

CA SOLVE:Operations® Automation

Linux Management Guide

Release 11.9



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CA Technologies Product References

This document references the following CA Technologies products:

- CA Mainframe Connector for Linux on System z (CA Mainframe Connector)
- CA SOLVE:Operations® Automation

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Chapter 1: Introduction

This section contains the following topics:

[Overview](#) (see page 7)

[Linux Management Components](#) (see page 8)

[How You Implement the Management Environment](#) (see page 9)

Overview

The following products working together on the same z/OS system enable you to manage your Linux resources on z/VM systems:

- CA SOLVE:Operations Automation
- CA Mainframe Connector, which consists of a z/OS task, and one or more z/VM and Linux agents

You define Linux system and application resources in z/VM system images, which then become visible on the Resource Monitor. Through CA Mainframe Connector, CA SOLVE:Operations Automation receives unsolicited z/VM and Linux messages, and issues z/VM- or Linux-specific commands to manage these resources.

CA Mainframe Connector provides the z/VM and Linux message, and command and response services that CA SOLVE:Operations Automation uses to manage the Linux resources.

Note: For information about CA Mainframe Connector, see the *CA Mainframe Connector for Linux on System z Installation Guide*.

Linux Management Components

CA SOLVE:Operations Automation communicates with CA Mainframe Connector for information about the managed Linux resources and the z/VM systems that host those resources. Linux and z/VM commands can be issued from the product region to help with the management of those resources.

The following main components help you manage the resources:

z/VM system image

Represents a z/VM system. A z/VM system becomes known to the region through CA Mainframe Connector. Depending on configuration, as a z/VM system becomes known to the region, the region can define an image for the system dynamically. A z/VM system image contains definitions for managed resources on a z/VM system. The image uses a home system to determine under which local system image it loads.

Linux system resource

Represents a Linux system on a z/VM host. A Linux system becomes known to the region through CA Mainframe Connector. Depending on configuration, as a Linux system becomes known to the region, the region can define a resource for the system in the z/VM host image dynamically.

Linux application resource

Represents a Linux application on a Linux system on a z/VM host. You define these resources manually.

How You Implement the Management Environment

Using CA SOLVE:Operations Automation and CA Mainframe Connector, you can implement your Linux management environment. You configure the CA Mainframe Connector components to provide an interface between CA SOLVE:Operations Automation and the Linux resources you want to manage. You then create the definitions to manage those resources.

A typical configuration consists of one CA SOLVE:Operations Automation region, one CA Mainframe Connector z/OS region, one z/VM system, and multiple Linux systems.

With CA Mainframe Connector, implementation has the following stages:

1. You put a Linux agent on each Linux system you want to manage.
2. You put a z/VM agent on the z/VM system that hosts the Linux systems.
3. You configure the CA Mainframe Connector z/OS region to provide the interface between the Linux and z/VM agents and systems and this product. If you require multiple instances of CA Mainframe Connector, each instance interfaces with a CA SOLVE:Operations Automation region on a separate z/OS system.

Note: For information about how to configure CA Mainframe Connector, see the *CA Mainframe Connector for Linux on System z Installation Guide*.

With CA SOLVE:Operations Automation, implementation has the following stages:

1. In the LINUXCONNECT parameter group, enable message logging and dynamic discovery, but disable the loading of z/VM system images.
2. The CA SOLVE:Operations Automation region detects the z/VM system and adds the z/VM system image definition.
3. The CA SOLVE:Operations Automation region detects the Linux systems and adds the Linux system resource definitions in the z/VM system image.
4. After the resources are discovered, review the Linux and z/VM messages in the activity log.
 - a. If you find a message you want to use for the discovered resources, update the template used for the resources and apply the template.
 - b. Look for messages relevant to the Linux applications you want to manage. Use the messages to help you define your application resources.
5. When your resource definitions are ready, assign a home system to the z/VM system image definition to load the system image.
6. (Optional) You add a resource definition for the CA Mainframe Connector z/OS region in the local system image using the LINUXCON STC-class resource template.
7. (Optional) You include the new resources in service definitions.
8. (Optional) You add EventView rules.

