used if same subnet has been used for different RoCE interfaces.

**--roceRoutingTableId *ROCEROUTINGTABLEID***

Provides routing table ID for the RoCE over the Ethernet Network.

**--roceRoutingTableName *ROCEROUTINGTABLENAME***

Specifies routing table Name for the RoCE over the Ethernet Network.

**--verbsPortsFabricBond *VERBSPORTSFABRICBOND***

Specifies name of the Mellanox verbs port fabric for Bonded interface. For Example: /1 or /2. It will be automatically added to the verbs port. Multiple fabric can be applied using comma separated value.

**--verbsPortsFabricIface *VERBSPORTSFABRICIFACE***

Specifies name of the Mellanox verbs port fabric non Bonded interface such as regular interfaces. For Example: /1 or /2. It will be automatically added to the verbs port. Multiple fabric can be applied using comma-separated value.

**--devices *DEVICES***

Specifies name of the Mellanox device name. All devices attached to node will be accessed with the query all. Provides comma-separated device names to query more than one device at a given time.

**--change {InfiniBand, Ethernet}**

Changes the Mellanox port type to InfiniBand or Ethernet and vice versa.

**--port {P1, P2}**

Specifies the port number of the Mellanox VPI card.

**--mtu {1500, 2044, 4092, 9000}**

Provides the MTU of the bond network. For Ethernet, 1500 or 9000 MTU is allowed (Default is 1500). For Infiniband, 2044 or 4092 MTU is allowed (Default is 2048).

**-h | --help**

Displays usage information about this script and exits.

**Exit status****0**

Successful completion.

**nonzero**

A failure has occurred.

## Security

You must have root authority to run the `essgennetworks` script.

## Examples

1. This example shows running **essgennetworks** to obtain information of high-speed interfaces IP address assigned to the bond for Ethernet interfaces.

```
# essgennetworks -G ess_x86_64 --suffix=-10g --verbose
2018-02-28T01:33:51.764194 Starting network generation
2018-02-28T01:33:52.432630 nodelist: gssio1 gssio2
2018-02-28T01:33:52.432669 suffix used for network hostname: -10g
Interface(s) available on node gssio1-10g
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio1-10g considered for bonding are ['enP2p1s0', 'enP2p1s0d1']
Interface(s) available on node gssio2-10g
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio2-10g considered for bonding are ['enP2p1s0', 'enP2p1s0d1']
gssio1-10g: Current IP Address: IP not assigned
gssio2-10g: Current IP Address: IP not assigned
```

2. This example shows creating a bond in I/O server nodes using information provided in `/etc/hosts` file for Ethernet interfaces where bond name is `bond0`.

```
# essgennetworks -G ess_x86_64 --suffix=-10g --bond bond0 --create-bond
2018-02-28T01:41:11.413341 Starting network generation
2018-02-28T01:41:12.072727 nodelist: gssio1 gssio2
2018-02-28T01:41:12.072765 suffix used for network hostname: -10g
Interface(s) available on node gssio1-10g
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio1-10g considered for bonding are ['enP2p1s0', 'enP2p1s0d1']
Interface(s) available on node gssio2-10g
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio2-10g considered for bonding are ['enP2p1s0', 'enP2p1s0d1']
gssio1-10g: Current IP Address: IP not assigned
gssio2-10g: Current IP Address: IP not assigned
gssio1-10g: IP Address assigned to bond: 172.31.250.17
gssio2-10g: IP Address assigned to bond: 172.31.250.18
Bond creation complete
```

3. This example shows running **essgennetworks** to obtain information of high-speed interfaces IP address assigned to the bond for InfiniBand interfaces.

```
# essgennetworks -G ess_x86_64 --suffix=-ib --ipoib
2018-02-28T01:46:52.785492 Starting network generation
2018-02-28T01:46:53.452440 nodelist: gssio1 gssio2
2018-02-28T01:46:53.452475 suffix used for network hostname: -ib
Interface(s) available on node gssio1-ib
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio1-ib considered for bonding are ['ib0']
Interface(s) available on node gssio2-ib
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio2-ib considered for bonding are ['ib0']
gssio1-ib: Current IP Address: IP not assigned
gssio2-ib: Current IP Address: IP not assigned
```

4. This example shows creating a bond in I/O server nodes using information provided in /etc/hosts file for InfiniBand interfaces where bond name is bond1.

```
# essgennetworks -G ess_x86_64 --suffix=-ib --ipoib --create-bond
2018-02-28T01:48:31.769301 Starting network generation
2018-02-28T01:48:32.432582 nodelist: gssio1 gssio2
2018-02-28T01:48:32.432633 suffix used for network hostname: -ib
Interface(s) available on node gssio1-ib
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio1-ib considered for bonding are ['ib0']
Interface(s) available on node gssio2-ib
Up interface: enP2p1s0
Up interface: enP2p1s0d1
Up interface: ib0
Down interface: ib1
Up interface(s) of node gssio2-ib considered for bonding are ['ib0']
gssio1-ib: Current IP Address: IP not assigned
gssio2-ib: Current IP Address: IP not assigned
gssio1-ib: IP Address assigned to bond: 172.31.250.1
[WARN] gssio1-ib: Bond created with one slave interface
gssio2-ib: IP Address assigned to bond: 172.31.250.2
[WARN] gssio2-ib: Bond created with one slave interface
Bond creation complete
```

5. This example shows how to convert the VPI adapter port type to and from Ethernet to InfiniBand and vice versa. Make sure the MTS (Mellanox Tools Services) should be running on node before doing any type of interface type conversion.

a. Querying device

```
essgennetworks -N localhost --query --devices all
2020-09-23T04:24:03.397420 [INFO] Starting network generation
2020-09-23T04:24:03.579361 [INFO] nodelist: localhost
[ERROR] Mellanox Software Tools services are not running. Make sure Mellanox Software
Tools running configuring VPI adapters.
Make sure you must start Mellanox Software Tools using "/bin/mst start" command before
starting the configuration of the VPI adapters.
```

b. Start MST Services using below command.

```
/bin/mst start
Starting MST (Mellanox Software Tools) driver set
Loading MST PCI module - Success
[warn] mst_pciconf is already loaded, skipping
Create devices
Unloading MST PCI module (unused) - Success
```

c. Querying device again

```
essgennetworks -N localhost --query --devices all
2020-09-23T04:24:18.083995 [INFO] Starting network generation
2020-09-23T04:24:18.268935 [INFO] nodelist: localhost
[INFO] Device /dev/mst/mt4121_pciconf1 link type currently configured at system.
[INFO] Port 1 is set to **InfiniBand**
[INFO] Port 2 is set to InfiniBand
[INFO] Device /dev/mst/mt4121_pciconf0 link type currently configured at system.
[INFO] Port 1 is set to InfiniBand
[INFO] Port 2 is set to InfiniBand
```

d. Change the port type of device /dev/mst/mt4121\_pciconf1 for Port 1 from Infiniband to Ethernet

```
essgennetworks -N localhost --change Ethernet --devices /dev/mst/mt4121_pciconf1 --port P1
2020-09-23T03:45:52.322096 [INFO] Starting network generation
2020-09-23T03:45:52.510535 [INFO] nodelist: localhost
[INFO] Changing /dev/mst/mt4121_pciconf1 Port P1 link type to Ethernet
[INFO] Successfully changes the Port type to Ethernet for Port P1
```

e. Reboot the node and make sure the MST tool services started again using above command.

```
essgennetworks -N localhost --query --devices all
2020-09-23T04:05:55.774019 [INFO] Starting network generation
2020-09-23T04:05:55.960088 [INFO] nodelist: localhost
```



```
[INFO] Device      /dev/mst/mt4121_pciconf1 link type currently configured at system.
[INFO] Port 1 is set to **Ethernet**
[INFO] Port 2 is set to InfiniBand
[INFO] Device      /dev/mst/mt4121_pciconf0 link type currently configured at system.
[INFO] Port 1 is set to InfiniBand
[INFO] Port 2 is set to InfiniBand
```

f. Now, you can see the Port 1 has been changed to Ethernet.

```
mlxconfig -d /dev/mst/mt4121_pciconf1 query | grep -i link_type
LINK_TYPE_P1          **ETH(2)**
LINK_TYPE_P2          IB(1)
```

## Location

/opt/ibm/ess/tools/bin

## essinstallcheck command

Performs ESS install check.

## Synopsis

```
essinstallcheck { -N NODE-LIST } [ --prefix PREFIX ]
                 [ --get-version ] [ --suffix SUFFIX ]
                 [ --syslog ] [ --srv-events ]
                 [ --platform-events EVENTLIST ]
                 [ --monitor ] [ --skip-callhome ] [ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

The `essinstallcheck` command checks various aspects of the installation.

## Parameters

### **-N *NODE-LIST***

Provides a list of nodes to run the check.

### **--prefix *PREFIX***

Provides a hostname prefix. Use = between --suffix and value if the value starts with -.

### **--get-version**

Provides the ESS package version.

### **--suffix *SUFFIX***

Provides a hostname suffix. Use = between --suffix and value if the value starts with -.

### **--syslog**

Logs output to syslog (/var/log/messages). Default no logging to syslog.

### **--srv-events**

Shows the serviceable events. When selected, only this option is run.

### **--platform-events *EVENTLIST***

Provides platform event details.

### **--monitor**

In this mode, outputs are only logged in to syslog. The stdout is turned off.

### **--skip-callhome**

Skips hardware and software call home check.

## **-h | --help**

Displays usage information about this command and exits.

## **Exit status**

### **0**

Successful completion.

### **nonzero**

A failure has occurred.

## **Security**

You must have root authority to run the `essinstallcheck` command.

## **Examples**

1. This example shows running install check to obtain installed package version.

