

How To Effectively Incorporate Linux on System z Events Into Your OPS/MVS or SOLVE:Operations Automation Policies

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CA Technologies



Connecting Linux on System z to Your CA z/OS Automation Products

In this session, we will explain how to install the Connector and will provide an overview of its capabilities. This session will be of interest to any OPS/MVS or SOLVE:Operations customer who runs workloads on Linux on System z (or is considering doing so).

Agenda

Integrating Linux into System z

CA Mainframe Connector for Linux on System z Overview

Installing CA Mainframe Connector for Linux on System z

Connector Capabilities -- Configuration and Runtime

Integrating Linux into System z

- Companies are consolidating their disparate Linux workloads onto the mainframe
 - Such sites have relied on **CA OPS/MVS® Event Management and Automation** or **CA SOLVE:Operations Automation** for many years
 - Their Operators and Systems Programmers have many years experience in z/OS mainframe data centers but know only basic IBM z/VM and Linux on System z
 - They understand the business importance of the production Linux on System z workloads and the services they enable
 - They desire the same high level of management and visibility as they do on z/OS
- Today Linux on System z is more integrated with mainframe applications

Integrating Linux into System z (Cont.)

For many sites this naturally ties into their mainframe automation

Is Linux on System z image active?

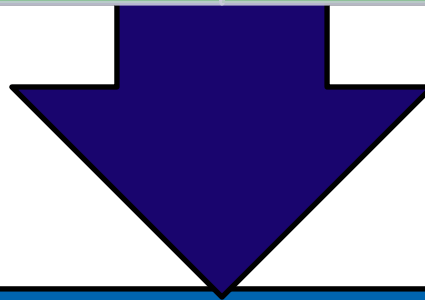
Is Linux on System z image experiencing problems?

Is host VM system experiencing problems?

Is Linux on System z application active?

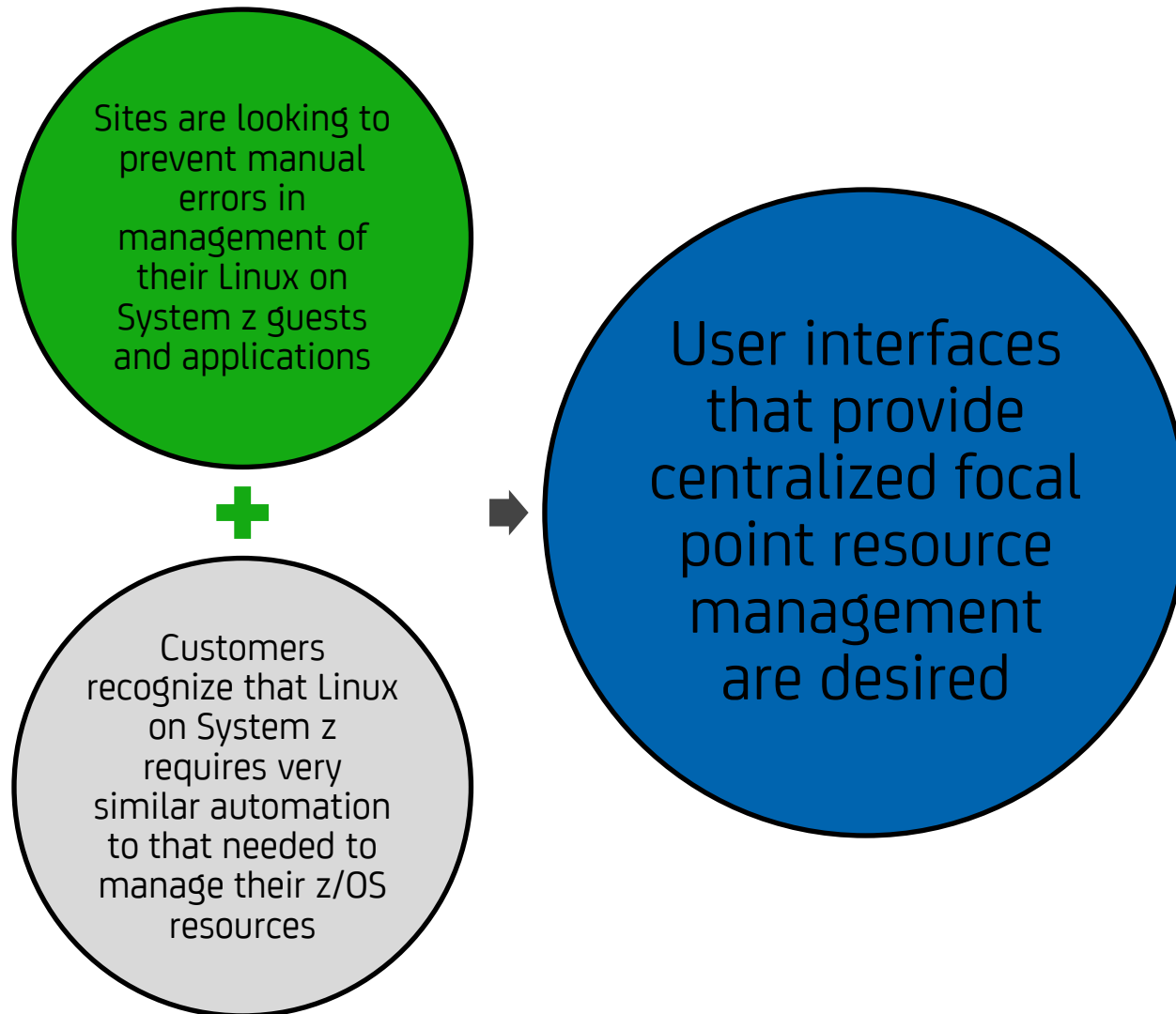
Is Linux on System z application experiencing problems?

Is z/OS prerequisite resource active?



Systems programmers understand that there is much similarity between USS and Linux on System z resources (e.g., processes)

Integrating Linux into System z (cont.)