Chapter 2: Configuration

This section contains the following topics:

[How You Enable the Linux Management Feature](#) (see page 11)

[LINUXCONNECT Parameter Group](#) (see page 11)

How You Enable the Linux Management Feature

To use the Linux Management feature, the CA SOLVE:Operations Automation region requires the following parameter setting in the *dsnpref.rname*.TESTEXEC(RUNSYSIN) member: PPREF='PROD=LINUXMGMT'.

If you include the feature when you set up the region, the Install Utility adds the parameter to the RUNSYSIN member. If you have not included the feature during setup and want to include the feature afterwards, you can add the parameter manually.

LINUXCONNECT Parameter Group

The LINUXCONNECT parameter group configures the Linux Management feature. The group specifies the following parameters:

- Specification that disables or enables the connection between the region and CA Mainframe Connector
- The port numbers for communication with CA Mainframe Connector
These values must match what is in the LNXPARMS parameter member. The values can be either named tokens or static port numbers.
- Specification of whether you want the region to log Linux and z/VM messages in the activity log
- Specification of whether you want the region to create definitions for z/VM and Linux systems automatically as they are discovered
- Specification of whether automatically created z/VM system images are loaded
If you disable loading, the created images do not specify a home system. To enable loading for those images, add a home system to the definitions.
- The version number of z/VM system images defined for any discovered z/VM systems
- The resource definition template used to define any discovered Linux systems

More Information:

[Add z/VM System Image Definitions](#) (see page 13)

Chapter 3: Defining System Images and Resources

This section contains the following topics:

[Add z/VM System Image Definitions](#) (see page 13)

[Add Resource Definitions](#) (see page 14)

[Linux and z/VM Resources in a Service](#) (see page 16)

Add z/VM System Image Definitions

By default, the region defines images for z/VM systems as they are discovered. However, you can disable this feature through the LINUXCONNECT parameter group, and you can define an image manually. Typically, you have a system image for each z/VM system on which a z/VM agent is running.

To define an image for a z/VM system

1. Enter the **/RADMIN.I.VM** panel path.
The VM System Image List panel appears.
2. Press F4 (Add).
The VM System Image Definition panel appears.
3. Define the system image.
 - a. Identify the system image, and provide a brief description.
 - b. Specify the home system image where you want to load the image. If you do not want to load the image, leave the Home System field blank.
Note: You can use this field to disable loading of the image or to move the image from one system to another.
 - c. Press F3 (File).

The system image is created, and if the home system image is active, loads and becomes active.

Add Resource Definitions

A z/VM system image can contain definitions for the following resources:

- Linux system resources, Class LINUX (By default, the region adds definitions for Linux systems as they are discovered. However, you can disable this feature through the LINUXCONNECT parameter group, and you can define a Linux system resource manually.)
- Linux application resources, Class LXAPPL (Each application resource definition identifies the Linux system on which the application is running as the owner, which forms an implicit relationship. You define the Linux system resource before you define the applications running on that system. You do not need to define an explicit parent-child relationship between a Linux application resource and its owner.)
- z/VM resources, Class VMGST

Note: You can include these resources in service definitions. You *cannot* include these resources in shared system images.

To add a resource definition to a z/VM system image

1. From the VM System Image List panel, enter **R** next to the z/VM system image in which you want to add a resource.

The Resource List panel appears.

2. Press F4 (Add).

The Resource Class List panel appears.

3. Select the class of resources you want to define.

The resource definition General Description panel appears.

4. Define the resource:

- a. Complete the mandatory fields.

- b. In the Template Selection window, enter L in the action field next to the TemplateName column.

The Template List panel appears.

- c. Enter **R** next to the required template.

The values in the template populate the resource definition.

- d. Review and customize the definition as required.

Special [messages](#) (see page 21) (LXLOG001x, LXMSG001x, and LX EVT001I) and commands ([LXCMD](#) (see page 23) and [VMCMD](#) (see page 24)) help you specify automation for the definition.

Important! If you are defining an LXAPPL-class resource, use the \$MN- special message prefix to capture messages.

Note: If the changes you make can be applied to similar resources, consider creating a template with those changes for use by those resources.

- e. Press F3 (File).

The resource definition is created.

More Information:

[Linux Resources](#) (see page 17)

[Unsolicited Messages](#) (see page 21)

[LXCMD Command—Issue a Linux Command](#) (see page 23)

[VMCMD Command—Issue a z/VM Command](#) (see page 24)

Templates

The \$TEMPLAT 0001 and 0002 template images provide the following sample templates that help you define the resources you want to manage:

LINUXCON

Defines an STC-class CA Mainframe Connector z/OS region.

