



# IBM Serviceable Event Provider for KVM on Power Systems User's Guide

*Version 1.0*





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**Note**

Before using this information and the product it supports, read the information in "Notices" on page 17.

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## About this document

This book provides the information to install, activate, use, and manage IBM® Serviceable Event Provider for KVM on Power® systems.

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## Highlighting

The following highlighting conventions are used in this book:

<b>Bold</b>	Identifies commands, subroutines, keywords, files, structures, directories, and other items whose names are predefined by the system. Also, identifies graphical objects such as buttons, labels, and icons that the user selects.
<i>Italics</i>	Identifies parameters whose actual names or values are to be supplied by the user.
Monospace	Identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or information you must actually type.

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## Case-sensitivity in Linux

Linux operating system is case-sensitive, which means that it distinguishes between uppercase and lowercase letters. For example, you can use the **ls** command to list files. If you type **LS**, the system responds that the command is not found. Likewise, **FILEA**, **FiLea**, and **filea** are three distinct file names, even if they reside in the same directory. To avoid causing undesirable actions, always ensure that you use the correct case.

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## ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.





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# IBM Serviceable Event Provider for KVM on Power

The IBM Serviceable Event Provider provides key functions, which identifies serviceable problems and sending the respective SNMP traps. IBM Serviceable Event Provider also provides a registration mechanism to receive the SNMP traps.

The topic collection provides information about installing, activating, configuring, managing, and troubleshooting IBM Serviceable Event Provider on KVM on Power devices.

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## IBM Serviceable Event Provider Overview

IBM Serviceable Event Provider is a no-charge software tool that is deployed on your host system to automatically and continuously monitor, track the hardware problems, and send traps to the registered listener. IBM Serviceable Event Provider also supports activity log, which contains the problems that are identified and traps sent to the list of registered listeners. The registered listeners monitor the alerts and performs call home for problems, registered listeners also collects, and sends the Performance Management data.

IBM Serviceable Event Provider provides early knowledge about the potential problems. The IBM support can use the problem descriptions and service information to better diagnose issues with your systems to proactively assist you in achieving higher availability and better performance.

IBM Serviceable Event Provider performs the following tasks:

- Monitors the KVM syslog for all the hardware problems.
- Logs the serviceable problems to the activity log.
- Sends the serviceable problems to Trap generator.
- Generates SNMP traps and transmits them to the registered listeners.

### Problem processing overview

Problem processing is an important capability of IBM Serviceable Event Provider. When IBM Serviceable Event Provider detects a problem, a specific sequence of events occurs. The events include tracking the problem, processing the problem, and sending SNMP traps to the registered listeners.

The following shows the problem processing sequence of events, with references to procedures, settings, and information to help you manage those events.

1. Start and stop the Serviceable Event Provider. To see how to start and stop the Serviceable Event Provider, see “Starting and stopping IBM Serviceable Event Provider” on page 3.
2. For every problem occurring on the KVM on Power device, an entry is created in the KVM syslog file. The Serviceable Event Provider reads the KVM Syslog for all serviceable hardware problems. For more information about subscribing listeners, see “Configuring listeners” on page 4.

3. SNMP trap generation and transmission. IBM Serviceable Event Provider generates SNMP traps and transmit them to the registered listener. You need to subscribe external devices to receive SNMP traps. For more information, see “Sending notifications or alerts to Listeners” on page 6.
4. Activity log generation. All the serviceable problems are logged in to the activity log. For more information, see “Displaying the activity log” on page 8.

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## Planning for IBM Serviceable Event Provider

When you are planning for IBM Serviceable Event Provider, you need to consider the following prerequisites you plan to support.

### Prerequisites

To install the IBM Serviceable Event Provider, the following prerequisites are mandatory:

- Install the following SNMP packages:
  - net-snmp-5.7.2-13.pkvm2\_1.1.ppc64
  - net-snmp-libs-5.7.2-13.pkvm2\_1.1.ppc64
  - net-snmp-utils-5.7.2-13.pkvm2\_1.1.ppc64

**Note:** If any of these SNMP packages are not installed, the IBM Serviceable Event Provider will fail to install.

- As part of Serviceable Event Provider functionality, the ports that are used to receive the traps on registered listeners from KVM on Power system have to be open.

