



# Advanced z/VM Systems Management with IBM Wave for z/VM

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IBM System z Tiger Team: News





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## Agenda

- IBM Wave for z/VM
- Functionality
- Benefits
- Fit in Portfolio
- Test Drive Environment
- IBM Wave Tiger Team
- Features and Architectural Overview
- Live Demo





## What is IBM Wave for z/VM?



IBM recently acquired CSL International, and with that its flagship product CSL Wave, now known as IBM Wave for z/VM v1.1 (IBM Wave). In this session we will discuss IBM Wave and how one can leverage it to simplify the administration of z/VM and Linux on z environments, and drive more productivity.





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## **IBM Wave for z/VM**

Empowered Virtualization Management

5648-AE1 1.1. IBM Wave for z/VM 5648-AE2 1.1. IBM Wave for z/VM S&S

IBM Wave enables the management of the entire Enterprise and its multiple z/VM guests across LPARs and CECs. Using the Enterprise Viewer and IBM Wave functions such as Projects and Grouping, one can cross manage multiple instances by custom attributes to match specific business needs!

## IBM Wave for z/VM V1.1 (IBM Wave)



- IBM Wave is a new virtualization management product for z/VM<sup>®</sup> and Linux<sup>®</sup> virtual servers that uses visualization to dramatically automate and simplify administrative and management tasks
- New! Jumpstart Services to help customers get started with IBM Wave
- Read the announcement <u>here</u>!
  - http://www-01.ibm.com/common/ssi/cgibin/ssialias?subtype=ca&infotype=an&supplier=897&letternum=ENUS21 4-027
- General availability February 28th, 2014



Supported IBM System z<sup>®</sup> processors: IBM System z10<sup>®</sup> Enterprise Class (z10 EC<sup>™</sup>), IBM System z10 Business Class<sup>™</sup> (z10 BC<sup>™</sup>) and later

Supported z/VM versions/releases:

- z/VM 6.3
- z/VM 6.2
- z/VM 5.4



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# Dimensions of Systems Management & IBM Wave for z/VM primary use





## IBM Wave for z/VM

Helps Simplify and Automate Virtualization Management For z/VM and Linux virtual servers

- Automate, simplify management and monitor virtual servers and resources-all from a single dashboard
- Perform complex virtualization tasks in a fraction of the time compared to manual execution
- Provision virtual resources (Servers, Network, Storage) to accelerate the transformation to cloud infrastructure
- Supports advanced z/VM<sup>®</sup> management capabilities such as Live Guest Relocation with a few clicks
- Delegate responsibility and provide more self service capabilities to the appropriate teams

## A simple, intuitive virtualization management tool providing management, provisioning, and automation for a z/VM environment supporting Linux<sup>®</sup> virtual servers

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## Extend the Reach of Skills with IBM Wave for z/VM

## Intelligent Visualization



- Shorten the learning curve needed to manage complex environments
- Organize and simplify management of z/VM and virtual Linux servers
- View servers and storage utilization graphically; understand the status of system resources with Intelligent icons
- Reduce unnecessary steps using highly customizable views
- Graphical or tabular displays with layered drill down

## Simplified Monitoring

#### Vitual to Real memory Definition A MMI CPU Utilitization Definition Defini

- Monitor the status of z/VM systems through an innovative interface
- Monitor performance of CPU, paging devices, spool disks and more;
- Use agentless discovery to detect an accurate view of your environment
- Use advanced filters, tagging, layout and layer selection to make monitoring and management more meaningful
- Complements IBM OMEGAMON<sup>®</sup> XE used for in-depth performance monitoring

## Unified Management



- Manage your system from a single point of control
- Assign and delegate administrative access with role based assignments
- Provision, clone, and activate virtual resources. Define and control virtual network and storage devices
- Perform management tasks such as live guest relocation
- Annotate resources for additional policy based management
- Execute complex scripts with a single mouse click





## **IBM Wave Simplified Monitoring**

Intuitive Reports, Graphical Monitoring and Easy Integration

- Agentless Resource Discovery
  - Discover, manage and monitor z/VM resources and their relationships across multiple LPARs and CECs
  - Identify resource and relationship changes; reflect current environment in the user interface
- Monitoring
  - Allows the state of resources to be observed; icons show additional content for the resources
  - Use graphical and tabular displays with layered drill down to hone in on only the resources you
    need to view
  - Perform ongoing monitoring of changes that occur after initial auto-detection

