

## IBM Wave Setup, Use Cases, and Experiences

Tuesday, August 11, 2015: 04:30 PM - 05:30 PM,  
Dolphin, Southern Hemisphere 3

*Richard Young*  
*Executive I.T. Specialist*  
*IBM Systems Lab Services*



SHARE is an independent volunteer-run information technology association that provides education, professional networking and industry influence.



# Session Agenda



- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- Guest discovery and initialization for Wave
- z/VM System Management Use Cases
- Linux System Management Use Cases
  - Provisioning/Cloning
  - BMI (just a few words)
  - Live Guest Relocation
- Customize and Extend

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# Wave 1.2 Announcement Summary



- New enhancements
  - Reporting Improvements
    - Customized and scoped only to authorized role of resources
    - More data
    - Exportable
  - Support of RHEL 7 and SLES 12
    - All currently supported and serviced levels of RHEL and SLES can be managed by Wave
- Recent enhancements
  - Improved LDAP integration
  - Site specific configuration via PROFILE EXEC exit
  - EDEV Management of SCSI LUNs
    - Cloning, storage management, EDEV definitions
  - Provisioning across CPCs / Cross system cloning
  - Ext 4 support was added
  - Layer 2 support for BMI
  - Mixed case password support
  - Performance improvements
    - Autodetect processing
    - Reduced SMF record generation

# Session Agenda



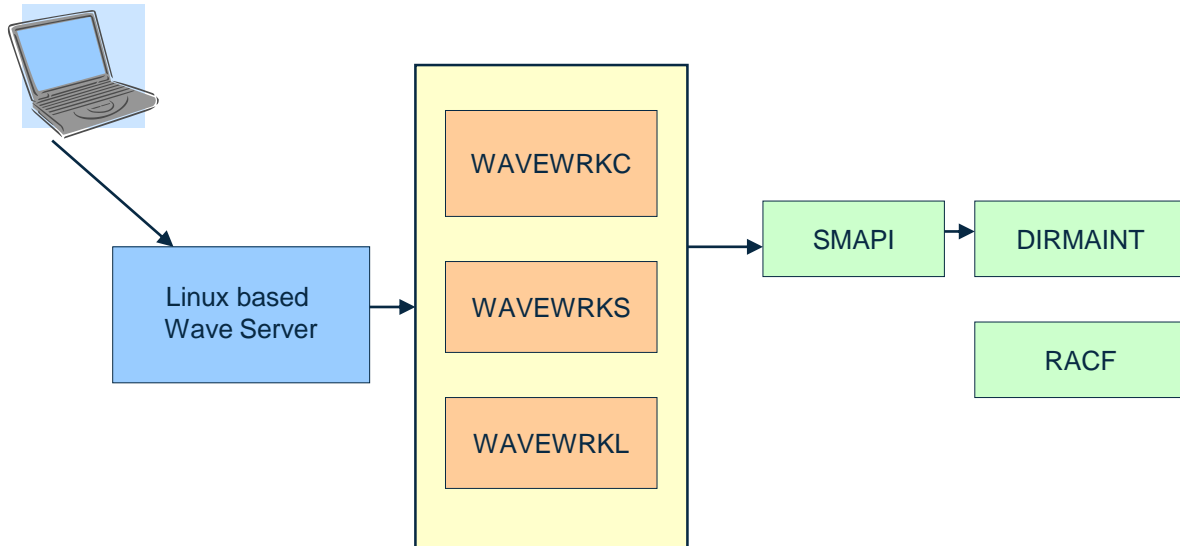
- **IBM Wave Product Architecture**
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# Architecture

The architecture consists of three tiers

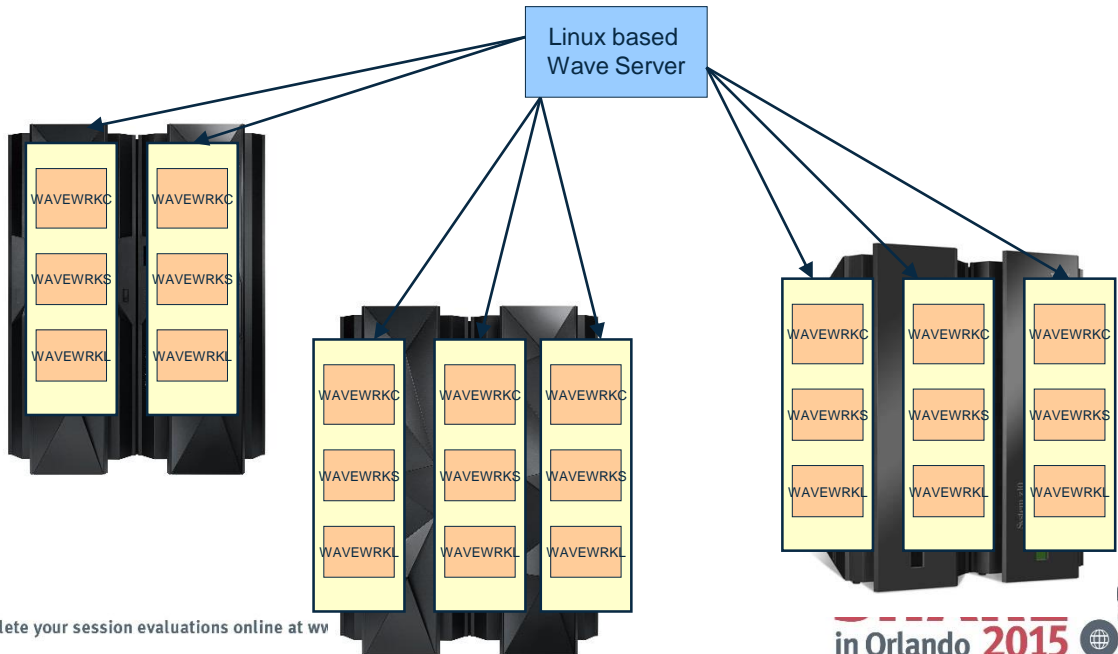
- Intuitive graphical interface as a Java application accessed via a browser
- Linux based server component
  - Typically only one (except if you have a test environment)
  - Single RPM installation
- Three z/VM service machines to interface with hypervisor
  - One per z/VM instance
  - Utilizes z/VM SMAPI
  - SMAPI interacts with the z/VM directory manager

# Architecture - Basic

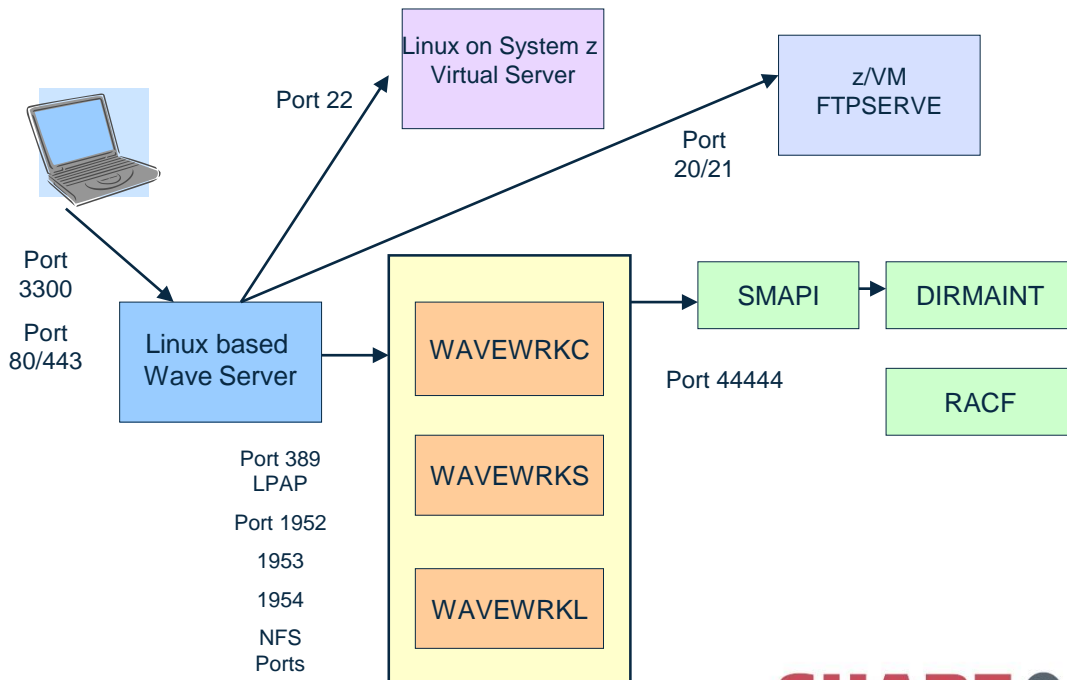


# Architecture – Multi CEC

- No requirement for z/VM single system image

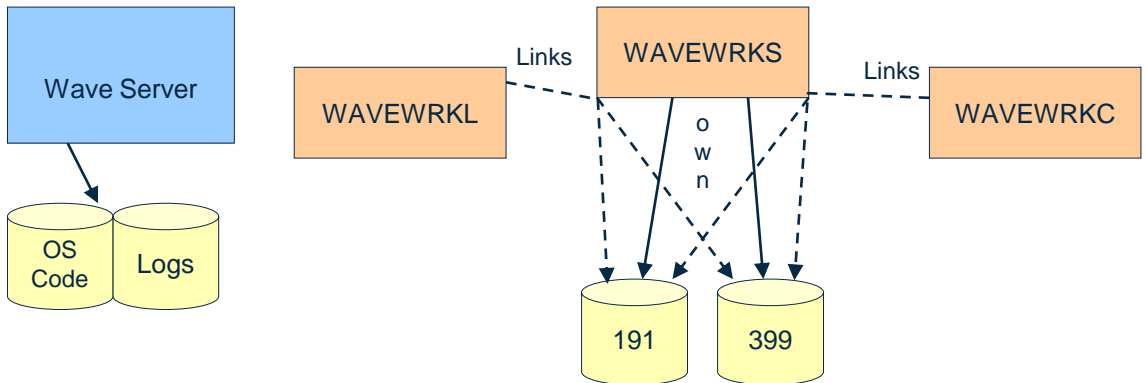


# Architecture Network Ports





# Architecture Disk Storage



- Model 9 alone for the Wave Server will likely run out of log space
- Implement a log rotation scheme for `/var/log/WAVE`
- Use an LVM, if you are unsure of your needs so you can dynamically grow the filesystem

# Architecture of Persistent Changes

Persistent changes are generally accomplished via:

- User directory and `EXTENT CONTROL` changes via `SMAPI` and `DIRMAINT`

- System resource definition outside of `SYSTEM CONFIG` via:

`AUTOLOGx`

<code>ACTPROF WAVEPARM</code>	– <code>XAUTOLOG WAVEWRKS</code>
<code>EDEVPROF WAVEPARM</code>	– Commands to define <code>EDEVs</code>
<code>GRNTPROF WAVEPARM</code>	– <code>VSWITCH GRANTs</code>
<code>LANPROF WAVEPARM</code>	– Virtual network definitions
<code>WAVEAUTR EXEC</code>	– Called by <code>AUTOLOG PROFILE EXEC</code>
<code>PROFILE AUTOORIG</code>	– Original <code>PROFILE EXEC</code>

- Other changes via shell scripts and `EXECs` against guests or system resources

# Atypical environments

- Linux OS on dedicated disk or DEVNO mdisks are not supported for cloning. LUNs via EDEVs or Emulated FBA device work just fine.
- Not using Virtual switches, allocating directly to OSA devices, can be limiting
- Linux OS on SCSI LUNs via dedicated FCP is not currently supported for cloning by Wave
- Wave needs to update sudoers, if you push a copy or have centralized instance this must be accounted for
- Standard but potentially challenging
  - Locked down with security software
  - Security policies prohibiting things Wave requires

# If you need a function Wave does not yet offer



## Submit and RFE (Request for enhancement)

- You need a Developerworks userid
- <http://www.ibm.com/developerworks/rfe/>
  
- Select the "Submit" tab
- Login

<b>Brand:</b> *	<input type="text" value="Servers and Systems Software"/>
<b>Product family:</b> *	<input type="text" value="zSeries Software"/>
<b>Product:</b> *	<input type="text" value="z/VM"/>
<b>Component:</b> *	<input type="text" value="WAVE"/>

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# Session Agenda



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  - Provisioning/Cloning
  - BMI
  - LGR
- Customize and Extend

# Installation

- Obtaining the code
  - **ShopzSeries** – Full product, base level code (lead time required) (rpm file)
  - **FixCentral** – Fixpack updates (not full product, immediate download when entitled) (tar file update)
  - You need both!
  - **Always apply the latest fixpack and read the included readme file**
- Prepare
  - Read the product manuals and review requirements
  - Enable directory manager to work with IBM Wave
  - Enable SMAPI, and authorize the IBM Wave server to it
  - Prepare a Linux Server with documented prerequisites to host the IBM Wave Server
  - Enable Perform Toolkit to work with Wave
  - Have a plan for authentication and role authorizations
  - Ensure ports are open thru any firewalls that communications must traverse

# Installation – Requisite Knowledge

- Knowledge Center
  - <http://www.ibm.com/support/knowledgecenter/SS6JTX/welcome>
- Admin and Customization Guide
  - <http://publibz.boulder.ibm.com/epubs/pdf/c2761185.pdf>
- User Guide and Reference
  - <http://publibz.boulder.ibm.com/epubs/pdf/c2761195.pdf>
- z/VM DIRMAINT
  - <http://publibz.boulder.ibm.com/epubs/pdf/hcsl3c20.pdf>
- z/VM SMAPI
  - <http://publibz.boulder.ibm.com/epubs/pdf/hcsl8c23.pdf>

# Installation

- FP10 Readme note
  - If making changes with Wave via SMAPI and making DIRMAINT changes via command line, Wave is saying to disable SMAPI
  - Example of LOHCOST\_Enabled=0 is given
  - LOHCOST\_Enabled= LOHCOST\_DIRECTORY is recommend
  - Normally it is LOHCOST\_DIRECTORY + LOHCOST\_GROUP
  
  - The change is made to DMSSICNF COPY
  - The proper way is to perform a VMSES Localmod (See the service guide)
  - You will have to remove and reapply the Localmod if there is any service to DMSSICNF COPY



# Installation Tips

- Ensure you have adequate space in the /var/log/WAVE directory on the Wave Server. Plan for some sort of log rotation
- LANG AMENG is required on the WAVEWRK service machines
- Important to consider IPTIMEOUT in layer 2 networking environments. Consider increasing from default, especially with environments that have idle servers.
- Apply **VM65560** and **VM65601**
- Apply latest IBM Wave fixpack
- If using RACF, DIRMAINT requires RACF special per DIRMAINT publications. WAVEWRKx require RACF operations
- Use the sample WAVEWRKx directory entries as given. Modifying aspects such as reader class could cause failures
- Ensure you have no empty DIRMAINT extent control groups

# Installation Tips

- Ensure you have adequate space in the `/var/log/WAVE` directory on the Wave Server. Plan for some sort of log rotation
- `LANG AMENG` is required on the WAVEWRK service machines
- Consider `IPTIMEOUT` in layer 2 networking environments. Consider increasing from default, especially with environments that have idle servers. Most relevant before the “init for Wave process”
- Apply latest IBM Wave fixpack
- If using RACF, DIRMAINT requires RACF special per DIRMAINT publications. WAVEWRKx require RACF operations
- Use the sample WAVEWRKx directory entries as given. Modifying aspects such as reader class could cause failures
- Ensure you have no empty DIRMAINT extent control groups

# Installation Tips

- Review SMAPI steps in product publications. Especially Appendix F if you are using an external security manager (ESM)
- Ensure DIRMAINT Tailoring and Admin Guide Appendix B has been reviewed and implemented
- Monitor operator console for ESM and other relevant messages during initial bring up
- Wave autodetect failure RSN 168 – check AUTHFOR CONTROL and CONFIG<sub>xx</sub> DATADVH files. Ensure the WAVEWRK user directory matches the product documentation exactly. For example, don't change reader class.
- Using SSI, but not attaching storage to all members could cause problems during clone, as some DATAMOVE operations may execute on other members.
- Predefine the WAVEWRK<sub>x</sub> servers, especially in instances where you have an ESM (ie RACF) or are in an SSI

# Installation Tips



- Be aware you will need to allow direct logon access to the WAVEWRKx servers as the product itself requires such access. Currently no provision for LOGON BY / surrogate authority

# Installation

- SMAPI authorizations required
  - Wave service machines
  - Wave userid

```
VSMWORK1 AUTHLIST Z1 F 195 Trunc=195 Size=10 Line=0 Col=1 Alt=2

00000 * * * Top of File * * *
00001 DO.NOT.REMOVE DO.NOT.
00002 MAINT ALL
00003 VSMPROXY ALL
00004 VSMWORK1 ALL
00005 WAVSMAPI ALL
00006 VSMGUARD ALL
00007 WAVEWRKC ALL
00008 WAVEWRKS ALL
00009 WAVEWRKL ALL
00010 ZHCP ALL
00011 * * * End of File * * *
```

# Installation

- Dirmaint CONFIGxx DATADVH authorizations required for IBM Wave and SMAPI

```
CONFIGAA DATADVH  Z1  F 80  Trunc=80 Size=16 Line=0 Col=1 Alt=0

00000 * * * Top of File * * *
00001 DISK_CLEANUP=                YES
00002 ONLINE=                      IMMED
00003 RUNMODE=                      OPERATIONAL
00004 DVHDXD_FLASHCOPY_BEHAVIOR=    1
00005 ASYNCHRONOUS_UPDATE_NOTIFICATION_EXIT.TCP= DVHXNE EXEC
00006 ASYNCHRONOUS_UPDATE_NOTIFICATION_EXIT.UDP= DVHXNE EXEC
00007 ALLOW_ASUSER_NOPASS_FROM=     VSMWORK1 *
00008 ALLOW_ASUSER_NOPASS_FROM=     VSMWORK2 *
00009 ALLOW_ASUSER_NOPASS_FROM=     VSMWORK3 *
00010 ALLOW_ASUSER_NOPASS_FROM=     VSMGUARD *
00011 ALLOW_ASUSER_NOPASS_FROM=     WAVSMAPI *
00012 ALLOW_ASUSER_NOPASS_FROM=     WAVEWRKS *
00013 ALLOW_ASUSER_NOPASS_FROM=     WAVEWRKL *
00014 ALLOW_ASUSER_NOPASS_FROM=     WAVEWRKC *
00015 ALLOW_ASUSER_NOPASS_FROM=     MIGMAINT *
00016 ALLOW_ASUSER_NOPASS_FROM=     ZHCP *
00017 * * * End of File * * *
```

# Installation

- Dirmaint AUTHFOR CONTROL authorizations for IBM Wave and SMAPI

```
AUTHFOR CONTROL A1 V 80 Trunc=80 Size=23 Line=0 Col=1 Alt=9

00000 * * * Top of File * * *
00001 ALL MAINT * 140A ADGHOPS
00002 ALL MAINT * 150A ADGHOPS
00003 ALL WAVSMAPI * 140A ADGHMOPS
00004 ALL WAVSMAPI * 150A ADGHMOPS
00005 ALL VSMWORK1 * 140A ADGHMOPS
00006 ALL VSMWORK1 * 150A ADGHMOPS
00007 ALL VSMWORK2 * 140A ADGHMOPS
00008 ALL VSMWORK2 * 150A ADGHMOPS
00009 ALL VSMWORK3 * 140A ADGHMOPS
00010 ALL VSMWORK3 * 150A ADGHMOPS
00011 ALL VSMGUARD * 140A ADGHMOPS
00012 ALL VSMGUARD * 150A ADGHMOPS
00013 ALL WAVEWRKC * 140A ADGHMOPS
00014 ALL WAVEWRKC * 150A ADGHMOPS
00015 ALL WAVEWRKS * 140A ADGHMOPS
00016 ALL WAVEWRKS * 150A ADGHMOPS
00017 ALL WAVEWRKL * 140A ADGHMOPS
00018 ALL WAVEWRKL * 150A ADGHMOPS
00019 ALL ZHCP * 140A ADGHMOPS
00020 ALL ZHCP * 150A ADGHMOPS
====>
```

# IBM Wave Linux Installation



```
rgylxsp2: # rpm -ivh IBM-Wave-1.1.0.1.fp001.s390x.rpm
Preparing...
##### [100%]
Detected suse-11.2
ibm java detected.
mysql-5.0.96 detected
nfs-kernel-server-1.2.3 detected
apache2-Prefork-2.2.12 detected
mysql-Max-5.0.96 detected
  1:IBM-Wave
##### [100%]
Initializing DB...
starting MySQL...
Creating MySQL privilege database...
Installing MySQL system tables...
OK
```

( Content omitted due to output size)



# IBM Wave Linux Installation



```
*-----*
|   IBM Wave Installed successfully!   |
*-----*
rgylxsp2: #
```

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# IBM Wave Fix Pack Installation



- Update to fixpack 10 (always update to the latest fixpack)
- `tar -xvf IBM-Wave-1.1.0.10.tar`
- Run `doUpdate.sh` script
- Answer prompts about IBM Wave service machines

# IBM Wave fixpack installation



```
rgylxsp2:~/wavfp2/IBM-Wave-1.1.0.02 # ./doUpdate.sh
Detected suse-11.2
Stopping IBM-Wave Background Services...
Shutting down WAVEBackgroundServices...
    done
Stopping mysql...
Shutting down service MySQL
    done
stopping apache2...
Shutting down httpd2 (waiting for all children to
    terminate)                                done
Backing up old version files...
Checking levels and updates...
grep: /usr/wave/install/smVer: No such file or directory
Updating files...
Updated Wave Jar
```

# IBM Wave fixpack installation



```
06/05/2014 23:38:46 com.CSL.WAVE.upgrade.Upgrader : WARNING:  
service machines update will recycle the IBM-WAVE service  
machines. Also make sure FTP access to the system is  
available.
```

```
06/05/2014 23:38:46 com.CSL.WAVE.upgrade.Upgrader : Would you  
like to update Service Machines at z/VM POKLBS1 (1.2.3.4)?  
no
```

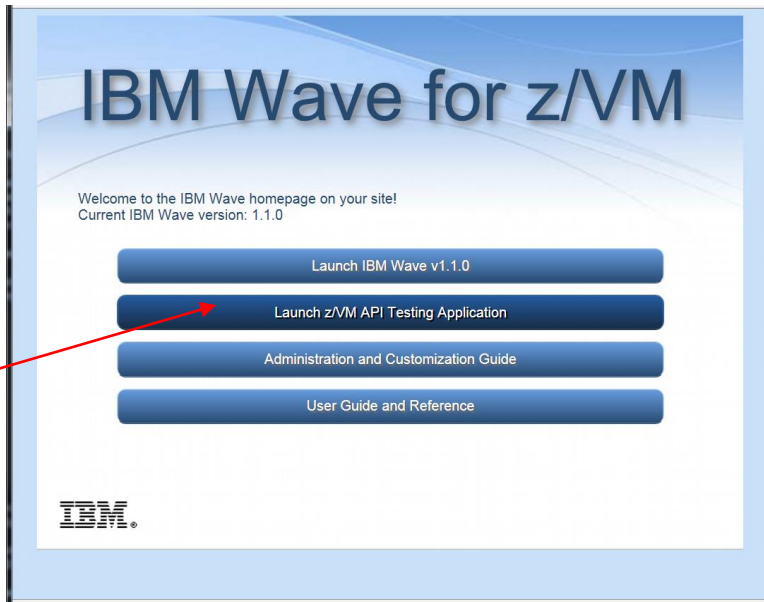
```
Restarting Background Services...
```

```
Starting WAVEBackgroundServices...  
done
```

- You would only reply “no” above if you had previously applied the Fixpack to the Wave worker servers
- Pay special attention to the statement about FTP access. Ensure firewalls are not an issue.

# Installation - Verifications

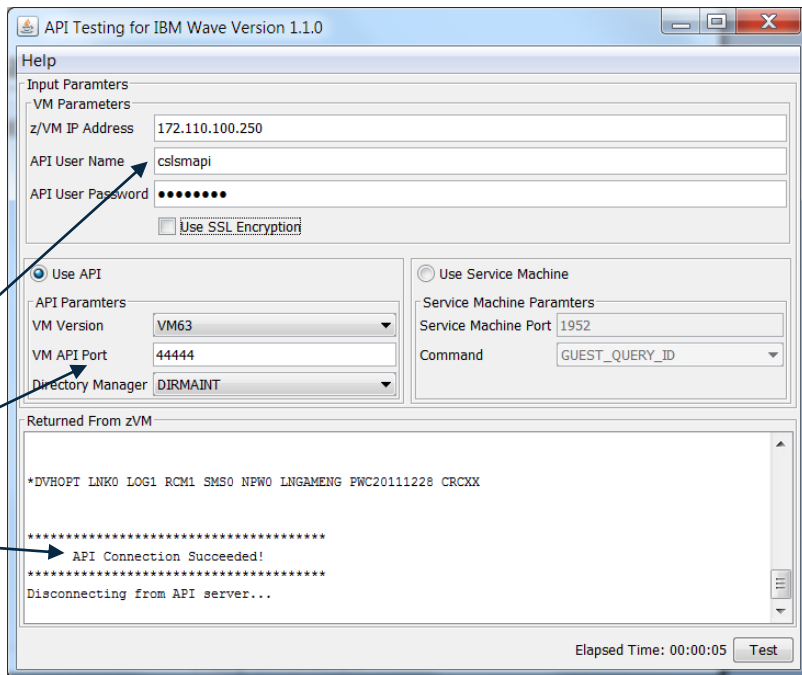
- Access SMAPI testing application from your browser
- Available after Wave rpm installation



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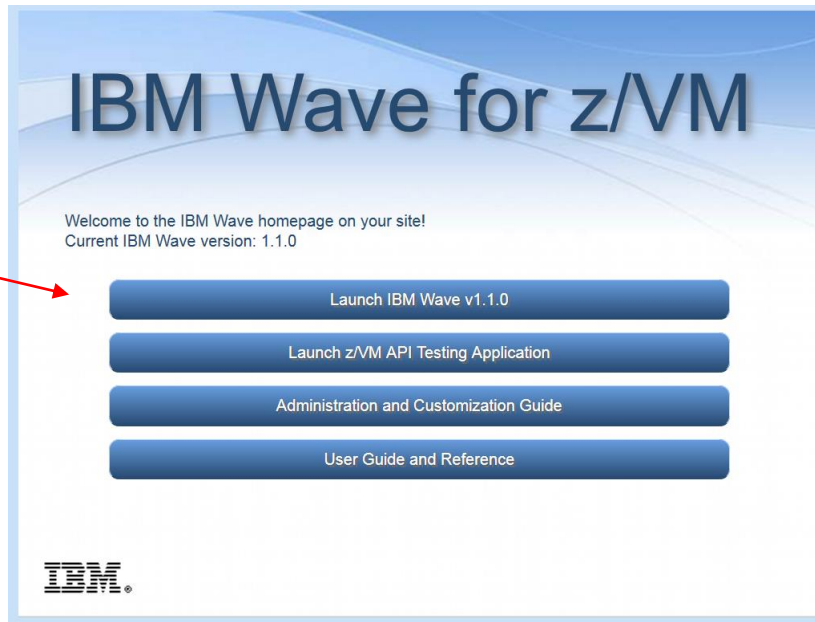
# Installation - Verifications

- Java based SMAPI testing application
- Important to validate SMAPI setup



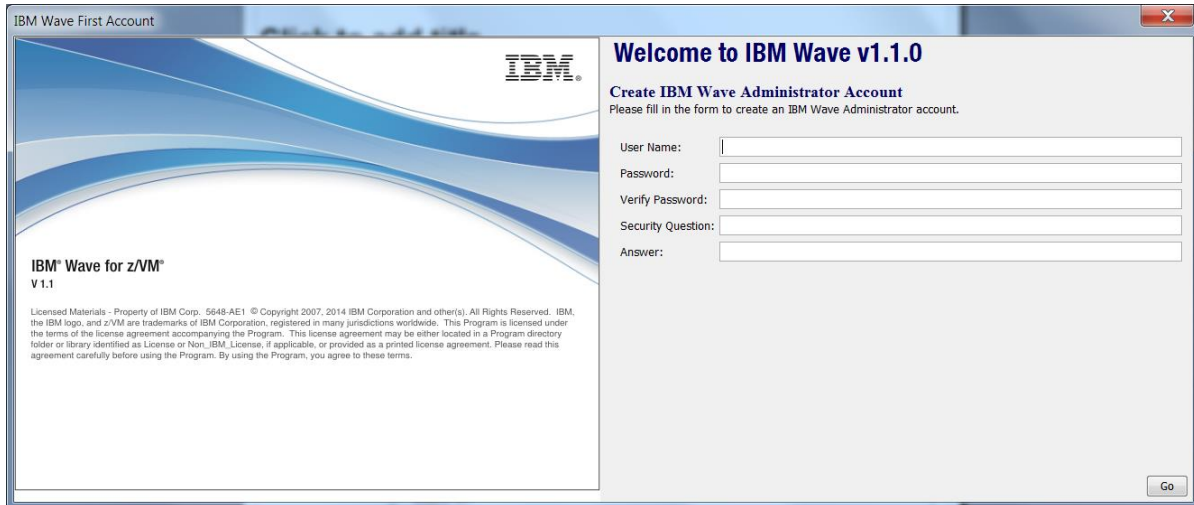
# IBM Wave Linux Installation

- Access Wave homepage from browser



# IBM Wave Linux Installation

- Initial login panel
- You make up the initial userid and password
- Note: The userid can NOT be deleted



IBM Wave First Account

**IBM**

## Welcome to IBM Wave v1.1.0

### Create IBM Wave Administrator Account

Please fill in the form to create an IBM Wave Administrator account.

User Name:

Password:

Verify Password:

Security Question:

Answer:

**IBM® Wave for z/VM®**  
V 1.1

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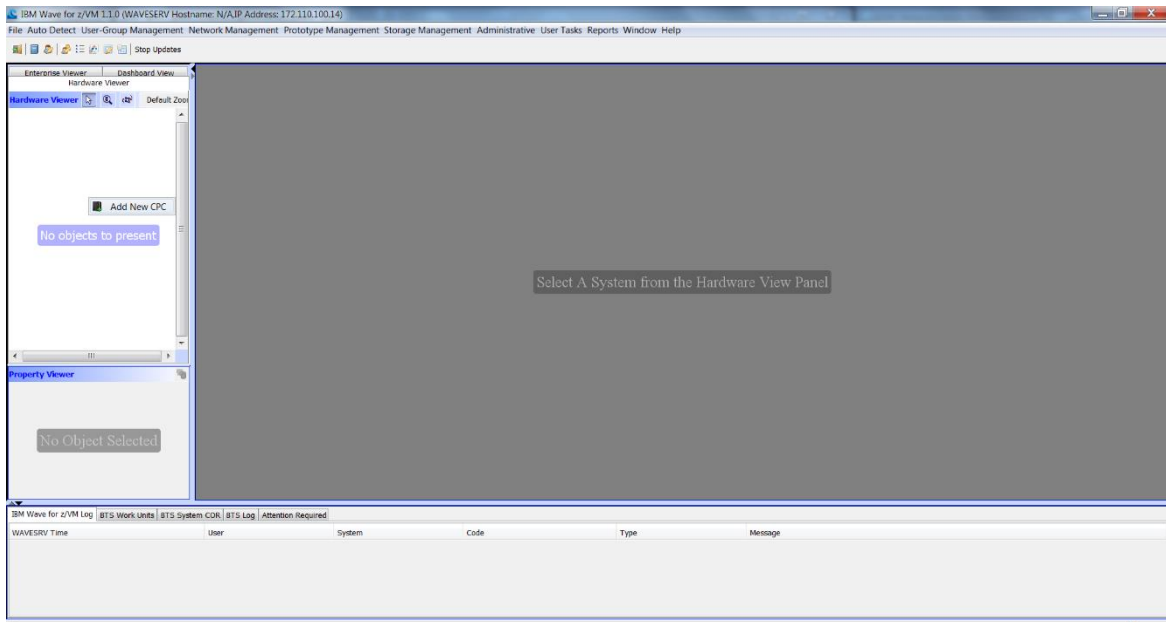
Go

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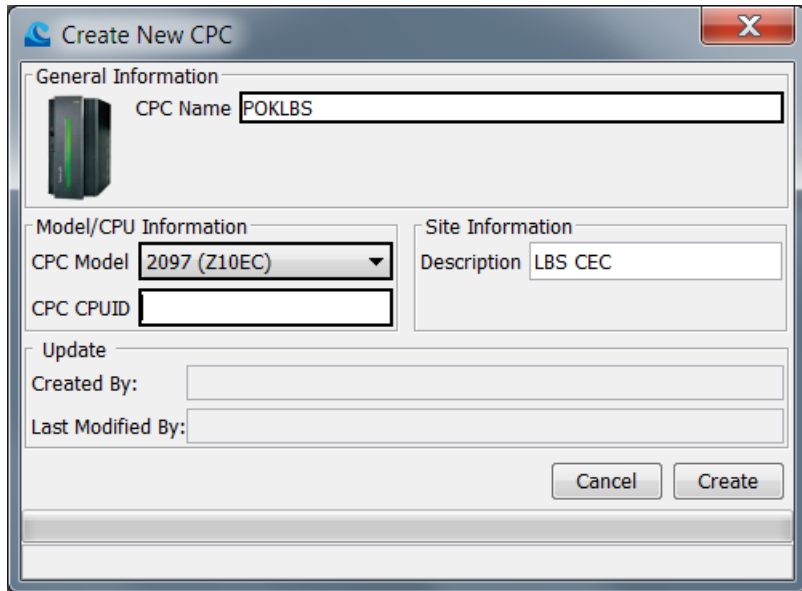
# IBM Wave Linux Installation

- Launch “Add New CPC” task from hardware viewer frame



# IBM Wave Linux Installation

- Define New CPC
- Obtain CPUID from /proc/sysinfo or other source



Create New CPC

General Information

CPC Name POKLBS

Model/CPU Information

CPC Model 2097 (Z10EC)

CPC CPUID

Site Information

Description LBS CEC

Update

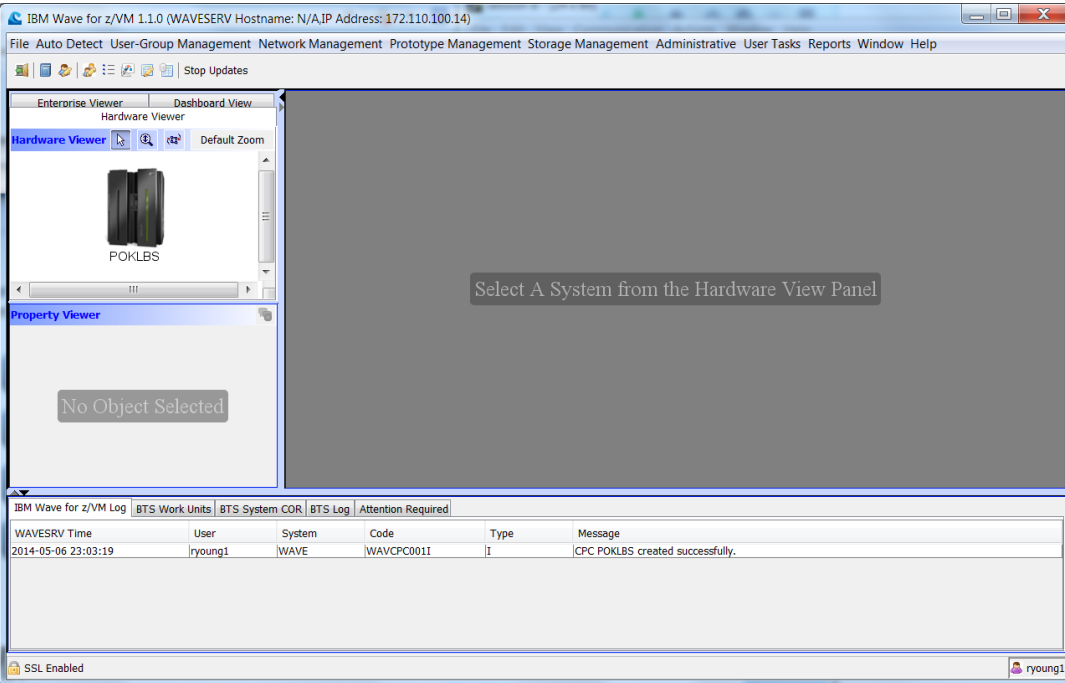
Created By:

Last Modified By:

Cancel Create

# IBM Wave Linux Installation

- CPC but no z/VM systems (LPARs) defined yet



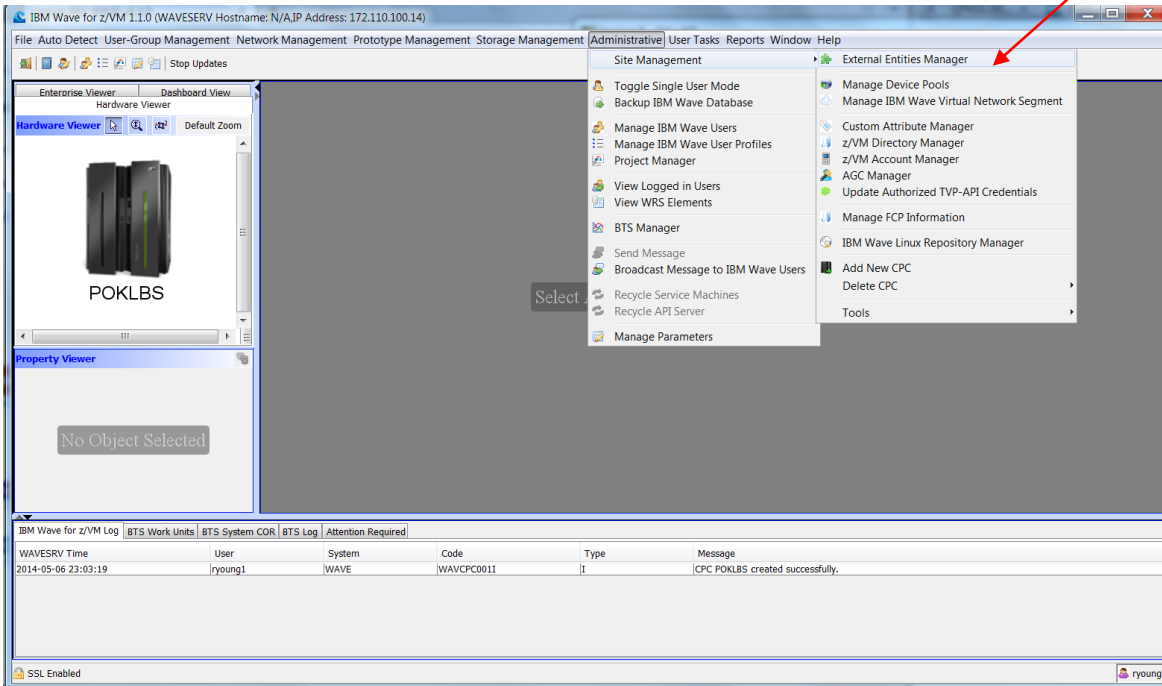
The screenshot shows the IBM Wave for z/VM 1.1.0 web interface. The browser title is "IBM Wave for z/VM 1.1.0 (WAVESERV Hostname: N/A/IP Address: 172.110.100.14)". The interface includes a menu bar with options like "File", "Auto Detect", "User-Group Management", "Network Management", "Prototype Management", "Storage Management", "Administrative", "User Tasks", "Reports", "Window", and "Help". Below the menu is a toolbar with icons and a "Stop Updates" button. The main content area is divided into three panels: "Enterprise Viewer" (selected), "Dashboard View", and "Hardware Viewer". The "Hardware Viewer" panel shows a list of systems, with "POKLBS" visible. A large grey box in the center of the main area contains the text "Select A System from the Hardware View Panel". The "Property Viewer" panel at the bottom left shows "No Object Selected". At the bottom of the interface, there is a status bar with a table of logs and a user profile icon.