```
# essinstallcheck -N ess_x86_64 --get-version
Start of install check
nodelist:  fab3a          fab3b

Node: fab3a          Installed version:          ess3000_6.0.0_1122-22_dme
[PASS] essinstallcheck passed successfully
```

2. This example shows example output of check running on an I/O node in the `ess_x86_64` group.

```
# essinstallcheck -N c145f08zn01
Start of install check
nodelist:  c145f08zn01
Checking nodes.
===== Summary of node: c145f08zn01 =====
[INFO] Getting system firmware level. May take a long time...
[INFO] Getting system profile setting.
Installed version:          ess5000_6.0.1.0_0721-16_dme
[OK] Linux kernel installed: 4.18.0-147.13.2.el8_1.ppc64le
[OK] Systemd installed:      239-18.el8_1.5.ppc64le
[OK] Networkmgr installed:   1.20.0-3.el8.ppc64le
[OK] Mellanox OFED level:    MLNX_OFED_LINUX-4.9-0.1.7.3
[OK] IPR SAS FW:             19512900
[OK] ipraid RAID level:      10
[OK] ipraid RAID Status:     Optimized
[OK] IPR SAS queue depth:    64
[OK] System Firmware:        FW941.00 (VL941_031)
[OK] System profile setting: scale
[OK] System profile verification PASSED.
[OK] rsyslog logging is already configure
[OK] Host adapter driver:    28.100.00.00
[OK] GNR Level:              5.0.5.1 efix3
Performing Spectrum Scale RAID configuration check.
[OK] mmvdisk settings match best practices.
[OK] GNR callback events:
postRGTakeover,postRGRelinquish,rgOpenFailed,rgPanic,pdFailed,pdRecovered,pdReplacePdisk,pdPa
thDown,daRebuildFailed
Can not obtain ip address of the FSP node: c145f08zn01
Can not obtain ipmt pw of node: c145f08zn01
[ERROR] Static IP check (Error communicating with FSP)
[OK] New disk prep script: /usr/lpp/mmfs/bin/tspreparenewdiskforuse
[OK] Network adapter MT4121 firmware: 16.27.2008, net adapter count: 6
[OK] Network adapter firmware
Obtaining storage firmware versions from IO nodes. May take a long time...
[OK] Host adapter 0x3180 firmware: 16.00.11.00, host-adapter count: 5
[OK] Enclosure 5147-092 firmware: E557,E557, enclosure count: 2
[OK] Drive ST800FM0183 firmware: 4036, drive count: 2
[OK] Drive HUH721010AL4200 firmware: J6R7, drive count: 182
[OK] Storage system firmware
[OK] Node is not reserving KVM memory.
End of install check
[ERROR] essinstallcheck detected error in system. Please review output carefully.
```

## Location

/opt/ibm/ess/tools/bin

## essnettest command

---

Performs ESS Network test.

## Synopsis

```
essnettest { -N NODE-LIST } [ --prefix PREFIX ] [ --suffix SUFFIX ]  
[ --duration TEST-DURATION ] [ --buffersize BUFFER-SIZE ]  
[ --errthld ERROR-THRESHOLD ] [ --dropthld DROP-THRESHOLD ]  
[ --rdma ] [--syslog] [ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

The **essnettest** script helps in running the network workload to test network for proper operations. The **nsdperf** workload generator is the underlying tool to generate the workload.

## Parameters

### **-N *NODE-LIST***

Provides a list of nodes to run the network performance test.

### **--prefix *PREFIX***

Provides the host name prefix. Use = between --prefix and value if the value starts with -.

### **--suffix *SUFFIX***

Provides the host name suffix. Use = between --suffix and value if the value starts with -.

### **--duration *TEST-DURATION***

Provides the test run time in seconds. Default test duration is 30 seconds.

### **--buffersize *BUFFER-SIZE***

Provides the buffer size in bytes. Default is 4194304 (4 MiB).

### **--errthld *ERROR-THRESHOLD***

Provides the packet error threshold in percent.

### **--dropthld *DROP-THRESHOLD***

Provides the packet drop threshold in percent.

### **--rdma**

Specifies RDMA test only; skips IP part.

### **--syslog**

Logs the packet error and drop percent to syslog (/var/log/messages). Default no logging to syslog.

### **-h | --help**

Displays usage information about this script and exits.

## Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

## Security

You must have root authority to run the `essnettest` script.

## Example

This example shows running the network test on the management server node (EMS) and I/O server nodes.

```
ESSENV=TEST essnettest -N ems1,ess_x86_64 --suffix=-hs
```

## Location

`/opt/ibm/ess/tools/bin`

## essnodedetails command

---

Obtains node details.

## Synopsis

```
essnodedetails { -N NODE-LIST }  
                [ --prefix Prefix ] [ --suffix Suffix ]  
                [ --fspdiscover ][--identify] [--iprange IPRANGE]  
                [ --pass PASSWORD] [ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

The `essnodedetails` command can be used to obtain node details.

## Parameters

### **-N *NODE-LIST***

Specifies a comma separated list of nodes to get the node details.

### **--prefix *Prefix***

Provides a host name prefix. Use = between --prefix and value if the value starts with a -.

### **--suffix *Suffix***

Provides a host name suffix. Use = between --suffix and value if the value starts with -.

### **--fspdiscover**

Specifies to discover nodes on the FSP network.

### **--identify**

Specifies to identify the node.

### **--iprange *IPRANGE***

Provides the IP range use to discover nodes.

### **--pass *PASSWORD***

Specifies the IPMI password of FSP. Default password is used when not provided.

### **-h | --help**

Displays usage information about this command and exits.

## Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

## Security

You must have root authority to run the `essnodedetails` command.

## Example

This example shows how to obtain the node details of the `gssio1` node.

```
# essnodedetails -N gssio1
```

A sample output is as follows:

```
2018-02-28T03:30:07.688876 Generating node list for the test...
2018-02-28T03:30:08.352377 nodelist:    gssio1
Node type      : 8247-22L
Node serial    : 2159F3A
  Static hostname: gssio1.localdomain
    Icon name: computer
    Machine ID: 213721d940844446a8b7e5f7bdf2ad1e
    Boot ID: cf8f091260ac4a9d92a48ca7f9f730be
  Operating System: Red Hat Enterprise Linux Server 7.4 (Maipo)
    CPE OS Name: cpe:/o:redhat:enterprise_linux:7.4:GA:server
    Kernel: Linux 3.10.0-693.33.1.el7.ppc64le
    Architecture: ppc64-le

IP Address:
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1
   inet 127.0.0.1/8 scope host lo
   --
2: enP3p9s0f0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
   inet 192.168.45.21/24 brd 192.168.45.255 scope global enP3p9s0f0
Kernel                  : Linux gssio1.localdomain 3.10.0-693.33.1.el7.ppc64le
#1 SMP Wed Jan 17 10:35:28 EST 2018 ppc64le ppc64le ppc64le GNU/Linux

OFED                    : MLNX_OFED_LINUX-4.1-4.1.6.1:
gssio1: PCI Adapters
0001:05:00.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS2308 PCI-Express Fusion-MPT SAS-2 (rev 05)

0001:0b:00.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS2308 PCI-Express Fusion-MPT SAS-2 (rev 05)

0001:0c:00.0 RAID bus controller: IBM PCI-E IPR SAS Adapter (ASIC) (rev 02)

0005:03:00.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS2308 PCI-Express Fusion-MPT SAS-2 (rev 05)

0005:09:00.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS2308 PCI-Express Fusion-MPT SAS-2 (rev 05)

0006:03:00.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS2308 PCI-Express Fusion-MPT SAS-2 (rev 05)

0006:09:00.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS2308 PCI-Express Fusion-MPT SAS-2 (rev 05)
gssio1: Memory
          total        used         free      shared  buff/cache   available
Mem:      123G          2.9G          119G          26M          1.0G          119G
Swap:      7.8G           0B           7.8G

gssio1: Highspeed Interface
mlx4_0 port 1 ==> enP2p1s0 (Up)
mlx4_0 port 2 ==> enP2p1s0d1 (Up)
mlx5_0 port 1 ==> ib0 (Up)
mlx5_1 port 1 ==> ib1 (Down)
Kernel Interface table
Iface    MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
enP2p1s0 1500      0      0      0      0      0      0      0      0 BMRU
```

enP2p1s0	1500	0	0	0 0	0	0	0	0 BMRU
enP3p9s0	1500	595	0	0 0	4884	0	0	0 BMRU
enP3p9s0	1500	0	0	0 0	0	0	0	0 BMU
enP3p9s0	1500	0	0	0 0	0	0	0	0 BMU
enP3p9s0	1500	0	0	0 0	0	0	0	0 BMU
ib0	2044	129	0	0 0	0	0	0	0 BMRU
ib1	4092	0	0	0 0	0	0	0	0 BMU
lo	65536	4	0	0 0	4	0	0	0 LRU
gssio1: IP RAID Adapte Status								
Name	PCI/SCSI	Location		Description			Status	
-----								
sda	0001:0c:00.0/0:2:0:0			RAID 10 Array			Optimized	

## Location

/opt/ibm/ess/tools/bin

## essrun command

Runs the IBM Elastic Storage System (ESS) deployment command to create and deploy a working ESS cluster.

## Synopsis