#### Reporting

- Automatically generate charts like pie charts to report on utilization and more
- All table-based views can be exported to a CSV file for import into other applications

#### Integration

- Use Automatic Guest Classification (AGC) to integrate with existing provisioning process
- LDAP/Active Directory Support for Authentication and Authorization





## **IBM Wave Intelligent Visualization** Quickly Understand the Status of System Resources

- Get a current and accurate view of your managed environment
  - Network Topology
    - Centralized view of the entire network topology per z/VM System, view Virtual LANS (VLANS)
    - Annotate network topology view to identify external resources routers, switches, etc
  - Linux Servers
    - View performance gauges for all z/VM systems from one screen:
    - See resource consumption by guest or type
    - CPU, Virtual to Real, Paging, Spool
  - Storage
    - Visual representation of all storage resources (ECKD<sup>™</sup> and FCP-SCSI)

#### Visualize and control virtual resources

- Views can be graphical or easily switched to tabular mode
- View relationships between resources easily and graphically
- View the entire environment graphically and easily zoom in
- Advanced filters, tagging, layout and layer based views for every display







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## **Performance Resource Monitoring**

## At a Glance Status of all z/VM instances





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## **Simplify Systems Management Tasks**

Provision resources quickly and easily

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## **FCP/SCSI Support**



- IBM Wave DOES SUPPORT FCP/SCSI environments
  - IBM Wave always supported FCP/SCSI environments.
  - IBM is very committed in enhancing IBM Wave's support for FCP/SCSIonly environments.
  - New and important functionality was made available on IBM Wave FCP/SCSI-only environments, released in early July under the FixPack 5 (FP5).
  - IBM will keep investing on IBM Wave to continue to develop its capabilities not just on FCP/SCSI-only environments, but across the entire product.
- IBM Wave absolutely supports FCP/SCSI !



## FCP/SCSI-only environments at GA level (Feb 28<sup>th</sup> 2014)



- Specifically for direct attached SCSI disks:
  - Visualize disks
  - Add disks to guest
  - Create partitions
  - Create/extend LVM volume group and logical volume
  - Create/resize new file system
- At GA in February:
  - The IBM Wave installation itself was possible, requiring one to manually create the IBM Wave service machines prior to installing the IBM Wave RPM.
     Note that IBM Wave utilizes EDEVs for its own disk space.





Benefits	IBM Wave for z/VM Capabilities
<ul> <li>Gain efficiencies in virtualization management</li> </ul>	<ul> <li>IBM Wave provides a high level view of performance, storage usage, networks at a glance with built-in reporting</li> </ul>
✓ Work with a current, accurate and complete view of your managed z/\/M environment	<ul> <li>By providing an up to date, accurate view of the IT environment through its "agentless discovery" organizations can plan, change and optimize their virtualized resources accurately</li> </ul>
managea 2/ vivi environment	<ul> <li>IBM Wave enables automation of management tasks and can incorporate scripts.</li> </ul>
<ul> <li>Simplify administrative, operations and systems functions</li> </ul>	<ul> <li>Optimize z/VM capabilities by simplifying and automating management tasks that could otherwise take hours and require significant z/VM knowledge, (includes complicated tasks as LGR, Server Cloping, Storage provisioning, etc.)</li> </ul>
<ul> <li>✓ Enable improved self service to reduce costs</li> </ul>	Cerver Cloring, Clorage provisioning, clo.j.
V Pospond quickly to changing	Make common management tasks accessible to more user roles
business needs	<ul> <li>Easily delegate administrative capabilities to the appropriate users</li> </ul>
<ul> <li>Reduce errors with appropriate delegation</li> </ul>	<ul> <li>Enforce segregation policies at the individual administrator as well as the group level</li> </ul>
	Set scope and permissions to match business requirements     SHARE     In Pittsburgh 2014

