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

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Agenda

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

What is IBM Wave for z/VM?

- **IBM acquired CSL International and it's flagship product, CSL-WAVE**
- **CSL-WAVE was heavily modified by IBM to enhance security and usability and became IBM Wave for z/VM version 1.1**
- **An enormous amount of additional upgrades and functionality has been added since v1.1 to produce v1.2 which was just announced in May**
- **IBM Wave enables management of z/VM across the entire enterprise!**
- **z/VM virtual machines across multiple LPARs and CPCs are controlled from one console**
- **Using built-in functions such as Enterprise Viewer, Projects, and Grouping, one can easily manage multiple instances by using custom attributes to match specific business needs**

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

What is IBM Wave for z/VM (continued)

From the product documentation:
"IBM Wave provides a simplified approach to the management of IBM System z servers running z/VM and Linux. System z servers can be configured with z/VM instances that can run hundreds to thousands of virtual Linux servers with each one supporting individual workloads. IBM Wave's intelligent visualization of the virtual server environment and physical infrastructure provides intuitive management of physical servers, z/VM, Linux guests, and other resources. IBM Wave provides the necessary capabilities for complete virtual server provisioning, can readily scale to handle the most complex installations, and is an ideal solution to begin transitioning to a highly virtualized cloud infrastructure. With IBM Wave, you can rapidly gain insight into your entire virtualized infrastructure topology at a glance and also accelerate the path to using private clouds."

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.

Why organizations need IBM Wave

- **Reductions in budgets means IT needs to leverage existing staff to do more with less. 70-80% of IT spend goes to operations alone.**
- **Managers and administrators benefit from having tools offering self service, with easier and simpler administration**
- **z/VM® managers find they need fast and accurate insight into changes in their environment**
- **Administrators need to eliminate the continual maintenance, and increased management complexity of writing and maintaining home grown solutions and scripts**
- **Managers need to train staff new to z/VM to perform complex tasks quickly and easily**
- **Linux® administrators need to manage a powerful mainframe environment without significant z/VM skills**

70 - 80%
of IT budgets are spent on ongoing operations and maintenance costs

Robert Frances Group, "Data Center Optimization Planning – Dashboard Metrics," December 2012 .

"IBM Wave is a virtualization management tool for administrators that could reduce the administration and management of IBM z/VM and Linux virtual servers up to 85 to 95 percent."
Robert Frances Group 2014

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Overview of IBM Wave for z/VM V1.1 (IBM Wave)

- **IBM Wave is a new virtualization management product for z/VM® and Linux® virtual servers that uses visualization to dramatically automate and simplify administrative and management tasks**

- **Enterprise Linux Server (ELS) and the Enterprise Cloud System (ECS) solutions are also available with IBM Wave for z/VM**

- **IBM Infrastructure Suite for z/VM and Linux V1.1**

- **New! Jumpstart Services to help customers get started with IBM Wave**

- **Read the announcement here**
  ibm.com/common/ssi/cgi-bin/ssialias? subtype=ca&infotype=an&supplier=897&letternum=ENUS214-027

- **General availability of v1.1 was on February 28th, 2014 and v1.2 was on May 11th, 2015**