CA Mainframe Connector for Linux on System z

Started Task independent of other client software



Provides TCP/IP pipe between Linux on System z, z/VM & z/OS



Command/response for Linux on System z objects from z/OS

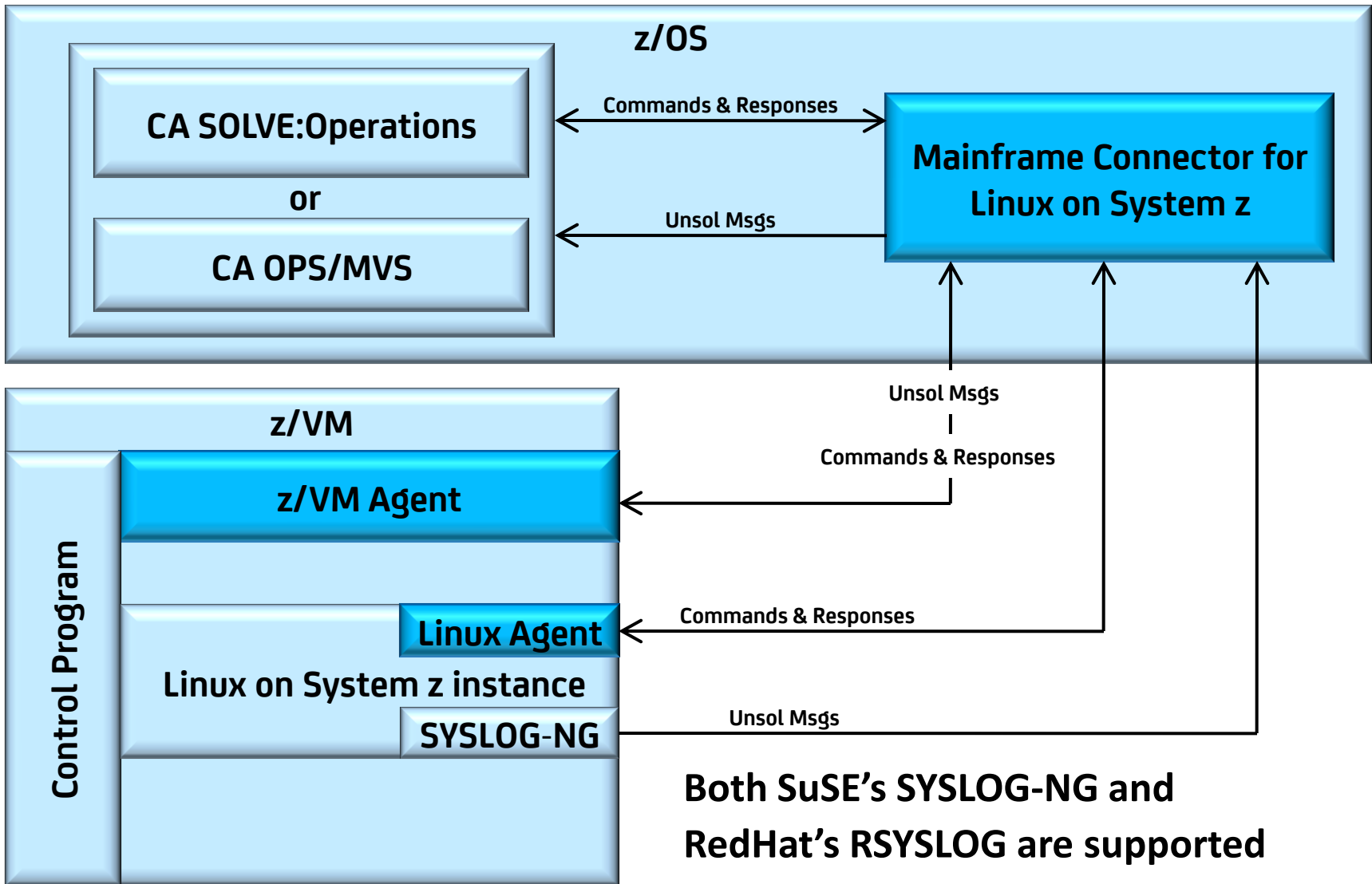


Event feed from Linux on System z to z/OS



Automatic discovery of z/VM and Linux on System z systems

CA Mainframe Connector Logical Overview



CA Mainframe Connector Components

Architecture consists of 3 separate components:

**Mainframe
Connector for
Linux region on
z/OS**

- This runs as a standalone region on z/OS as a 'black box', providing a communication path for the z/VM and Linux on System z agents which can be utilized by CA SOLVE:Operations or CA OPS/MVS

z/VM Agent

- The z/VM agent interfaces with the Connector for Linux region to deliver unsolicited events/messages. It will also receive z/VM commands from Connector for Linux region and return the responses

**Linux on System
z Agent(s)**

- The Linux on System z agent(s) interfaces with the Connector for Linux region to deliver unsolicited messages and receive Linux commands and return the responses

Install and Configuration Process

- **Step 1**
 - Install and set Up a z/OS Region
- **Step 2**
 - Install and configure z/VM Agents
- **Step 3**
 - Install and configure the Linux Syslog Daemon
- **Step 4**
 - Install and configure Linux Agents
- **Step 5**
 - Update OPS/MVS Parms or SOLVE:Operations Parameter Group

Obtaining Installation Software

CA MSM PRE VAL UTIL-ESD ONLY 50000068XU1.pax.Z	5.0 /0000	05/30/2012	3.29MB	<input type="checkbox"/>	Download
CA MSM PRE VALIDATION INSTR 50000068XU1CL.pdf	5.0 /0000	05/15/2012	411.08KB	<input type="checkbox"/>	Download
EZTRVE REPORT GENERATOR CCS B60000ESA00.pax.Z	11.5 /0000	07/05/2011	6.12MB	<input type="checkbox"/>	Download
CA OPS/MVS PRODUCT TAPE C00000NY100.pax.Z	12.0 /0000	06/07/2012	20.83MB	<input type="checkbox"/>	Download
CA MF CONNECTR FOR LINUX SYS Z C2D72G0.pax.Z	1.0 /0000	08/29/2011	62.42MB	<input type="checkbox"/>	Download
CDMPRE INTECE SERV FM CA TECH C2D73G0.pax.Z	1.0 /0000	08/29/2011	8.03MB	<input type="checkbox"/>	Download
DATACOM/AD PROD INFO PACKET CAIE00000P0.pdf	14.0 /0000	06/01/2012	220.53KB	<input type="checkbox"/>	Download
DATACOM/AD XPRESS INSTALL E00000CA100.pax.Z	14.0 /0000	06/04/2012	48.57MB	<input type="checkbox"/>	Download
CA COMMON SERVICES COVER LTR RI45048.pdf	14.1 /0000	06/26/2012	183.1KB	<input type="checkbox"/>	Download
CA MSM COVER LETTER RI45051.pdf	5.0 /0000	05/16/2012	178.43KB	<input type="checkbox"/>	Download
OPS/MVS COVER LETTER RI46937.pdf	12.0 /0000	06/07/2012	6.74KB	<input type="checkbox"/>	Download

Installing z/OS component

Requires currently supported version of z/OS

SMPE-based allowing CA MSM installation or pax-Enhanced ESD installation

SMPE delivers required software for z/OS, zVM and Linux on System z agents

Setup process requires that the CAIT72 target zone and the CAID72 distribution zone names be used