Benefits	IBM Wave for z/VM Capabilities
✓ Improve service levels	<ul> <li>Offers easy, convenient access to performance and management information –at a glance</li> </ul>
<ul> <li>Easily respond to changing requirements.</li> </ul>	<ul> <li>Helps you quickly and easily administer and provision resources like servers, storage, user accounts.</li> </ul>
<ul> <li>Reduce time spent on administrative efforts</li> </ul>	<ul> <li>Tag resources with meaningful notes to help enforce installation defined rules.</li> </ul>
<ul> <li>Easily manage virtualized environments</li> </ul>	<ul> <li>Lets you provision new servers (bare metal installations) and easily clone Linux virtual servers and other resources</li> </ul>
<ul> <li>Simplify and accelerate your journey to cloud</li> </ul>	<ul> <li>Scripts allow customization of a golden master.</li> </ul>
	<ul> <li>Support early virtualization steps needed to get to a private cloud.</li> </ul>
✓ Create audit trails of IBM Wave users' activities	• List tasks and status requested by the users with respect to their scope.
	<ul> <li>Log each operation that changes the system including logon and logoff to provide an audit trail. The logs may be then routed to a centralized logging mechanism for further filtering or processing.</li> </ul>
<ul> <li>✓ Simplify your administration</li> </ul>	<ul> <li>IBM Wave automates a sequence of VM commands, reducing steps needed to complete common administrative and management tasks—and improve consistency.</li> </ul>
<ul> <li>Extend the reach of your existing IT staff</li> </ul>	<ul> <li>IBM Wave helps your team manage additional servers even if your servers have a deep expert skills bench available.</li> </ul>
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## Cloud Computing – Based on Virtualization and Standardization

Helps facilitate better integration between infrastructure – system admins – and middleware/applications - developers/architects



## Virtualization and Cloud Portfolio for Linux on System z



Virtualization Infrastructure & Virtualization Management	Entry Level Cloud Standardization & Automation	Advanced Cloud Orchestration & Optimization
<ul> <li>zEnterprise: zEC12, zBC12</li> <li>Massively scalable</li> <li>Characterized by great economics / efficiencies</li> <li>Highly secure / available</li> </ul>	<ul> <li>Cloud Manager with OpenStack</li> <li>A simple, entry level cloud management stack</li> <li>Based on OpenStack</li> </ul>	<ul> <li>Cloud Management Suite for System z</li> <li>Builds on functionality of Cloud Manager with OpenStack and adds runbook automation and middleware pettern support for</li> </ul>
<ul> <li>z/VM 6.3</li> <li>Support more virtual servers than any other platform in a single footprint</li> <li>Integrated OpenStack support</li> </ul>	<ul> <li>Formerly known as SmartCloud Entry</li> </ul>	<ul> <li>Includes SmartCloud Orchestrator</li> <li>Also includes Tivoli Storage Manager and OMEGAMON XE on z/VM and Linux</li> </ul>
Linux on System z <ul> <li>Distributions available from RedHat and SUSE</li> </ul>		
<b>IBM Wave for z/VM</b> • A tool that simplifies the management and administration of the z/VM and Linux on System z environments via an intuitive graphical user interface		
Differentiation Complete your session evaluations online at w	Standardization ww.SHARE.org/Pittsburgh-Eval	Service Lifecycle Management

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## Learn More with IBM Wave Client Hands on Experience





#### **Client Sites Worldwide**

#### Hands on IBM Wave Environment now available

- Client hands-on experience using IBM Wave on a IBM zEnterprise EC12 (zEC12)
- Secure remote access from client site to zEC12 in Gaithersburg, MD
- Accessible 24 hours a day, 7 days a week (except for occasional planned outages)
- Guided exercises provide hands on experience with IBM Wave
- Contact your representative to get started today



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# IBM Wave for z/VM Features and Architectural Overview









## Feature overview - Automation and simplification

- View the entire server farm laid out graphically
- Ordered Activation/Deactivation of servers
- Execution of customer's REXX as part of the cloning process to allow local z/VM customization
- Run Linux shell scripts against dynamically grouped/filtered servers, as IBM Wave for z/VM background tasks, listing the results for each selected server - All via the GUI
- Run REXX EXECs against any virtual object with customized parameters and results listing - All via the GUI
- WAVECLI A CLI for IBM Wave for z/VM actions that can be utilized from Linux shell scripts or Windows Batch files
- Access z/Linux guests directly from the GUI using SSH, 3270 or CLC
   – No hostnames or IP addresses to remember, simply right-click on the server and select the desired access





## **Feature overview - Provisioning**

- Sophisticated guests cloning including Cross System Clone (across LPARs and CPCs)
- Ability to customize the first boot of a cloned server (before TCP/IP is initialized)
- Simple creating and manipulation of Vswitches and Guest LANs
- Connect/disconnect guests to Vswitches or Guest LANs via the GUI
- Storage management and provisioning at the z/VM and Linux levels (including LVM support)
- Automatic handling of Real or Dedicated devices via IBM Wave for z/VM's user defined Device Pool



## SHARE Educate · Network · Influence

## Feature overview – Auto-detection

- Agentless technology
- Automatic initial detection of all virtual server farms components (servers, prototypes, networks, network devices and storage)
- Ongoing monitoring of changes made outside of IBM Wave for z/VM after the initial auto-detection





## Feature overview – Network support

- Centralized, layer based view of the entire network topology per z/VM system
- Define and control all network devices such as VSwitches and guest LANs
- Manipulation of servers-to-network connect/disconnect using GUI
- Support for VLAN usage
- Management of VSwitches with protocol layer 2 or 3
- Customize network topology view with external resources such as routers, LPARs etc.