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## Installing IBM Serviceable Event Provider

You must install IBM Serviceable Event Provider to enable tracking hardware problem, processing, and reporting to registered listeners.

### Before you begin

IBM Serviceable Event Provider for KVM on Power supports 2.1.0 version of KVM on Power devices . You can download the IBM Serviceable Event Provider from the ESA Support website. The software is provided in the common RPM format, and this document is included with the software.

### About this task

To install IBM Serviceable Event Provider, follow these steps:

1. Go to the directory that contains the IBM Serviceable Event Provider installation file.
2. Use your normal installation process to install IBM Serviceable Event Provider. The IBM Serviceable Event Provider fileset is `serviceable.event.provider-<version>.ppc.rpm` where *version* is the IBM Serviceable Event Provider version.
3. Enter the RPM installation command:

```
rpm -ivh serviceable.event.provider-1.0.0-0.ppc64.rpm
```

You can see on the console, that the installation is 100% completed in this format:

```
[root@11mjuno05b User]# serviceable.event.provider-1.0.0-0.ppc64.rpm
Preparing... ##### [100%]
Updating / installing...
 1:serviceable.event.provider-1.0.0-0 ##### [100%]
```

## What to do next

After the installation is complete, you must activate / start IBM Serviceable Event Provider to enable it to report problems and transmit service information to the registered listeners. For information, see “Activating and configuring IBM Serviceable Event Provider.”

To view the system information, run the command **sys.discover -f prop** in command line.

---

## Activating and configuring IBM Serviceable Event Provider

After installing IBM Serviceable Event Provider, you must activate or start IBM Serviceable Event Provider.

Activating and configuring IBM Serviceable Event Provider involves of the following steps:

1. Using a command to activate IBM Serviceable Event Provider.
2. Configuring the service connection to registered listeners, so that IBM Serviceable Event Provider can report problems and send service information.
3. Testing the service connection to registered listeners.
4. Specifying device information so that IBM Support representatives know the details of the system that is running IBM Serviceable Event Provider.

## Starting and stopping IBM Serviceable Event Provider

You can start and stop the IBM Serviceable Event Provider manually.

### Before you begin

When the registered listener runs the **subscribe** command on KVM on Power system, the listener checks the state of IBM Serviceable Event Provider and starts it, if not started already. The IBM Serviceable Event Provider monitors problems, collects, and sends service information. These functions are stopped when IBM Serviceable Event Provider is stopped. IBM Serviceable Event Provider must be started to activate these functions. If IBM Serviceable Event Provider is stopped, it does not start on system reboot as the status of the IBM Serviceable Event Provider is retained across multiple reboots.

### About this task

IBM Serviceable Event Provider has two modes: Active and Inactive. By default, the IBM Serviceable Event Provider that is installed on the KVM on Power system is in inactive mode. But, when the listener subscribes for the events, the IBM Serviceable Event Provider starts and is in active mode. To start and stop the Serviceable Event Provider manually, follow these steps:

### Procedure

1. Log in to the KVM on Power system.

2. In command line, go to `/opt/ibm/seprovider/bin` and enter either of the following commands
  - To start the Serviceable Event Provider, run **sepcli start** command. For more information about **sepcli start** command, see “sepcli start” on page 11.
  - To stop the Serviceable Event Provider, run **sepcli stop** command. For information about **sepcli stop** command, see “sepcli stop” on page 13.The Serviceable Event Provider retains its status after system restart. That is, if the Serviceable Event Provider is in **stop** state, after system restart also the Serviceable Event Provider will be in same state.

## Results

After you activate Serviceable Event Provider on the system, you can use the command-line interface to both use and manage IBM Serviceable Event Provider.

## Configuring listeners

IBM Serviceable Event Provider uses these SNMP traps to report problems and send service information to registered listeners. IBM Serviceable Event Provider uses an available intranet connection to transmit traps to the registered listeners.

### About this task

You can use the IBM Serviceable Event Provider command-line interface to configure your service connection through the following steps:

### Procedure

1. Log in to the KVM on Power device.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Use the command **subscribe**.

### Subscribe trap listeners

Use the **subscribe** command to subscribe to Serviceable Event Provider.