WAVESRV Time	User	System	Code	Type	Message
2014-05-06 23:03:19	ryoung1	WAVE	WAVCPC001I	I	CPC POKLBS created successfully.

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# IBM Wave Linux Installation

- Launch the External Entity Manager



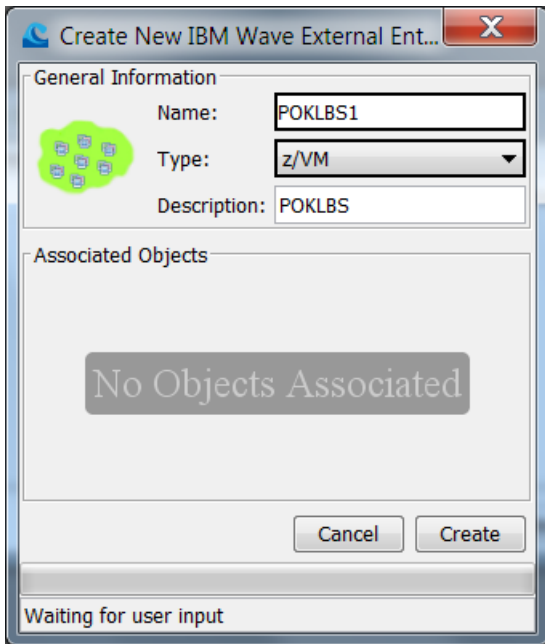
The screenshot shows the IBM Wave for z/VM 1.1.0 interface. The main window displays the Hardware Viewer for a system named POKLBS. A red arrow points to the 'External Entities Manager' option in the 'Administrative' menu. The interface also shows a 'Property Viewer' with 'No Object Selected' and a log table at the bottom.

WAVESRV Time	User	System	Code	Type	Message
2014-05-06 23:03:19	ryoung1	WAVE	WAVCP001I	I	CPC POKLBS created successfully.

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# IBM Wave Linux Installation

- Predefine new system in the External Entity Manager



Create New IBM Wave External Ent...

General Information

Name: POKLBS1

Type: z/VM

Description: POKLBS

Associated Objects

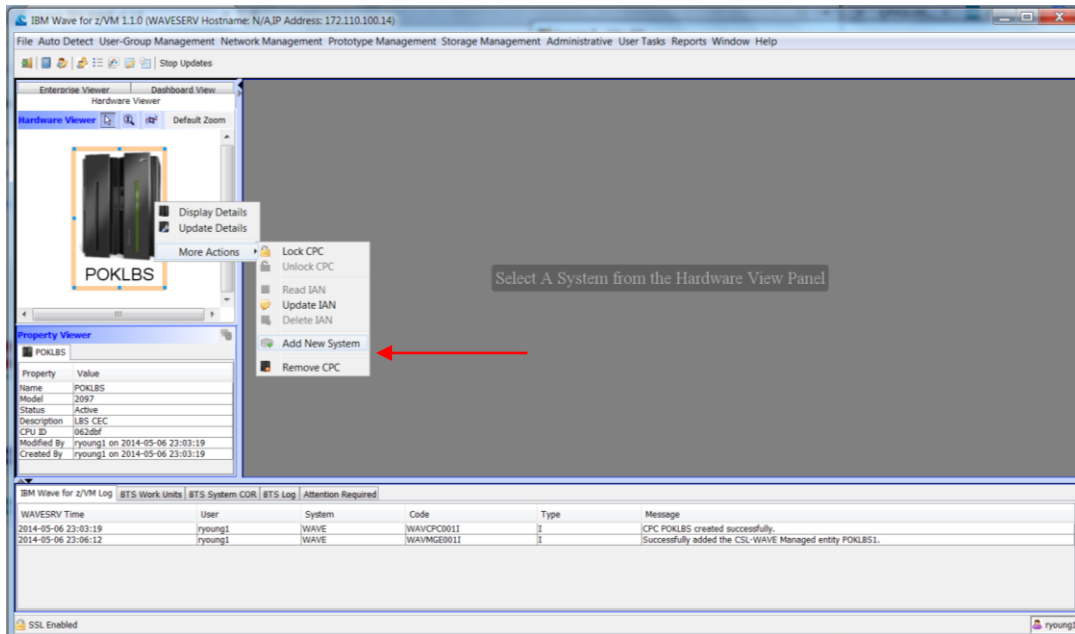
No Objects Associated

Cancel Create

Waiting for user input

# IBM Wave Linux Installation

- “Add New System” task



The screenshot shows the IBM Wave for z/VM 1.1.0 interface. The main window displays a hardware view of a system named 'POKLBS'. A context menu is open over the hardware view, with the 'Add New System' option highlighted by a red arrow. The menu also includes options like 'Lock CPC', 'Unlock CPC', 'Read IAN', 'Update IAN', 'Delete IAN', and 'Remove CPC'. A text box in the center of the main window says 'Select A System from the Hardware View Panel'. The bottom of the interface shows a log table with the following data:

WAVESRV Time	User	System	Code	Type	Message
2014-05-06 23:03:19	ryoung1	WAVE	WAVFCP0011	I	CPIC POKLBS created successfully.
2014-05-06 23:06:12	ryoung1	WAVE	WAVMGE0011	I	Successfully added the CSL-WAVE Managed entity POKLBS1.

# IBM Wave Linux Installation



- New System Definition
  - z/VM version
  - IP Address
  - Performance Machine
  - Dummy Region
  - Region Volume id

**Create New z/VM System for CPC POKLBS**

**General Information**

System Name: POKLBS1  
CPC Name: POKLBS  
System Status: suspend

**Version Information**

z/VM Version: VM63  
API Port no: 44444  
z/VM Service Level:   
z/VM Architecture: 64  
z/VM name:

**Communication Information**

IP Address: 1.2.3.4  
IPv6 Address:   
Hostname:   
NFS Server: WAVESERV

**Site Information**

System Type: Other  
Description:   
Associate Directory:   
3270 Connection Port: 23  
 Use TLS/SSL tunnel for 3270  
 Use SSL for TVP-API

**CPC Information**

No. of CPUs:   
CPU Serial: 062dbf

**IBM Wave Service Machine Information**

Service Machine IP: 1.2.3.4  
Service Machine Port: 1952  
Short Service Machine: WAVEWRKS  
Long Service Machine: WAVEWRKL  
CSC Service Machine: WAVEWRKC  
Performance Machine: PERFSVM

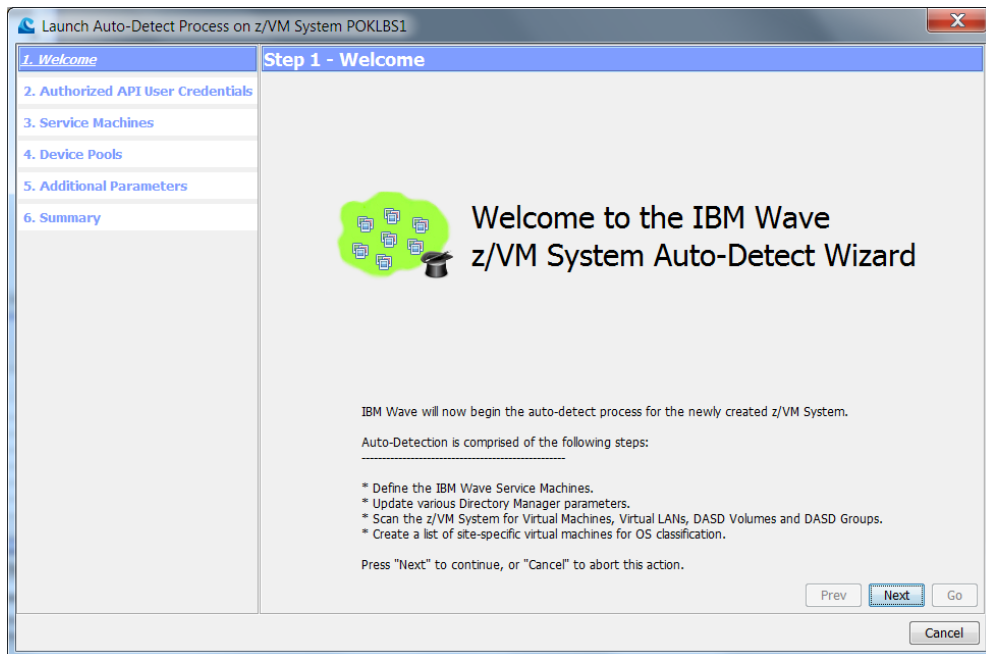
**Directory Manager Options**

Directory Manager: DIRMAINT  
DASD Dummy Region Name: CSLDMY  
DASD Dummy Region VOLID: VM2US2

Buttons: Cancel, Create

# IBM Wave Linux Installation

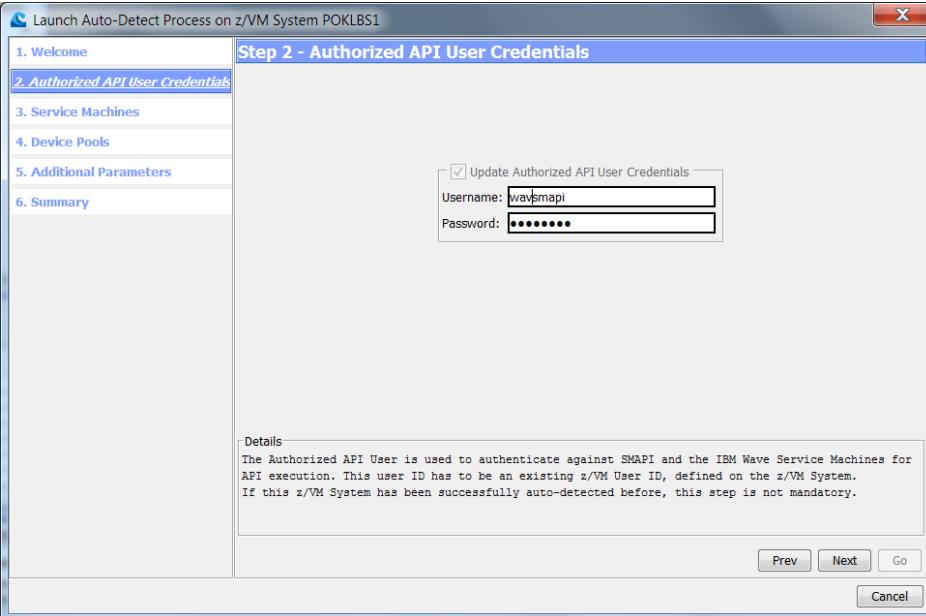
- Auto-Detect Wizard





# IBM Wave Linux Installation

- z/VM SMAPI userid for IBM Wave
- Be alert for mixed case passwords being enabled



Launch Auto-Detect Process on z/VM System POKLBS1

1. Welcome  
2. Authorized API User Credentials  
3. Service Machines  
4. Device Pools  
5. Additional Parameters  
6. Summary

Update Authorized API User Credentials

Username:

Password:

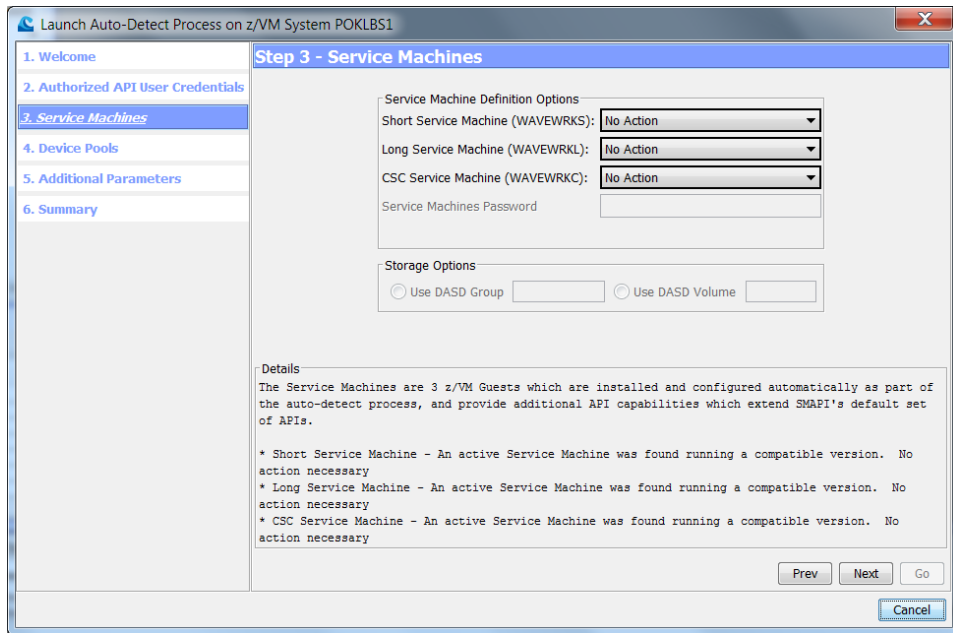
**Details**  
The Authorized API User is used to authenticate against SMAPI and the IBM Wave Service Machines for API execution. This user ID has to be an existing z/VM User ID, defined on the z/VM System.  
If this z/VM System has been successfully auto-detected before, this step is not mandatory.

Prev Next Go Cancel

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# IBM Wave Linux Installation

- If services machines did not exist, Wave would define and populate in non-RACF/SSI environment



Launch Auto-Detect Process on z/VM System POKLBS1

1. Welcome  
2. Authorized API User Credentials  
3. Service Machines  
4. Device Pools  
5. Additional Parameters  
6. Summary

### Step 3 - Service Machines

Service Machine Definition Options

Short Service Machine (WAVEWRKS):

Long Service Machine (WAVEWRKL):

CSC Service Machine (WAVEWRKC):

Service Machines Password:

Storage Options

Use DASD Group   
 Use DASD Volume

Details

The Service Machines are 3 z/VM Guests which are installed and configured automatically as part of the auto-detect process, and provide additional API capabilities which extend SHAPI's default set of APIs.

- \* Short Service Machine - An active Service Machine was found running a compatible version. No action necessary
- \* Long Service Machine - An active Service Machine was found running a compatible version. No action necessary
- \* CSC Service Machine - An active Service Machine was found running a compatible version. No action necessary

Prev Next Go Cancel

# Installation - Verifications

## netstat

VM TCP/IP Netstat Level 630

TCP/IP Server Name: TCPIP

### Active IPv4 Transmission Blocks:

User Id	Conn	Local Socket	Foreign Socket	State
----	--	-----	-----	-----
FTPSERVE	1014	*..FTP-C	*..*	Listen
INTCLIEN	1018	*..TELNET	*..*	Listen
PERFSVM	1005	*..81	*..*	Listen
<b>WAVEWRKS</b>	<b>1003</b>	<b>*..1952</b>	<b>*..*</b>	<b>Listen</b>
<b>WAVEWRKC</b>	<b>1017</b>	<b>*..1954</b>	<b>*..*</b>	<b>Listen</b>
<b>WAVEWRKL</b>	<b>1030</b>	<b>*..1953</b>	<b>*..*</b>	<b>Listen</b>
VSMREQIN	1025	*..44444	*..*	Listen
VSMEVSRV	1006	*..55555	*..*	Listen

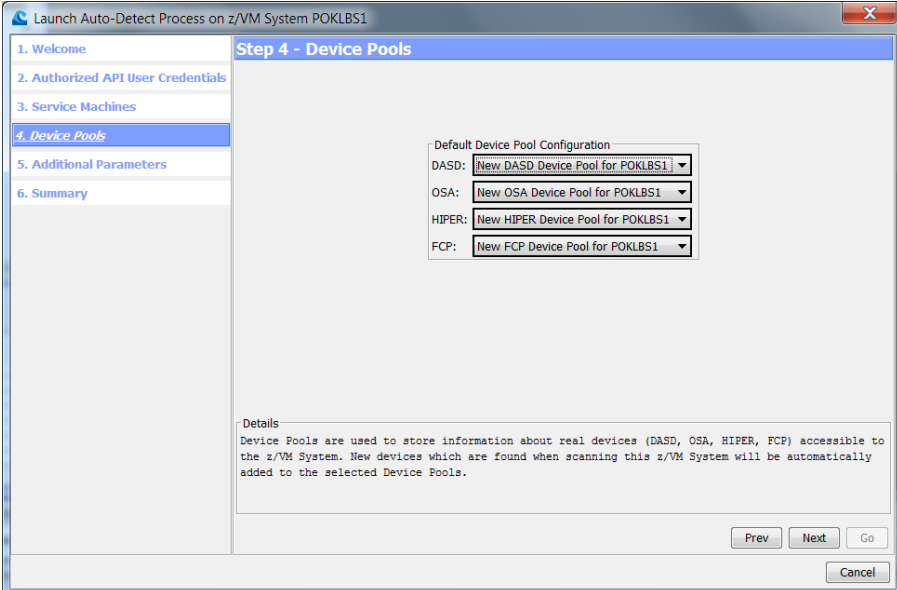
### Active IPv6 Transmission Blocks:

User Id	Conn	State
----	--	-----
VSMREQI6	1007	Listen

- The Wave servers should report they are listening on the specified ports

# IBM Wave Linux Installation

- Default device pool names shown
- You can't change the names here, but you can create new ones later



Launch Auto-Detect Process on z/VM System POKLBS1

1. Welcome

2. Authorized API User Credentials

3. Service Machines

4. Device Pools

5. Additional Parameters

6. Summary

### Step 4 - Device Pools

Default Device Pool Configuration

DASD:

OSA:

HIPER:

FCP:

Details

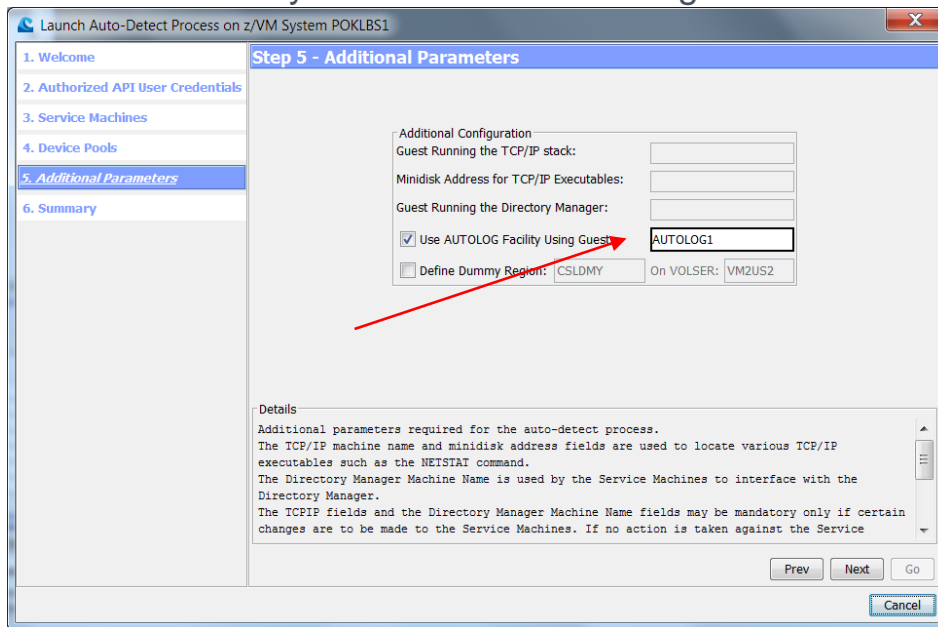
Device Pools are used to store information about real devices (DASD, OSA, HIPER, FCP) accessible to the z/VM System. New devices which are found when scanning this z/VM System will be automatically added to the selected Device Pools.

Prev Next Go

Cancel

# IBM Wave Linux Installation

- Typically no need to change these values, unless you use RACF. In which case you would want to change to AUTOLOG2



Launch Auto-Detect Process on z/VM System POKLBS1

1. Welcome  
2. Authorized API User Credentials  
3. Service Machines  
4. Device Pools  
5. Additional Parameters  
6. Summary

### Step 5 - Additional Parameters

Additional Configuration

Guest Running the TCP/IP stack:

Minidisk Address for TCP/IP Executables:

Guest Running the Directory Manager:

Use AUTOLOG Facility Using Guest

Define Dummy Region: CSLDMY On VOLSER: VM2US2

Details

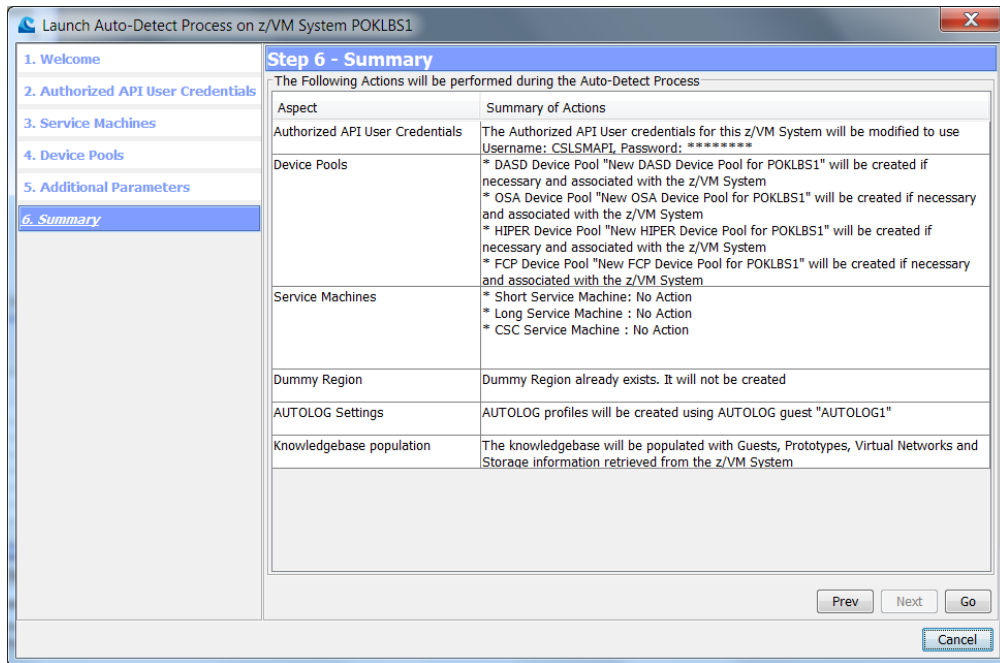
Additional parameters required for the auto-detect process.  
The TCP/IP machine name and minidisk address fields are used to locate various TCP/IP executables such as the NETSTAT command.  
The Directory Manager Machine Name is used by the Service Machines to interface with the Directory Manager.  
The TCP/IP fields and the Directory Manager Machine Name fields may be mandatory only if certain changes are to be made to the Service Machines. If no action is taken against the Service

Prev Next Go

Cancel

# IBM Wave Linux Installation

- Review summary and launch the Auto-Detect process



The screenshot shows a window titled "Launch Auto-Detect Process on z/VM System POKLBS1". On the left is a navigation pane with steps 1 through 6. Step 6, "Summary", is selected. The main area displays a table of actions to be performed during the auto-detect process.

Aspect	Summary of Actions
Authorized API User Credentials	The Authorized API User credentials for this z/VM System will be modified to use Username: CSLSMAPI, Password: *****
Device Pools	* DASD Device Pool "New DASD Device Pool for POKLBS1" will be created if necessary and associated with the z/VM System * OSA Device Pool "New OSA Device Pool for POKLBS1" will be created if necessary and associated with the z/VM System * HIPER Device Pool "New HIPER Device Pool for POKLBS1" will be created if necessary and associated with the z/VM System * FCP Device Pool "New FCP Device Pool for POKLBS1" will be created if necessary and associated with the z/VM System
Service Machines	* Short Service Machine: No Action * Long Service Machine : No Action * CSC Service Machine : No Action
Dummy Region	Dummy Region already exists. It will not be created
AUTOLOG Settings	AUTOLOG profiles will be created using AUTOLOG guest "AUTOLOG1"
Knowledgebase population	The knowledgebase will be populated with Guests, Prototypes, Virtual Networks and Storage information retrieved from the z/VM System

At the bottom of the dialog are buttons for "Prev", "Next", "Go", and "Cancel".

# IBM Wave Linux Installation



- Initial scan may take a period of time to process all devices it can detect
- Online and offline storage devices will be processed
- Don't “sense” devices you don't intend to ever work with in order to reduce auto detect time. Exclude them from being sensed in SYSTEM CONFIG ahead of time.

z/VM System is in Auto-Detect status, processing 1036 update events. Please wait...

# IBM Wave Installation

- Installation completed

IBM Wave for z/VM 1.1.0 (WAVESERV Hostname: N/A, IP Address: 172.110.100.14)

File Auto Detect User-Group Management Network Management Prototype Management Storage Management Administrative User Tasks Reports Window Help

Enterprise Viewer Dashboard View Hardware Viewer

Current System View - "POKLBS1"

z/VM User Groups Network Prototypes Storage **System State** Session Tasks

Hardware Viewer Default Zoom Group By: Site Defined ... Show Filter ...

POKLBS

POKLBS1

POKLBS

Property Viewer

POKLBS1

Property Value

Name: POKLBS1

Workunit Name	Initiator	Start At	End At	Duration	Status	Progress
Auto-detect z/VM System	ryoung1	2014-05-06 23:14:08	2014-05-06 23:16:40	2:32 minutes	Done	100%
Create new z/VM system	ryoung1	2014-05-06 23:10:08	2014-05-06 23:10:09	1 seconds	Done	100%
Add New Managed Entity	ryoung1	2014-05-06 23:06:12	2014-05-06 23:06:12	0 seconds	Done	100%
Add new CPC	ryoung1	2014-05-06 23:03:19	2014-05-06 23:03:20	1 seconds	Done	100%

SSL Enabled

ryoung1



# Session Agenda



- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - **ESM Considerations**
- Authentication and Authorization
- Guest discovery and initialization for Wave
- z/VM System Management Use Cases
- Linux System Management Use Cases
  - Provisioning/Cloning
  - BMI
  - LGR
- Customize and Extend

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# ESM Installation Actions

```
'EXEC RAC PERMIT DIRMSAT2 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKC)'  
'EXEC RAC PERMIT DIRMSAT2 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKS)'  
'EXEC RAC PERMIT DIRMSAT2 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKL)'  
'EXEC RAC PERMIT DIRMSAT3 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKC)'  
'EXEC RAC PERMIT DIRMSAT3 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKS)'  
'EXEC RAC PERMIT DIRMSAT3 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKL)'  
'EXEC RAC PERMIT DIRMSAT4 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKC)'  
'EXEC RAC PERMIT DIRMSAT4 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKS)'  
'EXEC RAC PERMIT DIRMSAT4 CLASS(VMRDR) ACC(UPDATE) ID(WAVEWRKL)'
```

```
'EXEC RAC PERMIT DIAG088 CLASS(VMCMD) ACC(READ) ID(WAVEWRKC)'  
'EXEC RAC PERMIT DIAG088 CLASS(VMCMD) ACC(READ) ID(WAVEWRKS)'  
'EXEC RAC PERMIT DIAG088 CLASS(VMCMD) ACC(READ) ID(WAVEWRKL)'
```

```
'EXEC RAC PERMIT WAVEWRKS CLASS(VMBATCH) ACC(CONTROL) ID(FTPSEVE)'  
'EXEC RAC PERMIT AUTOLOG2.191 CLASS(VMMDISK) ACC(ALTER) ID(WAVEWRKS)'
```

```
'EXEC RAC PERMIT WAVEWRKS.191 CLASS(VMMDISK) ACC(ALTER) ID(VMADMINS)'  
'EXEC RAC PERMIT WAVEWRKS.191 CLASS(VMMDISK) ACC(ALTER) ID(MAINT)'  
'EXEC RAC PERMIT WAVEWRKS.399 CLASS(VMMDISK) ACC(ALTER) ID(VMADMINS)'  
'EXEC RAC PERMIT WAVEWRKS.399 CLASS(VMMDISK) ACC(ALTER) ID(MAINT)'
```

# ESM Installation Actions

```
'EXEC RAC PERMIT AUTOLOG1.191 CLASS(VMMDISK) id(WAVEWRKS) acc(alter) '  
'EXEC RAC PERMIT AUTOLOG2.191 CLASS(VMMDISK) id(WAVEWRKS) acc(alter) '  
'EXEC RAC PERMIT DIRMAINT.1DF CLASS(VMMDISK) id(WAVEWRKS) acc(read) '  
'EXEC RAC PERMIT WAVEWRKS.191 CLASS(VMMDISK) id(WAVEWRKL) acc(alter) '  
'EXEC RAC PERMIT WAVEWRKS.191 CLASS(VMMDISK) id(WAVEWRKC) acc(alter) '  
'EXEC RAC PERMIT WAVEWRKS.399 CLASS(VMMDISK) id(WAVEWRKS) acc(alter) '  
'EXEC RAC PERMIT WAVEWRKS.191 CLASS(VMMDISK) id(WAVEWRKS) acc(alter) '  
'EXEC RAC PERMIT WAVEWRKS.399 CLASS(VMMDISK) id(WAVEWRKL) acc(alter) '  
'EXEC RAC PERMIT WAVEWRKS.399 CLASS(VMMDISK) id(WAVEWRKC) acc(alter) '
```

```
'EXEC RAC RALT VMMDISK WAVEWRKS.399 UACC(READ) '  
'EXEC RAC ALU WAVEWRKC OPERATIONS'
```

```
'EXEC RAC RDEFINE VMXEVENT USERSEL.WAVEWRKS '  
'EXEC RAC RALT VMXEVENT USERSEL.WAVEWRKS ADDMEM(FOR.C/NOCTL FOR.G/NOCTL) '  
'EXEC RAC SETEVENT REFRESH USERSEL.WAVEWRKS'
```

```
'EXEC RAC RDEFINE VMXEVENT USERSEL.WAVEWRKC '  
'EXEC RAC RALT VMXEVENT USERSEL.WAVEWRKC ADDMEM(FOR.C/NOCTL FOR.G/NOCTL) '  
'EXEC RAC SETEVENT REFRESH USERSEL.WAVEWRKC'
```

```
'EXEC RAC RDEFINE VMXEVENT USERSEL.WAVEWRKI '  
'EXEC RAC RALT VMXEVENT USERSEL.WAVEWRKI ADDMEM(FOR.C/NOCTL FOR.G/NOCTL) '  
'EXEC RAC SETEVENT REFRESH USERSEL.WAVEWRKI'
```

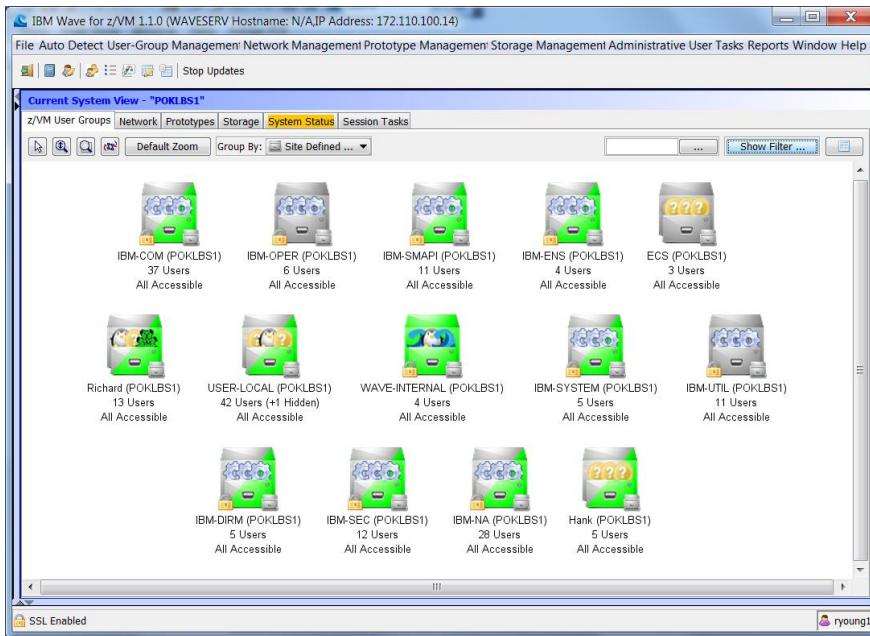
# Post Install Setup Actions



- Creating User Defined Groups
- Define Authentication mechanisms, role authorizations, and additional users
- Define External Entities
- Review/Modify Device Pools
- Assign device pools to storage controllers
- Evaluate IPTimeout for Layer 2 environment
- Init for Wave the guest that will be managed

# Adding user defined groups

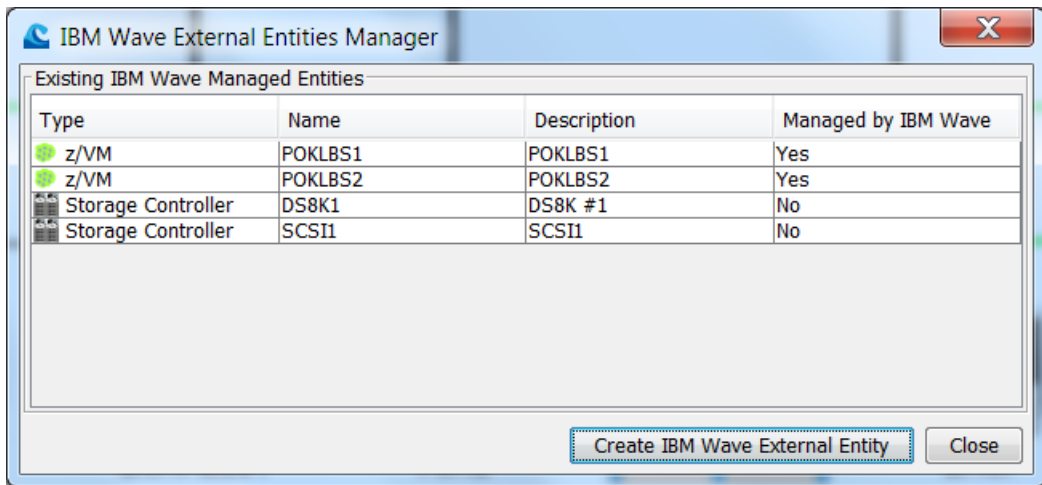
- Right mouse to define the name of a new user defined group
- Groups and projects are a point of access control



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# Adding External Entities

- z/VM instances, Storage Controller instances, routers and z/OS instances can be defined here. z/VM entities are required and part of the early setup process
- Storage Controller entities help in the visualization of the storage. Define one for each storage subsystem



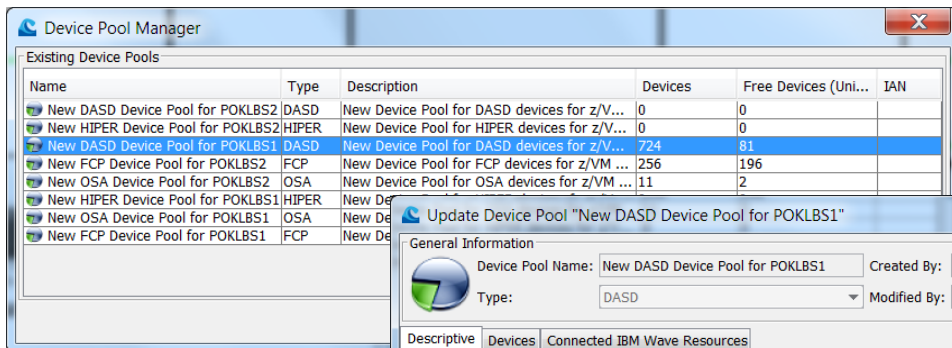
The screenshot shows a window titled "IBM Wave External Entities Manager". It contains a table of existing entities:

Type	Name	Description	Managed by IBM Wave
z/VM	POKLBS1	POKLBS1	Yes
z/VM	POKLBS2	POKLBS2	Yes
Storage Controller	DS8K1	DS8K #1	No
Storage Controller	SCSI1	SCSI1	No

At the bottom of the window, there are two buttons: "Create IBM Wave External Entity" and "Close".