## **IBM Wave Requirements**

#### Client

- Windows 7 Workstation
- Internet Explorer or Firefox

 Java Runtime 1.7 with Web Start Support

PuTTY or equivalent telnet/SSH client

#### WAVESRV

- z/VM Guest or LPAR
- RHEL 6 or SLES 11
- MySQL V12.22 or higher
- Java SE Runtime 1.7
- Apache

### TVP

■IBM System z10<sup>®</sup> or later

 z/VM V5.4, V6.2 or higher with Systems Management API configured

- ■IBM Directory Maintenance for z/VM (DirMaint<sup>™</sup>) or equivalent
- ■Performance Toolkit for VM<sup>™</sup> (Perfkit, optional but suggested)











## **Planning and Design**

- Sizing
  - IGB RAM
  - Filesystems:
    - /boot 100MB (approx. 100 Cyls)
    - / 2GB (approx. 3000 Cyls)
    - /var 3GB (approx. 4500 Cyls)

## Sizing the log space areas

- By default, logs are stored in /var
  - configure the /var filesystem as a logical volume under LVM so it can be extended when needed

## Location of WAVESRV server

The server is implemented as a virtual server within a z/VM LPAR.





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## Sample directory entry for the WAVESRV

## virtual server

USER WAVESRV <Password Here> 1G 2G GC **CPU 00** IPL CMS MACHINE ESA 4 OPTION QUICKDSP CONSOLE 0009 3215 NICDEF 0800 TYPE ODIO LAN SYSTEM <GLAN/VSWITCH Name here> SPOOL 000C 3505 A SPOOL 000D 3525 A SPOOL 000E 1403 A LINK MAINT 0190 0190 RR LINK MAINT 019D 019D RR LINK MAINT 019E 019E RR MDISK 0191 3390 1 3 < DASD Volume Name here> - This is a CMS minidisk MDISK 0150 3390 1 3000 < DASD Volume Name here> - This minidisk will be used for "/" MDISK 0151 3390 1 4500 < DASD Volume Name here> - This minidisk will be used for "/var" MDISK 0152 3390 1 200 < DASD Volume Name here> - This minidisk will be used for swap 



## **IBM Wave Systems Management Task Example:**

## "Add Disk Space To A Virtual Server"

#### Without IBM Wave

- Find requested disk space 1.
- 2. Create disk definition
- 3. Activate definition
- Connect storage to virtual server 4
- Mount device 5
- 6. Create a File System

#### View Storage at a Glance

#### DASD Volume Map View for LINFCPT 👌 🔍 🖸 📾 Default Zoom Show Legend Tag Predefined Vesa Enable All 🕘 Guests & Volumes Vier SC & Volumes View Costram View Ev Lavers DASD Volumes 7 FCP Volumes 76 V Storage Controllers V Device Pools EDEVs 7 Quests 1 .....

#### Manage z/VM User LINCSL2 Storag USER-LOCA inux File Systems LVM Volume Group Current Active File Systems on Serve Free (GB) 0.28 0.00 0.00 0.00 0.71 used (GB) 1.01 0.00 FS Type Size (GB) ext3 proc 1.35 STD STD CKD CKD 0.00 0.00 0.00 0.00 STD Close Extend Partition Streate New Partition . Waiting for user inpu

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### With IBM Wave

- Open the "Add Storage" form 1.
- 2. Fill the storage capacity requested
- 3. Press the "Go" button

#### **Benefits:**

- ✓ Reduce reliance on scarce skills
- ✓ Respond faster to IT customer needs
- ✓ Reduce costs
- Empower team to do more independently
- ✓ Simplify management
- ✓Accurately depict current environment
- ✓ Reduce manual procedure errors
- ✓ Avoid problematic situations downstream

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## **IBM Wave Systems Management Task Example:**

#### "Clone a Virtual Machine"

#### Without IBM Wave

- 1. Determine if required resources exist
- 2. Create clone VM definition
- 3. Define clone VM resources
- 4. Create copies of private VM resources (server)
- 5. Create copies of private VM resources (disk)
- 6. Customize clone VM
- 7. Authorize clone VM access / VSwitch Access
- 8. Add clone to management groups
- 9. Activate clone
- 10. Configure the network
- 11. Run middleware configuration scripts
- 12. Monitor and report on cloning operation.