### Syntax

```
./subscribe [-h hostname] [-p port] [-c Community name]
```

### Description

The **subscribe** command configures the service contact information of the trap listener. The **subscribe** command sets the configuration information for IBM Serviceable Event Provider instance that is associated with the service contact information. All fields must be entered to run this command. When the command **getSubscriber** is specified, the new settings are displayed.

### Options

- h** *hostname*  
Specifies the host name or IP address of the subscriber (registered listener) to be configured.
- p** *port*  
Specifies the port number at which the registered listener listens to the SNMP traps that are sent by Serviceable Event Provider.

**-c** *community*  
Specifies the SNMP community name.

## Examples

- Display the current contact settings

This example shows how to use **getSubscriber** to display the current settings.

```
./getSubscriber
Subscriber_1
hostname = 9.57.20.130
port = 245
community = public
Subscriber_2
hostname = 10.0.0.1
port = 163
community = public
```

- Subscribe the listener

This example shows how to use **subscribe** to configure the trap listener.

```
./subscribe -h 9.57.20.130 -p 162 -c public
Subscription is successful
```

- Listeners are not configured

When the listeners are not configured, the following message is displayed.

```
./getSubscriber
There are no subscribers configured
```

## Sending test alerts

When you complete configuration of your connectivity settings, test the connectivity to registered listeners.

### Synopsis

```
./sendTestEvent
```

```
./sendTestEvent [h] [s|c]
```

### Description

To test connectivity to registered listeners, follow these steps:

1. Log in to the KVM on Power device.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Run this command - **sendTestEvent h**.

### Options

- h** - Specifies the hostname or IP address of the destination.
- s** - Specifies the service action required alert.
- c** - Specifies the service action and call home required alert.

### Examples

- Service action required alert

This example shows how to use **sendTestEvent** to send a test alert for the service action.

```
./sendTestEvent 9.57.20.130 s
```

- Service action and call home required alert

This example shows how to use **sendTestEvent** to send a test alert for service action and call home.

```
./sendTestEvent 9.57.20.130 c
```

---

## Sending notifications or alerts to Listeners

IBM Serviceable Event Provider would generate SNMP traps and transmit them to the registered listener.

### About this task

IBM Serviceable Event Provider has two modes: Active and Inactive. After the Serviceable Event Provider is started by using the **sepccli start** command, the IBM Serviceable Event Provider is in active mode. The Syslog of the KVM on Power device, at user-defined location for example, `/var/log/messages`, is updated for every hardware problem occurred in the device. Log monitor of IBM Serviceable Event Provider monitors the KVM Syslog for all the hardware events and validates if they fall under the following types:

- Events that require a service action by IBM support (call home) - **Service action required.**
- Events that need to be notified locally - **Service action no call home required.**
- Events that can be ignored - **No service action required.**

For the events that require a service action, or for the events that need to be notified, the log monitor sends traps to Trap generator. If the Trap generator identifies the serviceable problems, then it would send an SNMP trap to the registered listener.

**Note:** If the configured listener port is not open, the SNMP traps sent by Serviceable Event Provider are not received by the Trap listener.

---

## Managing IBM Serviceable Event Provider

You can configure and manage Serviceable Event Provider. This includes modifying the configuration and specifying how Serviceable Event Provider monitors and collects problem information, and sends SNMP traps to registered listeners.

### Management information base

The IBM Serviceable Event Provider generates a Management information base (**.mib**) file, which can be used by the SNMP management applications when they listen to the traps.

To refer to the complete collection of available management information, you can refer to MIB file. The **ibmServiceableEvents.mib** file contains a set of definitions for the SNMP management data that is provided by the IBM Serviceable Event Provider. It defines the data type of each managed object, and also the current validity of the object. The **.mib** file also provides a brief description of the purpose of each MIB object.

The MIB file is saved at the location: `/opt/ibm/seprovider/lib`.

The top-level structure of the MIB describes the following entities:

- Serviceable Event Provider Objects.

- Serviceable Event Provider Notifications.
- Serviceable Event Provider Conformance.

## Updating the Configuration file

You can specify the IBM Serviceable Event Provider to continuously report a problem according to the configuration file settings.