```
essrun { -N NODE-LIST | NODE-GROUP } [--offline] [-v] [-h]
      { config | healthcheck | update | perfset | timeset
      | firewall | security | selinux | sudo | admincentral
      | network | cluster | filesystem | vdisk | gui }
```

## Availability

Available with IBM Elastic Storage System (ESS). [Only available in the management container]

## Description

The `essrun` command runs the ESS deployment to create and deploy a working ESS cluster. It can be used to run the following Ansible® roles in ESS.

- `config`: Configure requirements for ESS
- `healthcheck`: General health check status of the node(s)
- `update`: Update node to the latest ESS packages
- `perfset`: Performance check option for ESS 5000
- `timeset`: Time check option for ESS 5000
- `firewall`: Firewall security option for ESS
- `security`: Security option for ESS
- `selinux`: SELinux security option for ESS
- `sudo`: Sudo security option for ESS
- `admincentral`: AdminCentral security option for ESS
- `network`: Create a high-speed network in ESS
- `cluster`: Create an ESS cluster
- `filesystem`: Create a file system on ESS
- `vdisk`: Create a vdiskset on ESS
- `gui`: Configure or modify GUI setup for ESS Legacy

## Parameters

### **-N *NODE-LIST* | *NODE-GROUP***

Specifies hosts with host names separated by comma or the name of the node group.

### **--offline**

Run program on all nodes specified with the -N option.

### **-v | -V**

Shows verbose output.

### **-h | --help**

Displays usage information about this script and exits.

To display usage information for the roles available with **essrun**, use -h or --help with the role name. For example, to display usage information for the `firewall` role, use **essrun firewall --help**.

## Subcommand help

### **config**

Shows general health check status of the node(s).

Usage:

```
essrun config [-h] [-p Password] { load | check }
```

### **-p *Password***

Specifies password used for root login to node(s).

### **load**

Detects the node type of specified nodes, and configures passwordless SSH, creates node definitions, and creates VPD files.

### **check**

Creates repositories and performs a dry-run update for checking if you need to fix something before the actual update.

### **-h | --help**

Displays usage information about this subcommand and exits.

### **healthcheck**

Shows general health check status of the node(s).

Usage:

```
essrun healthcheck [-h]
```

### **-h | --help**

Displays usage information about this subcommand and exits.

### **update**

Updates nodes to the latest ESS packages.

Usage:

```
essrun update [-h] [--offline] [--no-fw-update | --ofed-only] [--silent]
               [--serial { n | all }] [--no-check]
```

### **--offline**

Run the update on all nodes specified with the -N option in the offline mode. If --offline is not specified, the command is run in the online mode (default behavior).

### **--no-fw-update**

Specify to not update storage enclosure, host adapters, or drive firmware on I/O nodes.

**--ofed-only**

Updates the OFED only. These updates are only done offline. This command option forces the reinstall of OFED.

**-s | --silent**

Run the update silently.

**--serial { n | all }**

Provides number for defining how many hosts Ansible should manage at a single time. The default value is 8.

**--no-check**

Specify to not stop between groups. (Online update ONLY)

**-h | --help**

Displays usage information about this subcommand and exits.

**perfset**

Performance check option for ESS 5000.

Usage:

```
essrun perfset [-h] { enable | disable | verify }
```

**enable**

Enables the perfset.

**disable**

Disables the perfset.

**verify**

Verifies the perfset status.

**-h | --help**

Displays usage information about this subcommand and exits.

**timeset**

Time check option for ESS 5000.

Usage:

```
essrun timeset [-h] { enable | disable | verify }
```

**enable**

Enables the timeset.

**disable**

Disables the timeset.

**verify**

Verifies the timeset status.

**-h | --help**

Displays usage information about this subcommand and exits.

**firewall**

Configures firewall security options for ESS.

Usage:

```
essrun firewall [-h] { enable | disable }
```

**enable**

Enables the firewall.

**disable**

Disables the firewall.

**-h | --help**

Displays usage information about this subcommand and exits.



## security

Configures security options for ESS.

Usage:

```
essrun -N NODE-LIST security [-h] { enable | disable | verify }
```

### enable

Enables security.

### disable

Disables security.

### verify

Verifies the security status.

### -h | --help

Displays usage information about this subcommand and exits.

## selinux

Configures SELinux security options for ESS.

Usage:

```
essrun -N NODE-LIST security [-h] { permissive | enable | disable }
```

### permissive

Enables SELinux security in the permissive mode.

### enable

Enables SELinux security in the enforcing mode.

### disable

Disables SELinux security.

### -h | --help

Displays usage information about this subcommand and exits.

## sudo

Configures SUDO security options for ESS.

Usage:

```
essrun sudo [-h] [--user SUDO_USER] [--group SUDO_GROUP]
             { enable | disable | use_sudo_wrapper | no_sudo_wrapper }
```

### --user *SUDO\_USER*

Specifies the SUDO user name.

### --group *SUDO\_GROUP*

Specifies the SUDO group name.

### enable

Enables SUDO.

### disable

Disables SUDO.

### use\_sudo\_wrapper

Enables usage of SUDO wrapper.

### no\_sudo\_wrapper

Disables usage of SUDO wrapper.

### -h | --help

Displays usage information about this subcommand and exits.

## admincentral

Configures Admin Central related security options for ESS.

Usage:

```
essrun admincentral [-h] { enable | disable }
```

### **enable**

Enables Admin Central mode.

### **disable**

Disables Admin Central mode.

### **-h | --help**

Displays usage information about this subcommand and exits.

## **network**

Creates a high-speed network for ESS.

Usage:

```
essrun network [-h] --suffix=SUFFIX
```

### **--suffix=SUFFIX**

Specifies the suffix of the high-speed network. You must add it separated by "=" and with no blank spaces.

### **-h | --help**

Displays usage information about this subcommand and exits.

## **cluster**

Creates an ESS cluster.

Usage:

```
essrun cluster [-h] [--name CLUSTER-NAME] [--suffix=SUFFIX]
               [--add-ems EMS-NODE | --add-nodes NODE-LIST]
```

### **--name CLUSTER-NAME**

Specifies the cluster name. The default cluster name is test01.

### **--suffix=SUFFIX**

Specifies the suffix of the high-speed network. You must add it separated by "=" and no blank spaces. For example, --suffix=-hs.

### **--add-ems EMS-NODE**

Specifies the name of the ESS Management Server (EMS) node to be added.

### **--add-nodes NODE-LIST**

Specifies the names of the ESS I/O nodes in a comma-separated list.

### **-h | --help**

Displays usage information about this subcommand and exits.

## **filesystem**

Creates a file system on ESS.

Usage:

```
essrun filesystem [-h] [--name FS_NAME] [--code RaidCode]
                  [--bs BlockSize]
                  [--size {n% | n | nK | nM | nG | nT}]
                  --suffix=SUFFIX [--rg-only | --ces]
```

### **--name FS-NAME**

Specifies the file system name. The default file system name is fs5k. The default file system name for CES is cesSharedRoot.

### **--code RaidCode**

Specifies the RAID code. The default RAID code is 8+2p.

### **--bs BlockSize**

Specifies the block size. The default block size is 16M.

**--size {n% | n | nK | nM | nG | nT}**

Specifies the vdiskset size. The default vdiskset size is 100%.

**--suffix=*SUFFIX***

Specifies the suffix of the high-speed network. You must add it separated by "=" and with no blank spaces. For example, --suffix=-hs.

**--rg-only**

Use this flag if you want to create recovery groups only.

**--ces**

Use this flag if you want to create a CES file system.

**-h | --help**

Displays usage information about this subcommand and exits.

**vdisk**

Creates a vdiskset on ESS.

Usage:

```
essrun vdisk [-h] [--name VS_NAME] [--code RaidCode] [--bs BlockSize]
              [--size {n% | n | nK | nM | nG | nT}] --suffix=SUFFIX
              [--extra-vars "mmvdisk vdisk define options"]
```

**--name *VS-NAME***

Specifies the vdiskset name. The default vdiskset name is 5k.

**--code *RaidCode***

Specifies the RAID code. The default RAID code is 8+2p.

**--bs *BlockSize***

Specifies the block size. The default block size is 16M.

**--size {n% | n | nK | nM | nG | nT}**

Specifies the vdiskset size. The default vdiskset size is 100%.

**--suffix=*SUFFIX***

Specifies the suffix of the high-speed network. You must add it separated by "=" and with no blank spaces. For example, --suffix=-hs.

**--extra-vars "*mmvdisk vdisk define options*"**

Provide "mmvdisk vdisk define" options in quotation marks. For example,

```
--extra-vars "--DA DA1 --nsd-usage dataAndMetadata --storage-pool system"
```

**-h | --help**

Displays usage information about this subcommand and exits.

**gui**

Configure the GUI for ESS.

Usage:

```
essrun gui [-h] {--configure | --add-to-host}
```

**-h | --help**

Displays usage information about this subcommand and exits.

**--configure**

Performs all initial configuration for GUI setup.

**--add-to-hosts**

Adds node(s) to the hosts.yml file for GUI setup in EMS.

## Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

## Security

You must have root authority to run this command.

## Examples

### essrun config

- Fix SSH keys between essio1 and essio2 nodes (Every node that you define with the `-N` flag). It also creates or fixes the inventory to run an online update.