#### Clone a Linux Virtual Server

en core monaum				
CSC Information				
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New Clone Parameters				
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			L. Harris	-
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#### With IBM Wave

- 1. Open the "Clone" form
- 2. Fill in the needed information
- 3. Press the "Go" Button

#### **Benefits:**

- ✓ Reduce time for a highly complex task
- ✓Reduce costs
- ✓ Reduce reliance on scarce skills
- ✓Improve speed to clone
- ✓ Simplify management
- ✓ Reduce errors associated with manual

procedures

✓No need to monitor every step of the process







## **IBM Wave Systems Management Task Example:**

## "Live Guest Relocation"

#### Without IBM Wave

•Using manual control program commands

#### With IBM Wave

•Using the GUI's Drag-and-Drop techniques •Or Execute via menu selection

Task	Task Steps
Log into both z/VM instances	Login PBCVMA Login PBCVMB
Find out which instance has the running guest	q HTTP2 in PBCVMA q HTTP2 in PBCVMB
Verify the guest can be moved	vmrelo test HTTP2 to PBCVMB
Move the guest	vmrelo move HTTP2 to PBCVMB
Log out of both z/VM instances	Logoff PBCVMA Logoff PBCVMB





## **Enterprise Linux Server features IBM Wave for z/VM**



Enterprise Linux Server includes IBM zEnterprise<sup>®</sup> hardware, hardware maintenance, IBM virtualization and management software components and software support & subscription.

#### Hardware options

- -IBM zEnterprise server
- -32 GB memory
- -Connectivity
- -S&S

#### Virtualization software

- -IBM z/VM Version 6
- -z/VM basic features:
  - Dirmaint<sup>™</sup>, RACF<sup>®</sup>, Performance Toolkit for VM<sup>™</sup>, RSCS

#### -NEW! IBM Wave for z/VM included

- -3-5 years S&S
- Note: Linux ordered from Red Hat or SUSE

#### Enterprise Linux Server

Includes IFLs, memory, I/O adapters, z/VM software including 3-to-5 years of S&S, and maintenance

#### **Solution Edition for Enterprise Linux**

Acquire incremental Linux CPUs (IFLs), memory, z/VM software and 3-5 years of subscription and support, and maintenance.

<sup>1</sup> 28-32 GB memory on zBC12, 24 GB memory per core up to 5 IFLs on z114. Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval







## Enterprise Cloud System (Pre-configured and integrated system)

- Server:
- IBM zEnterprise<sup>®</sup> EC12 or IBM zEnterprise BC12 (zEC12, zBC12)
- Storage:
- IBM DS8870 or Storwize® V7000
- Software:
- $z/VM^{\circ}$  6.3 with following features:
  - Directory Maintenance (DirMaint<sup>™</sup>) Feature
  - Resource Access Control Facility (RACF<sup>®</sup>)
  - Performance Toolkit for VM<sup>™</sup> Feature
  - Single System Image (SSI) Feature -
    - (Requires ECKD DASD)
- IBM Wave for z/VM
- Cloud Management Suite:
  - OMEGAMON® XE on z/VM and Linux
  - Tivoli Storage Manager
  - SmartCloud Orchestrator
- Operations Manager for z/VM
- Backup and Restore Manager for z/VM



## IBM Wave for z/VM - Live Demo





IBM-NA (CSLVM17) 28 Users All Accessible



IBM-DIRM (CSLVM17) 6 Users All Accessible



IBM-SYSTEM (CSLVM17) 5 Users All Accessible



IBM-SMAPI (CSLVM17) 11 Users All Accessible



IBM-UTIL (CSLVM17) 11 Users All Accessible



USER-LOCAL (CSLVM17) 9 Users (+1 Hidden) All Accessible

IBM-COM (CSLVM17)

37 Users

All Accessible

IBM System z Tiger Team: News

WAVE-INTERNAL (CSLVM17) 4 Users All Accessible

IBM-OPER (CSLVM17)

6 Users

All Accessible

12 Users

All Accessible



IBM-ENS (CSLVM17) 4 Users All Accessible



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