Installing z/OS component – cont'd

- **Install-Deploy-Configure Linux Connector using CA MSM**
OR
- **Use Enhanced-ESD process to**
 - **Unpack the UNIX pax file**
 - **UNZIPJCL to execute GIMUNZIP to create MVS installation files**
- **After you unzip the data sets, do one of the following:**
 - **Rename dsnpref.CAI.LX10.CC2DJCL to dsnpref.LX10.CC2DJCL**
 - **Copy the members in dsnpref.CAI.LX10.CC2DJCL into dsnpref.LX10.CC2DJCL**
- **Ensure that the dsnpref.LX10.CC2DLINK data set is in your system LNKLST.**
- **Allocate a data set to ISPTABL DD (FB 80 PDS) for INSTALL utility**

Installing z/OS component – cont'd

– Initiate Install Utility

- EXEC 'dsnpref.LX10.CC2DJCL(INSTALL)'

```

XE21 DSLIST  0000  0  00  0  00  000000  0000  000000  0000  00000
000000  000000  00  00  00  00  000000  000000  000000  000000  000000
00  00  00  00  000 00  000 00  00  00  00  00  00  00  00  00
00  00  00  00  000000  000000  00000  00  00  00  00  00  00000
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  0000  0000  00  00  00  00  000000  0000  00  0000  00  00
      0000  0  00  0000  000000  00  00  00
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      00  000 00  00  00  00  00  00  00  00
      00  000000  00000  00  000000  00  00
      00  00 000  00000  00  000000  00  00
      00  00  00  00  00  00  00  00  00  00
0000  00  00  000000  00  00  00  000000  000000
0000  00  00  0000  00  00  00  00  000000  000000

```

Install Utility (August 2011)
 CA Mainframe Connector for Linux on System z Version 1.0
 (LX10 - SP0)

Enter to continue
 F3 to EXIT
 *DSLIST

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F1 for Help
 F5 for INSTDB



XE21 DSLIST ----- Install Utility Primary Menu -----

Option ==> _

- 1 Set Installation Parameters
 - 2 Install CA Mainframe Connector for Linux on System z
 - 3 Setup a CA Mainframe Connector for Linux on System z Region
 - 4 Create VTAM Major Node
 - 5 Maintain CA Mainframe Connector for Linux on System z
- X Exit

*DSLIT

XE21 DSLIST ----- Parameters Primary Menu -----

Option ==> _

A Sequential display of parameters

1 Software Delivery Method

2 Data Set Prefixes

3 USS Path For Linux Connector

4 Data Set Prefixes (Setup)

5 IBM Data Sets

6 Load Libraries

7 SMP/E Member Location

8 SSL Support

9 Block Sizes

10 Job Card Information

11 Additional JCL Statements

X Exit

*DSLIS

XE21 DSLIST ----- SETUP Linux Connector Region Primary Menu -----

Option ==> _

- 1 Add a CA Mainframe Connector for Linux on System z Region
 - 2 Copy a CA Mainframe Connector for Linux on System z Region
 - 3 Regenerate a CA Mainframe Connector for Linux on System z Region
 - 4 Review Latest Generated Jobs List
 - 5 Delete a CA Mainframe Connector for Linux on System z Region
- X Exit

*DSLIST

```
XE21 DSLIST ----- SETUP Specify Linux Connector Region Name -----  
Command ==>
```

Take the default or enter your site-specific started task region information:

```
Region name. . . . . LNXCONE  
Member identifier. . . . . B  
Region description . . . . TEST2 Region
```

```
*DSLIS
```

XE21 DSLIST ----- SETUP Region Information -----

Command ==>

Linux Connector Region: LNXCONB

Take the defaults or enter your site-specific region initialization parameters:

Description	Value
z/OS Parameters	
TCPIP.DATA Data Set Name	<u>TCPIP.MVXE21.TCPIP.DATA</u>
TCP/IP Stack Name	<u>TCPIP</u>
Linux Syslog Daemon Port.	<u>601</u>
z/VM Parameters	
User Name	<u>CAVLUSER</u>
Minidisk Volume Serial (valid).	<u>DSK133</u>
Minidisk Start Cylinder	<u>1193</u>
z/OS Linux Connector IP Address	<u>141.202.200.250</u>
z/OS Linux Connector IP Port.	<u>2636</u>

*DSLIST

XE21 DSLIST ----- SETUP Generated Jobs ----- Row 1 to 10 of 11

Command ==>

Linux Connector Region: LNXCONB

The following list of members has been generated in the JCL library,

TEST2.LNXR10.LX10.CNTL

Submit and run each SBn job in sequence.

Enter J to Submit the member, B to Browse, S or E to Edit. Press F1 for help.

Member	Description
CAVLRUNB	Generated Member - VM Exec to run \$UTVM002
CAVLUSRB	Generated Member - VM User Definition
LNXCONB	Generated Member - Product region startup JCL
SB#DSLST	Generated Member - Region data set list
SBLNXPRM	Generated Member - Region initialization parameters
SBSAFF	Generated Member - Region security parameter file
SB2SHALC	Allocate shared region files
SB3LDVIP	Load of MODS, PANELS and OSCNTL files
SB5LDPDS	Copy members to PDS files
SB90DUMP	Optional - DFSMSdss Dump (refer JCL comments)
*DSLST	

XE21 DSLIST TEST2.LNXR10.LX10.CNTL Row 00001 of 00019

Command ==> Scroll ==> PAGE

Name	Prompt	Size	Created	Changed	ID
APFLIST		22	2012/07/22	2012/07/22 20:15:23	SPASU01
CAVLRUNB		16	2012/07/22	2012/07/22 22:55:46	SPASU01
CAVLUSRB		13	2012/07/22	2012/07/22 22:55:46	SPASU01
I01ALLOC		330	2012/07/22	2012/07/22 20:15:23	SPASU01
I02INSMP		626	2012/07/22	2012/07/22 20:15:24	SPASU01
I03RCSMP		30	2012/07/22	2012/07/22 20:18:41	SPASU01
I04AKSMP		39	2012/07/22	2012/07/22 20:15:24	SPASU01
I05RSSMP		46	2012/07/22	2012/07/22 20:15:24	SPASU01
I06APSMP		28	2012/07/22	2012/07/22 20:15:24	SPASU01
I07ACSMP		112	2012/07/22	2012/07/22 20:15:24	SPASU01
LNXCONE		49	2012/07/22	2012/07/22 22:55:46	SPASU01
SB#DSLST		27	2012/07/22	2012/07/22 22:55:46	SPASU01
SBLNXPRM		60	2012/07/22	2012/07/22 22:55:46	SPASU01
SBSAFF		293	2012/07/22	2012/07/22 22:55:46	SPASU01
SB2SHALC		16	2012/07/22	2012/07/22 22:55:45	SPASU01
SB3LDVIP		19	2012/07/22	2012/07/22 22:55:45	SPASU01
SB5LDPDS		27	2012/07/22	2012/07/22 22:55:45	SPASU01
SB90DUMP		25	2012/07/22	2012/07/22 22:55:46	SPASU01