```
# essrun -N essio1,essio2 config load -p OSRootPasswordof_essio1_and_essio2
```

- Create repositories and do a dry-run update for checking if you need to fix something before the actual update.

```
# essrun -N essio1,essio2 config check
```

### essrun update

- Run the **update** subcommand with the **--offline** option on the nodes ess3ka and ess3kb.

```
# essrun -N ess3ka,ess3kb --offline update
```

- Run an online update (top nodes first then bottom nodes) but without updating firmware (drives or enclosures).

```
# essrun -N essio1,essio2 update --no-fw-update
```

- Run an update (top nodes first, one by one, then bottom nodes, one by one). If only one building block is in the cluster, the result is same as doing an online update.

```
# essrun -N essio1,essio2,essio3,essio4 update --serial 1
```

- Run an online update and stop between the top group (first node) and the bottom group (second node).

```
# essrun -N essio1,essio2 update
```

A sample output is as follows:

```
[INFO] '2021-05-05T22:08:41.664490' Will stop for manual health check.
[INFO] '2021-05-05T22:08:41.664490' If you want to continue with next group type 'y'.
If you want to cancel update type 'n'.
Update finished in group ess5k_group_A, do you want to continue? (y/n): y
[INFO] '2021-05-05T22:08:41.664490' Continuing with next group...
```

- Skip stopping between top and bottom groups in the update. Only applies to online update.

```
# essrun -N essio1,essio2 update --no-check
```

- Run an update on all nodes specified with `-N`.

```
# essrun -N essio1,essio2 update --offline
```

- Run an update on all nodes specified with `-N` one by one.

```
# essrun -N essio1,essio2 update --serial 1 --offline
```

## essrun perfset

- Enable perfset from the container.

```
# essrun -N NodeList perfset enable
```

- Check the status of the perfset.

```
# essrun -N NodeList perfset verify
```

- Disable perfset from the container.

```
# essrun -N NodeList perfset disable
```

## essrun timeset

- Enable timeset from the container.

```
# essrun -N NodeList timeset enable
```

- Check the status of the Chrony timeset.

```
# essrun -N NodeList timeset verify
```

- Disable timeset from the container.

```
# essrun -N NodeList timeset disable
```

## essrun selinux

- Enable SELinux on the `ems1` node in the permissive mode.

```
# essrun -N ems1 selinux permissive
```

**Note:** Restart the node after this command completes for the changes to take effect.

- Enable SELinux on the `ems1` node in the enforcing mode.

```
# essrun -N ems1 selinux enable
```

**Note:** Restart the node after this command completes for the changes to take effect.

- Disable SELinux on the `ems1` node.

```
# essrun -N ems1 selinux disable
```

**Note:** Restart the node after this command completes for the changes to take effect.

## essrun network

- Create network bonds with name `bond0`. Infiniband or Ethernet, whichever is available is used. If both are available you are promoted for `eth` or `ib`.

```
# essrun -N essio1,essio2 network --suffix=HighSpeedSuffix
```

- Create network bonds with name `bond0` with the specified `netmask`.

```
# essrun -N essio1,essio2 network --suffix=HighSpeedSuffix --netmask {/24 | /25 | ...}
```

## essrun filesystem

- Create a file system with the management network. Your cluster must belong to that same net block for using this command.

```
# essrun -N essio1,essio2 filesystem
```

- Create a file system with the high-speed network. Your cluster must belong to that same net block for using this command.

```
# essrun -N essio1,essio2 filesystem --suffix=HighSpeedSuffix
```

- Create a file system with custom RAID code, block size, and size.

```
# essrun -N essio1,essio2 filesystem --suffix=HighSpeedSuffix  
--code { 8+2p | 8+3p | ... } --bs { 8M | 16M | ... }  
--size { n% | n | nK | nM | nG | nT }
```

- Create recovery groups only in the cluster. You need to create vdisk and add it manually to your desired file system.

```
# essrun -N essio1,essio2 filesystem --suffix=HighSpeedSuffix --rg-onl
```

### essrun vdisk

- Create a vdisk of the specified name with the management network. Your cluster must belong to that same net block for using this command.

```
# essrun -N essio1,essio2 vdisk --name VdiskName
```

- Create a vdisk with the high-speed network. Your cluster must belong to that same net block for using this command.

```
# essrun -N essio1,essio2 vdisk --suffix=HighSpeedSuffix
```

- Create a vdisk with custom RAID code, block size, name, and size.

```
# essrun -N essio1,essio2 vdisk --nameVdiskName  
--suffix=HighSpeedSuffix  
--code { 8+2p | 8+3p | ... } --bs { 8M | 16M | ... }  
--size { n% | n | nK | nM | nG | nT }
```

- Create a vdisk with default RAID code, block size, and size. This command creates vdisk with the defined NSD usage.

```
# essrun -N essio1,essio2 vdisk --nameVdiskName  
--suffix=HighSpeedSuffix  
--extra-vars "{--declustered-array / --nsd-usage / --storage-pool}"
```

### essrun gui

- Configure the GUI for the first time in a Power9 EMS and two I/O nodes. The nodes can be ESS 5000, ESS 3000, or ESS 3200 nodes.

```
# essrun -N ems1,essio1,essio2 gui --configure
```

- Configure or add the new nodes into GUI in a Power9 EMS. The nodes can be ESS 5000, ESS 3000, or ESS 3200 nodes.

```
# essrun -N ess32001a,ess32001b gui --add-to-hosts
```

### Location

Available only in the container at: /opt/ibm/ess/deploy/bin

## essruntask command

---

Runs specific tasks on a node.

### Synopsis

```
essruntask { -N NodeList }  
           [ --prefix Prefix ] [ --suffix Suffix ] --task Task [ --mode MODE ]  
           [ -h | --help ]
```

### Availability

Available with IBM Elastic Storage System (ESS).

### Description

The **essruntask** command can be used to run specific tasks on a node.

### Parameters

#### **-N *NodeList***

Specifies a comma separated list of nodes to get the node details.

#### **--prefix *Prefix***

Provides a host name prefix. Use = between --prefix and value if the value starts with a -.

#### **--suffix *Suffix***

Provides a host name suffix. Use = between --suffix and value if the value starts with -.

#### **--task *Task***

Provides the task with options to run on the *NodeList* or *NodeGroup*. The allowed values are `scsi`, `scsi-encl`, `scsi-disk`, `scsi-sg`, `ping`, `ssh`, `mmlsenclosure-all`, `mmlsenclosure-all-not-ok`, `mmlsenclosure-all-L`, `mmlsfirmware-adapt`, `mmlsfirmware-encl`, `mmlsfirmware-driv`, and `mmlspdisk-not-ok`.

#### **--mode *Mode***

Provides the run mode of the task. The default is `local`. the allowed values are `local` and `ota`.

#### **-h | --help**

Displays usage information about this command and exits.

### Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

### Security

You must have root authority to run the `essruntask` command.

### Example

This example shows how to run the `scsi` task on the `gssio1` node.