### About this task

The IBM Serviceable Event Provider configuration file is available at `/opt/ibm/seprovider/conf`. You can configure the following properties in the configuration file:

- Location of syslog file
- Size of activity log
- Maximum count of activity log
- Location of activity log
- Location of Product Engineering (PE) log
- Size of PE log
- Maximum count of Product Engineering (PE) log files

To view or edit the configuration file properties, follow these steps:

### Procedure

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/conf`
3. Run the command `cat conf.properties`. The configuration file displays.
4. Edit the properties in this configuration file, but it is not mandatory to provide values for all of these properties.

**Note:** For any modifications in the configuration file, you must restart the Serviceable Event Provider. For information on restarting the Serviceable Event Provider, see “`sepcli restart`” on page 12

### Results

IBM Serviceable Event Provider on KVM monitors and sends traps even without any update / entry in the configuration file. If no value or invalid value is associated to any or all of the parameters that are mentioned in configuration file, the respective properties are set to the following default values:

- Location of syslog file: **`/var/log/messages`**
- Max size of activity log: **2MB**
- Max count of activity log: **2**
- Location of activity log: **`/var/seprovider/logs`**
- Location of PE log: **`/var/seprovider/logs`**
- Max size of PE log: **2MB**
- Max count of PE log files: **2**

### Example

```
#####
## Inorder to reflect the changes in config file, seprovider need to be resarted ##
#####
```

```

#sys log
[SYS_LOG]
#sys log file path
SYS_LOG=/var/log/messages
#activity log
[ACTIVITY_LOG]
#activity log file path
ACTIVITY_LOG=/var/seprovider/logs/activity.log
#log file max size(byte)
MAXSIZE=2048000
#activity log file count
MAXCOUNT=3
#PE log
[TRACE_LOG]
#log file path
TRACE_LOG=/var/seprovider/logs/trace.log
#PE log file max size(byte)
MAXSIZE=2048000
#PE log file count
MAXCOUNT=3
#SNMP trap command path
[NET_SNMP_BIN]
#trap command of SNMP
CMD_STRAP=snmptrap

```

## Checking status

You can check whether IBM Serviceable Event Provider is monitoring your system's syslog.

### About this task

You can use the **sepli status** command to display the status of the IBM Serviceable Event Provider instance.

### Procedure

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/bin`
3. Run the command **sepli status** to check the status of Serviceable Event Provider.

**Note:** Running the **sepli status** command displays only if Serviceable Event Provider is running on the system. For more information, see “sepli status” on page 12.

## Displaying the activity log

Display the activity log to see all IBM Serviceable Event Provider activity for a designated time period.

### About this task

You can use the IBM Serviceable Event Provider command-line interface to view the activity log. Only the serviceable problems are logged in the Activity Log. The location of the activity log is configurable and can be specified in the configuration file. For more information about configuration settings, see “Updating the Configuration file” on page 7. Log files are rolled back depending on the **Max size** property in the configuration file.



**Note:** The Activity log is not updated for any of the events, if the Serviceable Event Provider is inactive.

To display or view the activity log, follow these steps:

### Procedure

1. Log in to the KVM on Power system.
2. In command line, go to `/var/seprovider/logs/`.
3. Run the command `cat activity.log`, the activity log is displayed.

### Results

The syntax for an entry in the log file for the serviceable event is **<error occurred timestamp> <source of error> <error log ID> <license log ID> <src> <error type> <action needed>**

### Example

```
May 11 02:12:34 localhost
ELOG[24838]:LID[502cdb2ib]::SRC[B181953F]::Platform Firmware::Informational
Error::Service action and call home required ::alert transmission to
<9.57.20.130:163> is successful
```

## Viewing the error data

IBM Serviceable Event Provider collects additional information about the errors and automatically captures set of diagnostic information when errors occur. To view error data use the following commands.

### collectEED

The `collectEED` command collects the extended error data files and creates a compressed tar file.

### Synopsis

```
collectEED
```

### Description

The `collectEED` command displays the location and file name of the sosreport that is collected by Serviceable Event Provider. The sosreport collects configuration and diagnostic information for hardware issues from Serviceable Event Provider. For example, the system logs and service configuration files that can be used for debugging. The Serviceable Event Provider generates a tar file of the collection and saves at `/var/temp`.

### Usage

To view the extended error data, follow these steps:

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Run the command `collectEED`.

## Examples

This example illustrates running the **collectEED** command successfully.

```
./collectEED  
/var/tmp/sosreport-seprovider.27678-20140613110942.tar.xz0
```

## sepfddc

Use the **sepfddc** to view the set of diagnostic information that is captured automatically when errors occur.