# Device Pools

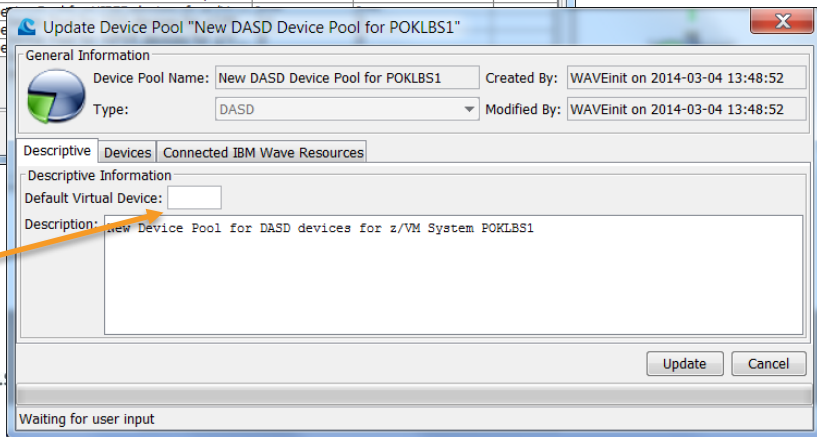
- Changing names requires add, reassign, then delete, there is no rename
- Assign default virtual devices



Device Pool Manager

Existing Device Pools

Name	Type	Description	Devices	Free Devices (Uni...	IAN
New DASD Device Pool for POKLBS2	DASD	New Device Pool for DASD devices for z/V...	0	0	
New HIPER Device Pool for POKLBS2	HIPER	New Device Pool for HIPER devices for z/V...	0	0	
New DASD Device Pool for POKLBS1	DASD	New Device Pool for DASD devices for z/V...	724	81	
New FCP Device Pool for POKLBS2	FCP	New Device Pool for FCP devices for z/VM ...	256	196	
New OSA Device Pool for POKLBS2	OSA	New Device Pool for OSA devices for z/VM ...	11	2	
New HIPER Device Pool for POKLBS1	HIPER	New De			
New OSA Device Pool for POKLBS1	OSA	New De			
New FCP Device Pool for POKLBS1	FCP	New De			



Update Device Pool "New DASD Device Pool for POKLBS1"

General Information

Device Pool Name: New DASD Device Pool for POKLBS1 Created By: WAVEinit on 2014-03-04 13:48:52

Type: DASD Modified By: WAVEinit on 2014-03-04 13:48:52

Descriptive Information

Default Virtual Device:

Description: New Device Pool for DASD devices for z/VM System POKLBS1

Update Cancel

Waiting for user input

Complete your session evaluations online at [www.ibm.com](http://www.ibm.com)

# Device Pools - DASD

Set default virtual device and review device:system associations

Update Device Pool "New DASD Device Pool for POKLBS1"

General Information

Device Pool Name: New DASD Device Pool for POKLBS1 Created By: WAVEinit on 2014-03-04 13:48:52

Type: DASD Modified By: WAVEinit on 2014-03-04 13:48:52

Descriptive Devices Connected IBM Wave Resources

Descriptive Information

Default Virtual Device: 200

Description: New Device Pool for DASD devices for z/VM System POKLBS1

Waiting for user input

Update Device Pool "New DASD Device Pool for POKLBS1"

General Information

Device Pool Name: New DASD Device Pool for POKLBS1 Created By: WAVEinit on 2014-03-04 13:48:52

Type: DASD Modified By: WAVEinit on 2014-03-04 13:48:52

Descriptive Devices Connected IBM Wave Resources

Associated z/VM Systems

System Name	Addr...	Online St...	Dedicate Status	Details	...	Loc...	IAN
POKLBS1	5FAB	ONLINE	FREE				
	5FAC	ONLINE	FREE				
	5FAD	ONLINE	FREE				
	5FAE	ONLINE	FREE				
	5FAP	ONLINE	FREE				
	5FB0	ONLINE	FREE				
	5FB1	ONLINE	FREE				

Associate System Cancel

Waiting for user input

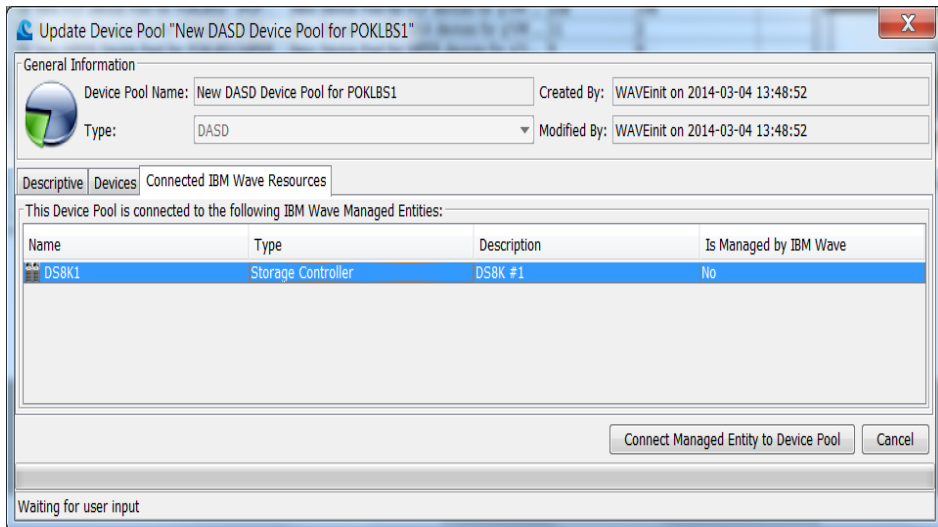
Complete y





# Device Pools - DASD

- You can associate a storage controller that you have defined in the “External Entities Manager” with a device pool
- As shown, DS8K1 is associated with this DASD device pool



Update Device Pool "New DASD Device Pool for POKLBS1"

General Information

Device Pool Name: New DASD Device Pool for POKLBS1 Created By: WAVEinit on 2014-03-04 13:48:52

Type: DASD Modified By: WAVEinit on 2014-03-04 13:48:52

Descriptive | Devices | Connected IBM Wave Resources

This Device Pool is connected to the following IBM Wave Managed Entities:

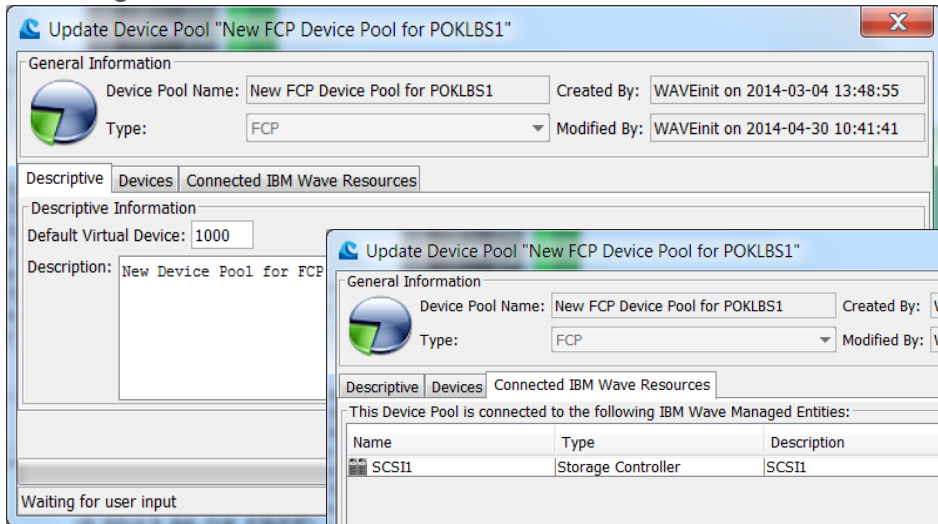
Name	Type	Description	Is Managed by IBM Wave
DS8K1	Storage Controller	DS8K #1	No

Connect Managed Entity to Device Pool Cancel

Waiting for user input

# Device Pools – FCP

- The process for FCP devices is similar to DASD devices
- Consider separate FCP pools for SSI/LGR systems to reserve relocation ranges



Update Device Pool "New FCP Device Pool for POKLBS1"

General Information

Device Pool Name: New FCP Device Pool for POKLBS1 Created By: WAVEinit on 2014-03-04 13:48:55

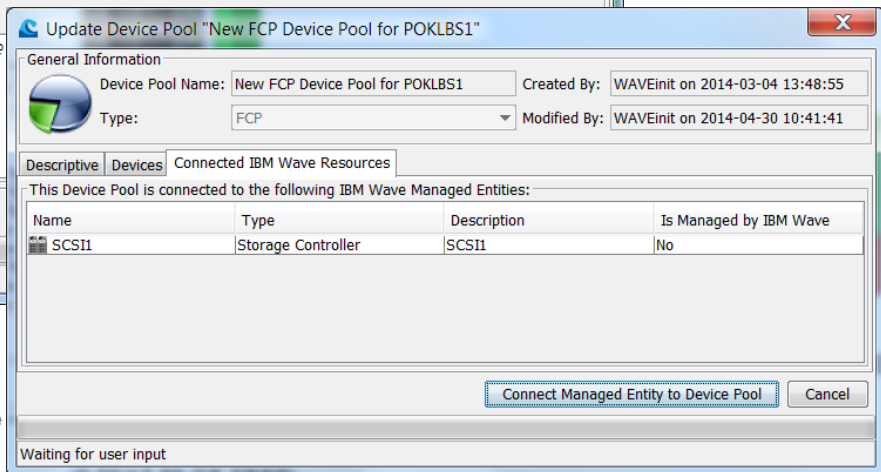
Type: FCP Modified By: WAVEinit on 2014-04-30 10:41:41

Descriptive Information

Default Virtual Device: 1000

Description: New Device Pool for FCP

Waiting for user input



Update Device Pool "New FCP Device Pool for POKLBS1"

General Information

Device Pool Name: New FCP Device Pool for POKLBS1 Created By: WAVEinit on 2014-03-04 13:48:55

Type: FCP Modified By: WAVEinit on 2014-04-30 10:41:41

Descriptive Information

This Device Pool is connected to the following IBM Wave Managed Entities:

Name	Type	Description	Is Managed by IBM Wave
SCSI1	Storage Controller	SCSI1	No

Connect Managed Entity to Device Pool Cancel

Waiting for user input

# IP Timeout in Layer 2 environments

```
q vswitch net172a
VSWITCH SYSTEM NET172A  Type: QDIO      Connected: 13      Maxconn: INFINITE
  PERSISTENT  RESTRICTED  ETHERNET          Accounting: OFF
  USERBASED
  VLAN Aware  Default VLAN: 0100      Default Porttype: Access  GVRP: Ena
bled
                        Native VLAN: 0001      VLAN Counters: OFF
  MAC address: 02-1B-00-00-00-01      MAC Protection: Unspecified
  ITimeout: 5      QueueStorage: 8
  Isolation Status: OFF      VEPA Status: OFF
  Uplink Port:
  State: Ready
  PMTUD setting: EXTERNAL      PMTUD value: 8992
  RDEV: 0147.P00 VDEV: 0600  Controller: DTCVSW2  ACTIVE
  EQID: 456
Ready; T=0.01/0.01 07:15:27
```

- Use DEFINE LAN, DEFINE VSWITCH, SET LAN, SET VSWITCH IPTIMEOUT parameter to set duration to the desired value

# Session Agenda



- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- **Authentication and Authorization**
- Guest discovery and initialization for Wave
- z/VM System Management Use Cases
- Linux System Management Use Cases
  - Provisioning/Cloning
  - BMI
  - LGR
- Customize and Extend

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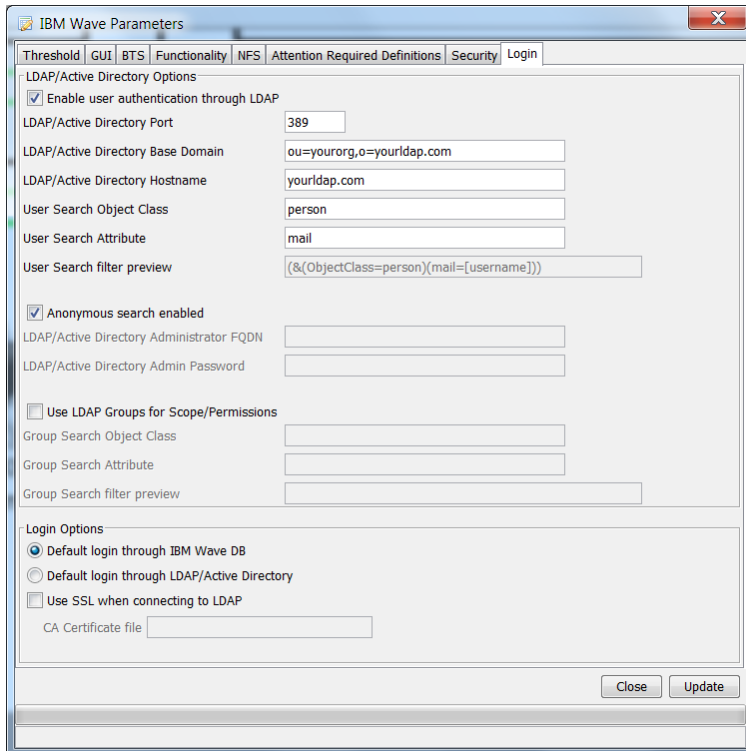
# Authentication and Authorization



- Authentication
  - LDAP/AD
  - Internal DB
  - Both
- Ability to group users in LDAP
- Ability to authorize by project
- Authorization via four different scope types

# Authentication and Authorization

- LDAP is optional
- Used for authentication
- LDAP groups are optional
- Can have a mixture of LDAP and non-LDAP users



The screenshot shows the 'IBM Wave Parameters' dialog box with the 'Security' tab selected. The 'LDAP/Active Directory Options' section is expanded, showing the following settings:

- Enable user authentication through LDAP
- LDAP/Active Directory Port: 389
- LDAP/Active Directory Base Domain: ou=yourorg,o=yourldap.com
- LDAP/Active Directory Hostname: yourldap.com
- User Search Object Class: person
- User Search Attribute: mail
- User Search filter preview: (&(ObjectClass=person)(mail=[username]))
- Anonymous search enabled
- LDAP/Active Directory Administrator FQDN: [empty]
- LDAP/Active Directory Admin Password: [empty]
- Use LDAP Groups for Scope/Permissions
- Group Search Object Class: [empty]
- Group Search Attribute: [empty]
- Group Search filter preview: [empty]

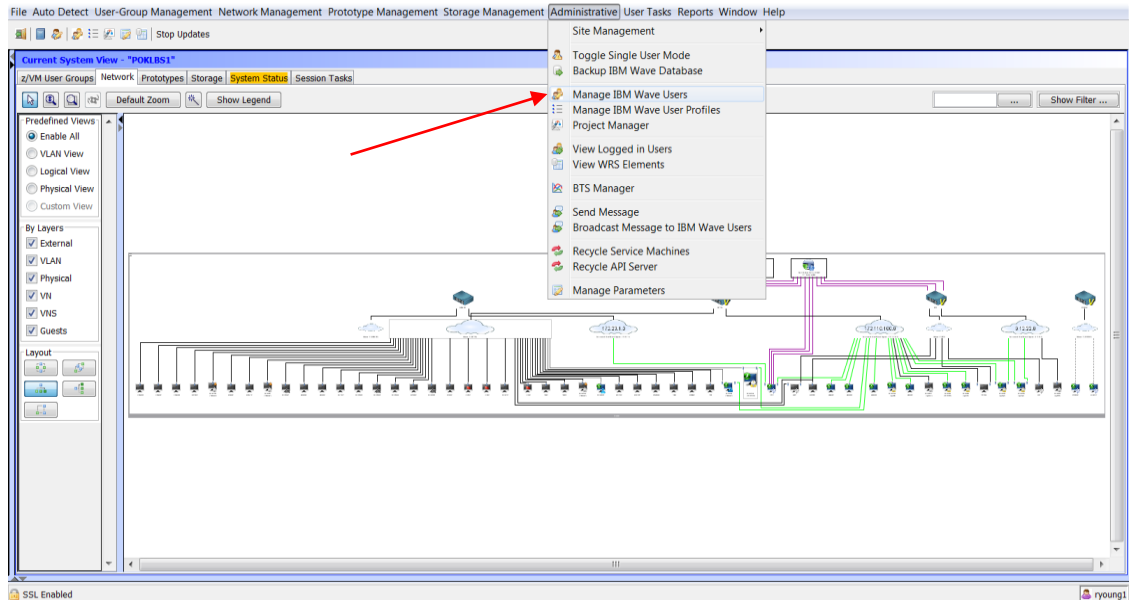
The 'Login Options' section is also visible:

- Default login through IBM Wave DB
- Default login through LDAP/Active Directory
- Use SSL when connecting to LDAP
- CA Certificate file: [empty]

Buttons for 'Close' and 'Update' are located at the bottom right of the dialog.

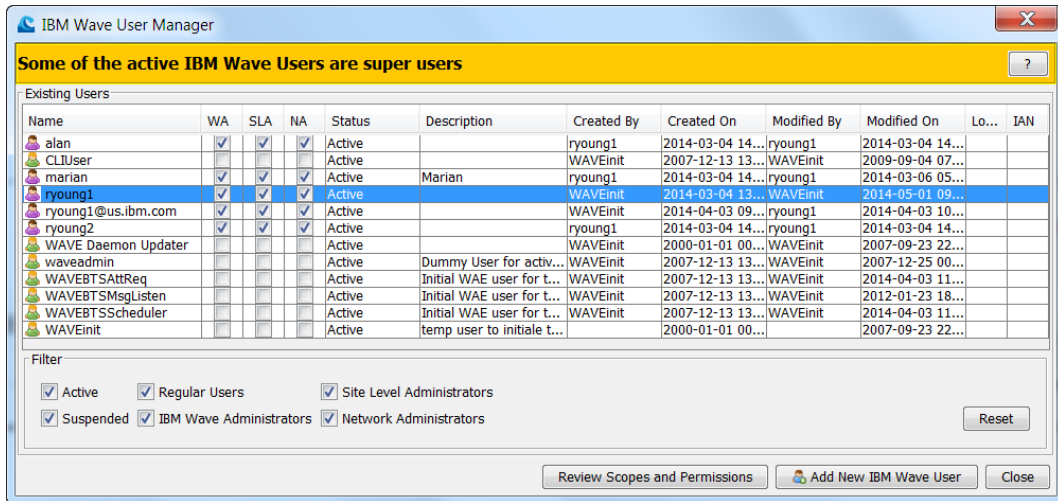
# Authentication and Authorization

- Users managed via administrative menu



# Authentication and Authorization

- User management
- Can not change a logged on user
- Can not delete a user, **but you can deactivate/suspend**



IBM Wave User Manager

Some of the active IBM Wave Users are super users

Existing Users

Name	WA	SLA	NA	Status	Description	Created By	Created On	Modified By	Modified On	Lo...	IAN
alan	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		ryoung1	2014-03-04 14...	ryoung1	2014-03-04 14...		
CLIUser	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		WAVEinit	2007-12-13 13...	WAVEinit	2009-09-04 07...		
marian	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active	Marian	ryoung1	2014-03-04 14...	ryoung1	2014-03-06 05...		
ryoung1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		WAVEinit	2014-03-04 13...	WAVEinit	2014-05-01 09...		
ryoung1@us.ibm.com	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		WAVEinit	2014-04-03 09...	ryoung1	2014-04-03 10...		
ryoung2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		ryoung1	2014-03-04 14...	ryoung1	2014-03-04 14...		
WAVE Daemon Updater	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		WAVEinit	2000-01-01 00...	WAVEinit	2007-09-23 22...		
waveadmin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	Dummy User for activ...	WAVEinit	2007-12-13 13...	WAVEinit	2007-12-25 00...		
WAVEBTSAttReq	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	Initial WAE user for t...	WAVEinit	2007-12-13 13...	WAVEinit	2014-04-03 11...		
WAVEBTSMsgListen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	Initial WAE user for t...	WAVEinit	2007-12-13 13...	WAVEinit	2012-01-23 18...		
WAVEBTSscheduler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	Initial WAE user for t...	WAVEinit	2007-12-13 13...	WAVEinit	2014-04-03 11...		
WAVEinit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	temp user to initiate t...	WAVEinit	2000-01-01 00...	WAVEinit	2007-09-23 22...		

Filter

Active    Regular Users    Site Level Administrators  
 Suspended    IBM Wave Administrators    Network Administrators

Reset

Review Scopes and Permissions   Add New IBM Wave User   Close



# Authentication and Authorization

- User management

## Some of the active IBM Wave Users are super users

Existing Users

Name	WA	SLA	NA	Status	Description	Created By	Created On	Modified By	Modified On	Lo...	IAN
alan	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		ryoung1	2014-03-04 14...	ryoung1	2014-03-04 14...		
CLIUser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active		WAVEinit	2007-12-13 13...	WAVEinit	2009-09-04 07...		
marian	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active	Marian	ryoung1	2014-03-04 14...	ryoung1	2014-03-06 05...		
ryoung1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		WAVEinit	2014-03-04 13...	WAVEinit	2014-05-01 09...		
ryoung1@us.ibm.com	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		WAVEinit	2014-04-03 09...	ryoung1	2014-04-03 10...		
ryoung2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active		ryoung1	2014-03-04 14...	ryoung1	2014-03-04 14...		
WAVE Daemon Upda						WAVEinit	2000-01-01 00...	WAVEinit	2007-09-23 22...		
waveadmin						WAVEinit	2007-12-13 13...	WAVEinit	2007-12-25 00...		
WAVEBTAttReq						WAVEinit	2007-12-13 13...	WAVEinit	2014-04-03 11...		
WAVEBTMsgListen						WAVEinit	2007-12-13 13...	WAVEinit	2012-01-23 18...		
WAVEBTSScheduler						WAVEinit	2007-12-13 13...	WAVEinit	2014-04-03 11...		
WAVEinit						WAVEinit	2000-01-01 00...	WAVEinit	2007-09-23 22...		

Filter

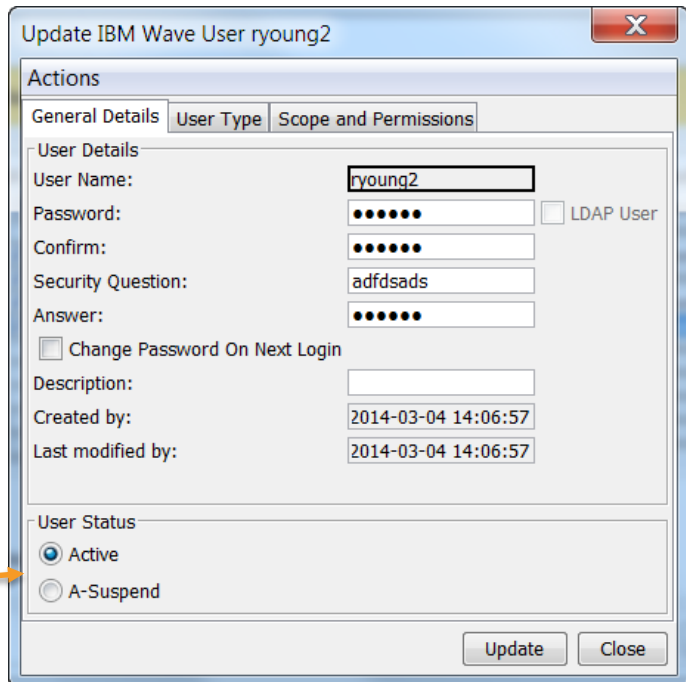
Active  Re  
 Suspended  IB

Update IBM Wave User  
Clone this IBM Wave User  
Lock IBM Wave user  
Unlock IBM Wave user  
Read IAN  
Update IAN  
Delete IAN  
Copy scopes and permissions to selected users...

Review Scopes and Permissions Add New IBM Wave User Close

# Authentication and Authorization

- Basic user attributes
  - User Status



Update IBM Wave User ryoung2

Actions

General Details | User Type | Scope and Permissions

User Details

User Name: ryoung2

Password: ●●●●●●  LDAP User

Confirm: ●●●●●●

Security Question: adfdsads

Answer: ●●●●●●

Change Password On Next Login

Description:

Created by: 2014-03-04 14:06:57

Last modified by: 2014-03-04 14:06:57

User Status

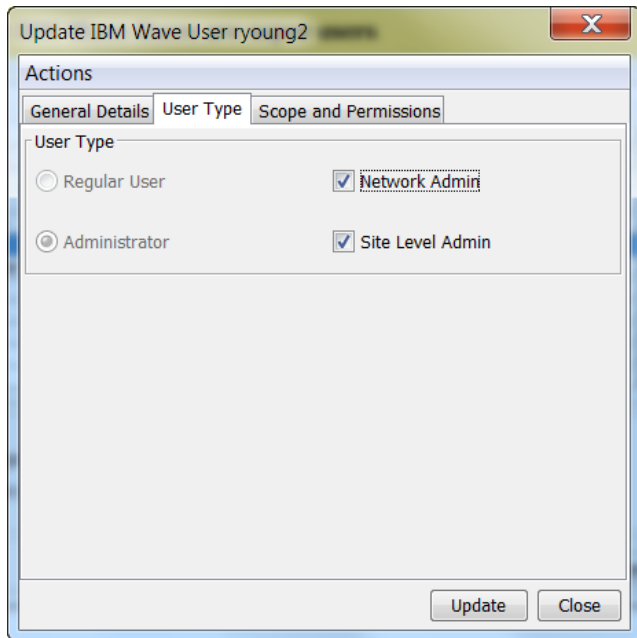
Active

A-Suspend

Update Close

# Authentication and Authorization

- User type controls admin access



Update IBM Wave User ryoung2

Actions

General Details User Type Scope and Permissions

User Type

Regular User  Network Admin

Administrator  Site Level Admin

Update Close





# Authentication and Authorization

- Overview of scope and permissions
- Full access shown
- No one specific read only setting

Actions

General Details | User Type | Scope and Permissions

Current Permissions

System	Permission T...	Entry Val...	Permissions
*	 DASDGroup	*	ALL
*	 Project	*	ALL
*	 DevicePool	*	ALL
*	 System	*	ALL


Delete Permission    Add Permission

Update    Close

# Authentication and Authorization

- There are fine grained controls for authorizations by project
- Operational and configuration permissions can be controlled

Permission Scope

 z/VM System    Scope Type    Scope Value

Permissions


z/VM User

<input type="checkbox"/> Activate	<input type="checkbox"/> Add	<input type="checkbox"/> Assign Distribut...	<input type="checkbox"/> Assign Project	<input type="checkbox"/> Browse Console
<input type="checkbox"/> CLC	<input type="checkbox"/> Clone	<input type="checkbox"/> Connect	<input type="checkbox"/> Create Like	<input type="checkbox"/> Create Prototype
<input type="checkbox"/> Deactivate	<input type="checkbox"/> Delete	<input type="checkbox"/> Disconnect	<input type="checkbox"/> Display	<input type="checkbox"/> Execute REXX
<input type="checkbox"/> Execute Script	<input type="checkbox"/> Init for IBM Wave	<input type="checkbox"/> Linux Console	<input type="checkbox"/> Lock/Unlock	<input type="checkbox"/> Manage Storage
<input type="checkbox"/> Pause	<input type="checkbox"/> Recycle	<input type="checkbox"/> Remove Incons...	<input type="checkbox"/> Resume	<input type="checkbox"/> SSH
<input type="checkbox"/> Send Message	<input type="checkbox"/> Set Account	<input type="checkbox"/> Status	<input type="checkbox"/> Transfer to SDG	<input type="checkbox"/> Update

# Authentication and Authorization

- Permissions to work with DASD by Group
- Not all functions shown, as some functions are for admins

Permission Scope

	z/VM System	Scope Type	Scope Value
	<input type="text" value="*"/>	<input type="text" value="DASDGroup"/>	<input type="text" value="*"/>

Permissions

DASD Group

- Add To Linux
- Execute REXX
- Lock/Unlock

XCAT1  
LINUX  
ECS  
SSI  
USER  
IOC



Permit All Deny All Clear All

Cancel Add permission

# Authentication and Authorization

- Since permissions are given to device pools, you should setup device pools before you define users authorizations if you need pool granularity

Permission Scope

 z/VM System    Scope Type:  DevicePool    Scope Value: \*

Permissions

Device Pool

Display Details

Update Details

New DASD Device Pool for POKLBS2  
New HIPER Device Pool for POKLBS2  
New DASD Device Pool for POKLBS1  
New FCP Device Pool for POKLBS2  
New OSA Device Pool for POKLBS2  
New HIPER Device Pool for POKLBS1  
New OSA Device Pool for POKLBS1

Permit All    Deny All    Clear All

Cancel    Add permission


# Authentication and Authorization

- Group controls are LDAP based
- Same permission controls as for individual users

**LDAP Group based Scope and Permission assignment is not in use** ?

Existing IBM Wave User Profiles

By LDAP Group | By Profile

IBM Wave Use...	LDAP Group	WA	SLA	NA	IBM Wave User Profile De...	Crea...	Created On	Last ...	Last Modified...	Locked	IAN
 LBSAdmins	LBSZWAVE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	LBSAdmins	ryoung1	2014-04-03 10...	ryoung1	2014-04-03 10...		