LINUXONVM

Defines a LINUX-class Linux system resource on a z/VM system.

VMGUEST

Defines a VMGST-class z/VM guest resource.

VMHOST

Defines a VMGST-class z/VM system resource for a z/VM system image. The template provides inactivation processing to shut down the z/VM system.

Linux and z/VM Resources in a Service

You can include Linux and z/VM resources in a service definition. A service filter has an SMF ID field. For Linux and z/VM resources, this field specifies the SMF ID of the *home system* in the hosting z/VM system image definition.

Chapter 4: Monitoring and Controlling Linux Resources

This section contains the following topics:

- [Linux Resources](#) (see page 17)
- [z/VM Resources](#) (see page 17)
- [Resource Monitor Filters](#) (see page 18)
- [Graphical Monitor Panel](#) (see page 18)
- [Issue Linux Commands](#) (see page 18)
- [Issue z/VM Commands](#) (see page 18)
- [Disable or Enable Monitoring and Control](#) (see page 19)
- [Move Monitoring and Control to Another System](#) (see page 19)

Linux Resources

Linux resource definitions are loaded as part of an active z/VM system image. The definitions are *one* of the following classes: Linux system (LINUX) and Linux application (LXAPPL). Linux applications are owned resources, with the Linux system on which the applications are running as the owner. A monitor identifies a Linux application resource as *owner_name.resource_name*:

owner_name

Is the name of the Linux system on which the Linux application is running.

resource_name

Is the name of the Linux application.

A Linux application and its owning Linux system have the following operational relationships:

- An application cannot be started until the Linux system that owns it has become active.
- An application becomes inactive when its owning Linux system is shut down.

z/VM Resources

z/VM resource definitions are loaded as part of an active z/VM system image. The definitions are of the VMGST class. Resources in this class can be of *one* of the following types: GUEST and HOST. A monitor displays a z/VM resource with its type in the Class column.

Resource Monitor Filters

The LINUX filter enables you to display only Linux resources on the Resource Monitor.

Graphical Monitor Panel

The \$LXDEFAULT icon panel helps you manage Linux and z/VM resources from the Graphical Monitor.

Issue Linux Commands

From the monitor, you can issue commands to a Linux system. The CMD command uses the LXCMD command.

To issue commands to a Linux system

1. Enter **CMD** next to the Linux system resource (Class LINUX) or an application resource (Class LXAPPL) on the Linux system.

The Linux Command Entry panel appears, primed with LXCMD and the target Linux system.

2. Issue a Linux command.

The function requested by the command is performed.

Issue z/VM Commands

From the monitor, you can issue commands to a z/VM system. The CMD command uses the VMCMD command.

To issue commands to a z/VM system

1. Enter **CMD** next to a VMGST-class resource on the z/VM system.

The VM Command Entry panel appears, primed with VMCMD and the target z/VM system.

2. Issue a z/VM command.

The function requested by the command is performed.

Disable or Enable Monitoring and Control

During initialization, the region loads defined z/VM system images that have the local system as the home system. You can disable the monitoring and control of the resources in a z/VM system image.

To disable the monitoring and control of the resources in a z/VM system image

1. Enter the **/RADMIN.I.VM** panel path.
The VM System Image List panel appears.
2. Enter **U** next to the required system image.
The VM System Image Definition panel appears.
3. Remove the home system, and press F3 (File).
The resources in the system image disappear from the monitor.

To enable the monitoring and control of the resources in a z/VM system image, specify a home system.

The system image loads on the home system, and the resources in the image appear on the monitor.

Move Monitoring and Control to Another System

If your site configures a duplicate CA Mainframe Connector instance on another system, you can move the monitoring and control to the CA SOLVE:Operations Automation region on that system. For example, if a problem occurs with the current instance of CA Mainframe Connector, you can use the duplicate CA Mainframe Connector as the fallback.

To move the monitoring and control of the resources in a z/VM system image

1. Enter the **/RADMIN.I.VM** panel path.
The VM System Image List panel appears.
2. Enter **U** next to the required system image.
The VM System Image Definition panel appears.
3. Change the home system, and press F3 (File).
The resources in the z/VM system image unload from the current system image and reload on the new home system image.