## Synopsis

**sepfddc**

## Description

The **sepfddc** command automatically gathers log files and trace files whenever a system error occurs. This information reduces the need to reproduce errors to get diagnostic information. The **sepfddc** command creates the **sepfddc.zip** file at `/var/seprovider/tmp/` with the updated log files (**subscriber.out**, **sys.discover.out**, **activity.log**, and **trace.log**).

## Usage

To view the log files, follow these steps:

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Run the command **sepfddc**.

## Examples

This example illustrates running the **sepfddc** command successfully.

```
./sepfddc  
updating: var/seprovider/tmp/sepfddc/subscriber.out (stored 0%)  
updating: var/seprovider/tmp/sepfddc/sys.discover.out (deflated 33%)  
  adding: var/seprovider/tmp/sepfddc/activity.log (stored 0%)  
  adding: var/seprovider/tmp/sepfddc/trace.log (deflated 63%)  
created /var/seprovider/tmp/sepfddc.zip
```

## Deactivating IBM Serviceable Event Provider

IBM Serviceable Event Provider is activated by using the **sepcli start** command. However, there might be times when you want to deactivate Serviceable Event Provider until you choose to restart it.

You can use the **sepcli stop** command to stop or deactivate the Serviceable Event Provider. For information see, “sepcli stop” on page 13

## Uninstalling IBM Serviceable Event Provider

Before you uninstall IBM Serviceable Event Provider, determine whether you want to save the configuration information to use for another system or again on this system.

IBM Serviceable Event Provider can be uninstalled from your system by using a Linux command. Uninstalling removes the Serviceable Event Provider code and

configuration information. The configuration information contains size, maximum count, location information of files, and operational settings.

You can choose whether to save your configuration information before you uninstall Serviceable Event Provider. If you plan to install Serviceable Event Provider again in future with the same configuration information, or use the same configuration information for another system, save the configuration file for future use.

To uninstall IBM Serviceable Event Provider, follow these steps:

1. Log in to the KVM on Power system.
2. In the command line, run this RPM uninstallation command `rpm -e <rpmfilename>`.

For example, `rpm -e serviceable.event.provider-1.0.0-0.ppc64.rpm`

---

## Using the IBM Serviceable Event Provider command-line interface

IBM Serviceable Event Provider operations can be done through the Linux command line.

The basic command to run is `/opt/ibm/seprovider/bin/sepcli`. Except where otherwise noted, `sepcli` subcommands can be used only after the activation of Serviceable Event Provider. For information about activating Serviceable Event Provider, see “Activating and configuring IBM Serviceable Event Provider” on page 3.

### sepcli start

Use the `sepcli start` command to start the IBM Serviceable Event Provider instance.

#### Synopsis

```
sepcli start
```

#### Description

The `sepcli start` command starts the Serviceable Event Provider instance.

#### Usage

To start the Serviceable Event Provider, follow these steps:

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Run the command `sepcli start` to start the Serviceable Event Provider.
4. Run the command `echo $?` to view the return code.

The `echo $?` command returns the following codes depending on the status of the Serviceable Event Provider. For information on the `sepcli status` command, see “sepcli status” on page 12

- **0 - Serviceable Event Provider started / Active**
- **10 - Serviceable Event Provider Stopped / Inactive**

**Note:** The return codes other than **0** and **10** represent that there is an error in the process.

## Examples

- Start Serviceable Event Provider

This example illustrates running the **./sepcli start** command successfully.

```
./sepcli start
echo $?
0
```

```
./sepcli status
Serviceable event provider is running
```

## sepcli status

Use the **sepcli status** command to display the status of the IBM Serviceable Event Provider instance.

### Synopsis

```
sepcli status
```

### Description

Use the **sepcli status** command to display the status of the Serviceable Event Provider instance.

### Usage

To view the status of Serviceable Event Provider, follow these steps:

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Run the command **sepcli status**.

## Examples

- Status after you start the Serviceable Event Provider

This example illustrates running the **./sepcli status** command successfully.

```
./sepcli status
serviceable event provider is running
```

- Status after you stop the Serviceable Event Provider

This example illustrates running the **./sepcli status** command successfully.

```
./sepcli status
serviceable event provider is not running
```

## sepcli restart

Use the **sepcli restart** command to restart the IBM Serviceable Event Provider instance.