Filter

Assigned to LDAP Group     Non Administrative     Site Level Administrators  
 Not Assigned to LDAP Group     IBM Wave Administrators     Network Administrators

Reset

Review Scopes and Permissions    Add New IBM Wave User Profile    Close



# Session Agenda

- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- **Guest discovery and initialization for Wave**
- z/VM System Management Use Cases
- Linux System Management Use Cases
  - Provisioning/Cloning
  - BMI
  - LGR
- Customize and Extend

# Discovery and Initialization

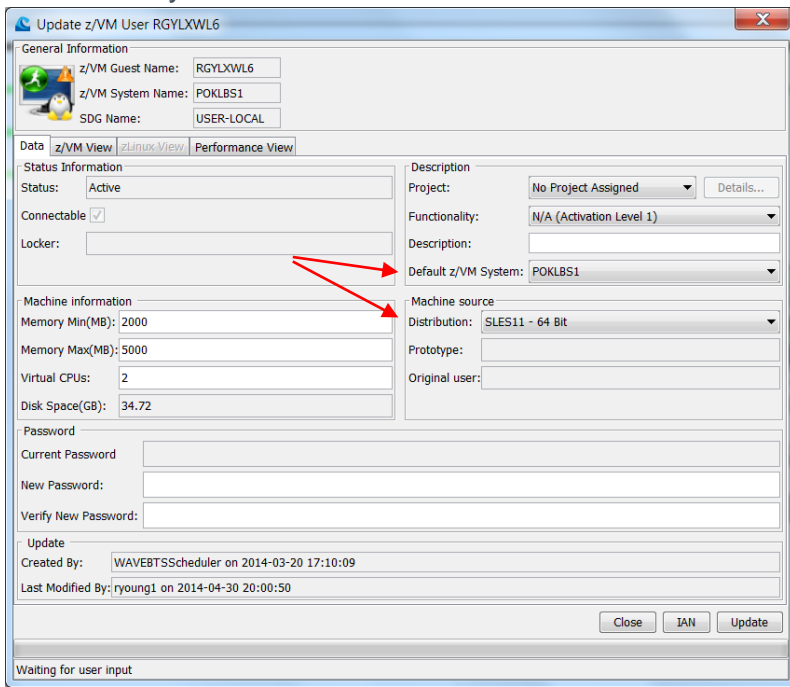
- Guest discovery is automatic (on demand updates possible). Directory reprocessed on regular intervals
- Pre-existing guests and changes automatically picked up
- Pre-existing guests can be as fully managed as newly created guests
- Network and storage resources also periodically scanned and refreshed, so updates outside of IBM Wave are automatically learned by IBM Wave
- “Init for IBM Wave”
  - Stores detailed information about the guest in the Wave database and prepares it to work with Wave

# Initialize guest for Wave management

- Required packages on managed Linux guest
  - cmsfs
  - vmcp
- Required access
  - A user with root level privilege via ssh
- IP must be visible on the network.
  - Apply **VM65560** and **VM65601**
  - Define vswitch IPTIMEOUT value up to 4 hours, in layer 2 networking environments
- Can NOT clone an uninitialized guest
- Can perform some levels of management on an uninitialized guest

# Initialize a Guest

- Minimally must set Linux OS



Update z/VM User RGYLXLW6

General Information

z/VM Guest Name: RGYLXLW6  
z/VM System Name: POKLBS1  
SDG Name: USER-LOCAL

Data | z/VM View | **zLinux View** | Performance View

Status Information

Status: Active  
Connectable:   
Locker:

Machine information

Memory Min(MB): 2000  
Memory Max(MB): 5000  
Virtual CPUs: 2  
Disk Space(GB): 34.72

Password

Current Password:   
New Password:   
Verify New Password:

Update

Created By: WAVEBTSScheduler on 2014-03-20 17:10:09  
Last Modified By: ryoung1 on 2014-04-30 20:00:50

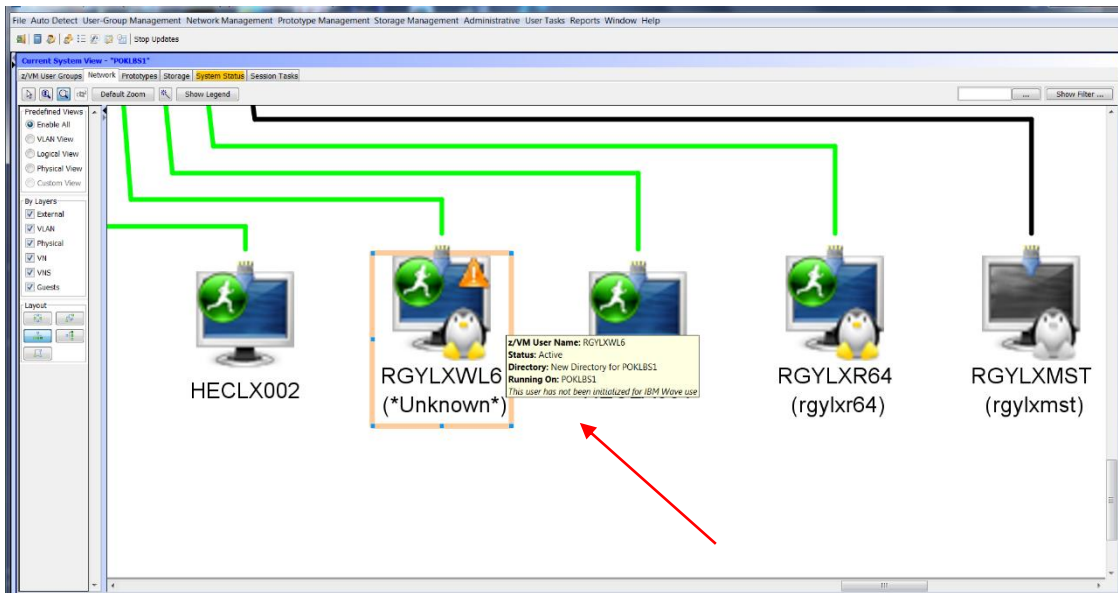
Close IAN Update

Waiting for user input

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

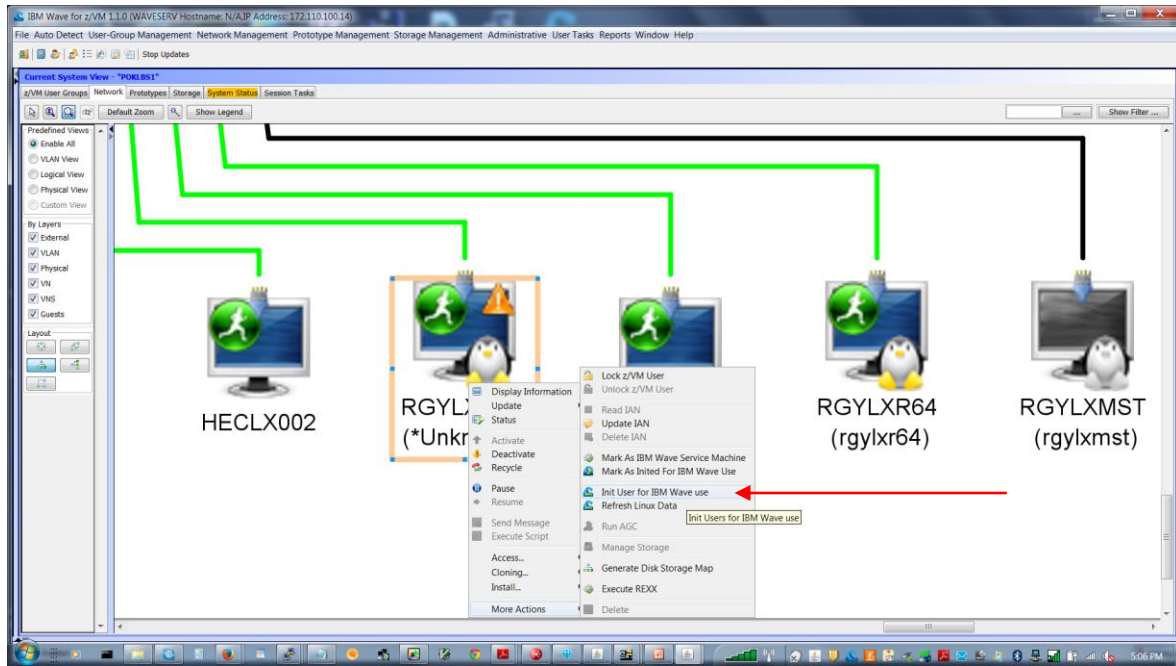
# Initialize for IBM Wave

- After OS is set to Linux, Penguin icon shown, warning message appears that guest is not initialized for IBM Wave



# Initialize for IBM Wave

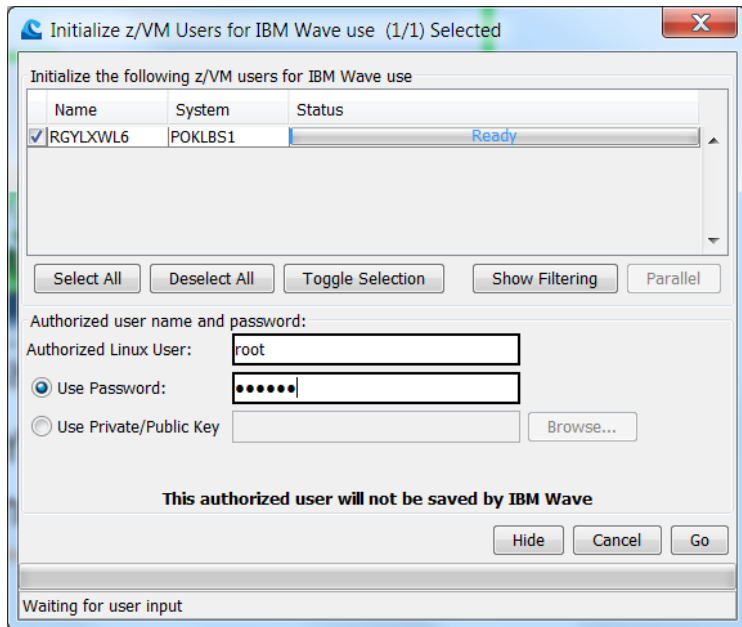
- Init action is under the “More Actions” submenu



Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Initialize for IBM Wave

- Can use root, or another user with root privileges
- Can use password or public key authentication



Initialize z/VM Users for IBM Wave use (1/1) Selected

Initialize the following z/VM users for IBM Wave use

Name	System	Status
<input checked="" type="checkbox"/> RGYLXWL6	POKLS1	Ready

Select All   Deselect All   Toggle Selection   Show Filtering   Parallel

Authorized user name and password:

Authorized Linux User:

Use Password:

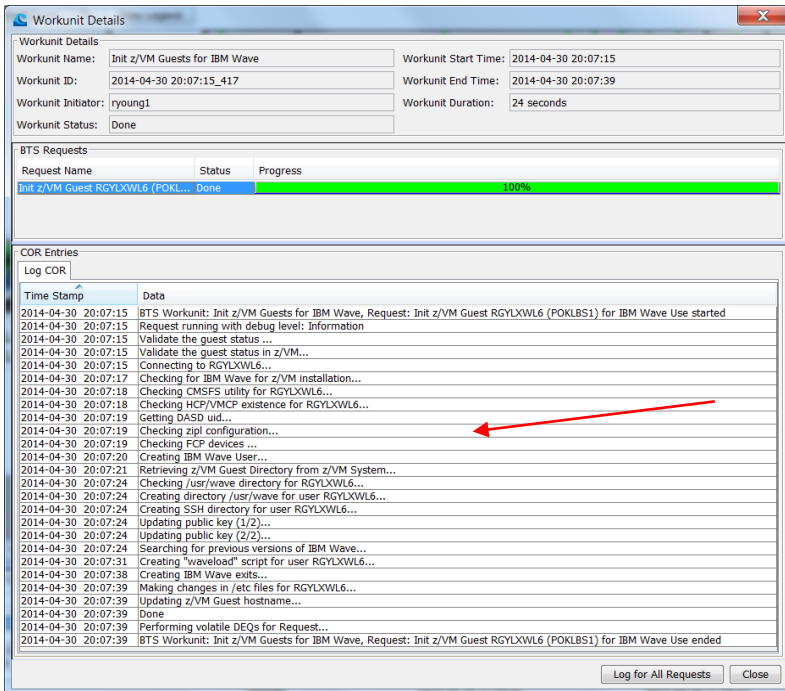
Use Private/Public Key

**This authorized user will not be saved by IBM Wave**

Waiting for user input

# Initialize for IBM Wave

- Task performed are detailed in BTS work unit for init action



The screenshot shows a 'Workunit Details' window with the following information:

- Workunit Name:** Init z/VM Guests for IBM Wave
- Workunit ID:** 2014-04-30 20:07:15\_417
- Workunit Initiator:** ryoung1
- Workunit Status:** Done
- Workunit Start Time:** 2014-04-30 20:07:15
- Workunit End Time:** 2014-04-30 20:07:39
- Workunit Duration:** 24 seconds

The 'BTS Requests' section shows a single request: 'Init z/VM Guest RGYLXWL6 (POKL...)' with a status of 'Done' and 100% progress.

The 'COR Entries' section shows a log of events:

Time Stamp	Data
2014-04-30 20:07:15	BTS Workunit: Init z/VM Guests for IBM Wave, Request: Init z/VM Guest RGYLXWL6 (POKLBS1) for IBM Wave Use started
2014-04-30 20:07:15	Request running with debug level: Information
2014-04-30 20:07:15	Validate the guest status ...
2014-04-30 20:07:15	Validate the guest status in z/VM...
2014-04-30 20:07:15	Connecting to RGYLXWL6...
2014-04-30 20:07:17	Checking for IBM Wave for z/VM installation...
2014-04-30 20:07:18	Checking CMSFS utility for RGYLXWL6...
2014-04-30 20:07:18	Checking HCP/VMCP existence for RGYLXWL6...
2014-04-30 20:07:19	Getting DASD uid...
2014-04-30 20:07:19	Checking zipl configuration...
2014-04-30 20:07:19	Checking FCP devices ...
2014-04-30 20:07:20	Creating IBM Wave User...
2014-04-30 20:07:21	Retrieving z/VM Guest Directory from z/VM System...
2014-04-30 20:07:24	Checking /usr/wave directory for RGYLXWL6...
2014-04-30 20:07:24	Creating directory /usr/wave for user RGYLXWL6...
2014-04-30 20:07:24	Creating SSH directory for user RGYLXWL6...
2014-04-30 20:07:24	Updating public key (1/2)...
2014-04-30 20:07:24	Updating public key (2/2)...
2014-04-30 20:07:24	Searching for previous versions of IBM Wave...
2014-04-30 20:07:31	Creating "waveload" script for user RGYLXWL6...
2014-04-30 20:07:38	Creating IBM Wave exits...
2014-04-30 20:07:39	Making changes in /etc files for RGYLXWL6...
2014-04-30 20:07:39	Updating z/VM Guest hostname...
2014-04-30 20:07:39	Done
2014-04-30 20:07:39	Performing volatile DEQs for Request...
2014-04-30 20:07:39	BTS Workunit: Init z/VM Guests for IBM Wave, Request: Init z/VM Guest RGYLXWL6 (POKLBS1) for IBM Wave Use ended

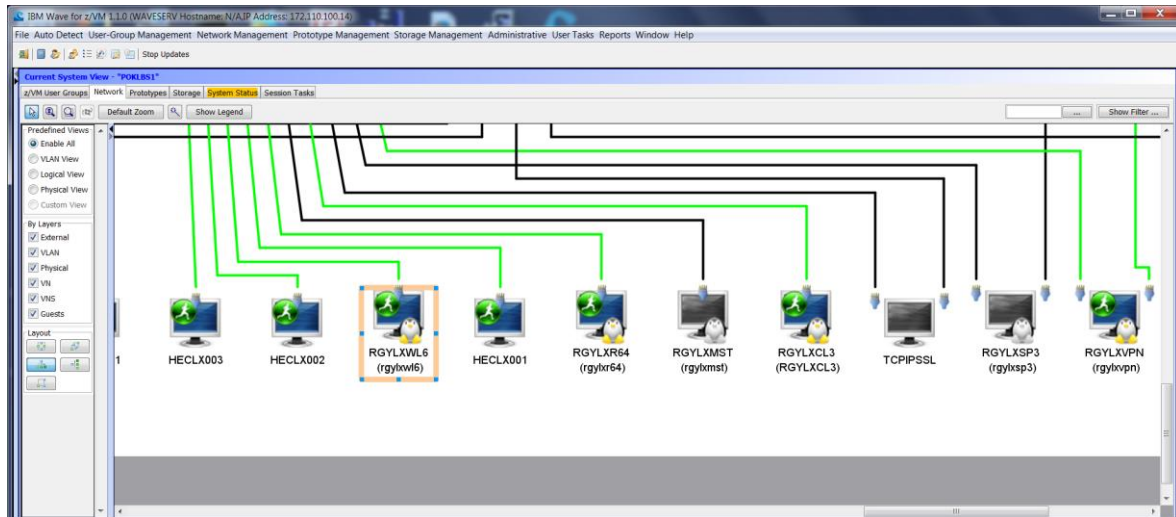
A red arrow points to the log entry: 'Checking zipl configuration...'.

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)



# Initialize for IBM Wave

- Virtual server successfully initialized



# Session Agenda



- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- Guest discovery and initialization for Wave
- **z/VM System Management Use Cases**
- Linux System Management Use Cases
  - Provisioning/Cloning
  - BMI
  - LGR
- Customize and Extend

# Key functions added in 2014



- EDEV/WWPN Management
  - Previously supported use of EDEV disks but did not allow you to define them from Wave
  - Now you can define the WWPN / LUN as an EDEV to z/VM from Wave
- Cross System Clone
  - Clone to another z/VM system that you may only have TCPIP network connectivity to.
  - Guest defined by Wave and disk copied from master image over the network to target z/VM

# z/VM System Management

## Network

- Add guest lan or vswitch
- Manage virtual network segments
- Visualize
- Draw new connection to a guest from a switch
- Perform actions on guests connected to a specific network

## Storage

- Add/delete Extent Control group
- Execute Rexx against volume(s) or group
- Assign / unassign volume to group
- Define / undefine region
- Vary on/off storage device
- Attach/detach from/to system
- Mark/unmark as page/spool
- Add to system as page/spool
- Purge Spool
- More...

## Guests management

- Add/remove
- Activate/deactivate
- Pause/resume
- Activate Default Guests
- Change memory/virtual CP assignment
- Change password
- Assign default system

## Shutdown z/VM

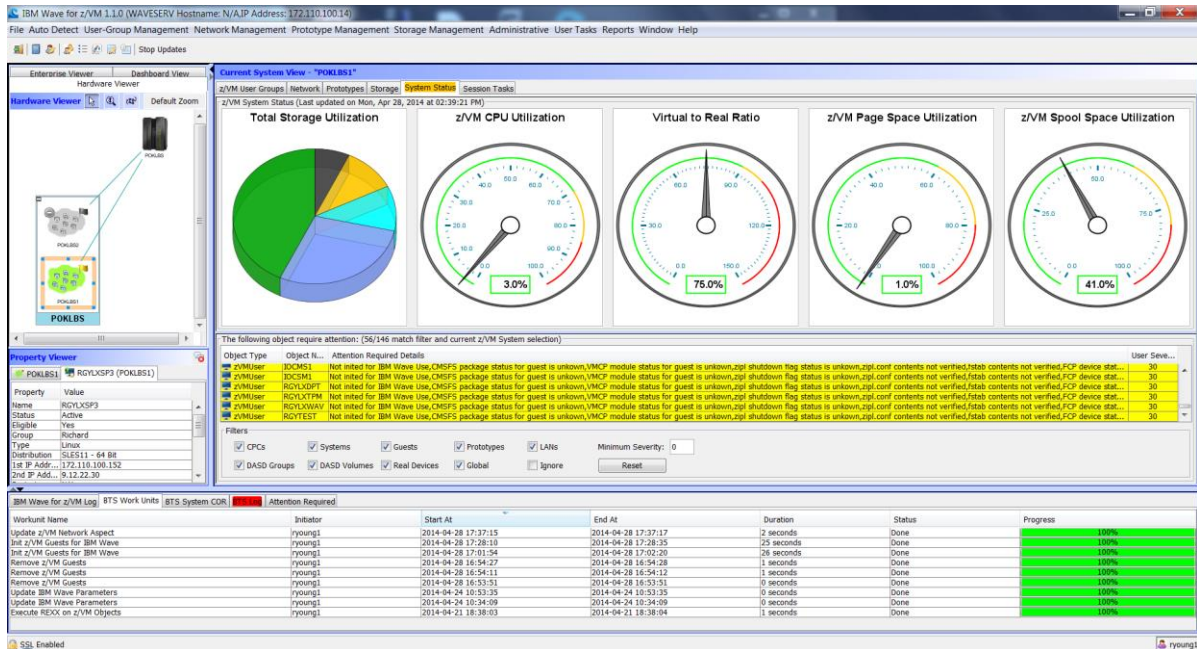
## Monitor

- Variety of CPU, Memory, Page, Spool metrics

## Reporting

- z/VM CPC, System, User reports
- z/VM Guest Lan, Vswitch, Connection
- z/VM Prototype, DASD Group, Volume
- Flagged Objects
- Wave users and permissions

# Resource Monitoring High Level Data



Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Monitoring Storage Drill Down

IBM Wave for z/VM 1.10 (WAYESERV Hostname: N/A/IP Address: 172.10.100.10)

File Auto Detect User-Group Management Network Management Prototype Management Storage Management Administrative User Tasks Reports Window Help

Enterance Views Dashboard View **Current System View "POK1B01"**

Hardware Viewer Hardware Viewer

z/VM User Groups Network Prototypes Storage **System Status** Session Tasks

Select Fields... Export to CSV

35/362 DASD Volumes

Groups	Volume	z/VM System No...	Assigned To	Create by	Device Type	Free	Is Online	Locker	Real Address	Size	Status	Update by
	LSM54	POK1B01	WAVE Daemo...	3390-09	0,23	true			3F0C	6,94	Defined	WAVE Daemo...
	LS3F2A	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F2A	6,94	Defined	WAVE Daemo...
	LS3F32	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F32	6,94	Defined	WAVE Daemo...
	LS3F33	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F33	6,94	Defined	WAVE Daemo...
	LS3F35	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F35	6,94	Defined	WAVE Daemo...
	LS3F36	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F36	6,94	Defined	WAVE Daemo...
	LS3F38	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F38	6,94	Defined	WAVE Daemo...
	LS3F3E	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F3E	6,94	Defined	WAVE Daemo...
	LS3F05	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F05	6,94	Defined	WAVE Daemo...
	LS3F21	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F21	6,94	Defined	WAVE Daemo...
	LS3F22	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F22	6,94	Defined	WAVE Daemo...
	LS3F30	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F30	6,94	Defined	WAVE Daemo...
	LS3F31	POK1B01	WAVE Daemo...	3390-09	0,00	true			3F31	6,94	Defined	WAVE Daemo...
	LS3F32	POK1B01	WAVE Daemo...	3390-09	0,00	true			3F32	6,94	Defined	WAVE Daemo...
	LS3F33	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F33	6,94	Defined	WAVE Daemo...
	LS3F34	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F34	6,94	Defined	WAVE Daemo...
	LS3F35	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F35	6,94	Defined	WAVE Daemo...
	LS3F36	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F36	6,94	Defined	WAVE Daemo...
	LS3F37	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F37	6,94	Defined	WAVE Daemo...
	LS3F38	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F38	6,94	Defined	WAVE Daemo...
	LS3F39	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F39	6,94	Defined	WAVE Daemo...
	LS3F44	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F44	6,94	Defined	WAVE Daemo...
	LS3F57	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F57	6,94	Defined	WAVE Daemo...
	LS3F58	POK1B01	WAVE Daemo...	3390-09	6,94	true			3F58	6,94	Defined	WAVE Daemo...
	PK3R11	POK1B01	WAVE Daemo...	3390-09	2,81	true			3F71	6,94	Defined	WAVE Daemo...
	LS3F76	POK1B01	WAVE Daemo...	3390-09	2,31	true			3F76	6,94	Defined	WAVE Daemo...
	LS3F77	POK1B01	WAVE Daemo...	3390-09	6,44	true			3F77	6,94	Defined	WAVE Daemo...

Property Viewer

POK1B01 | RDVLSXP3 (POK1B01)

Property Value

Name RDVLSXP3

Status Active

Eligible Yes

Group Richard

Type Linux

Distribution SLES11 - 64 Bit

1st IP Addr 172.110.100.152

Def IP Addr 9.12.22.30

Volume Status = Defined

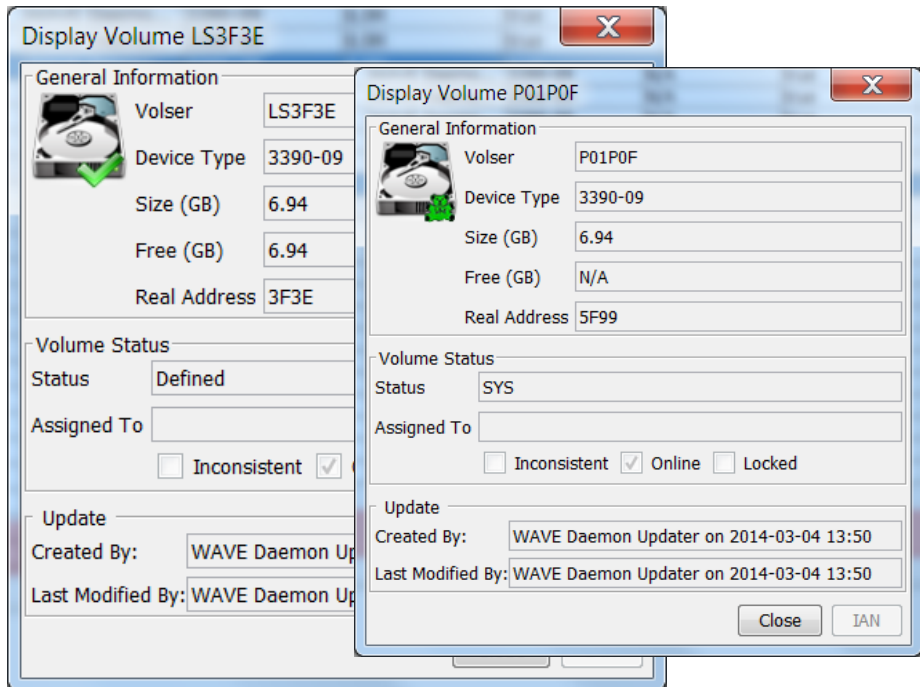
Go Reset

IBM Wave for z/VM Log BTS System CDR **BTS System CDR** Attention Required

Workunit Name	Initiator	Start At	End At	Duration	Status	Progress
Update z/VM Network Aspect	young1	2014-04-28 17:37:15	2014-04-28 17:37:17	2 seconds	Done	100%
Init z/VM Guests for IBM Wave	young1	2014-04-28 17:38:19	2014-04-28 17:38:35	25 seconds	Done	100%
Init z/VM Guests for IBM Wave	young1	2014-04-28 17:41:54	2014-04-28 17:52:20	26 seconds	Done	100%
Remove z/VM Guests	young1	2014-04-28 16:54:27	2014-04-28 16:54:28	1 seconds	Done	100%
Remove z/VM Guests	young1	2014-04-28 16:54:11	2014-04-28 16:54:12	1 seconds	Done	100%
Remove z/VM Guests	young1	2014-04-28 16:53:31	2014-04-28 16:53:33	0 seconds	Done	100%
Update IBM Wave Parameters	young1	2014-04-24 10:53:35	2014-04-24 10:53:35	0 seconds	Done	100%
Update IBM Wave Parameters	young1	2014-04-24 10:34:09	2014-04-24 10:34:09	0 seconds	Done	100%
Execute REDO on z/VM Objects	young1	2014-04-21 18:38:03	2014-04-21 18:38:04	1 seconds	Done	100%

SQL Enabled

# Storage Volume Drill Down



The image shows two overlapping windows from a storage management application. The background window is titled "Display Volume LS3F3E" and the foreground window is titled "Display Volume P01P0F". Both windows have a "General Information" section with fields for Volser, Device Type, Size (GB), Free (GB), and Real Address. The foreground window also has a "Volume Status" section with fields for Status, Assigned To, and checkboxes for Inconsistent, Online, and Locked. Both windows have an "Update" section with fields for Created By and Last Modified By. The foreground window has "Close" and "IAN" buttons at the bottom right.

**Display Volume LS3F3E**

**General Information**

Volser: LS3F3E  
Device Type: 3390-09  
Size (GB): 6.94  
Free (GB): 6.94  
Real Address: 3F3E

**Volume Status**

Status: Defined  
Assigned To:   
 Inconsistent

**Update**

Created By: WAVE Daemon Up  
Last Modified By: WAVE Daemon Up

**Display Volume P01P0F**

**General Information**

Volser: P01P0F  
Device Type: 3390-09  
Size (GB): 6.94  
Free (GB): N/A  
Real Address: 5F99

**Volume Status**

Status: SYS  
Assigned To:   
 Inconsistent  Online  Locked

**Update**

Created By: WAVE Daemon Updater on 2014-03-04 13:50  
Last Modified By: WAVE Daemon Updater on 2014-03-04 13:50

Close IAN

# Monitoring CPU Drill Downs

Performance Statistics

Update Every **When Changed**

Graphical View **Textual View** Virtual Machines Utilization

Total CPU Utilization

3%

Individual CPU Utilization

CPU Num...	Type	Utilizat
00	CP	<div style="width: 100%;"></div>
01	CP	<div style="width: 100%;"></div>
02	CP	<div style="width: 100%;"></div>
03	CP	<div style="width: 100%;"></div>

Paging

4

Waiting for Update Event from BTS

Performance Statistics

Update Every **When Changed**

Graphical View **Textual View** Virtual Machines Utilization

Include IBM Service Machines

Virtual Machines Utilization - Interval Start : 15:55:59 End : 15:56:59

User Name	Share Type	Share Value	# Of CPUs	%CPU
HECLX001	RELATIVE	100	2	0%
HECLX002	RELATIVE	100	2	0%
HECLX003	RELATIVE	100	2	0%
HXBIX001	RELATIVE	100	2	0%
RGYLMNT	RELATIVE	100	2	0%
<b>RGYLR64</b>	<b>RELATIVE</b>	<b>500</b>	<b>2</b>	<b>0%</b>
RGYXSP2	RELATIVE	500	2	0%
RGYXSP3	RELATIVE	800	2	1%
RGYXVPN	RELATIVE	500	2	0%
RGYXWS8	RELATIVE	500	2	0%
RGYX002	RELATIVE	500	3	0%

User Detailed Information For User : RGYLR64

CPU Utilization Summary

	Total %Util.	Supervisor %U...	Emulated %Util
Summary	0%	0%	0%

Shared Details

Share Type : RFI ATIVE

Share : 500

Max Share Type : N/A

Max Share : N/A

Detailed CPU Utilization

#CPU	Total %Util.	Supervisor %U...	Emulated %Util
00	0%	0%	0%
01	0%	0%	0%

Storage Details

Defined Storage : 4096MB

Storage < 2GB : 0 Pages

Storage > 2GB : 643051 Pages

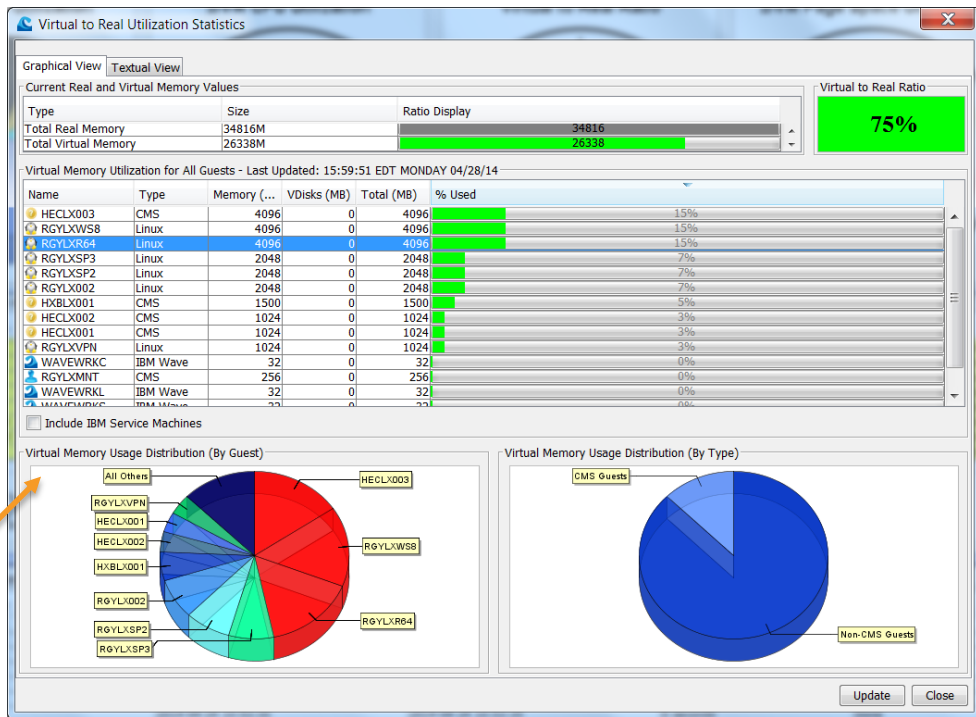
Update Close

Waiting for Update Event from BTS or User Action

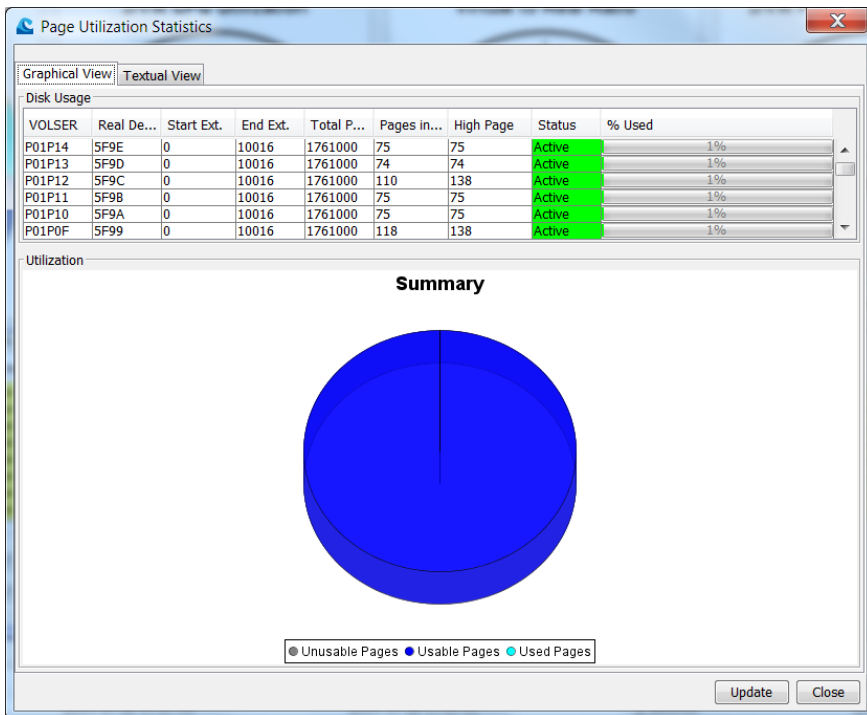
Complete your session evaluation



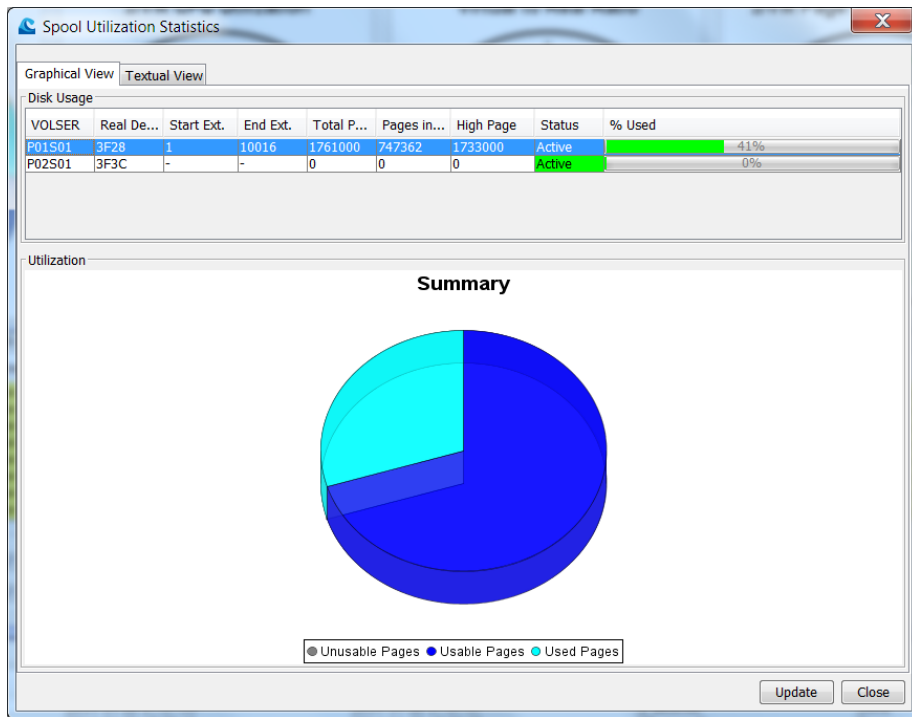
# Monitoring Memory Drill Down



# Monitoring Paging Drill Down

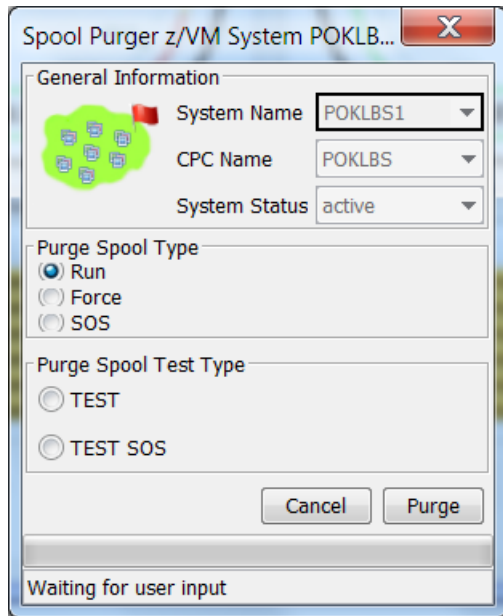


# Monitoring Spool Drill Down



# z/VM Spool Management

- Utilizes SFPurger
- You select and execute the purge policy
- Policy would be on the maint 193 disk



# Virtual Networking with IBM Wave

- Network topology visualized
- You can filter and customize the display

File Auto Detect User-Group Management Network Management Prototype Management Storage Management Administrative User Tasks Reports Window Help

Hardware Viewer | Default Zoom | Show Legend | Show Filter...