*DSLST

Installing z/OS component – cont'd

PARMLIB(SiLNXPBM)

ABENDCMD=S LNXCONN

STACKNAME=TCPIP21

STACKTYPE=IBM

IPPORT=3636

LXPORT=2636

SLPORT=514

CMDTOKEN=CALINUXCOMMANDS:

MSGTOKEN=CALINUXUNSOLMSG:

MULTICLIENT=NO

CMDPORT=

MSGPORT=

Installing z/OS component – cont'd

LNXC CON STC Startup messages

LXIN0009 Stack Type set to IBM

LXIN0009 Stack Name set to TCPIP21

N3AT01 TCPIP START COMMAND PROCESSED

N00503 * LinuxCon INITIALIZATION COMPLETE LINUXCON *****

Installing z/VM agent

Software delivered as part of the z/OS component SMPE install

Requires currently supported version of z/VM

Requires either:

- Library for REXX on zSeries (5695-014)**
- Alternate Library for REXX on zSeries Version 1.4.0 for use with z/VM**

Installing z/VM agent

- **Define a user ID for the z/VM agent to the z/VM system:**
 - **Log on to the user ID responsible for directory maintenance on the target z/VM system**
 - **Transfer the CAVLUSRi data set member to the 191 disk as agent_user_id DIRECT**

Transfer required zVM components from z/OS

- **dsnpref.LX10.CNTL(CAVLUSRi)**
 - **z/VM directory for the agent user ID**
 - **CMS file name: *agent_user_id***
 - **CMS file type: DIRECT**
 - **Populated through INSTALL Utility or through CA MSM Configuration Services**

Transfer required zVM components from z/OS

USER CAVLUSER password 64M 64M ABCG

IPL CMS

MACH ESA

SPOOL 000C 2540 READER *

SPOOL 000D 2540 PUNCH A

SPOOL 000E 1403 A

CONSOLE 009 3215 T

LINK MAINT 0190 0190 RR ← May need to change to meet your environment

LINK MAINT 019D 019D RR ← May need to change to meet your environment

LINK MAINT 019E 019E RR ← May need to change to meet your environment

LINK TCPMAINT 198 198 RR ← May need to change to meet your environment

LINK TCPMAINT 592 592 RR ← May need to change to meet your environment

MDISK 191 3390 1 003 *VOLIDX* MR ← *VOLIDX* is volume in your environment

Complete zVM Setup

- **Define a user ID for the z/VM agent to the z/VM system:**
 - Log on to the user ID responsible for directory maintenance on the target z/VM system
 - Transfer the CAVLUSRi data set member to the 191 disk as agent_user_id DIRECT
 - Customize the password in the directory to suit your requirements
 - Add the directory to the z/VM system directory
 - Install the changed directory using the DIRECTXA utility
- **Log on to the agent user ID (CAVLUSERi)**
- **Transfer the other data set members to the 191 disk for the agent user ID**

Transfer required zVM components from z/OS

- **dsnpref.LX10.CNTL(CAVLRUNi)**
 - **REXX program that runs \$UTVM002**
 - **Member contains the z/OS region IP address and port number specified during z/OS region setup**
 - **CMS file name: CAVLRUNA**
 - **CMS file type: EXEC**
 - **Populated through INSTALL Utility or through CA MSM Configuration Services**

Transfer required zVM components from z/OS

```
/* Start the Linux Connector VM Agent */
```

```
ADDRESS COMMAND
```

```
/* Modify the following with the IP addr and port of Linux Connector */
```

```
ipAddr = "???.???.???.???"      ← IP address assigned to z/OS LNXCON STC
```

```
port = "?????"                    ← IP address assigned to z/OS LNXCON STC
```

```
"CP SET MSG ON"
```

```
"ACCESS 592 H"
```

```
EXEC "$UTVM002" ipaddr port
```

```
IF RC = 1 THEN
```

```
  PUSH "EXEC CAVLRUNA"
```

```
EXIT RC
```


Transfer required zVM components from z/OS)

— dsnpref.LX10.CE2JOB0(CAVLPROF)

– Profile for the agent user ID

- CMS file name: PROFILE
- CMS file type: EXEC

```
/* Profile for CAVLAGNT */
```

```
ADDRESS COMMAND
```

```
"EXEC CAVLRUNA"
```

```
EXIT RC
```

Transfer required zVM components from z/OS)

- **dsnpref.LX10.CE2JOB0(GENIUCVM)**
 - **REXX program that generates the IUCVMSG module**
 - **CMS file name: GENIUCVM**
 - **CMS file type: EXEC**

Transfer required zVM components from z/OS

— dsnpref.LX10.CE2JOB0(IUCVMSG)

- Inter-User Communications Vehicle (IUCV) message handler
 - CMS file name: IUCVMSG
 - CMS file type: TEXT

— dsnpref.LX10.CE2JOB0(\$UTVM002)

- Compiled REXX program that is the agent
 - CMS file name: \$UTVM002
 - CMS file type: EXEC

Important! Transfer the IUCVMSG and \$UTVM002 members using the binary data type

Installing z/VM agent – cont'd

- **Run the GENIUCVM EXEC**
 - **The IUCVMSG module is generated**
- **Logoff agent user ID**
- **XAUTOLOG agent user ID**
- **Add start of agent user ID to AUTOLOG1**

Configure the Linux Syslog Daemon rsyslog

- Add the following statements in the `/etc/rsyslog.conf` file for the Linux system:

```
$WorkDirectory /var/spool/rsyslog           # where to place spool files
$ActionQueueFileName fwdRule1              # unique name prefix for spool files
$ActionQueueMaxDiskSpace 1g                 # 1gb space limit (use as much as possible)
$ActionQueueSaveOnShutdown on              # save messages to disk on shutdown
$ActionQueueType LinkedList                 # run asynchronously
$ActionResumeRetryCount -1                  # infinite retries if host is down
*. * @@[host_name]:601                      # host_name specifies the name or IP address
                                             # of the z/OS system on which the z/OS region
                                             # is running.
```

Note: You can change the port number, but the corresponding `SLPORT` value in the `SiLNXP` parameter member for the z/OS region must match.