### Synopsis

```
sepcli restart
```

## Description

Use the **sepccli restart** command to restart the Serviceable Event Provider instance.

## Usage

To restart IBM Serviceable Event Provider, follow these steps:

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Run the command **sepccli restart**.

## Examples

- Status when Serviceable Event Provider is restarted.

This example illustrates running the **./sepccli restart** command successfully.

```
./sepccli restart
echo $?
0
./sepccli status
serviceable event provider is running
```

## sepccli stop

Use the **sepccli stop** command to stop the IBM Serviceable Event Provider instance.

## Synopsis

```
sepccli stop
```

## Description

Use the **sepccli stop** command to stop or deactivate the Serviceable Event Provider instance.

## Usage

To stop the Serviceable Event Provider, follow these steps:

1. Log in to the KVM on Power system.
2. In command line, go to `/opt/ibm/seprovider/bin`.
3. Run the command **sepccli stop** to stop Serviceable Event Provider.
4. Run the command **echo \$?** to view the return code.

The Serviceable Event Provider retains its status after system restart. That is, if the Serviceable Event Provider is in **stop** state, after system restart also the Serviceable Event Provider will be in same state.

## Examples

- Status after you stop the Serviceable Event Provider

This example illustrates running the **./sepccli stop** command successfully.

```
./sepccli stop
echo $?
10
serviceable event provider stopped successfully
```

---

## Troubleshooting IBM Serviceable Event Provider

Follow these general troubleshooting guidelines when monitoring IBM Serviceable Event Provider.

### View the activity log to see if there are problems recorded

The activity log shows the date and time a problem occurred, as well as a description of the problem. See “Displaying the activity log” on page 8.

If a problem occurs when the system attempts to send a problem or service information to the registered listener, there are many possible reasons why the transmission may not have been successful. Serviceable Event Provider is dependent on functions of the operating system to be performing correctly. This includes managing the Serviceable Event Provider daemon and system connectivity. Normal system problem determination is advised for this type of problem.

### Getting support for IBM Serviceable Event Provider

You can post questions about any of the IBM Service and Productivity Tools, including IBM Serviceable Event Provider, on the developerWorks® PowerLinux Community at the following web address:

<https://www.ibm.com/developerworks/mydeveloperworks/groups/service/forum/topics?communityUuid=fe313521-2e95-46f2-817d-44a4f27eba32>

For issues or problems with IBM Serviceable Event Provider for KVM on Power, contact your hardware service provider via 1-800-IBM-SERV.

---

## Reference information

This section includes additional reference materials related to IBM Serviceable Event Provider.

### How to read syntax diagrams

Review the conventions used in syntax diagrams to understand the command descriptions.

Syntax diagrams consist of options, option arguments, and operands.

#### Options

*Options* indicate input that affects the behavior of the base command (for example, `-l` specifies long output) or required input that you can specify in different ways (for example, you can target objects using either `-n name` OR `-N groupname` OR `-ac objectclass`). Options consist of either a hyphen and single letter (for example, `-h`) or two hyphens and multiple letters (for example, `--help`). The single letter format is the short form of the multiple letter format, and the two formats are functionally interchangeable when issuing a command.

#### Option arguments

Some options are followed by one or more *option arguments* that specify a value for the option. For example, with `-file file_name`, `file_name` specifies the name of the file on or with which to take action.

## Operands

*Operands* are parameters at the end of a command that specify the user input.

Syntax diagrams adhere to the following conventions:

- Options and operands that are enclosed in brackets ([]) are optional. Do not include these brackets in the command.
- Options and operands that are enclosed in braces ({} ) are required. Do not include these braces in the command.
- Options and operands that are not enclosed in either brackets or braces are required.
- Operands and option arguments that are italicized must be replaced with actual values.
- The names of options are case sensitive and must be typed exactly as shown.
- Options preceded by two dashes (--) must be specified in their entirety.
- A pipe (|) character signifies that you can or must, depending on the enclosing characters, choose one option or the other. For example, [a | b] indicates that you can choose either a or b, but not both. Similarly, {a | b} indicates that you must choose either a or b.
- An ellipsis (...) signifies that you can repeat the operand and option argument on the command line.
- A dash (-) represents standard output.





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