Supported IBM System z® processors: IBM System z10® Enterprise Class (z10 EC™), IBM System z10 Business Class™ (z10 BC™) and later
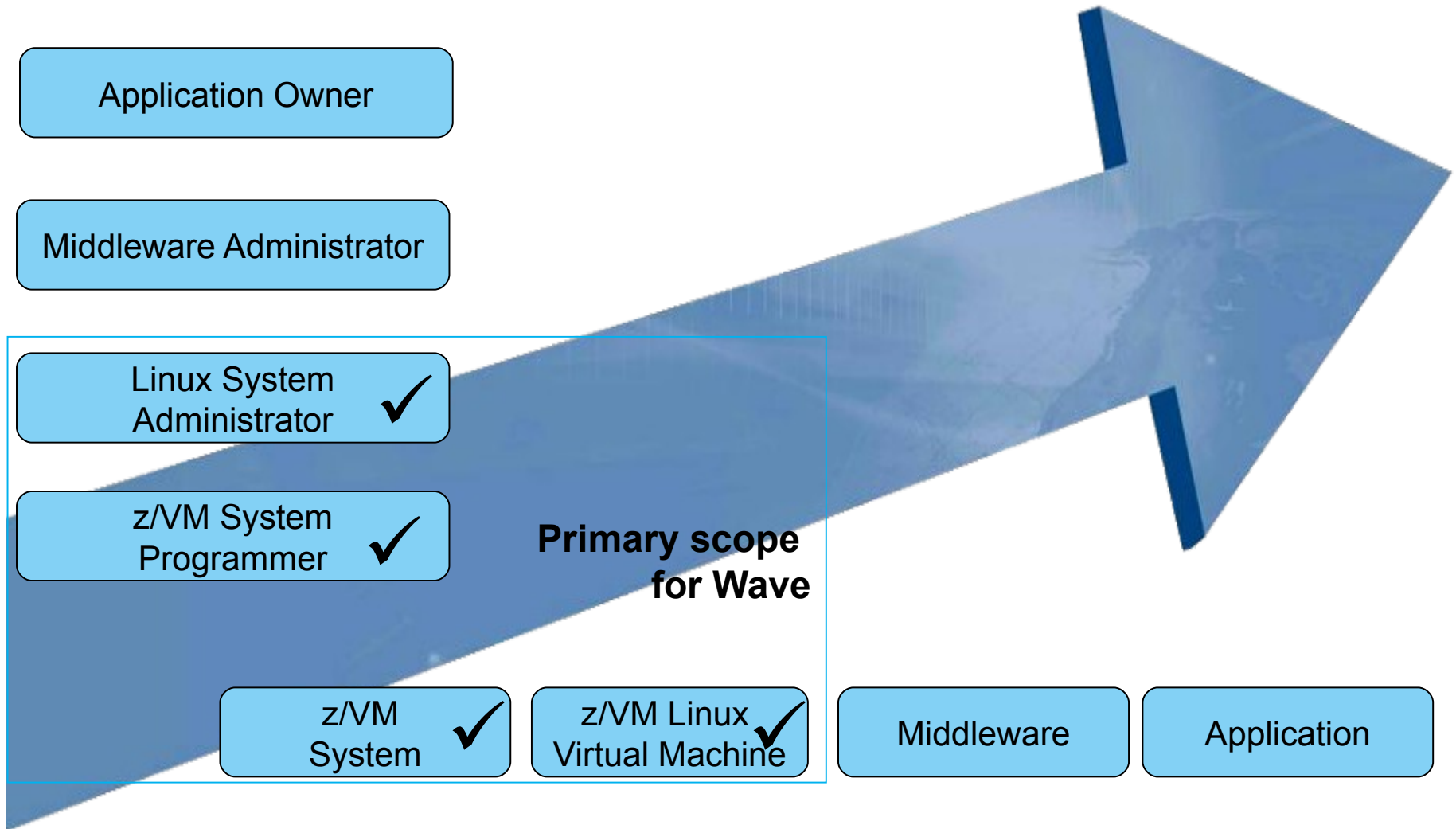
Supported z/VM versions/releases:
- z/VM 6.3
- z/VM 6.2
- z/VM 5.4

IBM Wave for z/VM

Welcome to the IBM Wave homepage on your site!
Current IBM Wave version: 1.1.0

Launch IBM Wave v1.1.0

Launch z/VM API Testing Application

Administration and Customization Guide

User Guide and Reference

IBM.

Dimensions of systems management

Application Owner

Middleware Administrator

Linux System Administrator ✓

z/VM System Programmer ✓

Primary scope for Wave

z/VM System ✓

z/VM Linux Virtual Machine ✓

Middleware

Application

IBM Wave Enhancements Since V1.1

Benefits	IBM Wave Enhancement
Easier to customize IBM Wave for your site	▪ Use additional Exits for site-specific configuration
More extensive support for Linux distros	▪ Red Hat Enterprise Linux (RHEL) 7 ▪ SUSE Linux Enterprise (SLES) 12 ▪ Bare Metal Install for SLES10, 11 and RHEL5, 6 + Layer 2 Network support ▪ Ext4 File System Support (RHEL6 only)
Improved FCP SCSI device support	▪ Enhanced storage support for −FCP SCSI-only environments using EDEVs −Richer EDEV support −SAN (FCP/SCSI) improved support for direct attached FCP devices ▪ Expanded management from a central point of control
Easier to get started with cloud	▪ Enhanced Cross System Cloning
Easier serviceability and support	▪ LDAP configuration checker ▪ Improved Auto-detection ▪ First Failure Data Capture to help capture diagnostics to aid in problem resolution
Strengthened security and audit	▪ Verisign authenticated code signing certificates ▪ Mixed case password support ▪ Additional audit records generated ▪ Supports your LDAP configuration

IBM Wave Enhancements Since V1.1

Benefits	IBM Wave Enhancement
Generate reports on demand, using customized data	▪ Improved Flexible Reporting Capability with many new data points for richer report content ▪ Export reports as needed to CSV or other formats ▪ Automatically provides current view of environment
SoD for Audit	▪ SOD for enhanced audit logging ▪ Allows an IBM Wave administrator to satisfy corporate auditing needs by accessing a consolidated log of auditable activities.
SoD for IBM Wave Server	▪ IBM intends to support the installation and execution of the IBM Wave server (IBM WAVESRV) on Red Hat Enterprise Linux (RHEL) 7 and SUSE Linux Enterprise Server (SLES) 12 distributions

IBM Wave offers increased automation and simplification around management of virtual Linux environments on z Systems

New IBM Wave V1.2 Enhancements

- Reporting enhancements
  - Users can now create customized reports on resources managed by IBM Wave

- Support of latest Linux distributions*
  - Red Hat Enterprise Linux (RHEL) 7
  - SUSE Linux Enterprise Server (SLES) 12

New Reporting Capabilities

Business Value	How
Obtain the current and specific information you need, on demand	**Generate accurate inventory of your environment** ▪ Customize reports with filtering and tagging ▪ Discover unused resource ▪ Easily manage and report on resources using detailed templates
Handle report management workflow with ease	
Create reports on demand in a self sufficient manner	