Current System View - "POKLBS1"

z/VM User Groups Network Prototypes Storage Session Tasks

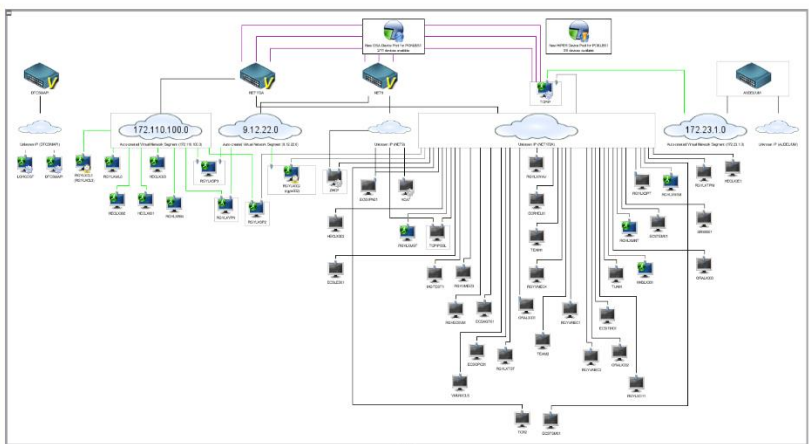
Refreshed Views: Enable All, VLAN View, Logical View, Physical View, Custom View

By Layers: External, VLAN, Physical, VLS, VMS, Guests

Layout: [Icons]

Property Viewer

Property	Value
Name	POKLBS1
IP Address	9.12.22.250
Status	ACTIVE
Total Users	284
Total Vols...	4
Total Prob...	4
Total Vols...	362
Total Vols...	6
BASE Free...	278.08 GB
BASE Stor...	625.05 GB
BASE Stor...	2,236.28 GB
Modified by	WAVEmc on 2014-05-06 23:10



SSL Enabled

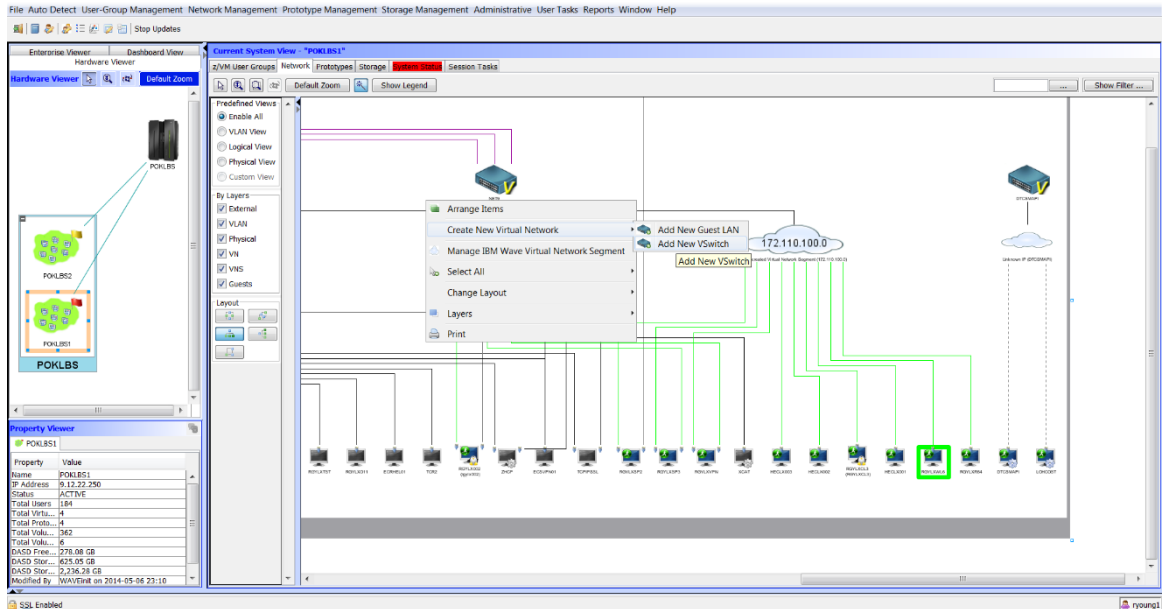
Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

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in Orlando 2015



# Virtual Networking with IBM Wave

- Add a new virtual switch or guest lan



The screenshot displays the IBM Wave software interface for network management. The main window shows a network diagram with various components like switches, servers, and virtual networks. A context menu is open over a switch, listing options such as "Arrange Items", "Create New Virtual Network", "Add New Guest LAN", and "Add New VSwitch". The "Add New VSwitch" option is highlighted. The interface includes a sidebar with navigation options and a property viewer at the bottom left.


Property Viewer

Property	Value
Name	POKLBS1
IP Address	9.12.22.250
Status	ACTIVE
Total Users	184
Total Virts...	4
Total Probl...	4
Total Vals...	342
Total Vals...	6
DASD Free...	278.08 GB
DASD Stor...	625.05 GB
DASD Stor...	2,736.28 GB
Modified By	WAVEnt on 2014-05-06 23:10

# Virtual Networking with IBM Wave

- New virtual switch dialog

General Information

 Name:  Owner:

z/VM System:  Default NIC:

Lifespan:  Temporary  Persistent  Permanent

Created By:

Modified By:

Descriptive **Connected Segments** VSwitch Specific

-VSwitch Specific Details

VLAN Aware Default VLAN ID:

Layer type:

Assigned Real Devices

Device Pool Name:

**No devices found for VSwitch**

Waiting for user input

# Virtual Networking with IBM Wave

- Drawing a new network connection

File Auto Detect User-Group Management Network Management Prototype Management Storage Management Administrative User Tasks Reports Window Help

Hardware Viewer | Default Zoom | Stop Updates

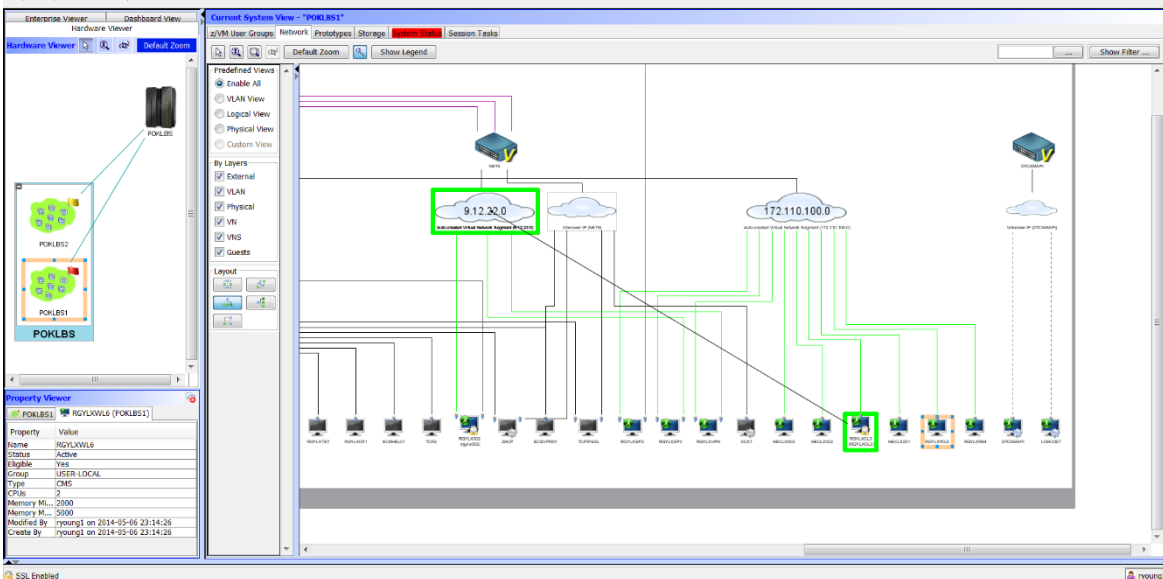
Enterprise Viewer: Dashboard View | Hardware Viewer | **Current System View - "POKLS1"** | VM User Groups | Network | Prototypes | Storage | Session Tests

Hardware Viewer | Default Zoom | Show Legend

Prefined Views  
 Enable All  
 VLAN View  
 Logical View  
 Physical View  
 Custom View

By Layers  
 External  
 VLAN  
 Physical  
 VNI  
 Guests

Layout



Property Viewer

Property	Value
Name	RDYXWLS6 (POKLS1)
Status	Active
Eligible	Yes
Group	USER-LOCAL
Type	CMS
CPUs	
Memory M...	2000
Memory M...	2000
Modified by	young1 on 2014-05-08 23:14:26
Create by	young1 on 2014-05-08 23:14:26

SSL Enabled | young1



# Virtual Networking with IBM Wave

- New connection dialog
- Does **NOT** make RACF calls for VMLAN

Connect The Following Users to the virtual network

Name	System	New IP Address	Status
<input checked="" type="checkbox"/> RGYLXCL3	POKLBS1	9.12.22.2	Ready

Select All   Deselect All   Toggle Selection   Show Filtering   Parallel

Select connection options

Connect through Virtual Network:  Using VLAN ID:  And Port Type:

Hide   Cancel   Go

Waiting for user input

# Virtual Networking with IBM Wave

- Override default IP address selection for new connection

Connect The Following Users to the virtual network

Name	System	New IP Address	Status
<input checked="" type="checkbox"/> RGYLXCL3	POKLBS1	9.12.22.21	Ready

Select All   Deselect All   Toggle Selection   Show Filtering   Parallel

Select connection options

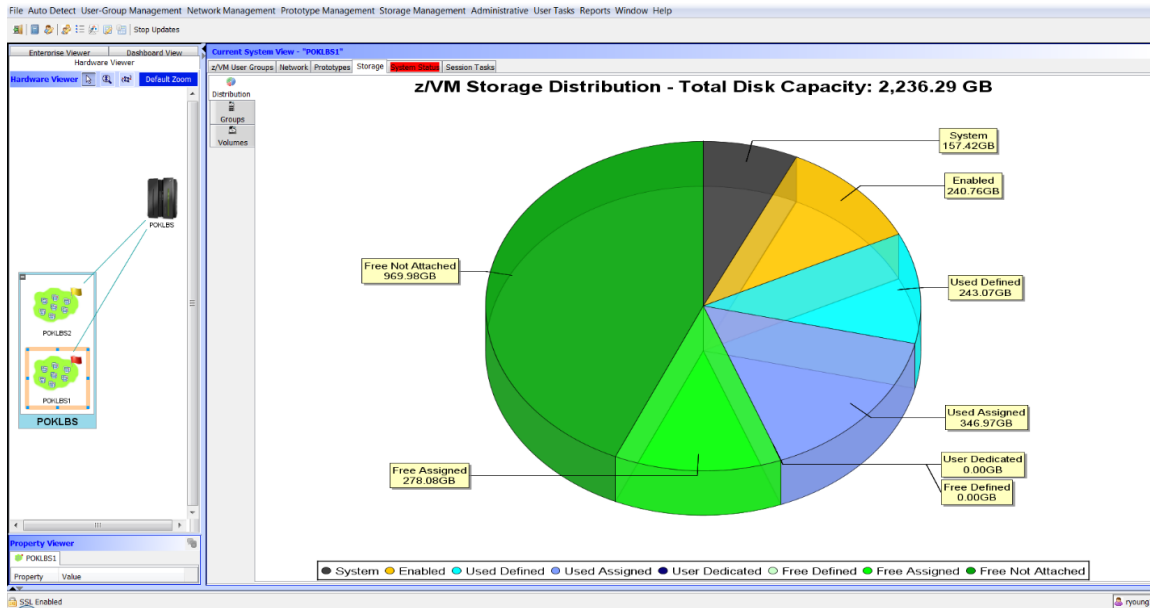
Connect through Virtual Network: NET9 (zVMVSwitch) Using VLAN ID:  And Port Type: ACCESS

Hide   Cancel   Go

Waiting for user input

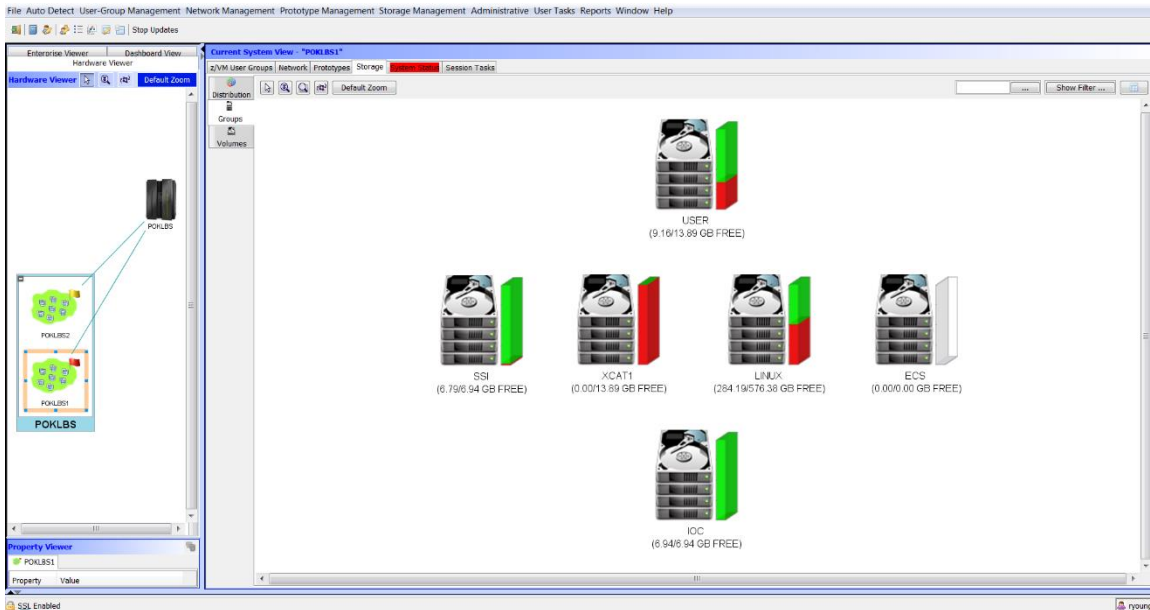
# IBM Wave Storage Management

- High level storage breakdown



# IBM Wave Storage Management

- Storage groups
- Groups with no entries are NOT supported



The screenshot displays the IBM Wave Storage Management interface. The main window is titled "Current System View - \*POKLS1\*" and shows a hierarchical view of storage resources. On the left, a "Hardware Viewer" pane shows a tree structure with nodes for POKLBS, POKLBS2, POKLBS1, and POKLBS. The main area displays a "Distribution" view of storage volumes, each represented by a disk icon with a colored bar indicating usage. The volumes and their free space are:

Volume Name	Free Space
USER	9.10/13.89 GB FREE
SSI	6.79/6.94 GB FREE
XCAT1	0.00/13.89 GB FREE
LINUX	284.19/576.38 GB FREE
ECS	0.00/0.00 GB FREE
IOC	6.94/6.94 GB FREE

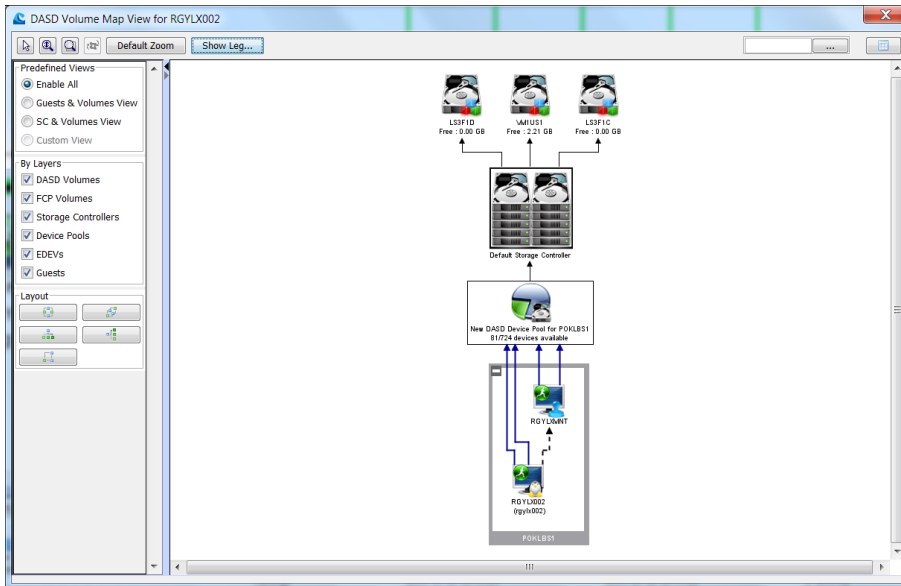
The interface includes a menu bar (File, Auto Detect, User-Group Management, Network Management, Prototype Management, Storage Management, Administrative, User Tasks, Reports, Window, Help) and a toolbar with icons for distribution, search, and zoom. A "Property Viewer" pane at the bottom left shows details for the selected POKLS1 group.

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)



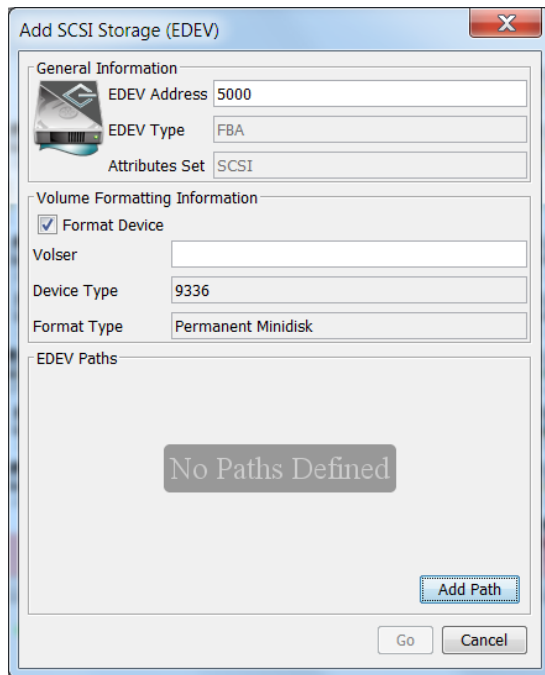
# Storage Map Visualized

- Storage resources of individual guest
- Dependent on external entity definitions and device pools



# Storage Management - EDEVs

- You can now add/define SCSI/EDEV storage to z/VM
- Begin by clicking “Add Path”
- z/VM enabled for dynamic IO with HCD/HCM can only have EDEVs defined in the IOGEN and not via CP SET EDEV” In this case EDEVs are exclusively defined in the IOGEN



Add SCSI Storage (EDEV)

**General Information**

EDEV Address: 5000

EDEV Type: FBA

Attributes Set: SCSI

**Volume Formatting Information**

Format Device

Volser:

Device Type: 9336

Format Type: Permanent Minidisk

**EDEV Paths**

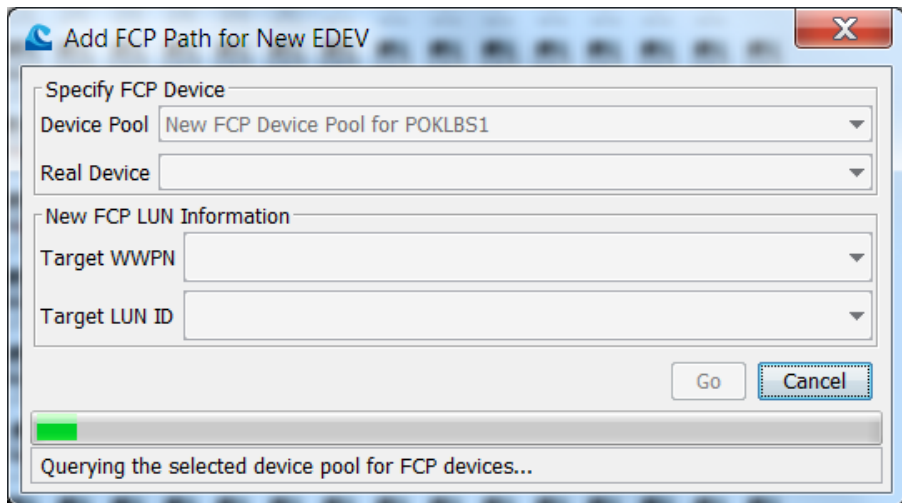
No Paths Defined

Add Path

Go Cancel

# Storage Management - EDEVs

- Select the FCP device pool you wish to use



Add FCP Path for New EDEV

Specify FCP Device

Device Pool

Real Device

New FCP LUN Information

Target WWPN

Target LUN ID

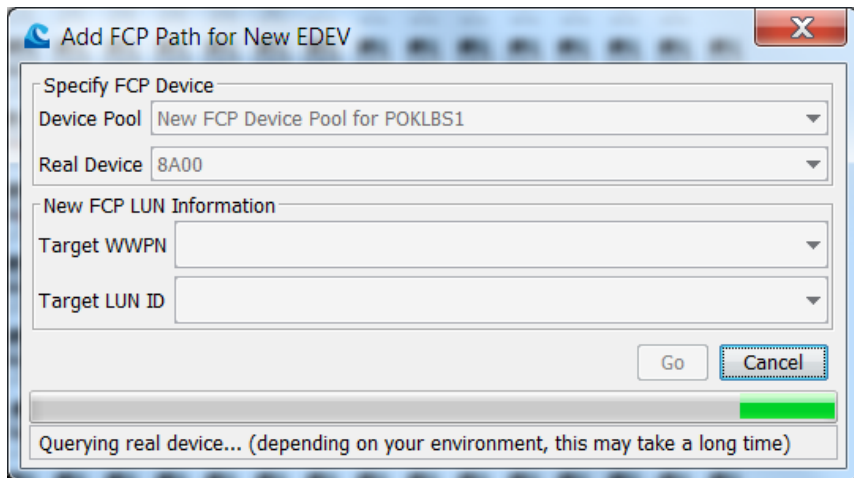
Go Cancel

Querying the selected device pool for FCP devices...



# Storage Management - EDEVs

- Select the REAL FCP device from the pool
- The list of potential target WWPNs will be presented
- Note the comment at the bottom of the dialog



Add FCP Path for New EDEV

Specify FCP Device

Device Pool New FCP Device Pool for POKLBS1

Real Device 8A00

New FCP LUN Information

Target WWPN

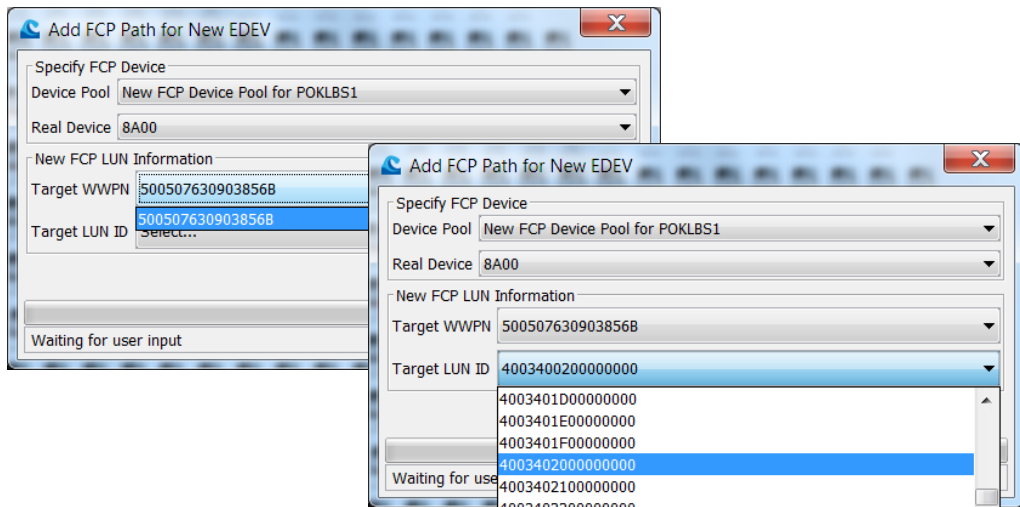
Target LUN ID

Go Cancel

Querying real device... (depending on your environment, this may take a long time)

# Storage Management - EDEVs

- Select the target WWPN and LUN
- Proper switch zoning and storage subsystem host definitions are important for security and performance



# Storage Management - EDEVs


- Confirm the device add
- Repeat process to add more paths (highly recommended)

### Confirm Disk

Specified path points to:  
Real Device Address: 8A00  
Unique Disk ID: 6005076309FFC56B00000000  
Size (GB): 20.0  
Are you sure you want to proceed?

### Add SCSI Storage (EDEV)

**General Information**

 EDEV Address: 5000  
EDEV Type: FBA  
Attributes Set: SCSI

**Volume Formatting Information**

Format Device

Volser:   
Device Type: 9336  
Format Type: Permanent Minidisk

**EDEV Paths**

FCP Device	WWPN	LUN
8A00	500507630903856B	4003402D00000000

# Storage Management - EDEVs

- Set your VOLSER and confirm you EDEV Address is unique
- The process for formatting the devices make take a little time depending upon its size

Add SCSI Storage (EDEV)

**General Information**

EDEV Address: 5000

EDEV Type: FBA

Attributes Set: SCSI

**Volume Formatting Information**

Format Device

Volser: LSE02D

Device Type: 9336

Format Type: Permanent Minidisk

**EDEV Paths**

FCP Device	WWPN	LUN
8A00	500507630903856B	4003402D00000000

Add Path

Go Cancel

Workunit Details

Workunit Name: Create EDEV Workunit Start Time: 2014-10-08 14:08:31

Workunit ID: 2014-10-08 14:08:31\_737 Workunit End Time:

Workunit Initiator: ryoung1 Workunit Duration:

Workunit Status: Active

**BTS Requests**

Request Name	Status	Progress
Create new EDEV 5000 in z/VM System POKLBS1	Done	100%
Format DASD Volume LSE02D in z/VM System POKLBS1	Active	20%
Attach DASD Volume LSE02D to SYSTEM( POKLBS1)	Scheduled	0%

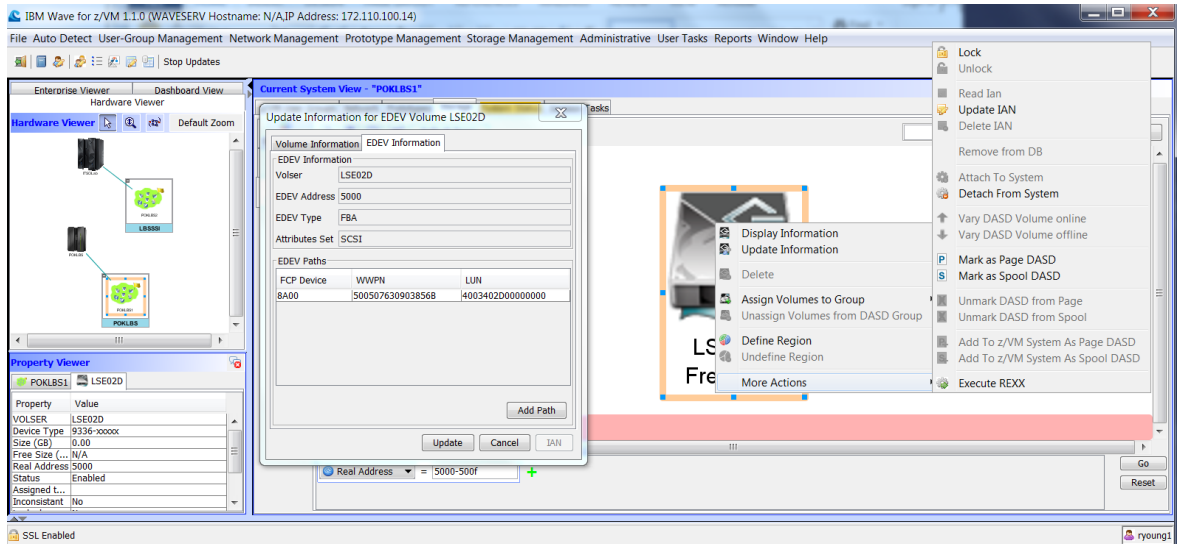
**COR Entries**

Select a BTS Request

Log for All Requests Close

# Storage Management - EDEVs

- Once the format is complete, you can perform all the tasks you would normally expect. You could add more paths, define region, add to an extent control group or whatever you wish.



The screenshot displays the IBM Wave for z/VM 1.1.0 interface. The main window is titled "Current System View - \*POKLBS1\*". A dialog box titled "Update Information for EDEV Volume LSE02D" is open, showing the following information:

EDEV Paths		
FCP Device	WWPN	LUN
BA00	5005076309038568	4003402000000000

Below the table, there is a "Real Address" field set to "5000-500f". The dialog also includes "Update", "Cancel", and "IAN" buttons. A context menu is visible over the volume, listing actions such as "Display Information", "Update Information", "Delete", "Assign Volumes to Group", "Define Region", and "More Actions". The background shows a hardware viewer with a diagram of the storage configuration and a property viewer for the selected volume.

# Session Agenda

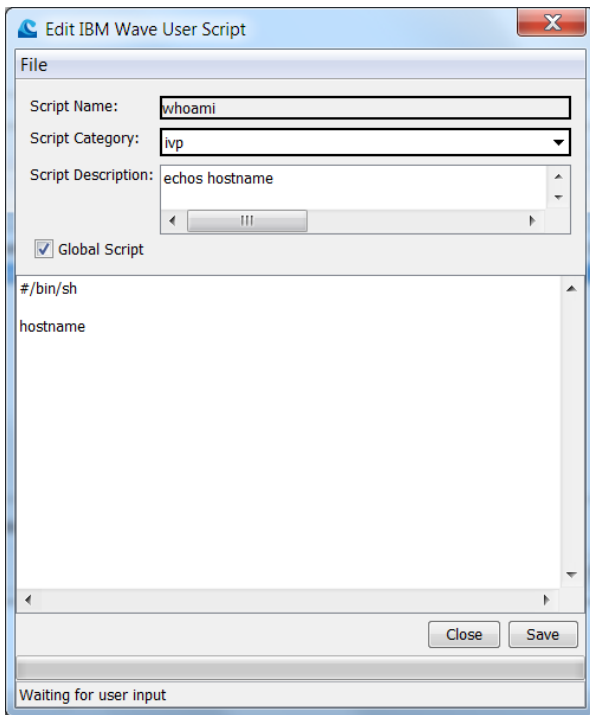


- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- Guest discovery and initialization for Wave
- z/VM System Management Use Cases
- **Linux System Management Use Cases**
  - Provisioning/Cloning
  - BMI
  - LGR
- Customize and Extend

# Linux Systems Management

- Operational and Life Cycle Functions
  - Activate
  - Deactivate
  - Recycle
  - Status
  - Pause
  - Resume
  - Send Message
  - Execute Script/Exec
  - Console Access
  - Clone or Install (including cross system)
  - SSI Live Guest Relocate
  - Lock/Unlock
  - Manage Storage
  - Change memory configuration
  - Change Virtual CPs
  - Activation System (Default home)
  - Activation Levels (ie Database, App Server, HTTP Server in sequence)
- Monitoring
  - Filesystem type, utilization, mount point
  - Process level details
  - Network Interface information
  - Routes
  - Reachability
- Project Assignment
- Classification
- Other
  - Add network connection
  - Disconnect an existing connection
  - IANs

# Linux Scripts from IBM Wave



Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)



# Linux Scripts from IBM Wave

Execute Script (1/1) Selected

Specify user credentials for script execution

Linux User Name:

Specify Password:

Use Public/Private Key File:    Specify Key Passphrase


Execute Selected Script on the following z/VM Users

Name	System	User Name	Password	Status
<input checked="" type="checkbox"/> RGYLXWS8	POKLBS1	Default User	••••••	Ready

With the following Execution Options:

Script Name:   NFS Server:

Script Parameters:  Debug Options:

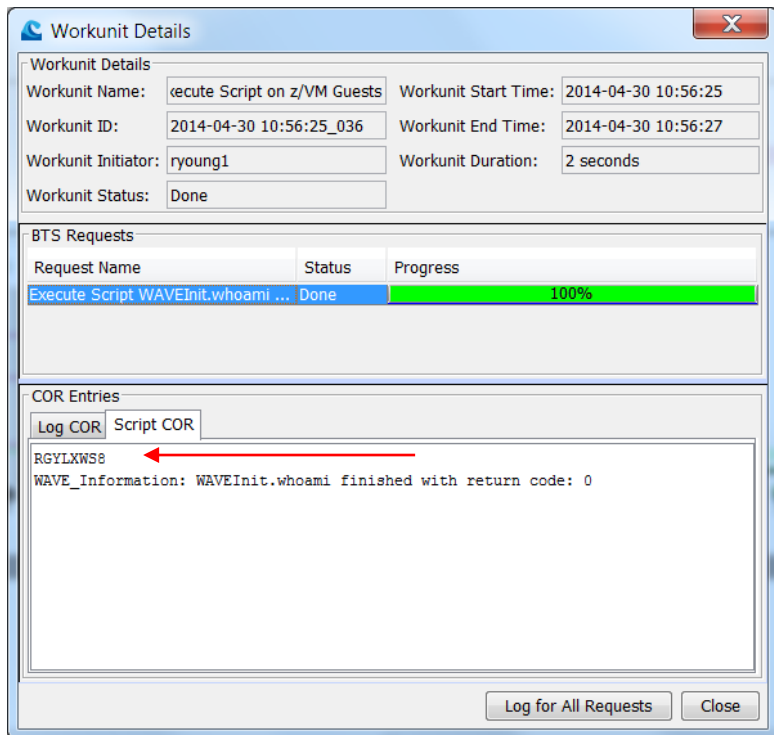
Script Description:  

Created By:  Last Modified By:

Waiting for user input

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Linux Script Execution and Output



Workunit Details

Workunit Name:  Workunit Start Time:

Workunit ID:  Workunit End Time:

Workunit Initiator:  Workunit Duration:

Workunit Status:

BTS Requests

Request Name	Status	Progress
Execute Script WAVEInit.whoami ...	Done	100%

COR Entries

```
RGYLXWS8  
WAVE_Information: WAVEInit.whoami finished with return code: 0
```

# Manage Linux Storage

Manage z/VM User RGYLXR64 Storage

General Information

z/VM Guest Name: RGYLXR64  
z/VM System Name: POKLBS1  
SDG Name: Richard

Linux File Systems | LVM Volume Groups

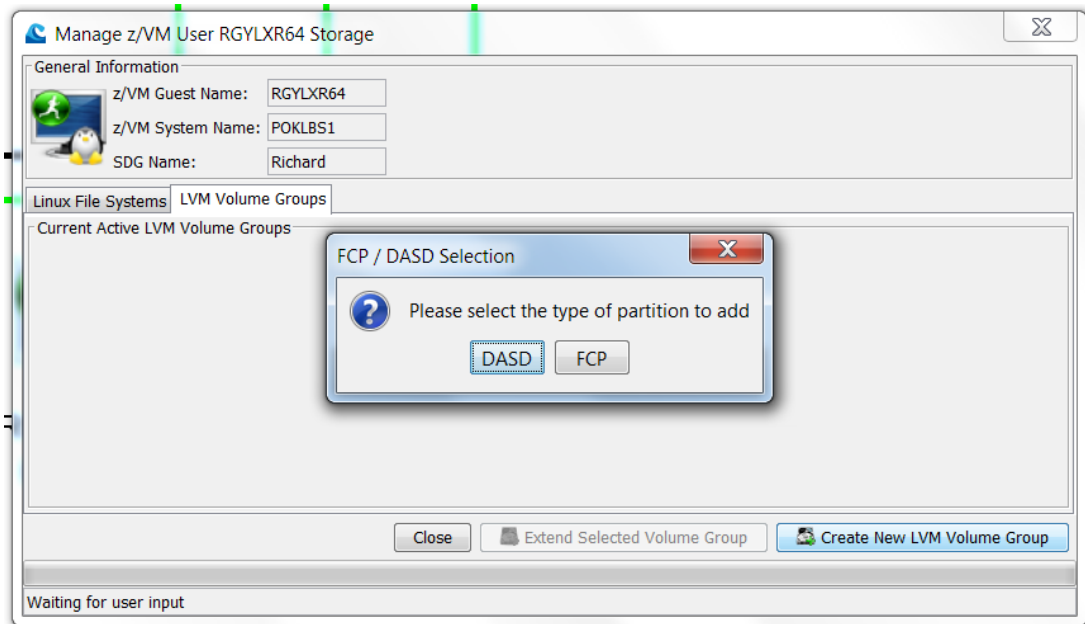
Current Active File Systems on Server

Device	FS Type	Size (GB)	used (GB)	Free (GB)	Type	Storage T...	Mount Point	Status (Capacity)
/dev/dasda1	ext4	6.77	4.86	1.56	STD	DASD	/	71%
proc	proc	0.00	0.00	0.00	STD	DASD	/proc	0%
sysfs	sysfs	0.00	0.00	0.00	STD	DASD	/sys	0%
devpts	devpts	0.00	0.00	0.00	STD	DASD	/dev/pts	0%
tmpfs	tmpfs	1.90	0.00	1.90	STD	DASD	/dev/shm	0%
none	binfmt_...	0.00	0.00	0.00	STD	DASD	/proc/sys/fs/binf...	0%

Close   Extend Partition   Create New Partition...

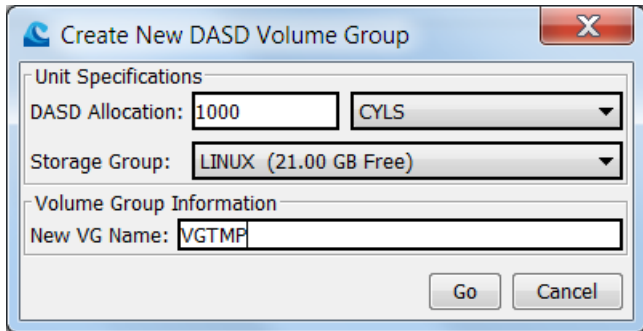
Waiting for user input

# Manage Linux Storage



The screenshot shows a web-based management interface for a z/VM user named RGYLXR64. The main window has a title bar "Manage z/VM User RGYLXR64 Storage" and a close button. It contains a "General Information" section with fields for "z/VM Guest Name" (RGYLXR64), "z/VM System Name" (POKLBS1), and "SDG Name" (Richard). Below this are tabs for "Linux File Systems" and "LVM Volume Groups". The "LVM Volume Groups" tab is active, showing "Current Active LVM Volume Groups". A modal dialog box titled "FCP / DASD Selection" is open, containing a question mark icon and the text "Please select the type of partition to add". There are two buttons: "DASD" (which is highlighted with a dashed border) and "FCP". At the bottom of the main window are three buttons: "Close", "Extend Selected Volume Group", and "Create New LVM Volume Group". The status bar at the bottom left says "Waiting for user input".