```
# essruntask -N gssio1 --task scsi-sg
```

A sample output is as follows:

```

2018-02-28T03:35:35.540298 Generating node list for the test...
2018-02-28T03:35:36.202471 nodelist:    gssio1
Running task lsscsi -sg node gssio1
Success: Running task lsscsi -sg on node gssio1

```

```

gssio1: [0:0:0:0]    storage IBM      AL14SEB060N    6506 -        /dev/sg1      -
gssio1: [0:0:1:0]    storage IBM      AL14SEB060N    6506 -        /dev/sg2      -
gssio1: [0:0:2:0]    enclosu IBM      VSBPD14M1 6GSAS    03 -        /dev/sg5      -
gssio1: [0:0:3:0]    cd/dvd  IBM.      RMB00140572    IP02 /dev/sr0    /dev/sg6      -
gssio1: [0:0:4:0]    enclosu IBM      PSBPD14M1 6GSAS    1508 -        /dev/sg7      -
gssio1: [0:0:5:0]    enclosu IBM      PSBPD14M1 6GSAS    1508 -        /dev/sg8      -
gssio1: [0:1:0:0]    no dev  IBM      IPR-10 68C38500 -        /dev/sg3      -
gssio1: [0:2:0:0]    disk   IBM      IPR-10 68C38500 /dev/sda    /dev/sg4      571GB
gssio1: [0:3:0:0]    no dev  IBM      57DC001SISIOA 0150 -        /dev/sg0      -
gssio1: [2:0:0:0]    disk   IBM      MTFDJAK400MBS 502E /dev/sdb    /dev/sg9      400GB
gssio1: [2:0:1:0]    disk   IBM      MTFDJAK400MBS 502E /dev/sdc    /dev/sg10    400GB
gssio1: [2:0:2:0]    disk   IBM      MTFDJAK400MBS 502E /dev/sdd    /dev/sg11    400GB
gssio1: [2:0:3:0]    disk   IBM      MTFDJAK400MBS 502E /dev/sde    /dev/sg12    400GB
gssio1: [2:0:4:0]    disk   IBM      MTFDJAK400MBS 502E /dev/sdf    /dev/sg13    400GB
....
....

```

## Location

/opt/ibm/ess/tools/bin

## essstoragequickcheck command

Quickly checks the attached configuration.

## Synopsis

```

essstoragequickcheck -N NodeList [ --component ComponentList ]
[ --prefix Prefix ] [ --suffix Suffix ]
[ -h | --help ]

```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

The `essstoragequickcheck` command is used to perform a high level check of the storage connectivity and configuration. It is run from the management server node (EMS).

## Parameters

### -N *NodeList*

Specifies a comma separated list of nodes.

### --component *ComponentList*

Provides a component list to specify the scope of check. The options are as follows:

- server - to check I/O server node
- adapter - to check installed network and storage adapters
- storage - to check attached enclosures and disks

### --prefix *Prefix*

Provides a host name prefix. *Prefix* is used with *NodeList* to generate node names where the check is run. Use = between --prefix and value if the value starts with a -.

### --suffix *Suffix*

Provides a host name suffix. *Suffix* is used with *NodeList* to generate node names where the check is run. For example, with a node list of `gssio1,gssio2` and prefix `A-` and suffix `-ib`, node names



A-gssio1-ib and A-gssio2-ib will be used to run the test. The newly formed node name must be resolvable to the corresponding IP address. Use = between --suffix and value if the value starts with -.

### **-h | --help**

Displays usage information about this command and exits.

### **Exit status**

#### **0**

Successful completion.

#### **nonzero**

A failure has occurred.

### **Security**

You must have root authority to run the `essstoragequickcheck` command.

### **Example**

This example shows `essstoragequickcheck` running on node `ess3k_a`.

```
essstoragequickcheck -N ess3k_a
```

A sample output is as follows:

```
2019-11-27T10:57:59.265887 Start of storage quick configuration check
2019-11-27T10:58:00.504113 nodelist:  ess3k_a

ess3k_a: IO Server/Canister Type: ESS3000-5141-AF8, Serial: 78E00T4A
ess3k_a: Valid Network Adapter Configuration. Number of Adapter(s) found: 2
ess3k_a: Slots of Network Adapter found d8:00.0, d8:00.1
ess3k_a: NVMe Drv 3.84TB NVMe G3 Tier-1 Flash found 24
ess3k_a: Summary: total NVMe Drv found 24, expected NVMe Drv 24

2019-11-27T10:58:41.896066 End of storage quick configuration check
[PASS] essstoragequickcheck passed successfully
```

### **Location**

`/opt/ibm/ess/tools/bin`

## **essstress command**

---

Runs a stress test on the file system with different options.

### **Synopsis**

```
essstress [ -t Threads ] [ -i Iterations ] [ -b BlockSize ]
           [ -s FileSize ] [ -o OperationList ] [ -p IoPattern ] [ -f FileName ]
           TargetPath Node1 [Node2...NodeN] [ -h | --help ]
```

### **Availability**

Available with IBM Elastic Storage System (ESS).

### **Description**

The `essstress` command can be invoked from the management server node (EMS) to run stress tests on the file system with different options.

## Parameters

### **-t NumThreads**

Specifies the number of simultaneous threads. The default is 16.

### **-i Iterations**

Specifies the number of iterations of read-write operations to be performed on the file system. The default is 20.

### **-b BlockSize**

Specifies the block size to be used for the stress test. The default is 16M.

### **-s FileSize**

Specifies the size of the file to be used for the stress test. The default is 200G.

### **-o OperationList**

Specifies the I/O operation type to be performed while running the stress test. Valid values are: create, read, write, read. The default is create.

### **-p IoPattern**

Specifies the I/O pattern to be used for the stress test. Valid values are: seq (for sequential), rand (for random access). The default is seq.

### **-f FileName**

Specifies the base file name used in the stress test. The default is stressFile. The file names for the tests are generated as: *FileName.Iteration.NodeWhereRunning*. For example: stressFile.1.gssio1, stressFile.2.gssio1,.... for iterations 1 and 2 on node gssio1.

### **TargetPath**

Specifies the GPFS file system mount point on which the stress test is performed.

### **Node1 [Node2...NodeN]**

Is a space-separated list of nodes where the stress test is run. Do not use commas between the node names. For example:

```
gssio1 gssio2
```

The node must have file system mounted on it before performing any stress test.

### **-h | --help**

Displays usage information about this command and exits.

## Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

## Security

You must have root authority to run the `essstress` command.

## Example

This example shows how to run the stress test on GPFS file system `/gpfs/gpfs0`.

```
# mmmount gpfs0 -a  
# essstress /gpfs/gpfs0 gssio1 gssio2
```

In this example, **essstress** is invoked on the management server node. It is run on I/O server nodes `gssio1` and `gssio2` with `/gpfs/gpfs0` as the target path. By default, **essstress** runs for 20 iterations, which can be adjusted using the **-i** option.

## Location

/opt/ibm/ess/tools/bin

## essmkym1 command

---

Runs ESS deployment command to create and run container used to deploy working ESS cluster.

## Synopsis

```
essmkym1 [ -c ] [ -f YML_FILENAME ] [ -v ] [--clean-up]
          [ --no-clean-up-on-startup ] [ --no-use-EMS-hostname ]
          [ -h | --help ]
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

The `essmkym1` command helps to create and run container in order to deploy working ESS cluster. This command must be run only on the EMS node. The `essmkym1` command prompts you to confirm EMS FQDN and change it, provide the container short name and provide a free IP address on the FSP subnet for the container FSP connection.

## Parameters

### **-h | --help**

Displays usage information about this command and exits.

### **-c | --not-prepare-start-container**

Do not prepare or start container. It will require to run `essmgr` to do the preparations and run the container.

### **-f *YML\_FILENAME* | --filename *YML\_FILENAME***

The YML filename to operate on. By default, `essmgr.yml` is used.

### **-v | --verbose**

Shows verbose messages in the console.

### **--clean-up**

Clean up all container images of this ESS type and network bridges. No confirmation of any kind, use with caution.

### **--no-clean-up-on-startup**

Network bridges are not restarted when a container is started.

### **--no-use-EMS-hostname**

Do not use EMS hostname for derivating the remaining information. This is not recommended setting. Always set the EMS hostname to Management Network.

## Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

## Security

You must have root authority to run the `essmkym1` command.

## Examples

1. 

```
# ./essmkym1
Is the current EMS FQDN c145f05zems06.gpfs.net correct (y/n):y
Please type the desired and resolvable short hostname [ess5k-cems0]: cems0
Please type the FSP IP of the container [10.0.0.5]: 10.0.0.80
```

**Note:** The values in parentheses ( [ ] ) are examples or the last entered values.

2. If all of the checks pass, the `essmgr.yml` file is written and you can proceed to bridge creation, if applicable, and running the container. At this point, if all checks are successful, the image is loaded and container is started.

```
# ESS 5000 CONTAINER root@cems0:/ #
```

## Location

/opt/ibm/ess/tools/bin

## essutils command

---

Installs and deploys ESS

### Synopsis

```
essutils { -N NODE-LIST | -G NODE-GROUP }
[ --prefix PREFIX ] [ --suffix SUFFIX ]
[ --config CONFIG_FILE ] [ --customize ]
[ --ems-node-name EMS_NODE ] [ --io-node-one-name IO_NODE1 ]
[ --io-node-two-name IO_NODE2 ] [ -h | --help ]
```

### Availability

Available with IBM Elastic Storage System (ESS).

### Description

**essutils** is the ESS installation and deployment toolkit. It is a collection of tools and utilities to facilitate SSR, installation and deployment, and upgrade tasks. **essutils** can be invoked with or without any optional arguments.

It provides a set of task menus related to install and deploy activities. When a task is selected from the menu a command is issued to the system for that task. This toolkit requires a minimum of 80 x 24 character window to operate.

**Restriction:** Make sure that you use a console of adequate height and width to specify long options for the command during "C" button customization . An 80 x 24 console size might lead to an unexpected error, if the command option is very long.

At the bottom of the screen, the command for the task with the options is displayed. To change the options, you can press c. A dialog window opens to enter new or modified options. Select back or press Esc key to close the screen. You can select the corresponding menu item using 1 to 9 number keys. If you want to select a menu item mapped to a number that is greater than 9, you must scroll down to that menu item.