- Restart rsyslog daemon with the new configuration
`/etc/init.d/rsyslog restart`

Configure the Linux Syslog Daemon syslog-ng

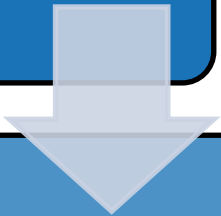
- Add the following statements in the `/etc/syslog-ng.conf` file for the Linux system:

```
destination loghost { tcp("host_name" port(601)); };  
log { source(src); destination(loghost); };
```

 - `host_name` specifies the name or IP address of the z/OS system on which the z/OS region is running.
 - If you are using Internet Protocol Version 6 (IPv6), use the `tcp6()` driver instead of the `tcp()` driver
 - Note: You can change the port number, but the corresponding `SLPORT` value in the `SiLNXP` parameter member for the z/OS region must match
- Restart `syslog-ng` daemon with the new configuration
`/etc/init.d/syslog restart`

Installing Linux agent

Software delivered as part of the z/OS component SMPE install in designated USS directory



Packaged in an RPM file

- `calxagnt-v.r-1.s390x.rpm`
- 

Requires IBM-certified version of one of the following operating systems:

- Red Hat at minimum release level 6
- SuSE at minimum release level 11.1

XE21

Directory List

Command ==>

Select one or more files with / or action codes.

EUID=0 /u/users/connector/connector/

Type	Filename	Row 1 of 4
Dir	.	
Dir	..	
File	calxagnt-1.0-1.s390x.rpm	
File	ZLXAGENT	

*BPXWP06

Install the Linux agent

- Transfer calxagnt-1.0-1.s390x.rpm file to each zLinux server to be monitored in following directory:
 - For SuSE, /usr/src/packages/RPMS/s390x
 - For Red Hat, /usr/src/redhat/RPMS/s390x
- Install the Linux agent software using the following command:
`rpm -Uhv rpm_file_name`

Configure the Linux agent

— Enable the Linux agent to issue z/VM CP commands:

– Enter the following command:

modprobe vmcp

This allows the Linux agent can issue CP commands in the current session

— Add the command in the `/etc/init.d/boot.local` (SuSE) or `/etc/rc.local` (Red Hat) file.

The Linux agent can issue CP commands the next time the Linux system starts

Configure the Linux agent – cont'd

– Update the SOLVE service in the xinetd configuration:

- Create a file, named solve, in the /etc/xinetd.d directory, using the following name for the server program:

`/usr/sbin/calxagnt`

– Sample SOLVE Service file:

```
#Linux Agent for CA Mainframe Connector
```

```
service SOLVE
```

```
{
```

```
socket_type = stream
```

```
protocol = tcp
```

```
wait = no
```

```
user = root
```

```
server = /usr/sbin/calxagnt
```

```
}
```

Note: If you are using SuSE, you can use YaST (Yet another Setup Tool) to create this file

Configure the Linux agent – cont'd

- If root privilege is not required, change the user under which the agent runs
- (Optional) Add the following server argument to run the agent from a home directory:

```
server_args = -d home_directory_path
```

- Enter the following command to restart the xinetd daemon:

```
service xinetd restart
```

Communication between the Linux agent and the z/OS region is configured

With CA OPS/MVS
R12.0 or higher

CA OPS/MVS

Configuration for Mainframe Connector

— **INITLXC = YES/NO**

- Starts the unsolicited message subtask processing at CA OPS/MVS initialization
- **F OPSx,RESTART(LXC)** is the CA OPS/MVS command to restart or stop the unsolicited message subtask

— **BROWSELXC = YES/NO**

- Controls whether unsolicited z/VM and Linux on System z message event records are written to OPSLOG

— **LXCRULES = YES/NO**

- Enables)API LX* rules for unsolicited z/VM and Linux on System z messages
 - LXLOG001I for Linux on System z
 - LXMSG001I for z/VM
 - LXEVT001I for z/VM event message

Parameters must match the corresponding values specified in the Connector for Linux region

— **LXCONMSG = 'CALINUXUNSOLMSG:'**

– Name of z/OS name token pair containing the IP port number of Connector for Linux region message task

— **LXCONCMD = 'CALINUXCOMMANDS:'**

– Name of z/OS name token pair containing the IP port number of Connector for Linux region command task

NOTE the colons are part of the name!

Executes from within one of CA OPS/MVS's USS servers

- VMCMD VMNODE(*nodename*) COMMAND('command text')
WAIT(seconds) STEM(stem)
- LXCMD LINUX(*linuxname*) VMNODE(*nodename*)
COMMAND('command text') WAIT(seconds) STEM(stem)
- *nodename* and *linuxname* values are determined via topology messages sent to the unsolicited message subtask when
 - Connection is started
 - New systems are added after our connection is already active
 - Values will be put into a structured format for use with ADDRESS LXCON
- **WAIT** ignored if command initiated from an AOF rule

Executes from within the CA OPS/MVS address space

- LIST LINUX(*linuxname**) VMNODE(*nodename**)
 - Gathers topology data received from the Connector for Linux Region
 - Put records of topology data for matching LINUX and/or VMNODE names into the REXX EDQ
 - **Available as resource data for System State Manager (SSM)**

CA OPS/MVS

AOF Generic API events

- LXC events are presented as AOF Generic API events
- Only an activated CA OPS/MVS API interface can process the LXC message events
 - To activate the AOF API interface, set the APIACTIVE parameter to YES
 - **OPSPRM('SET','APIACTIVE','YES')**

CA Mainframe Connector for Linux on System z

Linux Connector API Rules

- CA OPS/MVS Linux Connector interface (LXCON) connects with the Linux Connector component through a local IP connection
- This interface delivers unsolicited message events from monitored VM and Linux systems as normalized messages that are processed as CA OPS/MVS API events
- Write API rules that specify how CA OPS/MVS can respond to these Linux and VM events
- Typically, the System State Manager (SSM) component of CA OPS/MVS is used to monitor and control the availability of Linux systems that run as VM guest computers

CA Mainframe Connector for Linux on System z

Linux Connector API Rules

- The Address LXCON host command can be used to display any connected VM and Linux systems and to issue commands to the systems
- Every Linux Connector API event ID begins with a common prefix
 - *LX*
 - Write individual API rules for specific LXCON events
 - Write a single rule for all events
 -)API LX*

CA Mainframe Connector for Linux on System z

Linux Connector API Rules

— Z/VM Messages

– Description:

- LXMSG001I z/VM-node message-type user ID message-text

– Example

- LXMSG001I ZVM002 MSG POLLGEN NMVM0001 00:34:49 Hello

— Z/VM Events

– Description

- LXEVT001I z/VM-node user ID event-type

– Example

- LXEVT001I ZVM002 LINUX113 RUNNABLESTATEENABLED

CA Mainframe Connector for Linux on System z

Linux Connector API Rules

— Linux Syslog-ng Messages

– Description

- LXLOG001I Linux-name z/VM-host facility severity message-text

– Example

- LXLOG001I LINUX113 ZVM002 user notice logger: Test Message

Linux Resources in CA OPS/MVS Guests and Applications

— One cross-enterprise SSM table

```
Table Data Editor ----- X ENTERPRISE ----- COLU
COL--> NAME          SYSTEM  CURRENT STATE DESIRED STATE MODE    PREMODE  REFMODE  ACTMODE  SCHEDMODE  PREREQ
***** *****
000001 CICSRCN1          CA11    FAILED   UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000002 DB2ADIST         CA11    UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000003 DB2AIRLM        CA11    UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000004 DB2AMSTR         CA11    UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000005 JES2            CA11    UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000006 LINUX201         ZVM011  UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000007 LINUX201.FTP      ZVM011  STOPPING DOWN      ACTIVE   ACTIVE   ACTIVE   RECYCLE  ACTIVE   NULL
000008 LINUX201.ORACLE    ZVM011  UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000009 LINUX202           ZVM011  UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000010 LINUX202.ITPAM     ZVM011  STARTING UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000011 LINUX202.SAPHR     ZVM011  UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000012 LINUX203           ZVM011  DOWN     DOWN     ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000013 LINUX203.DSERIES  ZVM011  DOWN     DOWN     ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
000014 NET              CA11    UP        UP        ACTIVE   ACTIVE   ACTIVE   ACTIVE   ACTIVE   NULL
***** *****
***** ***** BOTTOM OF DATA ***** *****
```


Linux Resources in CA OPS/MVS Guests and Applications

— One cross-enterprise SSM table

```

SSM Resource Status----- CA11 -- O P S V I E W ----- Exceptions exist
Date/Time: 2011/10/10 08:42                               Filtered: Y   View ==> ALL
System: *          SSM Mode: ACTIVE   Version: 2         Wait ==> 30
Disp: E (B/V/E)                States                Modes
Cm Sta Resource Name          Current  Desired  Res Pre Ref Tng Action  Message
-----
W CICS RGN1                   FAILED  UP        A  A  A  .  ACTIVE  Transition
DB2ADIST                      UP      UP        A  A  A  .  ACTIVE
DB2AIRLM                      UP      UP        A  A  A  .  ACTIVE
DB2AMSTR                      UP      UP        A  A  A  .  ACTIVE
JES2                          UP      UP        A  A  A  .  ACTIVE
LINUX201                      UP      UP        A  A  A  .  ACTIVE
W LINUX201.FTP                STOPPING DOWN      A  A  A  .  RECYCLE Transition
LINUX201.ORACLE              UP      UP        A  A  A  .  ACTIVE
LINUX202                     UP      UP        A  A  A  .  ACTIVE
W LINUX202.ITPAM             STARTING UP        A  A  A  .  ACTIVE  Transition
LINUX202.SAPHR              UP      UP        A  A  A  .  ACTIVE
LINUX203                    DOWN    DOWN      A  A  A  .  ACTIVE
LINUX203.DSERIES            DOWN    DOWN      A  A  A  .  ACTIVE
NET                          UP      UP        A  A  A  .  ACTIVE
***** Bottom of data *****

```

Linux Resources in CA OPS/MVS Guests and Applications

```

SSM Control----- CA11 -- O P S V I E W ----- Row 1 to 3 of 3
Date/Time: 2011/10/10 08:54                      Wait ==> 30
System ==> *
Parameters: Stateman ==> ACTIVE (Active/Passive/Inactive/Noprereq)
Statetbl ==> SSM MANAGED TBLS
Version ==> 2

                                State Names
Cmd  Managed Table  Mode  Action Table  Up    Down    Unknown  TNG
-----
ADD  LINUX_APPLS     A     LINUX ACT     UP    DOWN    UNKNOWN  N
     LINUX_GUESTS  A     LINUX ACT     UP    DOWN    UNKNOWN  N
     STCTBL        A     STCTBL ACT    UP    DOWN    UNKNOWN  N
***** Bottom of data *****

```

- Unique table for each type of resource
 - ✓ LINUX_APPLS
 - ✓ LINUX_GUESTS
 - ✓ STCTBL

```

Table Data Editor ----- LINUX_APPLS ----- COLUM
COL--> NAME          SYSTEM  CURRENT_STATE DESIRED_STATE MODE  PREMODE  REFMODE  ACTMODE  SCHEDMODE PREREQ
***** ***** TOP OF DATA *****
000001 LINUX201.FTP      ZVM011  UP            UP      ACTIVE  ACTIVE  ACTIVE  ACTIVE  ACTIVE  NULL
000002 LINUX201.ORACLE   ZVM011  UP            UP      ACTIVE  ACTIVE  ACTIVE  ACTIVE  ACTIVE  NULL
000003 LINUX202.ITPAM    ZVM011  STOPPING     DOWN    ACTIVE  ACTIVE  ACTIVE  RECYCLE ACTIVE  NULL
000004 LINUX202.SAPHR    ZVM011  FAILED       UP      ACTIVE  ACTIVE  ACTIVE  ACTIVE  ACTIVE  NULL
000005 LINUX203.DSERIES  ZVM011  DOWN         DOWN    ACTIVE  ACTIVE  ACTIVE  ACTIVE  ACTIVE  NULL
***** ***** BOTTOM OF DATA *****

```

Linux Resources in CA OPS/MVS Guests and Applications

- OPSVIEW brings together resources from LINUX_APPLS, LINUX_GUESTS, STCTBL tables

```

. SSM Resource Status----- CA11 -- O P S V I E W ----- Exceptions exist
. Date/Time: 2011/10/10 08:53                               Filtered: N   View ==> ALL
. System: *          SSM Mode: ACTIVE   Version: 2         Wait ==> 30
. Disp: E (B/V/E)          States          Modes
. Cm Sta Resource Name      Current  Desired  Res  Pre  Ref  Tng  Action  Message
. ---
.   LINUX201              ACTIVE  ACTIVE   A   A   A   .   ACTIVE
.   LINUX202              ACTIVE  ACTIVE   A   A   A   .   ACTIVE
.   W LINUX203             FAILED  ACTIVE   A   A   A   .   ACTIVE  Exception
.   LINUX204              INACTIVE INACTIVE A   A   A   .   ACTIVE
.   LINUX201.FTP          UP      UP       A   A   A   .   ACTIVE
.   LINUX201.ORACLE      UP      UP       A   A   A   .   ACTIVE
.   W LINUX202.ITPAM      STOPPING DOWN    A   A   A   .   RECYCLE Transition
.   W LINUX202.SAPHR      FAILED  UP       A   A   A   .   ACTIVE  Transition
.   LINUX203.DSERIES     DOWN    DOWN    A   A   A   .   ACTIVE
.   W CICSRGNA            TIMEOUT UP       N   A   A   .   ACTIVE  Transition
.   W DB2ADIST            STARTING UP      N   A   A   .   ACTIVE  Transition
.   DB2AIRLM             UP      UP       N   A   A   .   ACTIVE
.   DB2AMSTR             UP      UP       N   A   A   .   ACTIVE
.   JES2                 UP      UP       N   A   A   .   ACTIVE
.   NET                  UP      UP       N   A   A   .   ACTIVE
. ***** Bottom of data *****