# Manage Linux Storage



The screenshot shows a dialog box titled "Create New DASD Volume Group" with a close button (X) in the top right corner. The dialog is divided into two sections: "Unit Specifications" and "Volume Group Information".

**Unit Specifications:**

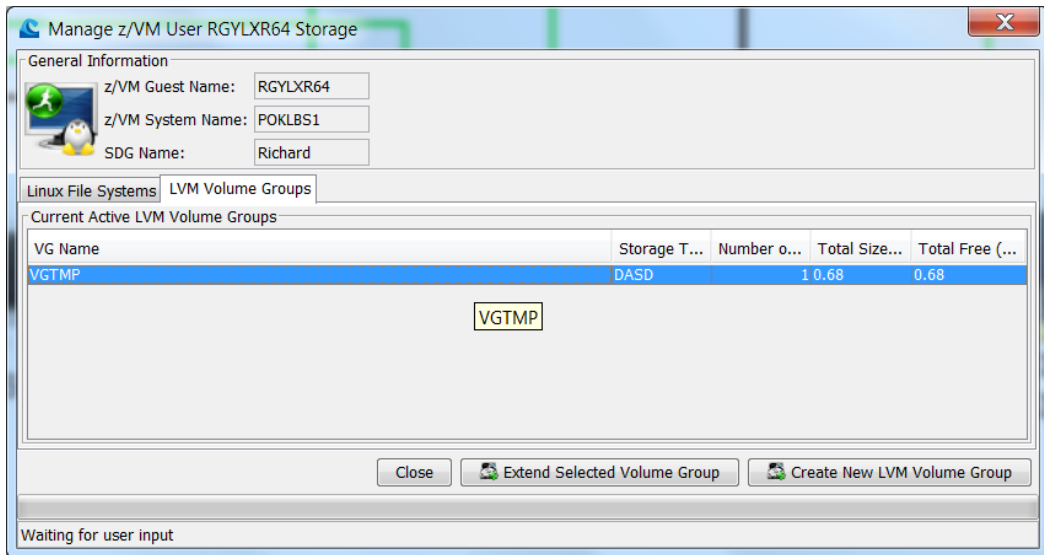
- DASD Allocation: 1000
- Unit: CYLS
- Storage Group: LINUX (21.00 GB Free)

**Volume Group Information:**

- New VG Name: VGTMP

At the bottom right of the dialog are two buttons: "Go" and "Cancel".

# Manage Linux Storage



Manage z/VM User RGYLXR64 Storage

General Information

z/VM Guest Name: RGYLXR64

z/VM System Name: POKLBS1

SDG Name: Richard

Linux File Systems | LVM Volume Groups

Current Active LVM Volume Groups

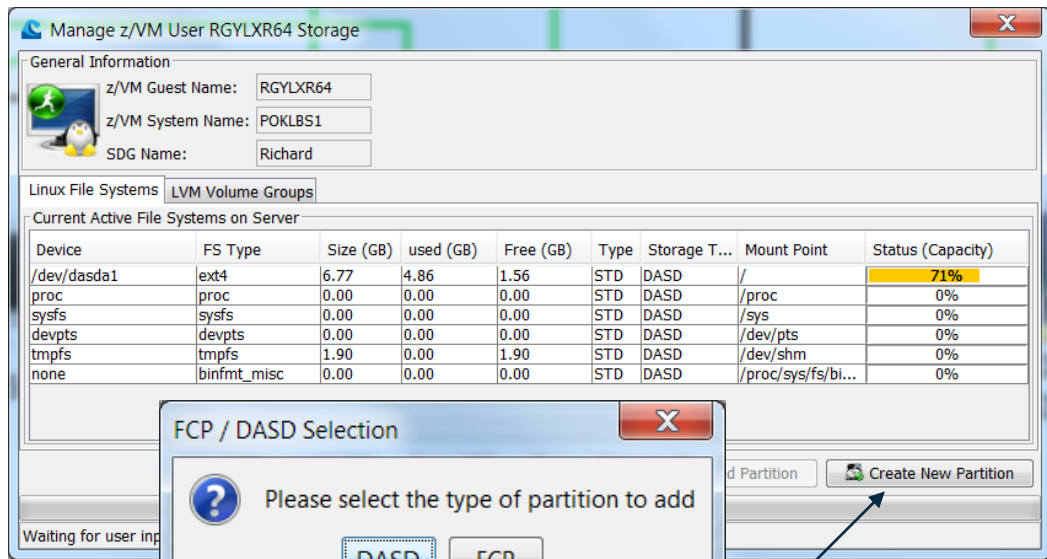
VG Name	Storage T...	Number o...	Total Size...	Total Free (...)
VGTMP	DASD	1	0.68	0.68

VGTMP

Close | Extend Selected Volume Group | Create New LVM Volume Group

Waiting for user input

# Manage Linux Storage



Manage z/VM User RGYLXR64 Storage

General Information

z/VM Guest Name: RGYLXR64  
z/VM System Name: POKLBS1  
SDG Name: Richard

Linux File Systems | LVM Volume Groups

Current Active File Systems on Server

Device	FS Type	Size (GB)	used (GB)	Free (GB)	Type	Storage T...	Mount Point	Status (Capacity)
/dev/dasda1	ext4	6.77	4.86	1.56	STD	DASD	/	71%
proc	proc	0.00	0.00	0.00	STD	DASD	/proc	0%
sysfs	sysfs	0.00	0.00	0.00	STD	DASD	/sys	0%
devpts	devpts	0.00	0.00	0.00	STD	DASD	/dev/pts	0%
tmpfs	tmpfs	1.90	0.00	1.90	STD	DASD	/dev/shm	0%
none	binfmt_misc	0.00	0.00	0.00	STD	DASD	/proc/sys/fs/bi...	0%

FCP / DASD Selection

Please select the type of partition to add

DASD FCP

Create New Partition

# Manage Linux Storage

Create New DASD Partition

Unit Specifications

DASD Allocation: 500 MB (CKD)

Storage Group: LINUX (20.30 GB Free)

Partition Definitions

Standard Partition  LVM

VG Name VGTMP LV Name LVTMP

File System Options

FS Type: ext3

Mount on /tmp

Add new filesystem to /etc/fstab

Go Cancel



# Manage Linux Storage

### Workunit Details

Workunit Name:  Workunit Start Time:

Workunit ID:  Workunit End Time:

Workunit Initiator:  Workunit Duration:

Workunit Status:

### BTS Requests

Request Name	Status	Progress
Add 500 MB (CKD) to Guest RGYLXR64(POKLBS1)	Done	100%
Create New DASD Partition for z/VM Guest RGYLXR64 (POKLBS1)	Done	100%
Create or Extend LVM Volume Group VGTMP for z/VM Guest RGYLXR64 (POKLBS1)	Done	100%
Create or Extend LVM Logical Volume LVTMP for z/VM Guest RGYLXR64 (POKLBS1)	Done	100%
Create New ext3 Filesystem for z/VM Guest RGYLXR64 (POKLBS1)	Done	100%
Update Storage Aspect for z/VM Directory New Directory for POKLBS1(POKLBS1)	Done	100%

### COR Entries

Select a BTS Request

# Manage Linux Storage – Added VG and LVM

Manage z/VM User RGYLXR64 Storage

General Information

z/VM Guest Name: RGYLXR64  
z/VM System Name: POKLBS1  
SDG Name: Richard

Linux File Systems | LVM Volume Groups

Current Active File Systems on Server

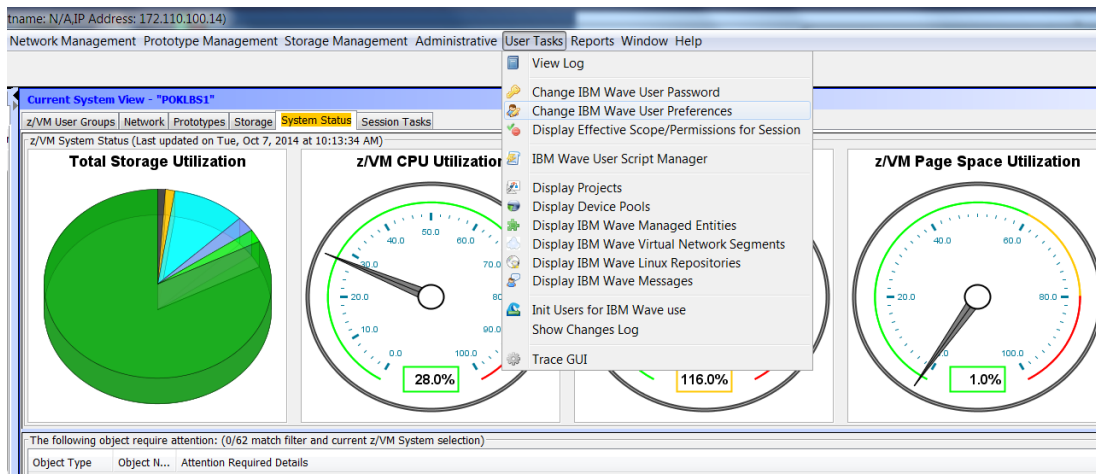
Device	FS Type	Size (GB)	used (GB)	Free (GB)	Type	Storage Type	Mount Point	Status (Capacity)
/dev/dasda1	ext4	6.77	4.86	1.56	STD	DASD	/	71%
proc	proc	0.00	0.00	0.00	STD	DASD	/proc	0%
sysfs	sysfs	0.00	0.00	0.00	STD	DASD	/sys	0%
devpts	devpts	0.00	0.00	0.00	STD	DASD	/dev/pts	0%
tmpfs	tmpfs	1.90	0.00	1.90	STD	DASD	/dev/shm	0%
none	binfmt_misc	0.00	0.00	0.00	STD	DASD	/proc/sys/fs/binf...	0%
/dev/mapper/VGTMP-LVTMP	ext3	1.15	0.03	1.10	LVM	DASD	/tmp	2%

Close   Extend Partition   Create New Partition...

Waiting for user input

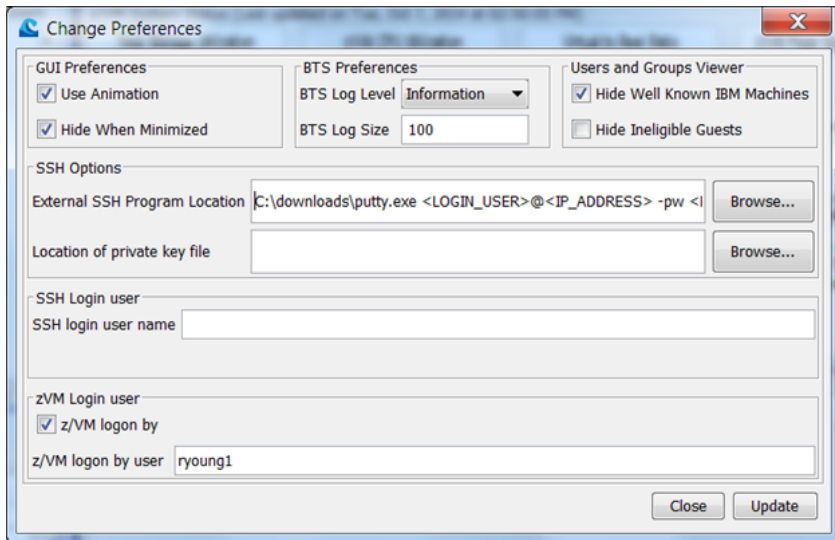
# Linux Console/Shell Access

- User preference must be set in order to launch a shell session
- The application launched is NOT part of IBM Wave for z/VM



# Linux Console/Shell Access

- The program location and variables must set to launch the terminal program you chose to use



**Change Preferences**

**GUI Preferences**

- Use Animation
- Hide When Minimized

**BTS Preferences**

BTS Log Level: **Information**

BTS Log Size: **100**

**Users and Groups Viewer**

- Hide Well Known IBM Machines
- Hide Ineligible Guests

**SSH Options**

External SSH Program Location:  **Browse...**

Location of private key file:  **Browse...**

**SSH Login user**

SSH login user name:

**zVM Login user**

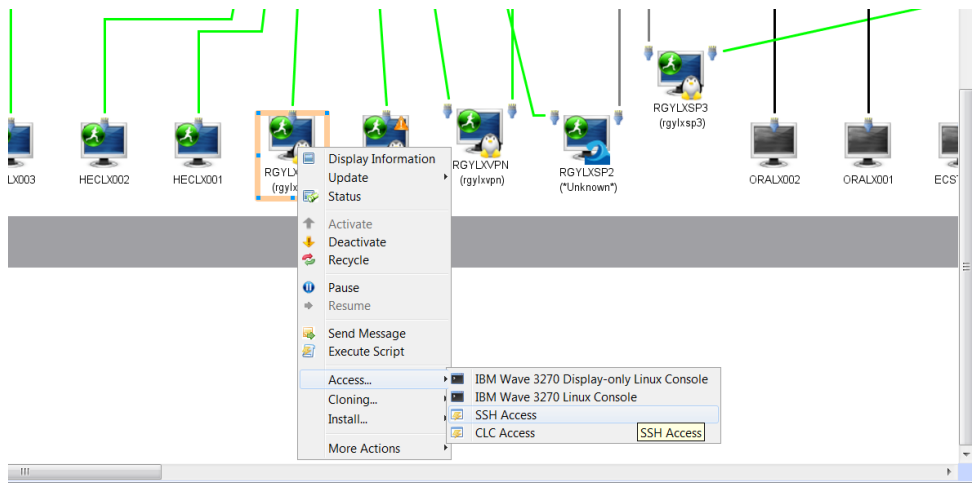
- z/VM logon by

z/VM logon by user:

**Close** **Update**

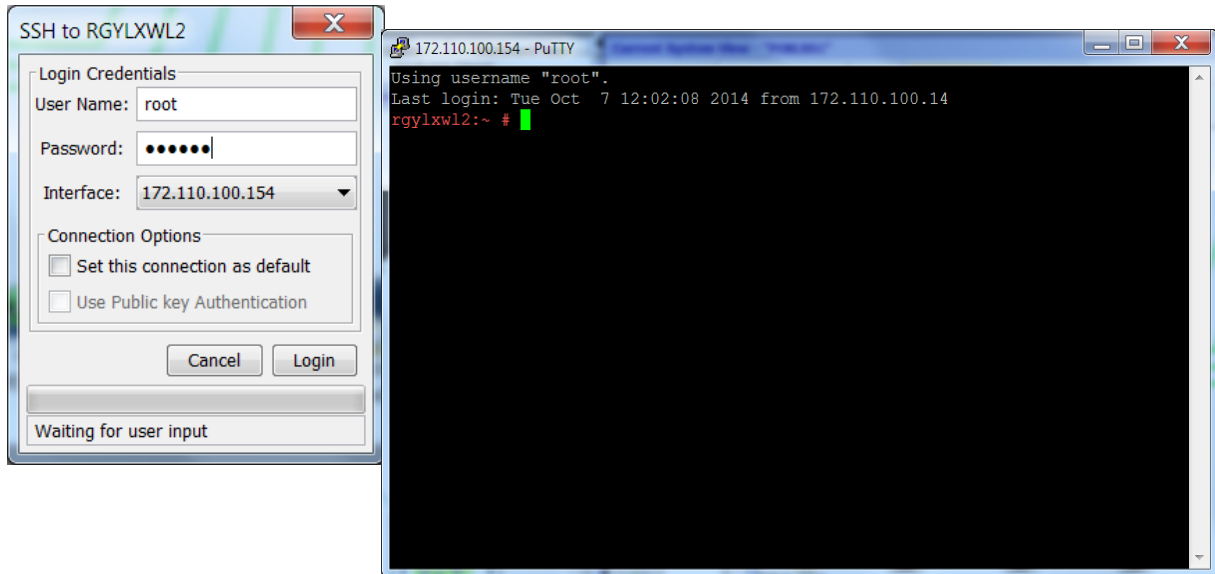
# Linux Console/Shell Access

- From any active Linux virtual server you can select either the 3270 console access or ssh/clc access
- ssh will use a regular TCPIP connection to Linux OS, CLC does not. It requires TCPIP to z/VM only



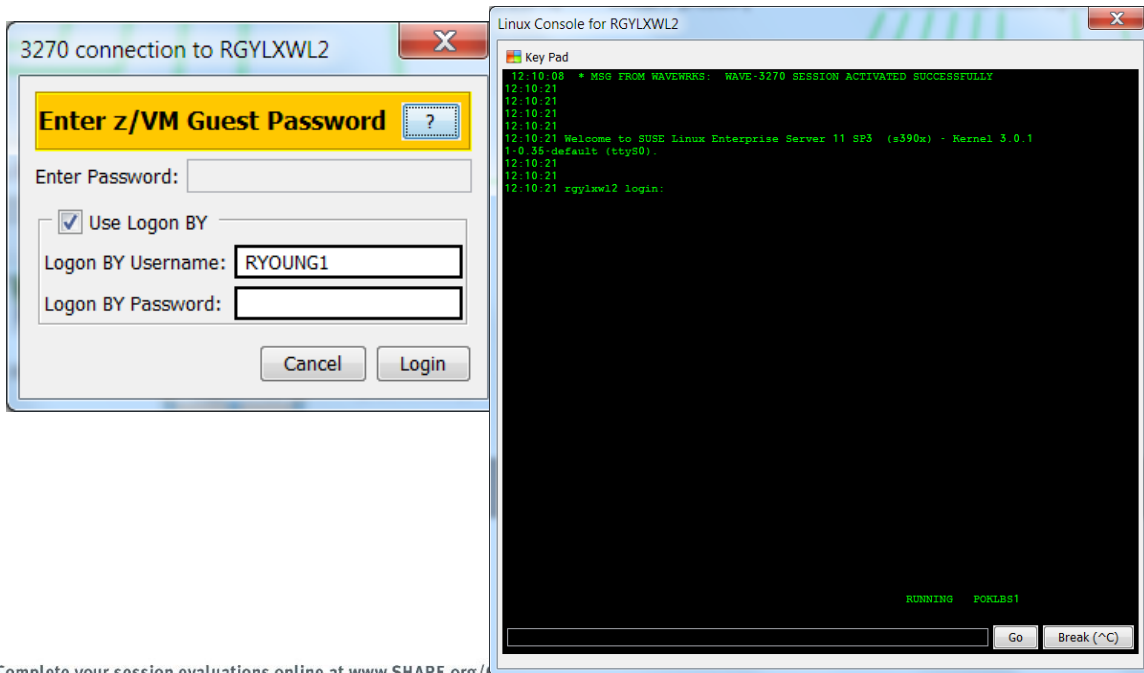
# Linux Console/Shell Access

- You must provide credentials (could be key based)
- Provides easy navigation if you are in Wave to a shell session



# Linux Console/Shell Access

- You must provide credentials (could be key based)
- Provides easy navigation if you are in Wave to a shell session



The screenshot displays two overlapping windows. The left window, titled "3270 connection to RGYLXWL2", features a yellow header "Enter z/VM Guest Password" with a help icon. Below it is a "Enter Password:" field, a checked "Use Logon BY" checkbox, a "Logon BY Username:" field containing "RYOUNG1", and an empty "Logon BY Password:" field. "Cancel" and "Login" buttons are at the bottom. The right window, titled "Linux Console for RGYLXWL2", shows a terminal with a "Key Pad" icon and the following text:

```
12:10:08 * MSG FROM HAVENRES: HAWE-3270 SESSION ACTIVATED SUCCESSFULLY
12:10:21
12:10:21
12:10:21
12:10:21 Welcome to SUSE Linux Enterprise Server 11 SP3 (s390x) - Kernel 3.0.1
1-0-35-default (ttyS0).
12:10:21
12:10:21
12:10:21 rgylw12 login:
12:10:21
```

At the bottom of the terminal, "RUNNING FORLS1" is visible. A "Go" button and a "Break (^C)" button are located at the bottom right of the terminal window.

# Session Agenda



- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- Guest discovery and initialization for Wave
- z/VM System Management Use Cases
- Linux System Management Use Cases
  - **Provisioning/Cloning**
  - BMI
  - LGR
- Customize and Extend

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

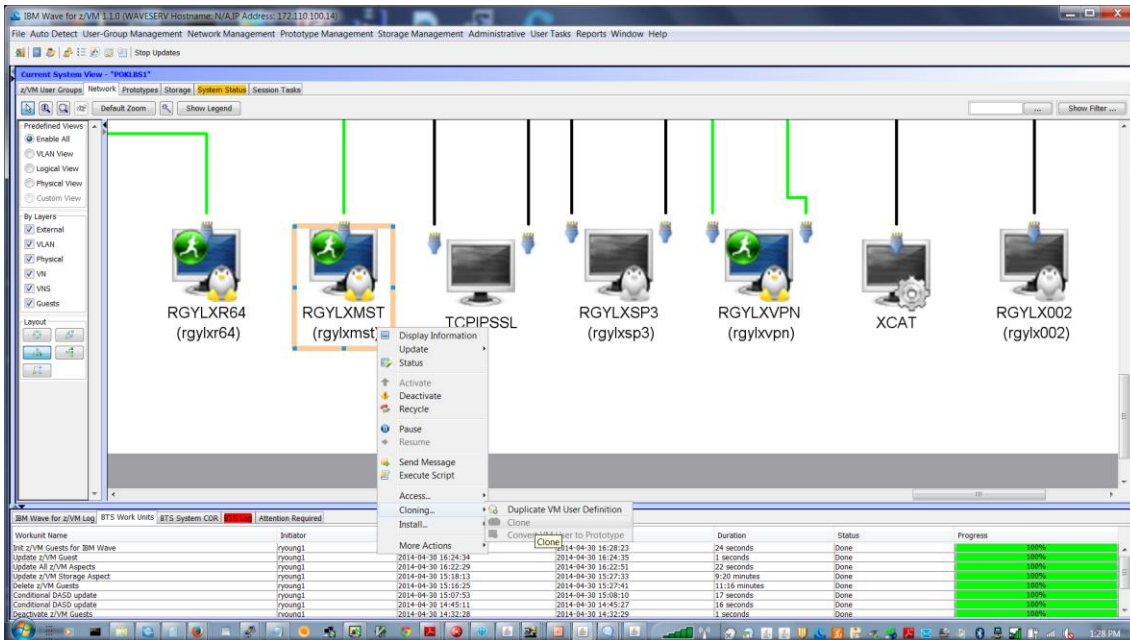


# Virtual Server Provisioning

- Supports multiple disks in guest definitions
- Supports varied virtual device numbers (unlike other solutions)
- Supports one or multiple NICs
- Supports master images with logical volumes and multiple partitions (unlike other solutions)
- Can utilize Flashcopy via DIRMAINT configuration, it is not required, but it is very helpful, especially with large Linux master images
- No direct RACF influence, but that can be tailored via DIRMAINT CONFIGxx DATADVH and/or DVHXUN exit.

# Provisioning

- Server must be “initialized for wave” and deactivated to clone



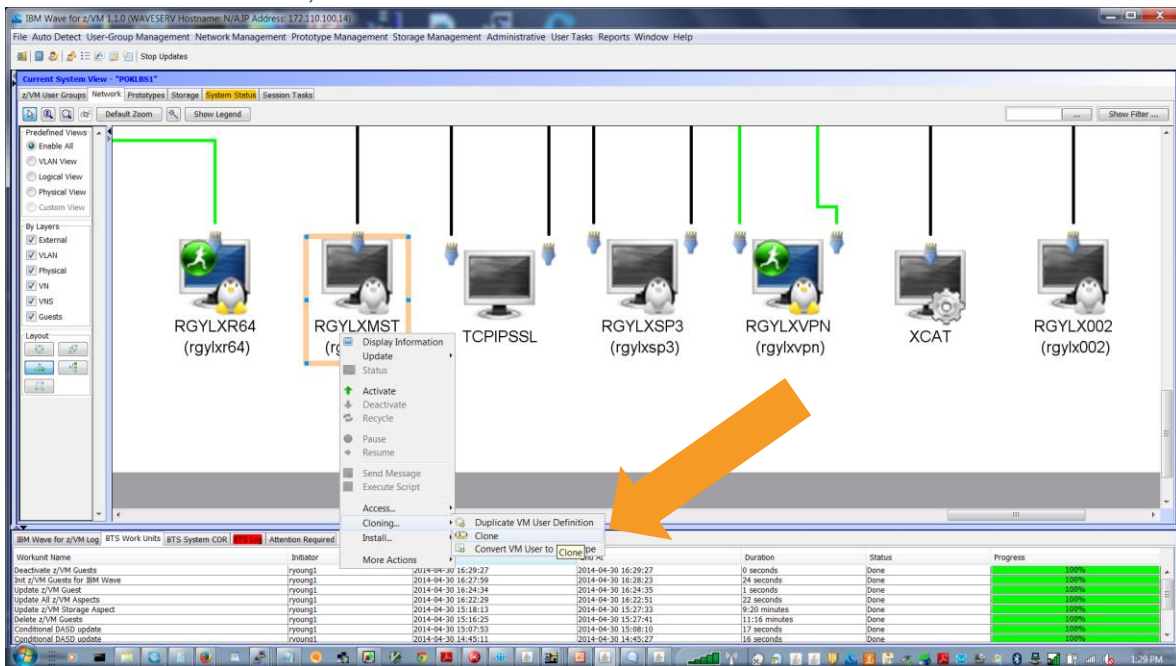
The screenshot shows the IBM Wave for z/VM interface. The main window displays a network diagram with several VMs: RGYLXR64 (rgylxr64), RGYLXMST (rgylxmst), TCPIPSSL, RGYLXSP3 (rgylxsp3), RGYLXVPN (rgylxvpn), XCAT, and RGYLX002 (rgylx002). A context menu is open over RGYLXMST, showing options like 'Clone', 'Duplicate VM User Definition', and 'Convert VM to Prototype'. The bottom panel shows a task log with the following data:

Workunit Name	Initiator	Start	End	Duration	Status	Progress
Init z/VM Guests for IBM Wave	ryoung1	2014-04-30 16:24:34	2014-04-30 16:28:23	24 seconds	Done	100%
Update z/VM Config	ryoung1	2014-04-30 16:24:34	2014-04-30 16:24:35	1 seconds	Done	100%
Update All z/VM Aspects	ryoung1	2014-04-30 16:22:29	2014-04-30 16:22:51	22 seconds	Done	100%
Update z/VM Storage Aspect	ryoung1	2014-04-30 15:18:13	2014-04-30 15:27:33	9-20 minutes	Done	100%
Create z/VM Guests	ryoung1	2014-04-30 15:16:29	2014-04-30 15:27:41	11:18 minutes	Done	100%
Conditional DASD update	ryoung1	2014-04-30 15:07:53	2014-04-30 15:08:10	17 seconds	Done	100%
Conditional DASD update	ryoung1	2014-04-30 14:45:11	2014-04-30 14:45:27	16 seconds	Done	100%
Deactivate z/VM Guests	ryoung1	2014-04-30 14:32:38	2014-04-30 14:32:39	1 seconds	Done	100%

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Provisioning

- Once deactivated, the clone task is available



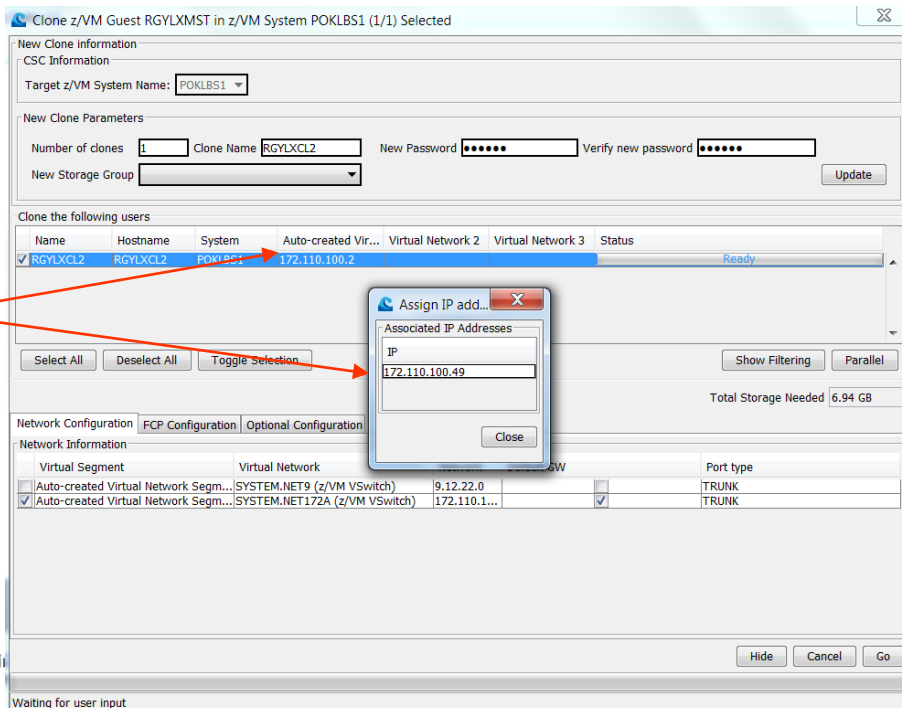
The screenshot shows the IBM Wave for z/VM interface. The main area displays a network diagram with several VMs: RGYLXR64 (rgylxr64), RGYLXMST (rgylxmst), TCPIPSSL, RGYLXSP3 (rgylxsp3), RGYLXVPN (rgylxvpn), XCAT, and RGYLX002 (rgylx002). The RGYLXMST VM is selected, and a context menu is open over it. The menu options are: Display Information, Update, Status, Activate, Deactivate, Recycle, Pause, Resume, Send Message, Execute Script, Access..., Cloning..., Duplicate VM User Definition, Install..., KVM Clone, and Convert VM User to Clone. An orange arrow points to the 'Clone' option. The bottom of the window shows a table of workunit tasks.

Workunit Name	Initiator	Start Time	End Time	Duration	Status	Progress
Deactivate z/VM Guests	rgylxmst	2014-04-30 16:29:27	2014-04-30 16:29:27	0 seconds	Done	100%
Int z/VM Guests for IBM Wave	rgylxmst	2014-04-30 16:27:59	2014-04-30 16:28:23	24 seconds	Done	100%
Update z/VM Guest	rgylxmst	2014-04-30 16:24:34	2014-04-30 16:24:35	1 seconds	Done	100%
Update All z/VM Agents	rgylxmst	2014-04-30 16:22:29	2014-04-30 16:22:51	22 seconds	Done	100%
Update z/VM Storage Aspect	rgylxmst	2014-04-30 15:18:13	2014-04-30 15:27:53	9-26 minutes	Done	100%
Delete z/VM Guests	rgylxmst	2014-04-30 15:16:25	2014-04-30 15:27:41	11:16 minutes	Done	100%
Conditional BARS update	rgylxmst	2014-04-30 15:07:53	2014-04-30 15:08:10	17 seconds	Done	100%
Conditional BARS update	rgylxmst	2014-04-30 14:45:11	2014-04-30 14:45:27	16 seconds	Done	100%

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Provisioning

- Assigned IP address can be overridden



The screenshot shows the 'Clone z/VM Guest RGYLMST in z/VM System POKLBS1 (1/1) Selected' wizard. The 'New Clone Parameters' section is filled out with 1 clone named RGYLXCL2. The 'Clone the following users' table shows a user with IP 172.110.100.2. An 'Assign IP address...' dialog box is open, showing the IP 172.110.100.49, which is being assigned to the selected user. The 'Network Configuration' section shows the selected user is connected to a virtual network segment with IP 172.110.100.49.

Clone z/VM Guest RGYLMST in z/VM System POKLBS1 (1/1) Selected

New Clone Information  
CSC Information  
Target z/VM System Name: POKLBS1

New Clone Parameters  
Number of clones: 1 Clone Name: RGYLXCL2 New Password: \*\*\*\*\* Verify new password: \*\*\*\*\*  
New Storage Group: [Dropdown] Update

Clone the following users

Name	Hostname	System	Auto-created Vir...	Virtual Network 2	Virtual Network 3	Status
✓ RGYLXCL2	RGYLXCL2	POKLBS1	172.110.100.2			Ready

Select All Deselect All Toggle Selection Show Filtering Parallel Total Storage Needed 6.94 GB

Network Configuration FCP Configuration Optional Configuration

Network Information

Virtual Segment	Virtual Network	IP	Port type
Auto-created Virtual Network Segm...SYSTEM.NET9 (z/VM VSwitch)	9.12.22.0		TRUNK
✓ Auto-created Virtual Network Segm...SYSTEM.NET172A (z/VM VSwitch)	172.110.100.49	172.110.100.49	TRUNK

Assign IP address...  
Associated IP Addresses  
IP  
172.110.100.49  
Close

Waiting for user input

Hide Cancel Go

# Provisioning

## Clone dialog

- Other optional configuration
- Allows for automation after cloning

Clone z/VM Guest RGYLX002 in z/VM System POKLBS1 (1/1) Selected

New Clone information

CSC Information

Target z/VM System Name: POKLBS1

New Clone Parameters

Number of clones: 1 Clone Name: RGYLXCL1 New Password: \*\*\*\*\* Verify new password: \*\*\*\*\*

New Storage Group: LINUX (19.81 GB Free) Update

Clone the following users

Name	Hostname	System	Auto-created Vir...	Virtual Network 2	Virtual Network 3	Status
<input checked="" type="checkbox"/> RGYLXCL1	RGYLXCL1	POKLBS1	172.110.100.49			Ready

Select All Deselect All Toggle Selection Show Filtering Parallel Total Storage Needed: 15.97 GB

Network Configuration FCP Configuration **Optional Configuration**

With the following Options

Select IBM Wave Script to run after clone

Script Name  Browse... Specify REXX to run after z/VM Guest creation

REXX Name:  Machine Name: WAVEWRKS Minidisk Address: 0399

Dedicate devices

Use same dedicated devices as source

OSA: New OSA Device Pool for POKLBS1

HIPER: New HIPER Device Pool for POKLBS1

DASD: New DASD Device Pool for POKLBS1

Descriptive fields

Project

Functionality: N/A (Activation Level 1)

Description

Optional Linux parameters

Domain

Regenerate SSH keys

Optional z/VM parameters

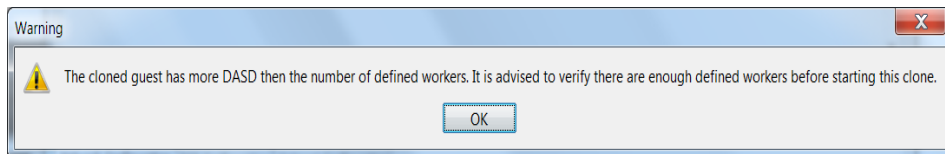
Virtual CPUs: 2

Hide Cancel Go

Waiting for user input

Complete your session evaluations on

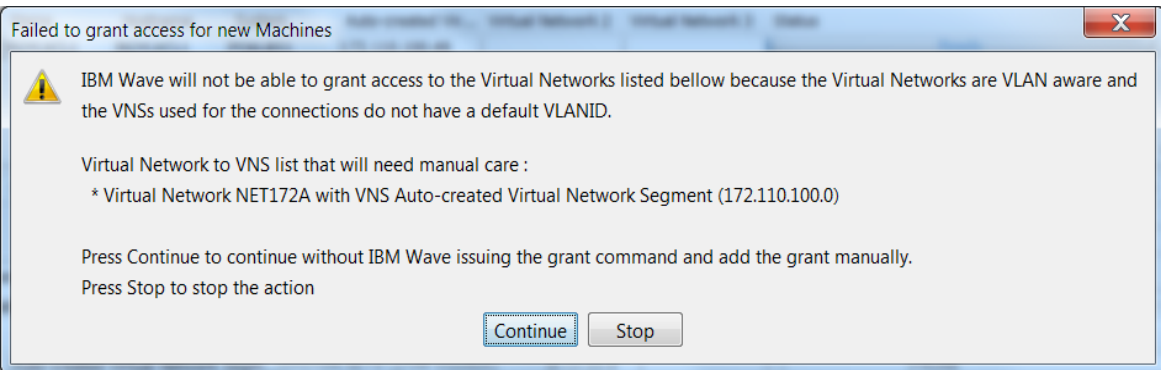
# Provisioning



- If you have a number of disk or guests to copy without a feature like flashcopy, you could tie up the SMAPI worker machines for extended periods
- If you are in such a situation, it is recommended you add more SMAPI worker machines.