**essutils** can be run on the ESS management server (EMS) node only. If no node name, node list, or group name are specified, `ems1` and `ess_x86_64` are considered as the default name for EMS and I/O server nodes respectively.

You can customize **essutils** according to a specific environment such that parameters such as EMS and I/O server node names, and node name suffix and prefix are saved in the **essutils** configuration file. As a result, you do not need to specify these parameters every time that you use **essutils**. You can

generate the **essutils** configuration file specific to your environment using `--customize` option and that configuration file can be used for subsequent **essutils** operations.

## Parameters

### **-N NODE-LIST**

Provides a list of nodes. If node list or group name is not provided, `-N localhost` is assumed.

### **-G NODE-GROUP**

Provides the name of node group that the nodes are a member of. Nodes in the *NODE-LIST* are members of the *NODE-GROUP*.

### **--prefix PREFIX**

Provides the host name prefix. Use `=` between `--prefix` and value if the value starts with `-`.

### **--suffix SUFFIX**

Provides the host name suffix. Use `=` between `--suffix` and value if the value starts with `-`.

### **--config CONFIG\_FILE**

Provides the configuration file for **essutils** for a specific environment.

### **--customize**

Customizes the EMS host name and I/O server node names and generates the **essutils** configuration file. This file can be used with `--config` to run **essutils** specific to an environment.

### **--ems-node-name EMS\_NODE**

Specifies the EMS host name to populate the **essutils** configuration file.

### **--io-node-one-name IO\_NODE1**

Specifies the I/O node 1 host name to populate the **essutils** configuration file.

### **--io-node-two-name IO\_NODE2**

Specifies the I/O node 2 host name to populate the **essutils** configuration file.

### **-h | --help**

Displays usage information about this script and exits.

## Exit status

### **0**

Successful completion.

### **nonzero**

A failure has occurred.

## Security

You must have root authority to run the **essutils** script.

## Examples

- This example shows how to run **essutils** with default values.

```
# essutils
```

- This example shows how to run **essutils** for `ems2` and `ess_x86_64` I/O node group, with the suffix `-10g`.

```
# essutils -G ems2,ess_x86_64 --suffix=-10g
```

- This example shows how to run **essutils** with the prefix `sk-` and with the suffix `-ib`.

```
# essutils --prefix sk- --suffix=-ib
```

- This example shows how to customize **essutils** for a specific environment. In this example environment `ems` node is `ems2` and I/O server node names are `io3` and `io4`. The suffix to be used is `-40g`.

```
# essutils --customize --config /var/tmp/env2 --ems-node-name ems2 \  
--io-node-one-name io3 --io-node-two-name io4 --suffix=-40g
```

```
Successfully generated the customization configuration file.
```

In this example, the user has generated the configuration file specific to their environment. The `--config` option can be used to load `essutils` with the values specific to the user environment.

```
# essutils --config /var/tmp/env2
```

## Location

`/opt/ibm/ess/tools/bin`

## essutils main menu

ESS Installation and Deployment Toolkit (`essutils`) main menu

### Synopsis

```
1. Help  
2. SSR Tools >  
3. Validation checks >  
4. View/Collect service data (snaps) >  
5. Advanced Tasks  
6. Exit
```

### Availability

Available with IBM Elastic Storage System (ESS).

### Description

The **essutils** main menu allows you to perform end-to-end operations for an ESS system.

### Menu options

#### 1. Help

Opens this manual page.

#### 2. SSR Tools

Checks ESS for proper hardware installation, system configuration, and SAS connectivity. Using this menu item, users can perform the basic validation of the system once it arrives from manufacturing.

```
a) Perform check of various install parameters.  
b) Perform a brief check of installed adapters and connected disks in the system.  
c) Perform storage cable connection and topology check. This test is meaningful when run in  
I/O Server nodes.  
d) Perform I/O operations check to the attached disks.  
e) Perform memory check  
f) Perform CPU check  
g) Assign IP address to an interface.  
h) Ping all nodes in node list.
```

### 3. Validation check

Performs stress test of the ESS hardware after installation or upgrade. Users can perform operations such as:

- See detailed properties of the attached storage.
- Perform network stress test.
- Run file system stress test.

### 4. View/Collect service data (snaps)

Collects various snaps of ESS system and GPFS such as:

- a) Collect `esssnap` from the ESS Management Server (EMS) node.
- b) Collect `gpfs.snap` for service.
- c) Collect SOS report for service.
- d) Generate call home xml config file for call home setup.

### 5. Advanced Tasks

Run advanced tasks by using the command prompt.

### 6. Exit

Exit to shell.

### Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

### Security

You must have root authority to run **essutils**.

## essutils - SSR Tools menu

ESS Installation and Deployment Toolkit (essutils) SSR Tools menu

### Synopsis

1. Help
2. Check and validate various install parameters
3. Quick storage configuration check
4. Check enclosure cabling and paths to disks
5. Check disks for IO operations
6. Check the memory
7. Check the CPU
8. Assign IP address to Interface
9. Ping tests
10. Back

### Availability

Available with IBM Elastic Storage System (ESS).

### Description

The SSR Tools menu allows users to check ESS for proper hardware installation, system configuration, and SAS connectivity. Using this menu item, users can perform the basic validation of the system once it arrives from manufacturing.

## Menu options

### 1. Help

Opens this manual page.

### 2. Check and validate various install parameters

Performs check of various installation parameters. Address items identified as WARN or ERROR. Some parameters can not be checked until the system is fully deployed. For more information, see *essinstallcheck command*.

```
essinstallcheck -N ems1,ess_x86_64
```

Press c to change the EMS host name and I/O server nodes group name or I/O server node host name.

### 3. Quick storage configuration check

Performs a brief check of installed adapters and connected disks in the system. For more information, see *essstoragequickcheck command*.

```
essstoragequickcheck -N localhost
```

Press c to change the EMS host name and I/O server nodes group name or I/O server node host name.

### 4. Check enclosure cabling and paths to disks

Performs storage cable connection and topology check. This test is meaningful when run on I/O server nodes. For more information, see *essfindmissingdisks command*.

```
essfindmissingdisks -N localhost
```

Press c to change the EMS host name and I/O server nodes group name or I/O server node host name.

### 5. Check disks for IO operations

Performs I/O operations to the attached disks. This test should only be run in a test environment. The node name must match the host name of the node. For more information, see *esscheckdisks command*.

```
ESSENV=INSTALL esscheckdisks --enclosure-list all --iotest a --write-enable --local
```

Press c to change the EMS host name and I/O server nodes group name or I/O server node host name.

### 6. Check the memory configuration

Checks for a valid memory configuration within the canister.

```
ess3kplt -t memory
```

### 7. Check the CPU configuration

Checks for a valid CPU configuration within the canister.

```
ess3kplt -t cpu
```

### 8. Assign IP address to Interface

Assigns IP address to the provided interface.

```
essgennetworks -N localhost --interface enP3p9s0f0 --assignip 198.51.100.20 --netmask /24
```

Press c to customize the command options. Change IP address as needed.



## 9. Ping tests

Pings all nodes in the node list. For more information, see *essruntask command*.

```
essruntask -N 198.51.100.10 --task ping --mode ota
```

Press c to change the EMS host name and I/O server nodes group name or I/O server node host name.

## 10. Back

Exit to the previous menu.

## Exit status

0

Successful completion.

nonzero

A failure has occurred.

## Security

You must have root authority to run **essutils**.

# essutils - Validation and stress test menu

ESS Installation and Deployment Toolkit (essutils) Validation and stress test menu

## Synopsis

```
1. Help
2. Show storage details      >
3. ESS network stress test
4. ESS filesystem stress test
5. Back
```

## Availability

Available with IBM Elastic Storage System (ESS).

## Description

This menu can be used to perform stress test of the ESS hardware after installation or upgrade.

## Menu options

### 1. Help

Opens this manual page.

### 2. Show storage details

View detailed properties of the attached storage.

```
a) Show attached enclosures
b) Show attached enclosures that are not-ok
c) Show attached enclosure detail
d) Show firmware details of SAS adapters
e) Show firmware details of storage enclosures
f) Show firmware details of installed drives
g) Show pdisks that are not-ok
```

### 3. ESS network stress test

Perform network stress test. This task must only be run in a test environment as it can generate high load on the network.

```
$ ESSENV=TEST essnettest -N fab3a
```

For more information, see *essnettest command*.

Press **c** to change the EMS host name and I/O server nodes group name or I/O server node host name.

#### 4. ESS filesystem stress test

Run file system stress test. Inspect and address any errors logged in `/var/log/messages` on the EMS node and `/var/adm/ras/mmfs.log.latest` on I/O server nodes.

```
$ essstress /gpfs/gpfs0 gssio1 gssio2
```

For more information, see *essstress command*.

Press **c** to change the file system name or the I/O server node host name.

#### 5. Back

Exit to the previous menu.

### Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

### Security

You must have root authority to run **essutils**.