```

With CA SOLVE:Operations
R11.9 or higher

CA SOLVE:Operations Configuration for Mainframe Connector

- System Administrators are able to configure how, or even if, CA SOLVE:Operations connects via the LINUXCONNECT parameter group

```
DENM9----- Customizer : Parameter Groups -----48
Command ==>                                     Scroll ==> CSR
                                           S/B=Browse U=Update H=Help L=ILog SD=Set Default

Category      Parameter
FILES          Group ID      Short Description
-----
$AM ALERTHIST  Alert History File Specification
$RM AUTOFILES  Automation Files Specification
$NM LOGFILES   Log File Specifications
$NM MODSFILES  MODS Files Specifications
$NM NETINFODB  NetInfo Database Specification
$XN NETVEMLDN  Netview Emulation Files
$NM PANELLIBS  Panel Libraries Specifications
$PS PSMSPPOOL  PSM Spool File Specification
INTERFACES     $AM ALERTS    Alert Monitor Interface
               $NM AUDIT     Audit Event Control
               $NM EXTAPPLPOOLS External Application ACB Pools
               $RM EXTAPPLS  External Applications Access
               $RM HISRV     Hardware Interface Service
               $RM LINUXCONNECT Linux Connector Interface
               $RM SCHEDAPI  Scheduler Interface
               $NM SMF       SMF Interface
               $NM SOCKETS   TCP/IP Sockets Interface
               $NM SSI       SOLVE Sub-System Interface
               $NM TELNETSPVR Telnet Server Control
```

CA SOLVE:Operations Configuration for Mainframe Connector (cont.)

- Define system tokens or ports that CA SOLVE:Operations will use to connect
- Define an alternate IP Address if Connector for Linux region is contactable via a different host

```
DENM9----- Customizer : Parameter Group -----Page 1 of 1
Command ==>                                     Function=Update

LINUXCONNECT - Linux Connector Interface
Connect to Linux Connector ..... YES           (Yes or No)
Alternate IP Address ..... _____
Command Server Token/Port ..... CALINUXCOMMANDS:
Unsolicited Message Server Token/Port ... CALINUXUNSOLMSG:
Log z/VM and Linux Messages? ..... YES         (Yes or No)
Enable Dynamic Discovery? ..... NO             (Yes or No)
Load Discovered VM Images? ..... NO           (Yes or No)
VM System Image Version ..... 0001           (to hold resources)
Linux Resource Template .....+ LINUXONVM      (to build resources)
```

CA SOLVE:Operations

Configuration for Mainframe Connector (cont.)

- Administrators are able to
 - Enable/disable dynamic discovery of z/VM and Linux on System z systems
 - Choose whether discovered images are loaded immediately or just defined for later inspection

```
DENM9----- Customizer : Parameter Group -----Page 1 of 1
Command ==>                                     Function=Update

  LINUXCONNECT - Linux Connector Interface
Connect to Linux Connector ..... YES           (Yes or No)

Alternate IP Address ..... _____

Command Server Token/Port ..... CALINUXCOMMANDS:
Unsolicited Message Server Token/Port ... CALINUXUNSOLMSG:

{ Log z/VM and Linux Messages? ..... YES           (Yes or No)
  Enable Dynamic Discovery? ..... NO           (Yes or No)
  Load Discovered VM Images? ..... NO           (Yes or No)
  VM System Image Version ..... 0001           (to hold resources)
  Linux Resource Template .....+ LINUXONVM       (to build resources)
```

CA SOLVE:Operations

Configuration for Mainframe Connector (cont.)

- The last two parameters allow users to define the default system image version for discovered z/VM System Images and also the template to use when adding discovered Linux on System z systems

```
DENM9----- Customizer : Parameter Group -----Page 1 of 1
Command ==>                                     Function=Update

- LINUXCONNECT - Linux Connector Interface
Connect to Linux Connector ..... YES           (Yes or No)

Alternate IP Address ..... _____

Command Server Token/Port ..... CALINUXCOMMANDS:
Unsolicited Message Server Token/Port ... CALINUXUNSOLMSG:

Log z/VM and Linux Messages? ..... YES         (Yes or No)
Enable Dynamic Discovery? ..... NO             (Yes or No)
Load Discovered VM Images? ..... NO           (Yes or No)
VM System Image Version ..... 0001           (to hold resources)
Linux Resource Template .....+ LINUXONVM      (to build resources)
```


CA SOLVE:Operations

Automatic Discovery of z/VM System Images

- New System Images

```
DENM9----- Automation Services : System Image --
Select Option ==>
  L   - Local System Images
  SHR - Shared System Images
  SPX - Sysplex System Images
  VM  - VM System Images
  X   - Exit
```

- Systems dynamically discovered

```
DENM9----- Automation Services : System Image -
S/B=Browse U=Update C=Copy D=Delete R=Resources STL=Set TLog Size
System Home
Name Vers. Short Description System
ZVMT001 0001 Dynamically discovered CA11
ZVMT002 0001 Dynamically discovered CA11
ZVMT003 0001 Dynamically discovered CA11
ZVM0001 0001 Dynamically discovered CA11
ZVM0002 0001 Dynamically discovered CA11
```

Linux on System z Resources in CA SOLVE:Operations Guests and Applications

```
QANM1031----- Resource Monitor -----CA31-0022
Command ==>
```

S=Status L=Trans

System	Class	Resource
\$SERVICE	SVC	FRED
CA31	DASD	DASD
CA31	INIT	1
CA31	INTNL	PR(SOLVCICS)
CA31	JES	JES2
CA31	JOB	CICSPROD
CA31	PRT	PRT10
CA31	SPOOL	SPOOL
CA31	STC	DENMX9JV
CA31	STC	D10ADIST
CA31	STC	D10AIRLM
CA31	STC	D10AMSTR
CA31	STC	QANM10
CA31	TAPE	0E7B
CA31	TAPE	0E7C
ZVM011	LINUX	LINUX181
ZVM011	LXAPP	LINUX181.CALXAGNT
ZVM011	LXAPP	LINUX181.QA1
ZVM011	LXAPP	LINUX181.QA2
ZVM011	LXAPP	LINUX181.QA3
ZVM011	LXAPP	LINUX181.QA4
ZVM011	LXAPP	LINUX181.QA5
ZVM011	LXAPP	LINUX181.QA6
ZVM011	LXAPP	LINUX181.QA7
ZVM011	LXAPP	LINUX181.QA8
ZVM011	LXAPP	LINUX181.QA9
ZVM011	LXAPP	LINUX181.QA10
ZVM011	LXAPP	LINUX181.QA11
ZVM011	LXAPP	LINUX181.QA12
ZVM011	LXAPP	LINUX181.QA13
ZVM011	VMGST	ZVM011