# Provisioning

- If an ESM is managing the VMLAN class, VSWITCH grants are meaningless
- An effective security strategy is important. You could manage access to switches via RACF groups and VMLAN class.
- Can grant access via guest security group assignment in DIRM user exits. Guest name prefix is just one option



# Provisioning

- Select the storage group you prefer
- You can deploy multiple guests with similar characteristics at once

Clone z/VM Guest RGYLXMST in z/VM System POKLBS1 (1/1) Selected

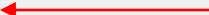
New Clone information

CSC Information

Target z/VM System Name: POKLBS1

New Clone Parameters

Number of clones: 1 Clone Name: RGYLXCL2 New Password: \*\*\*\*\* Verify new password: \*\*\*\*\*

New Storage Group: LINUX (298.08 GB Free) 

Update

Clone the following users

Name	Hostname	System	Auto-created Vir...	Virtual Network 2	Virtual Network 3	Status
<input checked="" type="checkbox"/> RGYLXCL2	RGYLXCL2	POKLBS1	172.110.100.49			Ready

Select All Deselect All Toggle Selection Show Filtering Parallel

Total Storage Needed 6.94 GB

Network Configuration FCP Configuration Optional Configuration

Network Information

Virtual Segment	Virtual Network	Network	Default GW	Port type
<input type="checkbox"/> Auto-created Virtual Network Segm...	SYSTEM.NET9 (z/VM VSwitch)	9.12.22.0	<input type="checkbox"/>	TRUNK
<input checked="" type="checkbox"/> Auto-created Virtual Network Segm...	SYSTEM.NET172A (z/VM VSwitch)	172.110.1...	<input checked="" type="checkbox"/>	TRUNK

Hide Cancel Go

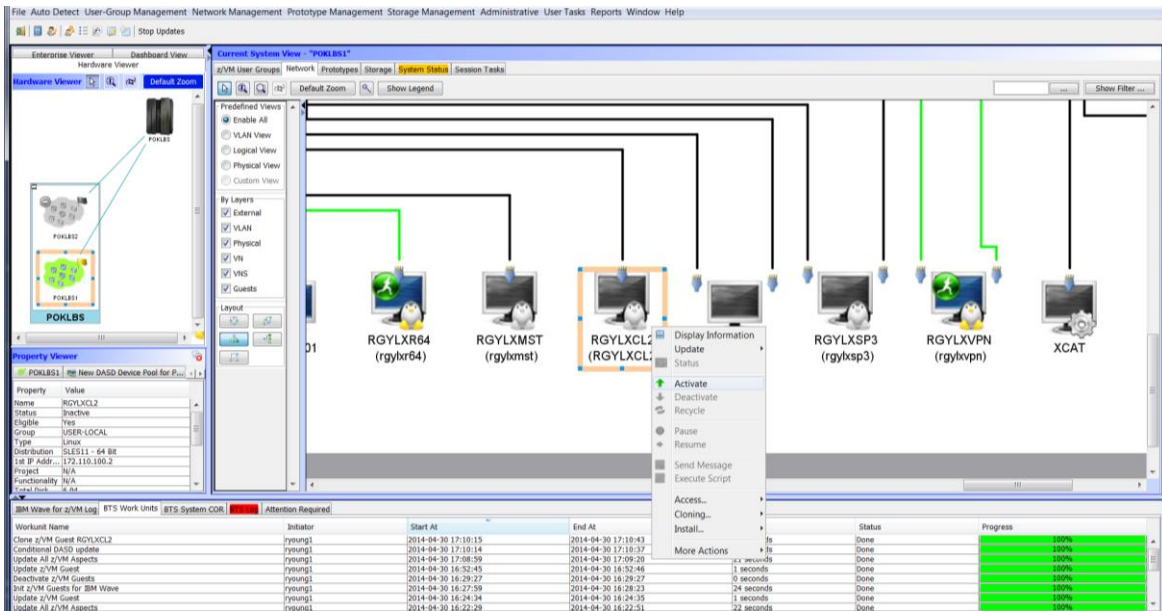
Waiting for user input

Complete your session evaluations



# Provisioning

- Activate the new virtual server



File Auto Detect User-Group Management Network Management Prototype Management Storage Management Administrative User Tasks Reports Window Help

Enterprise View Dashboard View Hardware Viewer **Current System View - "POKLR1"** a/VM User Groups Network Prototypes Storage System Status Session Tasks

Hardware Viewer Default Zoom

POKLR2  
POKLR1  
POKLR5

Property Viewer

POKLR5 New DASD Device Pool for P...

Property Value

Name	RGYLXL2
Status	Inactive
Eligible	Yes
Group	USER-LOCAL
Type	Linux
Distribution	SLES11 - 64 Bit
IP Addr.	172.168.100.2
Project	h/A
Functionality	h/A

Work Unit: RGYLXL2 (RGYLXL2)

Workunit Name	Initiator	Start At	End At	Status	Progress
Clone z/VM Guest RGYLXL2	rgymlg1	2014-04-30 17:10:15	2014-04-30 17:10:43	Done	100%
Conditional DASD update	rgymlg1	2014-04-30 17:10:14	2014-04-30 17:10:37	Done	100%
Update All z/VM Aspects	rgymlg1	2014-04-30 17:08:59	2014-04-30 17:09:20	Done	100%
Update z/VM Guest	rgymlg1	2014-04-30 16:52:45	2014-04-30 16:52:46	Done	100%
Deactivate z/VM Guests	rgymlg1	2014-04-30 16:29:27	2014-04-30 16:29:27	Done	100%
Init z/VM Guests for IBM Work	rgymlg1	2014-04-30 16:27:59	2014-04-30 16:28:23	Done	100%
Update z/VM Guest	rgymlg1	2014-04-30 16:24:34	2014-04-30 16:24:35	Done	100%
Update All z/VM Aspects	rgymlg1	2014-04-30 16:22:29	2014-04-30 16:22:51	Done	100%

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Provisioning

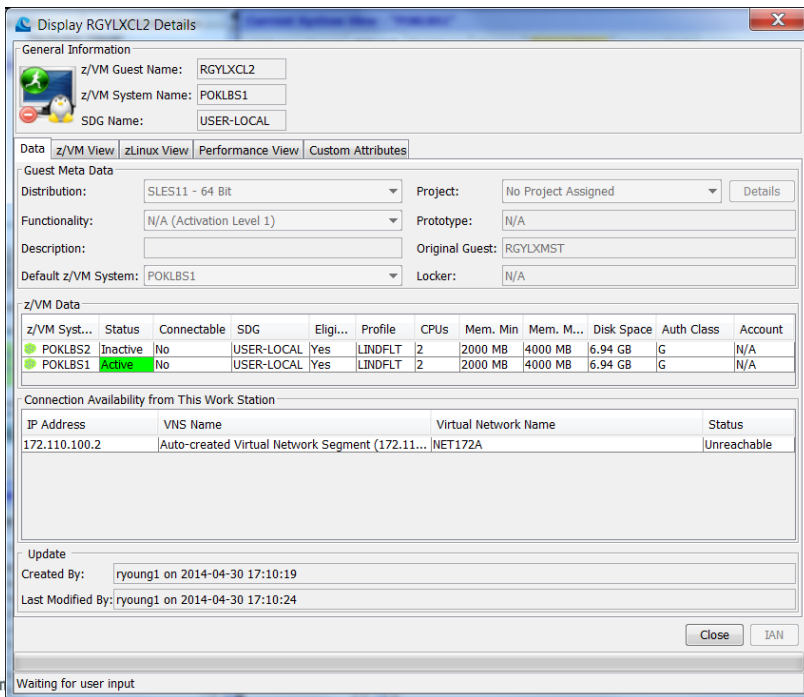
- Attempting to start a VLAN interface (trunked is the default)

```
15:19:14 Setting up (localfs) network interfaces:
15:19:23 802.1Q VLAN Support v1.8
15:19:23 8021q: adding VLAN 0 to HW filter on device eth0
15:19:23     lo
15:19:23     lo           IP address: 127.0.0.1/8
15:19:23     IP address: 127.0.0.2/8
15:19:23 ..done_   eth0
15:19:23 Apr 30 15:19:15 RGYLXCL2 SuSEfirewall2: SuSEfirewall2 not active
15:19:23 [1Awaiting
15:19:23 Waiting for mandatory devices:  eth0
15:19:23 29
15:19:23     eth0
15:19:23     eth0       is up
15:19:23 ..done   vlanNA
15:19:23 ERROR: unable to find create vlan NA interface 'vlanNA'
15:19:23 Apr 30 15:19:16 RGYLXCL2 ifup-802.1q: ERROR: unable to find create vlan
NA interface 'vlanNA'
15:19:23 ..doneSetting up service (localfs) network . . . . .
...done
15:19:23 Starting auditd ..done
15:19:23 Starting haveged daemon ..done
15:19:23 Starting rpcbind ..done

MORE...  POKLBS1
```

# Provisioning

- New guest reports unreachable, because trunked guest access is not intended



Display RGYLXCL2 Details

General Information

z/VM Guest Name: RGYLXCL2  
z/VM System Name: POKLBS1  
SDG Name: USER-LOCAL

Data | z/VM View | zLinux View | Performance View | Custom Attributes

Guest Meta Data

Distribution: SLES11 - 64 Bit Project: No Project Assigned Details  
Functionality: N/A (Activation Level 1) Prototype: N/A  
Description: Original Guest: RGYLXMST  
Default z/VM System: POKLBS1 Locker: N/A

z/VM Data

z/VM Syst...	Status	Connectable	SDG	Eligi...	Profile	CPUs	Mem. Min	Mem. M...	Disk Space	Auth Class	Account
POKLBS2	Inactive	No	USER-LOCAL	Yes	LINDFLT	2	2000 MB	4000 MB	6.94 GB	G	N/A
POKLBS1	Active	No	USER-LOCAL	Yes	LINDFLT	2	2000 MB	4000 MB	6.94 GB	G	N/A

Connection Availability from This Work Station

IP Address	VNS Name	Virtual Network Name	Status
172.110.100.2	Auto-created Virtual Network Segment (172.11...	NET172A	Unreachable

Update

Created By: ryoung1 on 2014-04-30 17:10:19  
Last Modified By: ryoung1 on 2014-04-30 17:10:24

Close IAN

Waiting for user input



# Provisioning

- Must select Trunk vs Access, it is not inherited from source image

Clone z/VM Guest RGYLXMST in z/VM System POKLBS1 (1/1) Selected

New Clone information

- CSC Information

Target z/VM System Name: POKLBS1

- New Clone Parameters

Number of clones: 1 Clone Name: RGYLXL3 New Password: \*\*\*\*\* Verify new password: \*\*\*\*\*

New Storage Group: LINUX (291.13 GB Free) Update

Clone the following users

Name	Hostname	System	Auto-created Vir...	Virtual Network 2	Virtual Network 3	Status
<input checked="" type="checkbox"/>	RGYLXL3	RGYLXL3	POKLBS1	172.110.100.49		Ready

Select All Deselect All Toggle Selection Show Filtering Parallel

Total Storage Needed 6.94 GB

Network Configuration FCP Configuration Optional Configuration

Network Information

Virtual Segment	Virtual Network	Network	Default GW	Port type
<input type="checkbox"/>	Auto-created Virtual Network Segm... SYSTEM.NET9 (z/VM VSwitch)	9.12.22.0	<input type="checkbox"/>	TRUNK
<input checked="" type="checkbox"/>	Auto-created Virtual Network Segm... SYSTEM.NET172A (z/VM VSwitch)	172.110.1...	<input checked="" type="checkbox"/>	TRUNK

N/A  
ACCESS  
TRUNK

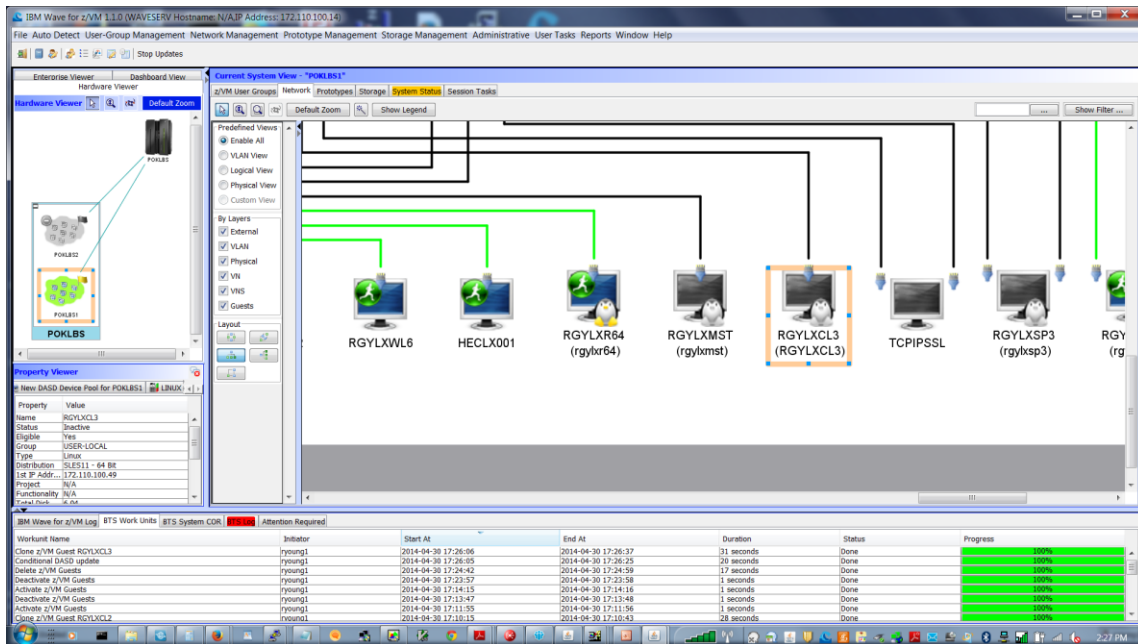
Hide Cancel Go

Waiting for user input

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Provisioning

- Newly cloned guest needs to be started



IBM Wave for z/VM 11.0 (WAVESEVR Hostname: N/A IP Address: 172.110.100.14)

File Auto Detect User-Group Management Network Management Prototype Management Storage Management Administrative User Tasks Reports Window Help

Enterprise Viewer Dashboard View Hardware Viewer

Current System View - "POKBS1"

z/VM User Groups Network Prototypes Storage System Status Session Tasks

Predefined Views: Enable All, VLAN View, Logical View, Physical View, Custom View

By Layers: External, VLAN, Physical, VPI, VMS, Guests

Layout: [Icons]

Property Viewer: New DASD Device Pool for POKBS1 | LINUX | .1

Property	Value
Name	RGYLXCL3
Status	Inactive
Visible	Yes
Group	USER-LOCAL
Type	Linux
Distribution	SLES11 - 64 Bit
1st IP Addr	172.110.100.49
Project	N/A
Functionality	N/A
Local Proxy	36.64

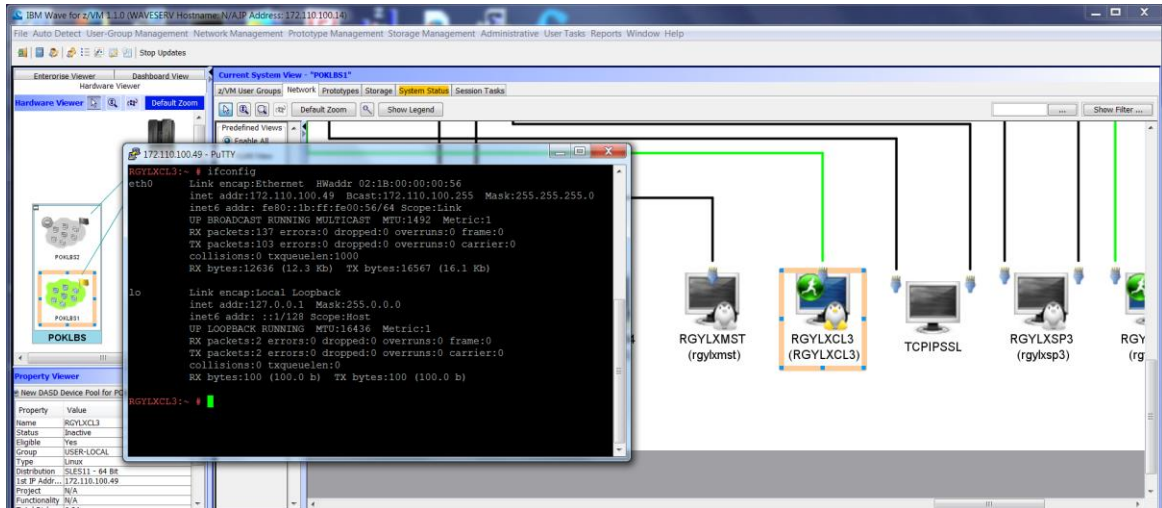
Work Unit Log: BTS Work Units | BTS System CMD | Attention Required

Workunit Name	Initiator	Start At	End At	Duration	Status	Progress
Clone z/VM Guest RGYLXCL3	jryoung1	2014-04-30 17:26:06	2014-04-30 17:26:37	31 seconds	Done	100%
Conditional DASD update	jryoung1	2014-04-30 17:26:05	2014-04-30 17:26:25	20 seconds	Done	100%
Delete z/VM Guests	jryoung1	2014-04-30 17:24:42	2014-04-30 17:24:59	17 seconds	Done	100%
Deactivate z/VM Guests	jryoung1	2014-04-30 17:23:57	2014-04-30 17:23:58	1 seconds	Done	100%
Activate z/VM Guests	jryoung1	2014-04-30 17:14:15	2014-04-30 17:14:16	1 seconds	Done	100%
Deactivate z/VM Guests	jryoung1	2014-04-30 17:13:47	2014-04-30 17:13:48	1 seconds	Done	100%
Activate z/VM Guests	jryoung1	2014-04-30 17:11:55	2014-04-30 17:11:56	1 seconds	Done	100%
Clone z/VM Guest RGYLXCL2	jryoung1	2014-04-30 17:10:15	2014-04-30 17:10:43	28 seconds	Done	100%

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Provisioning - Completed

- New virtual server fully accessible



The screenshot displays the IBM Wave for z/vM 1.1.0 interface. The main window shows a network diagram with several virtual servers connected to a central network. A terminal window titled "172.110.100.49 - PuTTY" is open, showing the output of the 'ifconfig' command for the 'RGYLXCL3' virtual server. The terminal output is as follows:

```
RGYLXCL3:~ # ifconfig
eth0    Link encap:Ethernet  HWaddr 02:18:00:00:56
        inet addr:172.110.100.49  Bcast:172.110.100.255  Mask:255.255.255.0
        inet6 addr: fe00::1bff:fe00:56/64 Scope:link
        UP BROADCAST RUNNING MULTICAST  MTU:1492  Metric:1
        RX packets:137 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:1000
        RX bytes:12636 (12.3 Kb)  TX bytes:16367 (16.1 Kb)

lo      Link encap:Local Loopback
        inet addr:127.0.0.1  Mask:255.0.0.0
        inet6 addr: ::1/128 Scope:Host
        UP LOOPBACK RUNNING  MTU:16436  Metric:1
        RX packets:2 errors:0 dropped:0 overruns:0 frame:0
        TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
        collisions:0 txqueuelen:0
        RX bytes:100 (100.0 b)  TX bytes:100 (100.0 b)

RGYLXCL3:~ #
```

The network diagram shows five virtual servers: RGYLXMST (rgylxmst), RGYLXCL3 (RGYLXCL3), TCPIPSSL, RGYLXSP3 (rgylxsp3), and RGY (rg). The RGYLXCL3 server is highlighted with a green border and a green line connecting it to the terminal window. The terminal window also shows the 'Property Viewer' for the RGYLXCL3 device, with the following details:

Property	Value
Name	RGYLXCL3
Status	Inactive
Visible	Yes
Group	USER-LOCAL
Type	Linux
IPv6-Enabled	IPv6S11 - 64 bit
1st IP Addr.	172.110.100.49
Project	IN/A
Functionality	IN/A
Total Pack.	0 Kbit

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Provisioning - Completed

```
RGYXLCL3:~ # df -h
Filesystem                Size      Used Avail Use% Mounted on
/dev/dasda1                5.0G      3.1G  1.7G  66% /
udev                      1001M      88K 1001M   1% /dev
tmpfs                     1001M         0 1001M   0% /dev/shm
/dev/mapper/VGSYS-lvhome   97M        4.1M   88M   5% /home
/dev/mapper/VGSYS-LVOPT   97M        4.1M   88M   5% /opt
/dev/mapper/VGSYS-lvvar   485M       113M  347M  25% /var
RGYXLCL3:~ # lsdasd
Bus-ID      Status      Name      Device  Type  BlkSz  Size      Blocks
=====
0.0.0200    active     dasda     94:0    ECKD  4096   7041MB    1802700
RGYXLCL3:~ # pvs
PV          VG      Fmt  Attr PSize PFree
/dev/dasda2 VGSYS  lvm2 a--  1.88g 1.19g
RGYXLCL3:~ # █
```

# Session Agenda



- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- Guest discovery and initialization for Wave
- z/VM System Management Use Cases
- Linux System Management Use Cases
  - Provisioning/Cloning
  - **BMI**
  - LGR
- Customize and Extend

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)



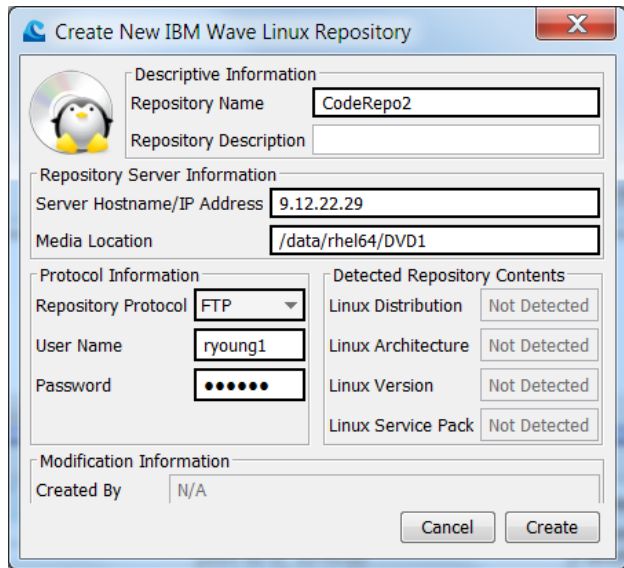
# Bare Metal Installation




- For those opposed to cloning an alternative form of guest creation
- Still requires the use of z/VM
- Does not require a pre-existing master image
- “automates” transferring the 3 files to the reader needed to IPL the Linux installer image. No 3270 required!
- You need to load the Linux installation ISO images repository location in to IBM Wave

# Bare Metal Installation

- You must begin by defining the Linux ISO repository
- This FTP server needs to be reachable over the network



Create New IBM Wave Linux Repository

 Descriptive Information

Repository Name

Repository Description

Repository Server Information

Server Hostname/IP Address

Media Location

Protocol Information

Repository Protocol

User Name

Password

Detected Repository Contents

Linux Distribution

Linux Architecture

Linux Version

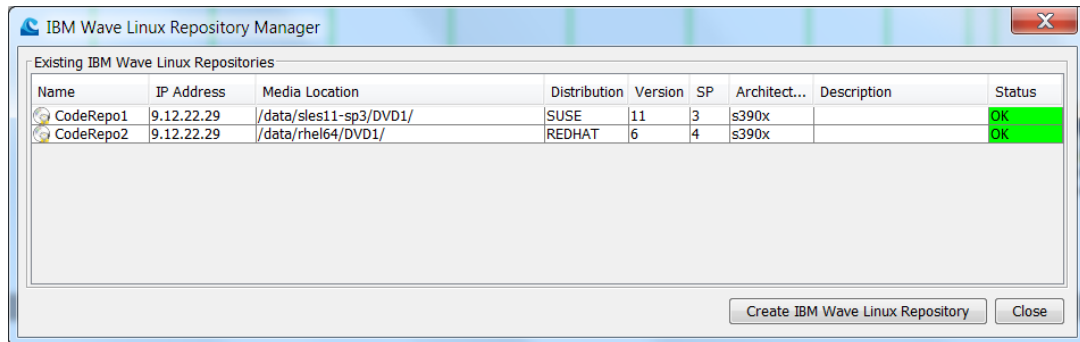
Linux Service Pack

Modification Information

Created By

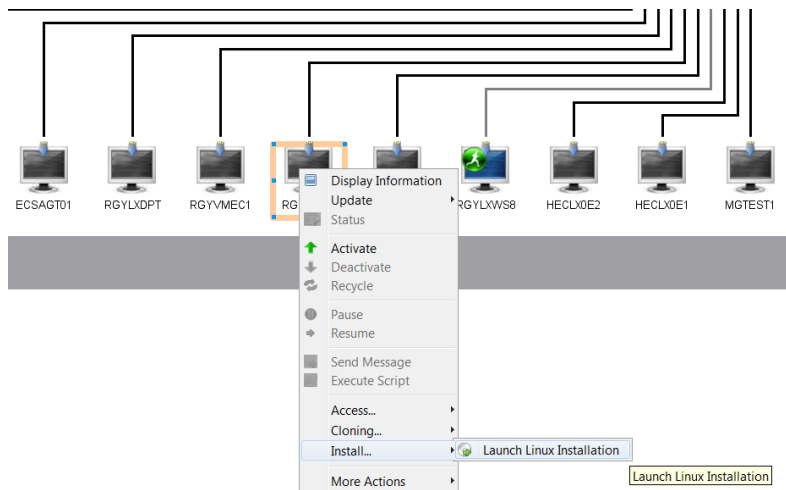
# Bare Metal Installation

- You can have multiple repositories
- The distribution and level are detected when defined.
- The install image/code does NOT transfer to the Wave server



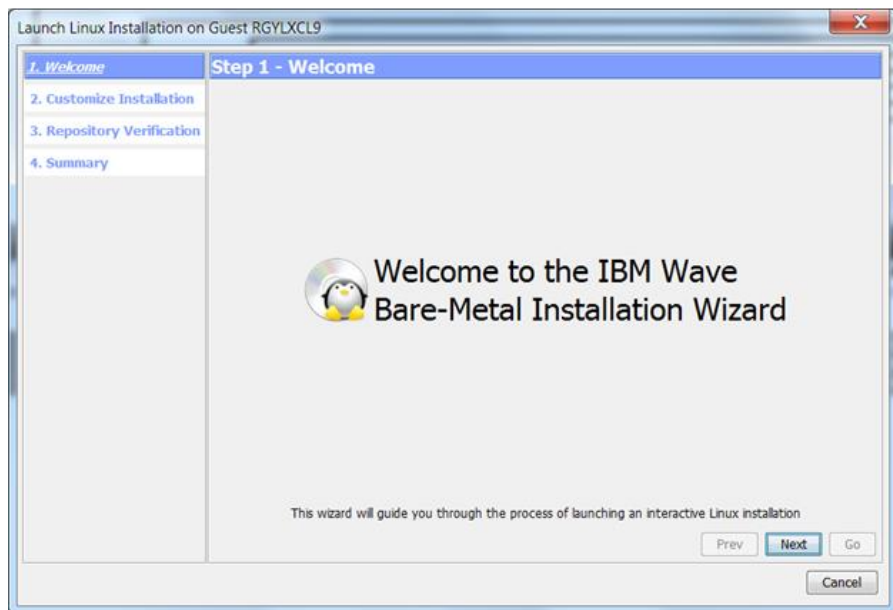
# Bare Metal Installation

- You need a guest container to install in to
- This could be a pre-existing Linux server you want to destroy and over write.



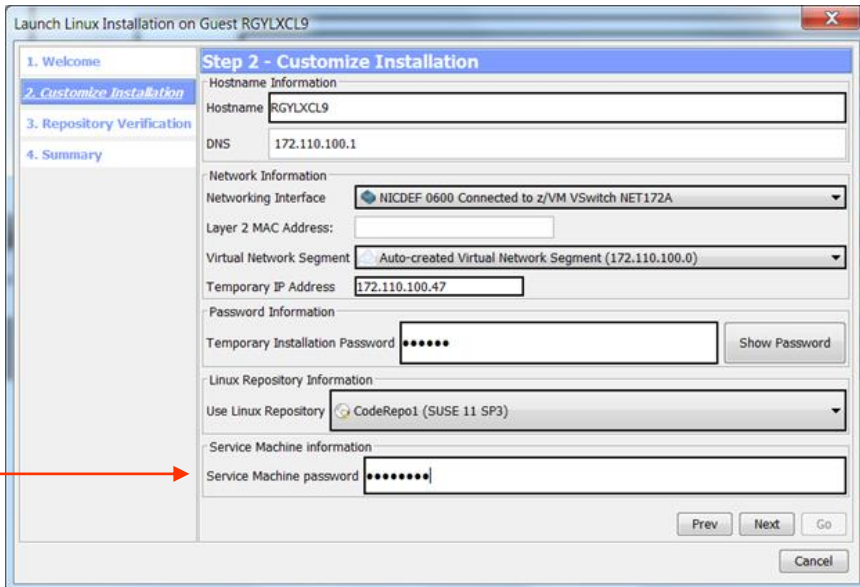
# Bare Metal Installation

- The BMI install is wizard driven



# Bare Metal Installation

- During the BMI install, only a single NIC is allowed, but that can be changed after installation.
- The service machine password is for **WAVEWRKS**. If you implement LOGON BY as the only means of logging on, you will need to make an exception here.



Launch Linux Installation on Guest RGYLXCL9

Step 2 - Customize Installation

1. Welcome  
2. Customize Installation  
3. Repository Verification  
4. Summary

Hostname Information  
Hostname: RGYLXCL9  
DNS: 172.110.100.1

Network Information  
Networking Interface: NICDEF 0600 Connected to z/VM VSwitch NET172A  
Layer 2 MAC Address:   
Virtual Network Segment: Auto-created Virtual Network Segment (172.110.100.0)  
Temporary IP Address: 172.110.100.47

Password Information  
Temporary Installation Password:  Show Password

Linux Repository Information  
Use Linux Repository: CodeRepo1 (SUSE 11 SP3)

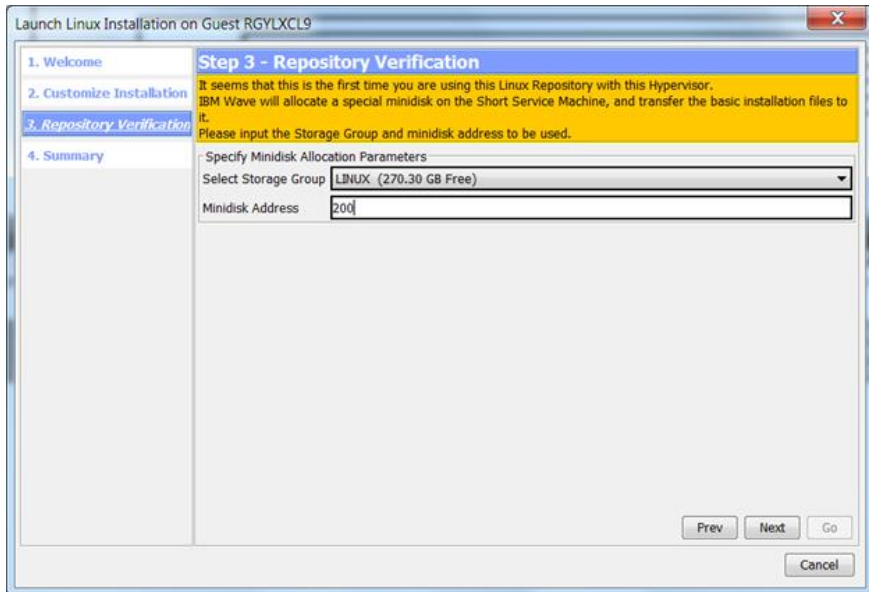
Service Machine information  
Service Machine password:

Prev Next Go Cancel

Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

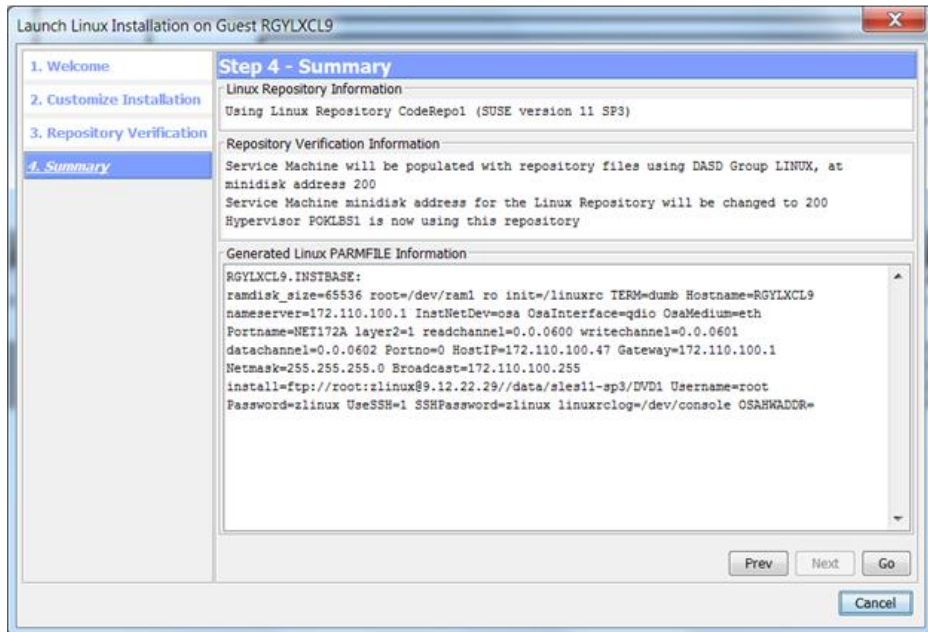
# Bare Metal Installation

- You need to select the storage group/extent control pool that will be used for minidisk allocations. You are allowed only a single disk at this time, but you can adjust this later



# Bare Metal Installation

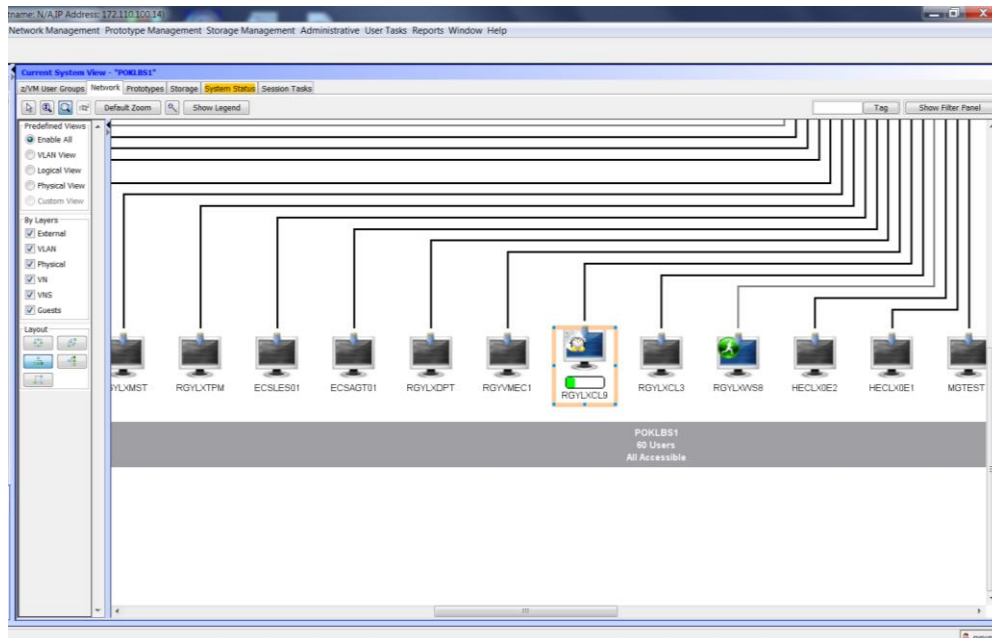
- The parmfile information is generated as shown below for the “installer” Linux to boot from