## essutils - Storage subsystem details menu

ESS Installation and Deployment Toolkit (essutils) Storage subsystem details menu

### Synopsis

```
1. Help
2. Show attached enclosures
3. Show attached enclosures that are not-ok
4. Show attached enclosure detail
5. Show firmware details of SAS adapters
6. Show firmware details of storage enclosures
7. Show firmware details of installed drives
8. Show pdisks that are not-ok
9. Back
```

### Availability

Available with IBM Elastic Storage System (ESS).

### Description

This menu can be used to view details of the storage subsystem including enclosure and disks.

### Menu options

#### 1. Help

Opens this manual page.

#### 2. Show attached enclosures

View attached enclosures in the node list (**mmlsenclosure all**). The node(s) must be member of an ESS cluster.

```
$ ESSSSH=ssh essruntask -N ess_x86_64 --task mmlsenclosure-all
```

For more information, see *essruntask command*.

Press **c** to change the I/O server nodes group name or I/O server node host name.

### 3. Show attached enclosures that are not-ok

View attached enclosure in the node list needing service (**mmlsenclosure all --not-ok**). The node(s) must be member of an ESS cluster.

```
$ ESSSSH=ssh essruntask -N ess_x86_64 --task mmlsenclosure-all-not-ok
```

For more information, see *essruntask command*.

Press **c** to change the I/O server nodes group name or I/O server node host name.

### 4. Show attached enclosure detail

View attached enclosure details in the node list (**mmlsenclosure all -L**). The node(s) must be member of an ESS cluster.

```
$ ESSSSH=ssh essruntask -N ess_x86_64 --task mmlsenclosure-all-L
```

For more information, see *essruntask command*.

Press **c** to change the I/O server nodes group name or I/O server node host name.

### 5. Show firmware details of SAS adapters

View firmware of SAS adapters in the node list (**mmlsfirmware --type host-adapter**).

```
$ ESSSSH=ssh essruntask -N ess_x86_64 --task mmlsfirmware-adapt
```

For more information, see *essruntask command*.

Press **c** to change the I/O server nodes group name or I/O server node host name.

### 6. Show firmware details of storage enclosures

View firmware of attached enclosures in the node list (**mmlsfirmware --type storage-enclosure**).

```
$ ESSSSH=ssh essruntask -N ess_x86_64 --task mmlsfirmware-encl
```

For more information, see *essruntask command*.

Press **c** to change the I/O server nodes group name or I/O server node host name.

### 7. Show firmware details of installed drives

View firmware details of installed disks in the node list (**mmlsfirmware --type drive**).

```
$ ESSSSH=ssh essruntask -N ess_x86_64 --task mmlsfirmware-drv
```

For more information, see *essruntask command*.

Press **c** to change the I/O server nodes group name or I/O server node host name.

### 8. Show pdisks that are not-ok

View attached pdisks that are not healthy in the node list (**mmlspdisk all --not-ok**).

```
$ ESSSSH=ssh essruntask -N ess_x86_64 --task mmlspdisk-not-ok
```

For more information, see *essruntask command*.

Press **c** to change the I/O server nodes group name or I/O server node host name.

### 9. Back

Exit to the previous menu.

## Exit status

0

Successful completion.

**nonzero**

A failure has occurred.

**Security**

You must have root authority to run **essutils**.

**essutils - Collect misc service data menu**

ESS Installation and Deployment Toolkit (essutils) Collect misc service data menu

**Synopsis**

1. Help
2. Collect `gpfs.snap`
3. Collect `sos report`
4. Back

**Availability**

Available with IBM Elastic Storage System (ESS).

**Description**

This menu can be used to view and collect miscellaneous service data.

**Menu options****1. Help**

Opens this manual page.

**2. Collect `gpfs.snap`**

Collect **`gpfs.snap`** for service. The snap is stored in `/tmp/mmfs`. The EMS node must be a member of an IBM Spectrum Scale cluster.

```
$ /usr/lpp/mmfs/bin/gpfs.snap
```

**3. Collect `sos report`**

Collect SOS report for service.

```
$ sosreport
```

**4. Back**

Exit to the previous menu.

**Exit status****0**

Successful completion.

**nonzero**

A failure has occurred.

**Security**

You must have root authority to run **essutils**.

---

## Chapter 2. IBM Elastic Storage System scripts

This section includes descriptions of the IBM Elastic Storage System (ESS) scripts.

Descriptions of these ESS scripts follow:

- “[esssnap script](#)” on page 49

For information about ESS commands, see [Chapter 1, “IBM Elastic Storage System commands,”](#) on page 1.

For information about IBM Spectrum Scale RAID commands and scripts, see *IBM Spectrum Scale RAID: Administration*.

For information about other IBM Spectrum Scale commands, see *IBM Spectrum Scale: Command and Programming Reference*.

---

### esssnap script

Collects the snapshot of the ESS deployment

#### Synopsis

```
esssnap [ -N | NodeList ] [ --skip-gpfs ]  
        [ --dir | OutputDirectory ] [ -h | --help ]
```

#### Availability

Available with IBM Elastic Storage System (ESS).

#### Description

The `esssnap` script creates an informational system snapshot at a single point in time. This system snapshot consists of cluster configuration, disk configuration, network configuration, network status, ESS logs, dumps, and traces. Use the `esssnap` script as one of the main tools to gather preliminary data when an ESS problem is encountered, such as a hung ESS script. The information that is gathered with the `esssnap` script can be used in conjunction with other information (for example, ESS internal dumps, traces, and kernel thread dumps) to solve an ESS problem.

#### Parameters

**-h | --help**

Displays usage information about this script and exits.

**-N *NodeList***

Specifies a comma-separated list of nodes from which to collect snapshot information.

**--skip-gpfs**

Skips `gpfs.snap` and saves only ESS information.

**--dir *OutputDirectory***

Specifies output directory name. The default output directory is `/var/mp/`.

#### Exit status

**0**

Successful completion.

**nonzero**

A failure has occurred.

**Security**

You must have root authority to run the `esssnap` script.

**Example**

Collects snap on IO node `gssio1`.

```
esssnap -N gssio1
```

**Location**

`/opt/ibm/ess/tools/bin/esssnap`

## Accessibility features for the system

---

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

### Accessibility features

---

The following list includes the major accessibility features in IBM Spectrum Scale RAID:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

IBM Documentation, and its related publications, are accessibility-enabled.

### Keyboard navigation

---

This product uses standard Microsoft Windows navigation keys.

### IBM and accessibility

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See the [IBM Human Ability and Accessibility Center \(www.ibm.com/able\)](http://www.ibm.com/able) for more information about the commitment that IBM has to accessibility.





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# Glossary

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This glossary provides terms and definitions for the IBM Elastic Storage System solution.

The following cross-references are used in this glossary:

- *See* refers you from a non-preferred term to the preferred term or from an abbreviation to the spelled-out form.
- *See also* refers you to a related or contrasting term.

For other terms and definitions, see the [IBM Terminology website](http://www.ibm.com/software/globalization/terminology) (opens in new window):

<http://www.ibm.com/software/globalization/terminology>

## B

### **building block**

A pair of servers with shared disk enclosures attached.

### **BOOTP**

See *Bootstrap Protocol (BOOTP)*.

### **Bootstrap Protocol (BOOTP)**

A computer networking protocol that is used in IP networks to automatically assign an IP address to network devices from a configuration server.

## C

### **CEC**

See *central processor complex (CPC)*.

### **central electronic complex (CEC)**

See *central processor complex (CPC)*.

### **central processor complex (CPC)**

A physical collection of hardware that consists of channels, timers, main storage, and one or more central processors.

### **cluster**

A loosely-coupled collection of independent systems, or *nodes*, organized into a network for the purpose of sharing resources and communicating with each other. See also *GPFS cluster*.

### **cluster manager**

The node that monitors node status using disk leases, detects failures, drives recovery, and selects file system managers. The cluster manager is the node with the lowest node number among the quorum nodes that are operating at a particular time.

### **compute node**

A node with a mounted GPFS file system that is used specifically to run a customer job. ESS disks are not directly visible from and are not managed by this type of node.

### **CPC**

See *central processor complex (CPC)*.

## D

### **DA**

See *declustered array (DA)*.

### **datagram**

A basic transfer unit associated with a packet-switched network.

### **DCM**

See *drawer control module (DCM)*.

**declustered array (DA)**

A disjoint subset of the pdisks in a recovery group.

**dependent fileset**

A fileset that shares the inode space of an existing independent fileset.

**DFM**

See *direct FSP management (DFM)*.

**DHCP**

See *Dynamic Host Configuration Protocol (DHCP)*.

**drawer control module (DCM)**

Essentially, a SAS expander on a storage enclosure drawer.

**Dynamic Host Configuration Protocol (DHCP)**

A standardized network protocol that is used on IP networks to dynamically distribute such network configuration parameters as IP addresses for interfaces and services.

**E****Elastic Storage System (ESS)**

A high-performance, GPFS NSD solution made up of one or more building blocks. The ESS software runs on ESS nodes - management server nodes and I/O server nodes.

**encryption key**

A mathematical value that allows components to verify that they are in communication with the expected server. Encryption keys are based on a public or private key pair that is created during the installation process. See also *file encryption key (FEK)*, *master encryption key (MEK)*.

**ESS**

See *Elastic Storage System (ESS)*.