END

```
QANM911----- Graphical Monitor : linux -----LINUXAPPS
Command ==>
```

LINUX113.QC1 ACTIVE	LINUX113.QC10 ACTIVE	LINUX113.QC8 DEGRADED	LINUX113.QC5 INACTIVE
LINUX113.QC12 INACTIVE	LINUX113.CALXAGN ACTIVE	LINUX113.QC22 INACTIVE	LINUX113.QC14 DEGRADED
LINUX113.QC18 FAILED	LINUX113.QC23 UNKNOWN	ZVM002 ACTIVE	LINUX113.QC2 ACTIVE
LINUX113.QC6 DEGRADED	LINUX113.QC4 INACTIVE	LINUX113.QC17 DEGRADED	LINUX113 ACTIVE
LINUX113.QC16 INACTIVE	LINUX113.QC13 ACTIVE	LINUX113.QC24 ACTIVE	LINUX113.QC20 ACTIVE
LINUX113.QC21 INACTIVE	LINUX113.QC19 ACTIVE	LINUX113.QC11 DEGRADED	LINUX113.QC7 INACTIVE
LINUX113.QC9 ACTIVE	LINUX113.QC3 INACTIVE	LINUX113.QC25 UNKNOWN	LINUX113.QC15 FAILED

ACTIVE	INACTIVE	MANUAL	ATTENTION
LINUX181.QA2 HAS BEEN STOPPED BY KILL			
LINUX181.QA3 IS STARTING			
ACTIVE	INACTIVE	MANUAL	ATTENTION
LINUX181.QA5 IS ACTIVE			
ACTIVE	INACTIVE	MANUAL	ATTENTION
LINUX181.QA7 HAS BEEN FORCED TERMINATED			
ACTIVE	INACTIVE	MANUAL	ATTENTION
LINUX181.QA9 HAS BEEN STOPPED BY KILL			
ACTIVE	INACTIVE	MANUAL	ATTENTION
LINUX181.QA11 IS INACTIVE			
ACTIVE	INACTIVE	MANUAL	ATTENTION
LINUX181.QA13 IS ACTIVE			
ACTIVE	ACTIVE	MANUAL	OK



SOPSOP01 (23.38.03)-- SOLVE:Operations : VM Command Entry -----Line 1 of 12

VMCMD ==> _
ZVM001 ==>

System SOPSOP01 Limit 200_ Wrap ON_ Edit OFF Scroll ON_ Async ON_
1---+----10---+----20---+----30---+----40---+----50---+----60---+----70---+----

MAINT -L0004, LINUX123 - DSC , LINUX122 - DSC , LINUX121 - DSC
ZWEB05 - DSC , ZWEB04 - DSC , ZWEB03 - DSC , ZWEB02 - DSC
ZWEB01 - DSC , ZWEBLOG - DSC , LINUX120 - DSC , ZADMIN - DSC
ZWRITE - DSC , ZTCP - DSC , ZSERVE - DSC , RSCS - DSC
RSCSDNS - DSC , VMX\$0002 - DSC , FTPSERVE - DSC , SNMPD - DSC
VMX\$0001 - DSC , VMSPOOL - DSC , VMSCHED - DSC , VMSERVU - DSC
VMSERVS - DSC , VMSERVR - DSC , VMSECURE - DSC , TCPIP - DSC
GCS - DSC , OPERSYMP - DSC , DISKACNT - DSC , EREP - DSC
OPERATOR - DSC , CAVLUSER - DSC
VSM - TCPIP
VMCMD999 END OF RESPONSES
** END OF DELIVERED MESSAGES **

F1=Help F2=Split F3=Exit F4=Print F5=Find F6=Retrieve
F7=Backward F8=Forward F9=Swap F10=Left F11=Right

SOPSOP01 (23.40.19)- SOLVE:Operations : Linux Command Entry -----Line 1 of 67

LXCMD ==> -
LINUX121 ==>

System SOPSOP01 Limit 1000 Wrap OFF Edit OFF Scroll OFF Async ON_
1---+----10---+----20---+----30---+----40---+----50---+----60---+----70---+----

LXCMD000	UID	PID	PPID	C	STIME	TTY	TIME	CMD
LXCMD000	root	1	0	0	11:48	?	00:00:00	init [5]
LXCMD000	root	2	0	0	11:48	?	00:00:00	[kthreadd]
LXCMD000	root	3	2	0	11:48	?	00:00:00	[migration/0]
LXCMD000	root	4	2	0	11:48	?	00:00:00	[ksoftirqd/0]
LXCMD000	root	5	2	0	11:48	?	00:00:02	[events/0]
LXCMD000	root	6	2	0	11:48	?	00:00:00	[cpuset]
LXCMD000	root	7	2	0	11:48	?	00:00:00	[khelper]
LXCMD000	root	8	2	0	11:48	?	00:00:00	[netns]
LXCMD000	root	9	2	0	11:48	?	00:00:00	[async/mgr]
LXCMD000	root	10	2	0	11:48	?	00:00:00	[sync_supers]
LXCMD000	root	11	2	0	11:48	?	00:00:00	[bdi-default]
LXCMD000	root	12	2	0	11:48	?	00:00:00	[kintegrityd/0]
LXCMD000	root	13	2	0	11:48	?	00:00:00	[kblockd/0]
LXCMD000	root	14	2	0	11:48	?	00:00:00	[cio]
LXCMD000	root	15	2	0	11:48	?	00:00:00	[kslowcrw]

F1=Help F2=Split F3=Exit F4=Print F5=Find F6=Retrieve
F7=Backward F8=Forward F9=Swap F10=Left F11=Right

Summary

Linux systems are increasingly being moved to System z

CA Mainframe Connector for Linux on System z can automatically "connect" Linux and z/VM systems to z/OS based automation

Through new interfaces, CA SOLVE:Operations and CA OPS/MVS on z/OS allow you to manage the environment holistically

CA Technologies has created a robust simulator to stress test

Interested in Seeing More?

Visit the CA Linux Management for Mainframe web portal at:

<http://www.ca.com/us/mainframe-linux.aspx>

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