Appendix A: Unsolicited Messages

The region receives the following messages from CA Mainframe Connector:

LXLOG001x *linux_system vm_host_node message_text*

Contains a message in syslog on a Linux system.

x

Indicates the severity level of the Linux message:

- **A** indicates an alert-level message for urgent situations.
- **C** indicates a crit-level message for critical conditions.
- **E** indicates an err-level message for other error conditions.
- **I** indicates an info-level message for information.
- **M** indicates an emerg-level message for panic situations.
- **N** indicates a notice-level message for things that merit investigation.
- **W** indicates a warning-level message for warnings.

linux_system

Identifies the Linux system that generates the message.

vm_host_node

Identifies the z/VM system that hosts the Linux system.

message_text

Is the text of the Linux message.

Example: LXLOG001I LINUX113 ZVM002 SYSLOG-NG STARTING

LXMSG001y vm_node user_id message_text

Contains an unsolicited message from a z/VM system.

y

Identifies the source of the z/VM message:

- **A** indicates an asynchronous CP message.
- **C** indicates a single console image facility (SCIF) message from CP.
- **E** indicates an error message from CP.
- **I** indicates an information message for CP.
- **M** indicates a message sent using CP MESSAGE or CP MSGNOH.
- **S** indicates a message sent using CP SMSG.
- **V** indicates data directed to the virtual console by the virtual machine.
- **W** indicates a message sent using CP WARNING.

vm_node

Identifies the z/VM system.

user_id

Identifies the z/VM user that generates the message.

message_text

Is the text of the z/VM message.

Example: LXVMMSG0I ZVM002 MSG POLLGEN NMVM0001 00:34:49 Hello

LXEVT001I vm_node user_id event_type

Contains an unsolicited event from a z/VM system.

vm_node

Identifies the z/VM system.

user_id

Identifies the z/VM user that generates the event.

event_type

Is the generated event.

Example: LXVMEVTOI ZVM002 LINUX113 RUNNABLESTATEENTERED

Appendix B: Commands

This section contains the following topics:

[LXCMD Command—Issue a Linux Command](#) (see page 23)

[VMCMD Command—Issue a z/VM Command](#) (see page 24)

LXCMD Command—Issue a Linux Command

The LXCMD command passes a command to a Linux agent. The agent then issues the actual command on the Linux system. Responses are returned with the LXCMD000 message ID and ends with the LXCMD999 message.

This command has the following format:

```
SYSCMD LXCMD NAME=linux_name NODE=vm_host_node CMD='linux_command'
```

linux_name

Specifies the name of the Linux system on which the agent is running.

vm_host_node

Specifies the node name of the z/VM system that is hosting the Linux system.

linux_command

Specifies the Linux command to pass to the agent.

You use this format when you issue this command from Command Entry. You use an abbreviated format when you issue this command from a resource definition or an EventView rule.

LXCMD Command from Resource Definitions

You can specify the LXCMD command in a System Command field or through a SYSCMD macro in a resource definition. Because you issue the command in the context of the resource, you use an abbreviated format for the command:

```
LXCMD linux_command
```

LXCMD Command from EventView Rules

You can issue the LXCMD command in a System Command field or through a SYSCMD macro in an EventView rule. You do not include SYSCMD in the command format:

```
LXCMD NAME=linux_name NODE=vm_host_node CMD='linux_command'
```

VMCMD Command—Issue a z/VM Command

The VMCMD command passes a command to a z/VM agent. The agent then issues the actual command on the z/VM system. Responses are returned as is and ends with the VMCMD999 message.

This command has the following format:

```
SYSCMD VMCMD NODE=vm_node CMD='vm_command'
```

vm_node

Specifies the node name of the z/VM system on which the agent is running.

vm_command

Specifies the z/VM command to pass to the agent.

You use this format when you issue this command from Command Entry. You use an abbreviated format when you issue this command from a resource definition or an EventView rule.

VMCMD Command from Resource Definitions

You can specify the VMCMD command in a System Command field or through a SYSCMD macro in a resource definition. Because you issue the command in the context of the resource, you use an abbreviated format for the command:

```
VMCMD vm_command
```

VMCMD Command from EventView Rules

You can issue the VMCMD command in a System Command field or through a SYSCMD macro in an EventView rule. You do not include SYSCMD in the command format:

```
VMCMD NODE=vm_node CMD='vm_command'
```

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