**environmental service module (ESM)**

Essentially, a SAS expander that attaches to the storage enclosure drives. In the case of multiple drawers in a storage enclosure, the ESM attaches to drawer control modules.

**ESM**

See *environmental service module (ESM)*.

**F****failback**

Cluster recovery from failover following repair. See also *failover*.

**failover**

(1) The assumption of file system duties by another node when a node fails. (2) The process of transferring all control of the ESS to a single cluster in the ESS when the other clusters in the ESS fails. See also *cluster*. (3) The routing of all transactions to a second controller when the first controller fails. See also *cluster*.

**failure group**

A collection of disks that share common access paths or adapter connection, and could all become unavailable through a single hardware failure.

**FEK**

See *file encryption key (FEK)*.

**file encryption key (FEK)**

A key used to encrypt sectors of an individual file. See also *encryption key*.

**file system**

The methods and data structures used to control how data is stored and retrieved.

**file system descriptor**

A data structure containing key information about a file system. This information includes the disks assigned to the file system (*stripe group*), the current state of the file system, and pointers to key files such as quota files and log files.

**file system descriptor quorum**

The number of disks needed in order to write the file system descriptor correctly.

**file system manager**

The provider of services for all the nodes using a single file system. A file system manager processes changes to the state or description of the file system, controls the regions of disks that are allocated to each node, and controls token management and quota management.

**fileset**

A hierarchical grouping of files managed as a unit for balancing workload across a cluster. See also *dependent fileset*, *independent fileset*.

**fileset snapshot**

A snapshot of an independent fileset plus all dependent filesets.

**flexible service processor (FSP)**

Firmware that provides diagnosis, initialization, configuration, runtime error detection, and correction. Connects to the HMC.

**FQDN**

See *fully-qualified domain name (FQDN)*.

**FSP**

See *flexible service processor (FSP)*.

**fully-qualified domain name (FQDN)**

The complete domain name for a specific computer, or host, on the Internet. The FQDN consists of two parts: the hostname and the domain name.

**G****GPFS cluster**

A cluster of nodes defined as being available for use by GPFS file systems.

**GPFS portability layer**

The interface module that each installation must build for its specific hardware platform and Linux distribution.

**GPFS Storage Server (GSS)**

A high-performance, GPFS NSD solution made up of one or more building blocks that runs on System x servers.

**GSS**

See *GPFS Storage Server (GSS)*.

**H****Hardware Management Console (HMC)**

Standard interface for configuring and operating partitioned (LPAR) and SMP systems.

**HMC**

See *Hardware Management Console (HMC)*.

**I****IBM Security Key Lifecycle Manager (ISKLM)**

For GPFS encryption, the ISKLM is used as an RKM server to store MEKs.

**independent fileset**

A fileset that has its own inode space.

**indirect block**

A block that contains pointers to other blocks.

**inode**

The internal structure that describes the individual files in the file system. There is one inode for each file.

**inode space**

A collection of inode number ranges reserved for an independent fileset, which enables more efficient per-fileset functions.

**Internet Protocol (IP)**

The primary communication protocol for relaying datagrams across network boundaries. Its routing function enables internetworking and essentially establishes the Internet.

**I/O server node**

An ESS node that is attached to the ESS storage enclosures. It is the NSD server for the GPFS cluster.

**IP**

See *Internet Protocol (IP)*.

**IP over InfiniBand (IPoIB)**

Provides an IP network emulation layer on top of InfiniBand RDMA networks, which allows existing applications to run over InfiniBand networks unmodified.

**IPoIB**

See *IP over InfiniBand (IPoIB)*.

**ISKLM**

See *IBM Security Key Lifecycle Manager (ISKLM)*.

**J****JBOD array**

The total collection of disks and enclosures over which a recovery group pair is defined.

**K****kernel**

The part of an operating system that contains programs for such tasks as input/output, management and control of hardware, and the scheduling of user tasks.

**L****LACP**

See *Link Aggregation Control Protocol (LACP)*.

**Link Aggregation Control Protocol (LACP)**

Provides a way to control the bundling of several physical ports together to form a single logical channel.

**logical partition (LPAR)**

A subset of a server's hardware resources virtualized as a separate computer, each with its own operating system. See also *node*.

**LPAR**

See *logical partition (LPAR)*.

**M****management network**

A network that is primarily responsible for booting and installing the designated server and compute nodes from the management server.

**management server (MS)**

An ESS node that hosts the ESS GUI and is not connected to storage. It must be part of a GPFS cluster. From a system management perspective, it is the central coordinator of the cluster. It also serves as a client node in an ESS building block.

**master encryption key (MEK)**

A key that is used to encrypt other keys. See also *encryption key*.



**maximum transmission unit (MTU)**

The largest packet or frame, specified in octets (eight-bit bytes), that can be sent in a packet- or frame-based network, such as the Internet. The TCP uses the MTU to determine the maximum size of each packet in any transmission.

**MEK**

See *master encryption key (MEK)*.

**metadata**

A data structure that contains access information about file data. Such structures include inodes, indirect blocks, and directories. These data structures are not accessible to user applications.

**MS**

See *management server (MS)*.

**MTU**

See *maximum transmission unit (MTU)*.

**N****Network File System (NFS)**

A protocol (developed by Sun Microsystems, Incorporated) that allows any host in a network to gain access to another host or netgroup and their file directories.

**Network Shared Disk (NSD)**

A component for cluster-wide disk naming and access.

**NSD volume ID**

A unique 16-digit hexadecimal number that is used to identify and access all NSDs.

**node**

An individual operating-system image within a cluster. Depending on the way in which the computer system is partitioned, it can contain one or more nodes. In a Power Systems environment, synonymous with *logical partition*.

**node descriptor**

A definition that indicates how ESS uses a node. Possible functions include: manager node, client node, quorum node, and non-quorum node.

**node number**

A number that is generated and maintained by ESS as the cluster is created, and as nodes are added to or deleted from the cluster.

**node quorum**

The minimum number of nodes that must be running in order for the daemon to start.

**node quorum with tiebreaker disks**

A form of quorum that allows ESS to run with as little as one quorum node available, as long as there is access to a majority of the quorum disks.

**non-quorum node**

A node in a cluster that is not counted for the purposes of quorum determination.

**O****OFED**

See *OpenFabrics Enterprise Distribution (OFED)*.

**OpenFabrics Enterprise Distribution (OFED)**

An open-source software stack includes software drivers, core kernel code, middleware, and user-level interfaces.

**P****pdisk**

A physical disk.

**PortFast**

A Cisco network function that can be configured to resolve any problems that could be caused by the amount of time STP takes to transition ports to the Forwarding state.

**R****RAID**

See *redundant array of independent disks (RAID)*.

**RDMA**

See *remote direct memory access (RDMA)*.

**redundant array of independent disks (RAID)**

A collection of two or more disk physical drives that present to the host an image of one or more logical disk drives. In the event of a single physical device failure, the data can be read or regenerated from the other disk drives in the array due to data redundancy.

**recovery**

The process of restoring access to file system data when a failure has occurred. Recovery can involve reconstructing data or providing alternative routing through a different server.

**recovery group (RG)**

A collection of disks that is set up by ESS, in which each disk is connected physically to two servers: a primary server and a backup server.

**remote direct memory access (RDMA)**

A direct memory access from the memory of one computer into that of another without involving either one's operating system. This permits high-throughput, low-latency networking, which is especially useful in massively-parallel computer clusters.

**RGD**

See *recovery group data (RGD)*.

**remote key management server (RKM server)**

A server that is used to store master encryption keys.

**RG**

See *recovery group (RG)*.

**recovery group data (RGD)**

Data that is associated with a recovery group.

**RKM server**

See *remote key management server (RKM server)*.

**S****SAS**

See *Serial Attached SCSI (SAS)*.

**secure shell (SSH)**

A cryptographic (encrypted) network protocol for initiating text-based shell sessions securely on remote computers.

**Serial Attached SCSI (SAS)**

A point-to-point serial protocol that moves data to and from such computer storage devices as hard drives and tape drives.

**service network**

A private network that is dedicated to managing POWER8 servers. Provides Ethernet-based connectivity among the FSP, CPC, HMC, and management server.

**SMP**

See *symmetric multiprocessing (SMP)*.

**Spanning Tree Protocol (STP)**

A network protocol that ensures a loop-free topology for any bridged Ethernet local-area network. The basic function of STP is to prevent bridge loops and the broadcast radiation that results from them.

**SSH**

See *secure shell (SSH)*.

**STP**

See *Spanning Tree Protocol (STP)*.

**symmetric multiprocessing (SMP)**

A computer architecture that provides fast performance by making multiple processors available to complete individual processes simultaneously.

**T****TCP**

See *Transmission Control Protocol (TCP)*.

**Transmission Control Protocol (TCP)**

A core protocol of the Internet Protocol Suite that provides reliable, ordered, and error-checked delivery of a stream of octets between applications running on hosts communicating over an IP network.

**V****VCD**

See *vdisk configuration data (VCD)*.

**vdisk**

A virtual disk.

**vdisk configuration data (VCD)**

Configuration data that is associated with a virtual disk.



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