# Bare Metal Installation

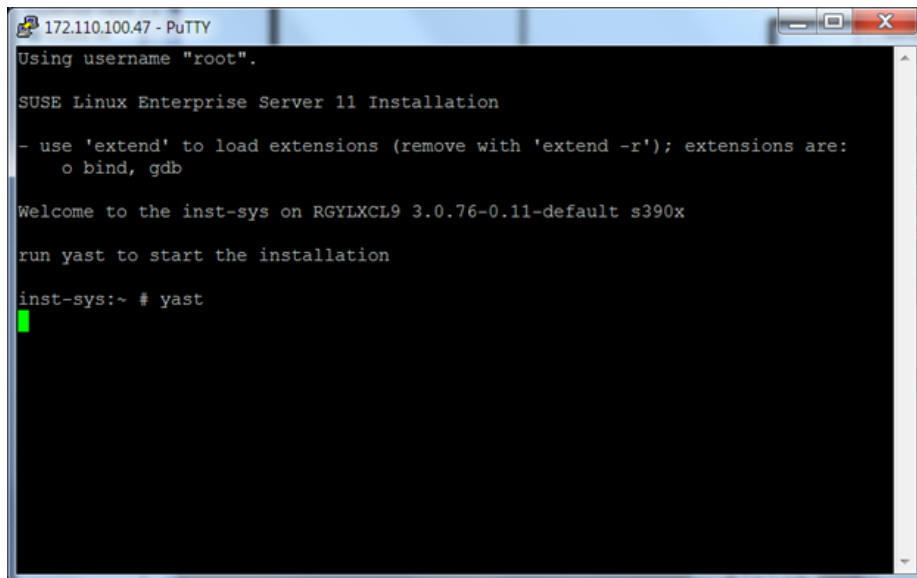
- You will see the install is in progress, as shown below
- Next you will be prompted by a dialog that opens a shell



Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# Bare Metal Installation

- Depending upon the distro you are installing, you will run different programs.
- The preceding Wave dialog provides the command to execute



```
172.110.100.47 - PuTTY
Using username "root".

SUSE Linux Enterprise Server 11 Installation

- use 'extend' to load extensions (remove with 'extend -r'); extensions are:
  o bind, gdb

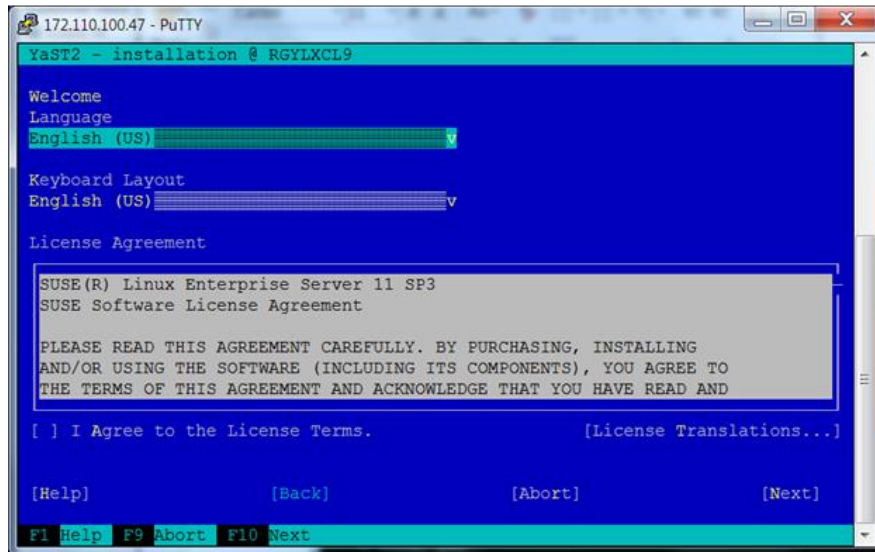
Welcome to the inst-sys on RGYLXCL9 3.0.76-0.11-default s390x

run yast to start the installation

inst-sys:~ # yast
```

# Bare Metal Installation

- You can now proceed with business as usual installation of Linux
- There was no need to logon to 3270 to accomplish this installation.
- VMRDR update access to the new server is required by WAVEWRKS, if using an ESM (like RACF)



```
172.110.100.47 - PuTTY
YaST2 - installation @ RGYLXCL9

Welcome
Language
English (US)

Keyboard Layout
English (US)

License Agreement

SUSE(R) Linux Enterprise Server 11 SP3
SUSE Software License Agreement

PLEASE READ THIS AGREEMENT CAREFULLY. BY PURCHASING, INSTALLING
AND/OR USING THE SOFTWARE (INCLUDING ITS COMPONENTS), YOU AGREE TO
THE TERMS OF THIS AGREEMENT AND ACKNOWLEDGE THAT YOU HAVE READ AND

[ ] I Agree to the License Terms.          [License Translations...]

[Help]          [Back]          [Abort]          [Next]

F1 Help  F9 Abort  F10 Next
```

# Session Agenda

- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- Guest discovery and initialization for Wave
- z/VM System Management
- Linux System Management
  - Provisioning/Cloning
  - BMI
  - **LGR**
- Customizable and Extensible
- CLI Interface

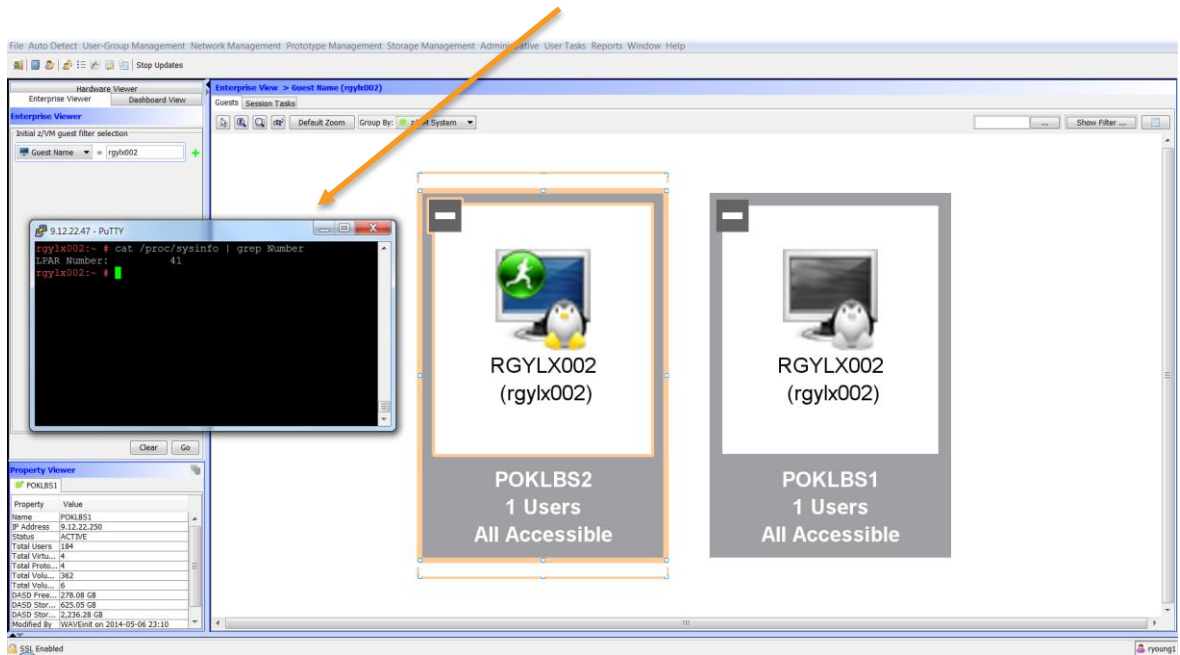
# IBM Wave and Live Guest Relocation



- Allows you to perform and visualize Live Guest Relocation under z/VM
- All the standard z/VM relocation rules apply
- Relocation task not available in the “Hardware View”

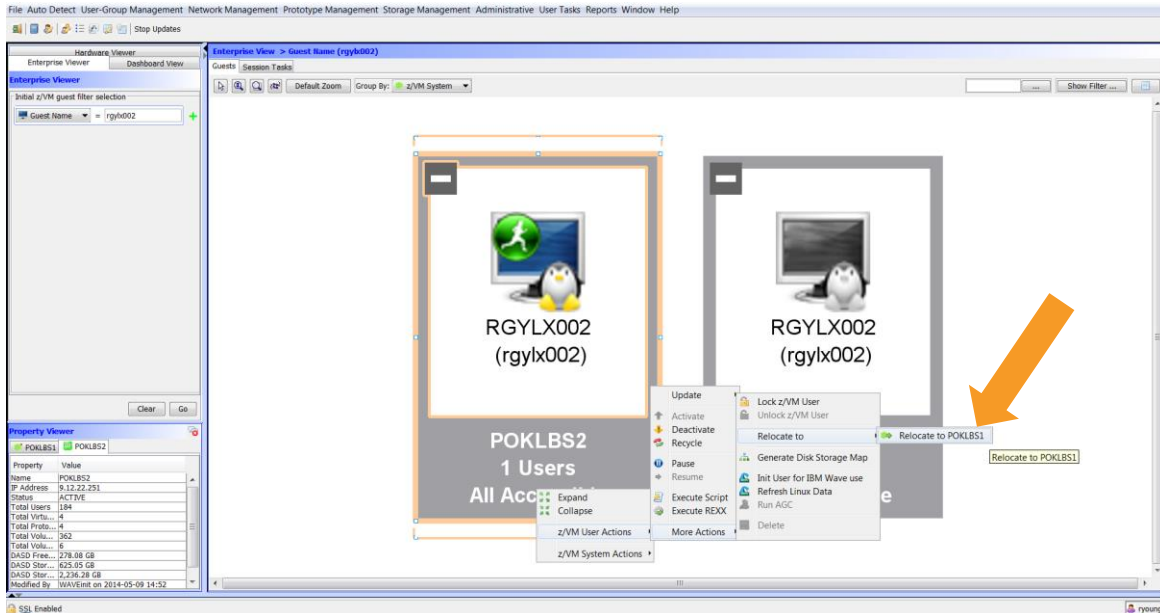
# IBM Wave and Live Guest Relocation

- State before relocation, with ssh session



# IBM Wave and Live Guest Relocation

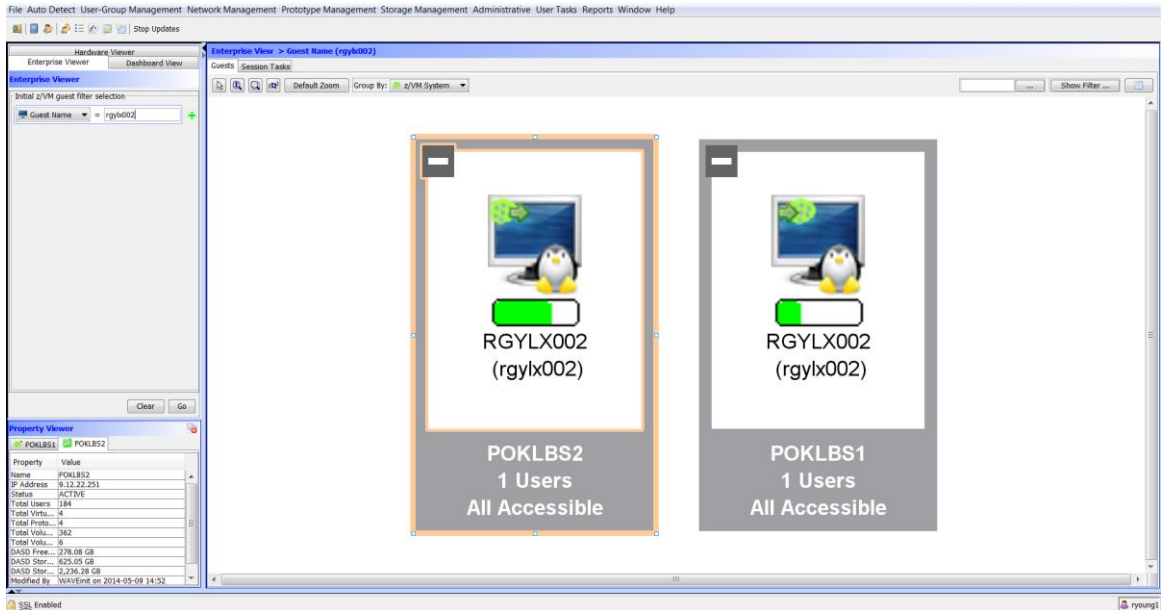
- Initiating relocation



Complete your session evaluations online at [www.SHARE.org/Orlando-Eval](http://www.SHARE.org/Orlando-Eval)

# IBM Wave and Live Guest Relocation

- Relocation in progress



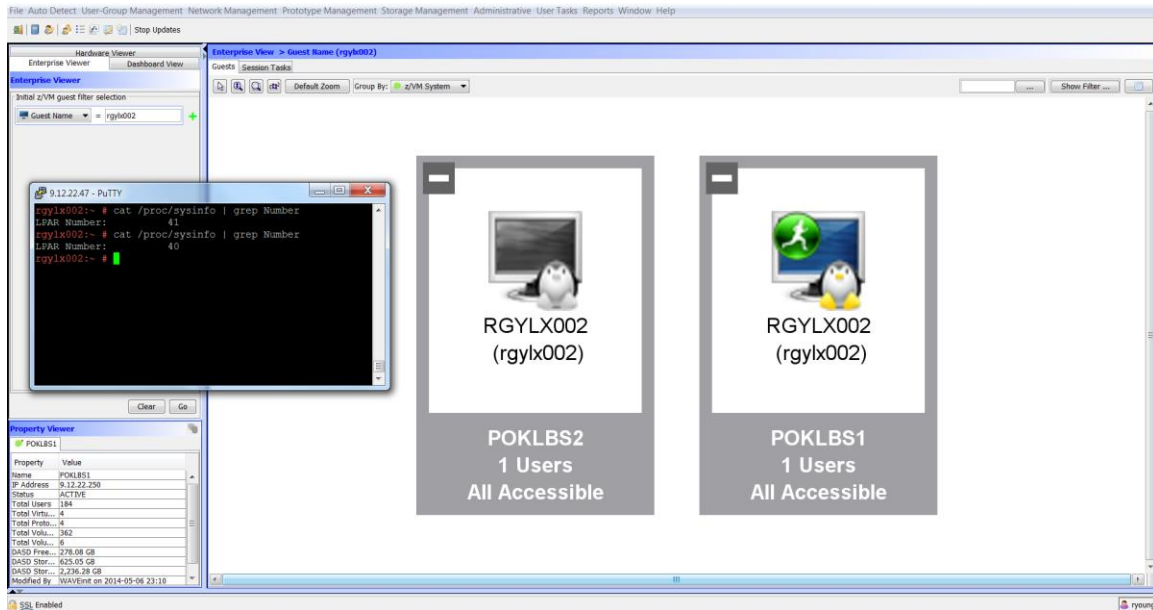
The screenshot displays the IBM Wave management interface. The main window shows two virtual machines, RGYLX002 (rgylx002), in the process of being relocated. Each VM is represented by a card with a penguin icon and a progress bar. The left card is labeled POKLBS2 (1 Users, All Accessible) and the right card is labeled POKLBS1 (1 Users, All Accessible). The interface includes a menu bar (File, Auto Detect, User-Group Management, Network Management, Prototype Management, Storage Management, Administrative, User Tasks, Reports, Window, Help), a toolbar, and a sidebar with a Hardware Viewer and Property Viewer. The Property Viewer shows details for POKLBS1 and POKLBS2, including Name, IP Address, Status, Total Users, Total Probs, Total Vols, DASD Free, and DASD Stor.

Property	Value
Name	POKLBS2
IP Address	9.12.22.251
Status	ACTIVE
Total Users	184
Total Vols...	4
Total Probs...	4
Total Vols...	362
Total Vols...	6
DASD Free...	2,78,98 GB
DASD Stor...	825,95 GB
DASD Stor...	2,236,38 GB
Modified by	WAVEnt on 2014-05-09 14:52



# IBM Wave and Live Guest Relocation

- Relocation completed, ssh session maintained



File | Auto Detect | User-Group Management | Network Management | Prototype Management | Storage Management | Administrative | User Tasks | Reports | Window | Help

Hardware Viewer | Enterprise View | Dashboard View

Enterprise Viewer

Initial z/VM guest filter selection

Guest Name = rgylx002

Enterprise View > Guest Name (rgylx002)

Guests | Session Tasks

Default Zoom | Group By: z/VM System

9.12.22.47 - PuTTY

```
rgylx002~# cat /proc/sysinfo | grep Number
LEAR Number: 41
rgylx002~# cat /proc/sysinfo | grep Number
LPAR Number: 40
rgylx002~#
```

Property Viewer

Property	Value
Name	POKLBS1
IP Address	9.12.22.250
Status	ACTIVE
Total Users	184
Total VMs	4
Total Profs	4
Total Vols	362
Total VMs	6
DA5D Free	278.08 GB
DA5D Stor	625.05 GB
DA5D Mem	2,236.28 GB
Modified By	WAVEnt on 2014-05-06 23:18

POKLBS2  
1 Users  
All Accessible

POKLBS1  
1 Users  
All Accessible

rgylx002  
rgylx002

SSL Enabled | ryoung1

# Session Agenda



- IBM Wave Product Architecture
- Installation of IBM Wave for z/VM
  - ESM Considerations
- Authentication and Authorization
- Guest discovery and initialization for Wave
- z/VM System Management Use Cases
- Linux System Management Use Case
  - Provisioning/Cloning
  - BMI
  - LGR
- **Customize and Extend**

# Customizing and Extending

- Execs and Shell scripts to operate against virtual servers and resources such as disk volumes. Some possible execs:
  - Dynamically configure Linux virtual CPUs on/off
  - Dynamically configure Linux memory on/off
  - Relabel a disk volume
  - Reassign system ownership of a volume
  - Format first n cyls (full volume format discouraged)
  - Flashcopy volumes
  - First boot scripts and first boot Execs
  - SMAPI Calls
- User Exits
  - WaveCloneConfigExit
  - WaveNetConfigExit
  - XVDSKOFF
  - XVDSKON
- Custom Attributes

# Execs, Scripts, and Customizing Tips



- z/VM Execs
  - Primarily utilizes links to WAVEWRKS minidisk
  - Guest must be able to link to minidisk
- Linux shell scripts
  - Utilizes NFS server on Wave Server (or alternate NFS server)
  - Client must have NFS connectivity to the server
- Avoid writing long running Execs
  - They will timeout and report in error
  - They may tie up Wave Service Machines prevent other work from running
- Shell and Exec output captured in workunit, add commands to produce output that would add in debugging

# Execs with IBM Wave

- Can be executed against individual objects or groups of objects
- Default location of Execs is WAVEWRKS 399
- Exec output to BTW work unit COR tab
- Executed by WAVEWRKS service machine
  - 60 second timeout
  - Never execute a long running Exec
- Test outside of IBM Wave before running under IBM Wave

# Execs with IBM Wave

- Select multiple unlabeled volumes

Current System View - "POKLBS1"

z/VM User Groups | Network | Prototypes | Storage | **System Status** | Session Tasks

Select Fields... | Export to CSV

128/362 DASD Volumes

Volser	z/VM System Na...	Device Type	Size	Free	Real Address	Status	Assigned To	Is Online
P01P02	POKLBS1	3390-03	2.31	N/A	3F00	SYS		true
P01P03	POKLBS1	3390-03	2.31	N/A	3F01	SYS		true
611TMP	POKLBS1	3390-03	2.31	N/A	3F02	Free		true
DEVNO	POKLBS1	3390-03	2.31	N/A	3F03	Enabled		true
DEVNO	POKLBS1	3390-03	2.31	N/A	3F04	Enabled		true
FREE	POKLBS1	3390-03	2.31	N/A	3F05	Free		true
FREE	POKLBS1	3390-03	2.31	N/A	3F06	Free		true
FREE	POKLBS1	3390-03	2.31	N/A	3F07	Free		true
FREE	POKLBS1	3390-03	2.31	N/A	3F08	Free		true
FREE	POKLBS1	3390-03	2.31	N/A	3F09	Free		true
612PG1	POKLBS1	3390-03	2.31	N/A	3F0A	Free		true
612PG0	POKLBS1	3390-03	2.31	N/A	3F0B	Free		true
LSM-54	POKLBS1	3390-09	6.94	0.23	3F0C	Defined		true
FREE	POKLBS1	3390-09	6.94	N/A	3F0D	Free		true
EC3FOE	POKLBS1	3390-09	6.94	N/A	3F0E	Free		true
EC3FOF	POKLBS1	3390-09	6.94	N/A	3F0F	Free		true
VM1US1	POKLBS1	3390-09	6.94	2.21	3F10	Assigned	USER	true

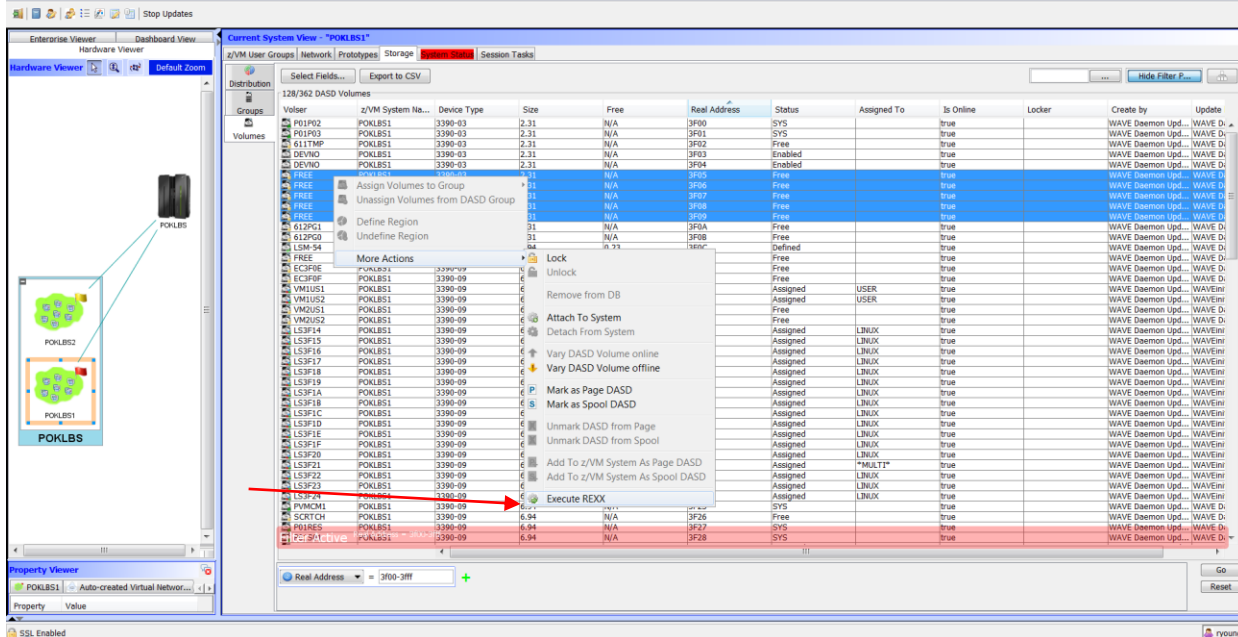
# Execs with IBM Wave

```
/*Rexx*/  
trace o  
Address COMMAND  
Arg dasds .  
'CP LINK MAINT 551 551 RR'  
ACCESS 551 F  
labelPrefix = 'LS'  
  label = labelPrefix || dasds  
  "CP detach " dasds " FROM SYSTEM "  
  "CP detach " dasds USERID()  
  "CP attach " dasds USERID()  
Queue 'FORMAT'  
Queue dasds  
Queue '0 5'  
Queue label  
Queue 'YES'  
Queue perm '0 END'  
Queue 'END'  
' CPFMTXA'  
retVal = rc  
"CP detach " dasds USERID()  
Return retVal /* from formatOne */
```

# Execs with IBM Wave

- Right mouse, More Actions, Execute Rexx

File Auto Detect User-Group Management Network Management Prototype Management Storage Management Administrative User Tasks Reports Window Help



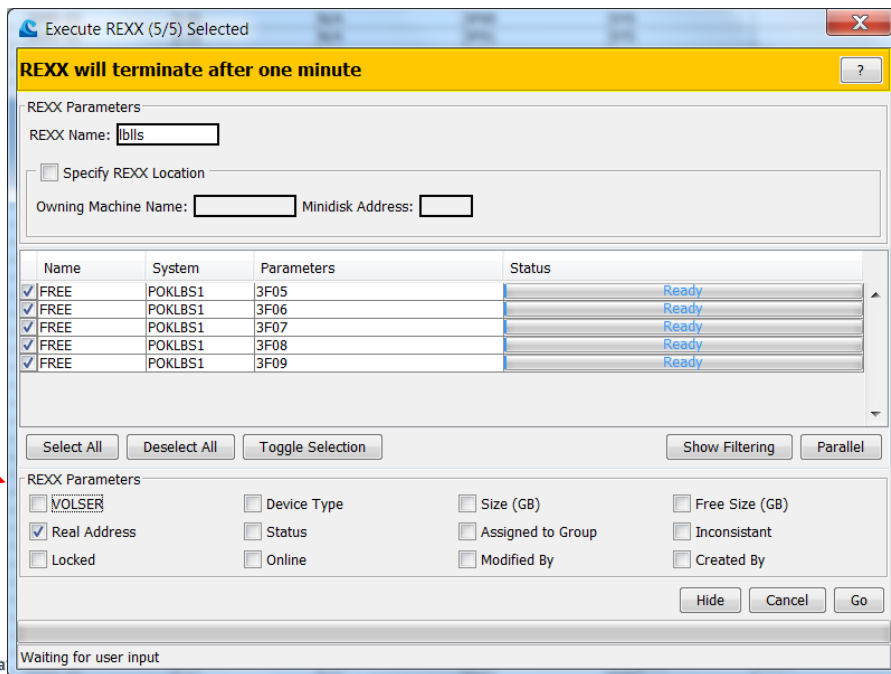
The screenshot displays the IBM Wave software interface. On the left, a hardware viewer shows a network diagram with nodes labeled POKLBS1, POKLBS2, and POKLBS3. The main window is titled "Current System View - 'POKLBS1'" and shows a table of 128/362 DASD Volumes. A context menu is open over the row for volume L53P23, with the "Execute REXX" option highlighted by a red arrow.

Volume	a/zVM System No.	Device Type	Size	Free	Real Address	Status	Assigned To	Is Online	Locker	Create by	Update
P01P02	POKLBS1	3390-03	2,31	N/A	3F00	SYS	true	true		WAVE Daemon Upd...	WAVE D...
P01P03	POKLBS1	3390-03	2,31	N/A	3F01	SYS	true	true		WAVE Daemon Upd...	WAVE D...
611TNP	POKLBS1	3390-03	2,31	N/A	3F02	Free	true	true		WAVE Daemon Upd...	WAVE D...
DEVNO	POKLBS1	3390-03	2,31	N/A	3F03	Enabled	true	true		WAVE Daemon Upd...	WAVE D...
DEVNO	POKLBS1	3390-03	2,31	N/A	3F04	Enabled	true	true		WAVE Daemon Upd...	WAVE D...
FREE			31	N/A	3F05	Free	true	true		WAVE Daemon Upd...	WAVE D...
FREE			31	N/A	3F06	Free	true	true		WAVE Daemon Upd...	WAVE D...
FREE			31	N/A	3F07	Free	true	true		WAVE Daemon Upd...	WAVE D...
FREE			31	N/A	3F08	Free	true	true		WAVE Daemon Upd...	WAVE D...
FREE			31	N/A	3F09	Free	true	true		WAVE Daemon Upd...	WAVE D...
612PC1			31	N/A	3F0A	Free	true	true		WAVE Daemon Upd...	WAVE D...
612PC0			31	N/A	3F0B	Free	true	true		WAVE Daemon Upd...	WAVE D...
L53P54			31	N/A	3F0C	Defined	true	true		WAVE Daemon Upd...	WAVE D...
FREE			31	N/A	3F0D	Free	true	true		WAVE Daemon Upd...	WAVE D...
EC3P0E	POKLBS1	3390-09	6			Free	true	true		WAVE Daemon Upd...	WAVE D...
EC3P0F	POKLBS1	3390-09	6			Free	true	true		WAVE Daemon Upd...	WAVE D...
VM1U01	POKLBS1	3390-09	6			Assigned	USER	true		WAVE Daemon Upd...	WAVE D...
VM1U02	POKLBS1	3390-09	6			Assigned	USER	true		WAVE Daemon Upd...	WAVE D...
VM2U01	POKLBS1	3390-09	6			Free	true	true		WAVE Daemon Upd...	WAVE D...
VM2U02	POKLBS1	3390-09	6			Free	true	true		WAVE Daemon Upd...	WAVE D...
L53P14	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P15	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P16	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P17	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P18	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P19	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P1A	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P1B	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P1C	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P1D	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P1E	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P1F	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P20	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P21	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P22	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P23	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
L53P24	POKLBS1	3390-09	6			Assigned	LNIX	true		WAVE Daemon Upd...	WAVE D...
PNCM01	POKLBS1	3390-09	6			SYS	true	true		WAVE Daemon Upd...	WAVE D...
SCRTCH	POKLBS1	3390-09	6,94	N/A	3F26	Free	true	true		WAVE Daemon Upd...	WAVE D...
POKLBS			3390-09	6,94	N/A	3F27	SYS	true		WAVE Daemon Upd...	WAVE D...
POKLBS			3390-09	6,94	N/A	3F28	SYS	true		WAVE Daemon Upd...	WAVE D...



# Execs with IBM Wave

- Check the parameters you want to pass
- No free form input



Execute REXX (5/5) Selected

**REXX will terminate after one minute**

REXX Parameters

REXX Name:

Specify REXX Location

Owning Machine Name:  Minidisk Address:

Name	System	Parameters	Status
<input checked="" type="checkbox"/> FREE	POKLBS1	3F05	Ready
<input checked="" type="checkbox"/> FREE	POKLBS1	3F06	Ready
<input checked="" type="checkbox"/> FREE	POKLBS1	3F07	Ready
<input checked="" type="checkbox"/> FREE	POKLBS1	3F08	Ready
<input checked="" type="checkbox"/> FREE	POKLBS1	3F09	Ready

Select All   Deselect All   Toggle Selection   Show Filtering   Parallel

REXX Parameters

VOLSER    Device Type    Size (GB)    Free Size (GB)

Real Address    Status    Assigned to Group    Inconsistent

Locked    Online    Modified By    Created By

Hide   Cancel   Go

Waiting for user input

# Execs with IBM Wave



- All 5 completed in 1 second

**Workunit Details**

Workunit Name: Execute REXX on z/VM Objects      Workunit Start Time: 2014-05-10 19:08:17

Workunit ID: 2014-05-10 19:08:17\_938      Workunit End Time: 2014-05-10 19:08:18

Workunit Initiator: ryoung1      Workunit Duration: 1 seconds

Workunit Status: Done

**BTS Requests**

Request Name	Status	Progress
Execute REXX LBLLS using zVMDASDVOLUME POKLBS1.3F05	Done	100%
Execute REXX LBLLS using zVMDASDVOLUME POKLBS1.3F06	Done	100%
Execute REXX LBLLS using zVMDASDVOLUME POKLBS1.3F07	Done	100%
Execute REXX LBLLS using zVMDASDVOLUME POKLBS1.3F08	Done	100%
Execute REXX LBLLS using zVMDASDVOLUME POKLBS1.3F09	Done	100%

**COR Entries**

Log COR    REXX COR

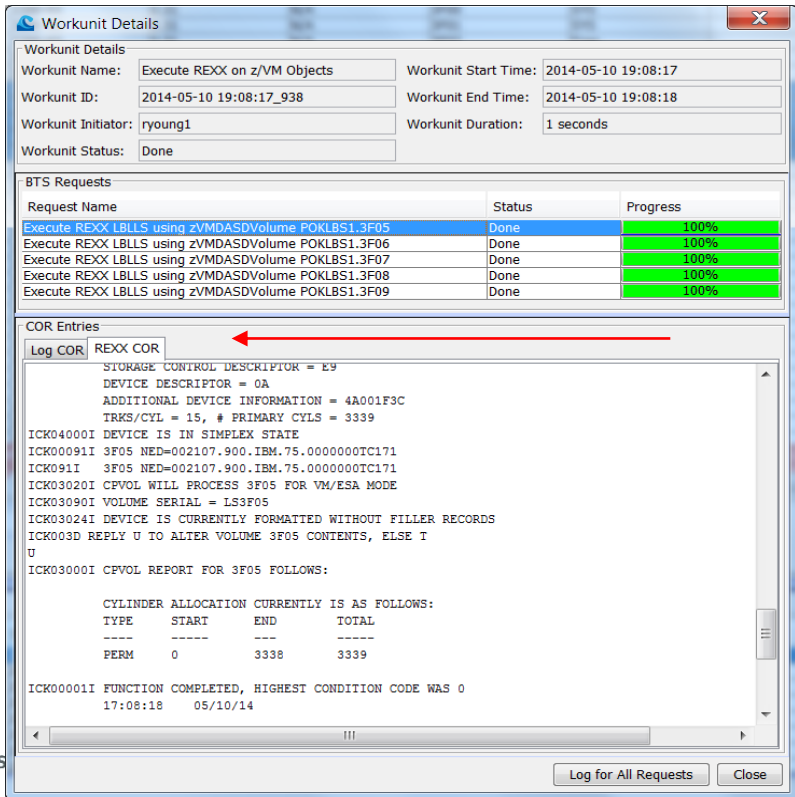
Time Stamp	Data
2014-05-10 19:08:17	BTS Workunit: Execute REXX on z/VM Objects, Request: Execute REXX LBLLS using zVMDA...
2014-05-10 19:08:17	Request running with debug level: Debug
2014-05-10 19:08:17	Connecting to Service Machine in z/VM System POKLBS1...
2014-05-10 19:08:17	Locating REXX on the specified guest (WAVEWRKS)...
2014-05-10 19:08:17	Executing REXX LBLLS from guest: WAVEWRKS at minidisk address: <All> with parameter...
2014-05-10 19:08:18	REXX output stored in REXX output COR entry for request
2014-05-10 19:08:18	Performing volatile DEQs for Request...
2014-05-10 19:08:18	BTS Workunit: Execute REXX on z/VM Objects, Request: Execute REXX LBLLS using zVMDA...

Log for All Requests    Close

Complete your session evaluations

# Execs with IBM Wave

- REXX COR tab contains output of Exec execution



The screenshot shows the 'Workunit Details' window with the following information:

Workunit Name:	Execute REXX on z/VM Objects	Workunit Start Time:	2014-05-10 19:08:17
Workunit ID:	2014-05-10 19:08:17_938	Workunit End Time:	2014-05-10 19:08:18
Workunit Initiator:	ryoung1	Workunit Duration:	1 seconds
Workunit Status:	Done		

Request Name	Status	Progress
Execute REXX LBLLS using zVMDASDVVolume POKLBS1.3F05	Done	100%
Execute REXX LBLLS using zVMDASDVVolume POKLBS1.3F06	Done	100%
Execute REXX LBLLS using zVMDASDVVolume POKLBS1.3F07	Done	100%
Execute REXX LBLLS using zVMDASDVVolume POKLBS1.3F08	Done	100%
Execute REXX LBLLS using zVMDASDVVolume POKLBS1.3F09	Done	100%

**COR Entries**

Log COR REXX COR ←

```
STORAGE CONTROL DESCRIPTOR = E9
DEVICE DESCRIPTOR = 0A
ADDITIONAL DEVICE INFORMATION = 4A001F3C
TRKS/CYL = 15, # PRIMARY CYLS = 3339
ICK04000I DEVICE IS IN SIMPLEX STATE
ICK00091I 3F05 NED=002107.900.IBM.75.0000000TC171
ICK091I 3F05 NED=002107.900.IBM.75.0000000TC171
ICK03020I CPVOL WILL PROCESS 3F05 FOR VM/ESA MODE
ICK03090I VOLUME SERIAL = LS3F05
ICK03024I DEVICE IS CURRENTLY FORMATTED WITHOUT FILLER RECORDS
ICK003D REPLY U TO ALTER VOLUME 3F05 CONTENTS, ELSE I
U
ICK03000I CPVOL REPORT FOR 3F05 FOLLOWS:

      CYLINDER ALLOCATION CURRENTLY IS AS FOLLOWS:
      TYPE   START   END   TOTAL
      ----   -
      PERM   0       3338  3339

ICK00001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0
17:08:18 05/10/14
```

Complete your session evaluations online at [www.S](http://www.S)

# Tips

- When applying a fixpack, always review the readme file first
- Clear the Java cache from the Windows Control Panel between each new level
- Remember that cloning is intended to be done with minidisks (ECKD or EDEV) , no LUNs and not DEDICATED disks.
- DIRMAINT requires RACF Special

# Thank you for attending

**Richard G. Young**

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