Benefits:

Provides visibility into your z/VM systems whenever you need it

Templates and Customization to help you create detailed reports for more meaningful content

Uses IBM Wave's scopes and permissions to restrict unauthorized access

Export reports (e.g.; CSV format) for further analysis and reporting workflow and get it documented

View and customize reports easily
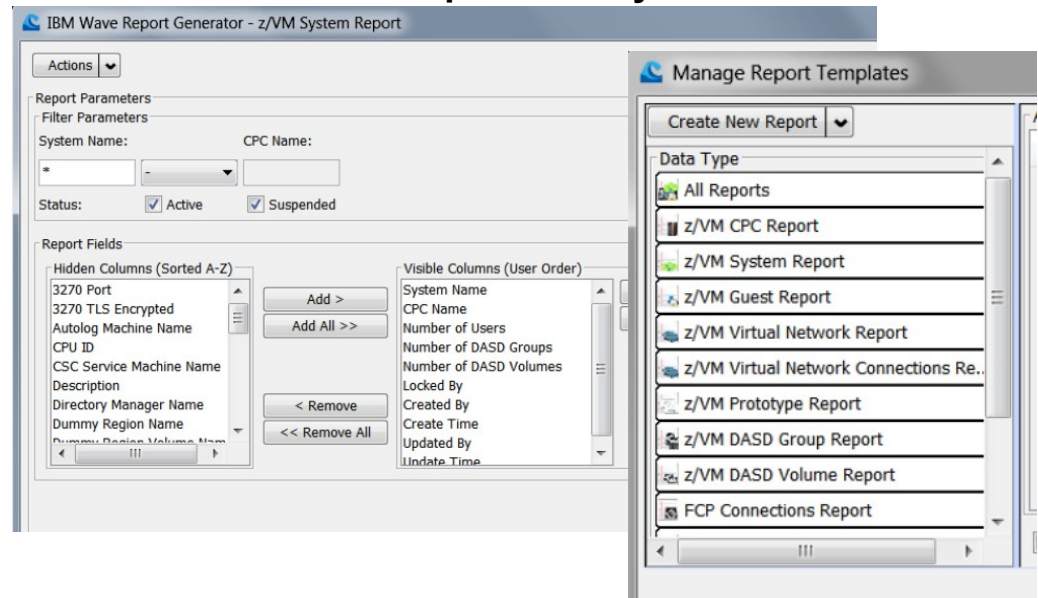
Help simplify and automate virtualization management

- 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® management capabilities such as Live Guest Relocation with a few clicks

- Delegate responsibility and provide more self service capabilities to the appropriate teams
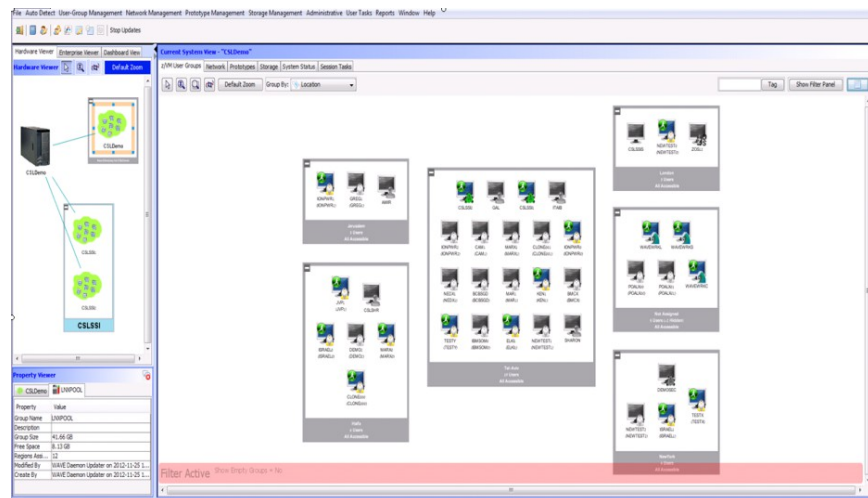
A simple, intuitive virtualization management tool providing management, provisioning, and automation for a z/VM environment supporting Linux® virtual servers

Extend the reach of skills

Advanced Visualization	**Simplified Monitoring**	**Unified Management**

- 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; view resource status at a glance

- Use graphical or tabular displays with layered drill down; customize and filter views

- Attach virtual notes to resources for additional policy based management
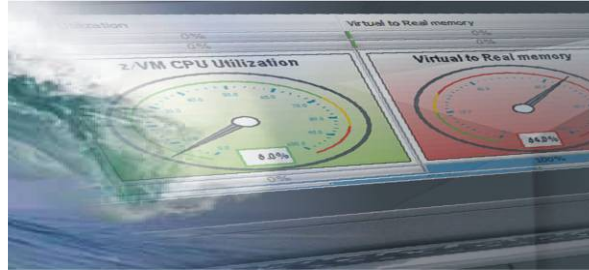
- Monitor the status of z/VM systems through an innovative interface

- 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® XE used for in-depth performance monitoring

- 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

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

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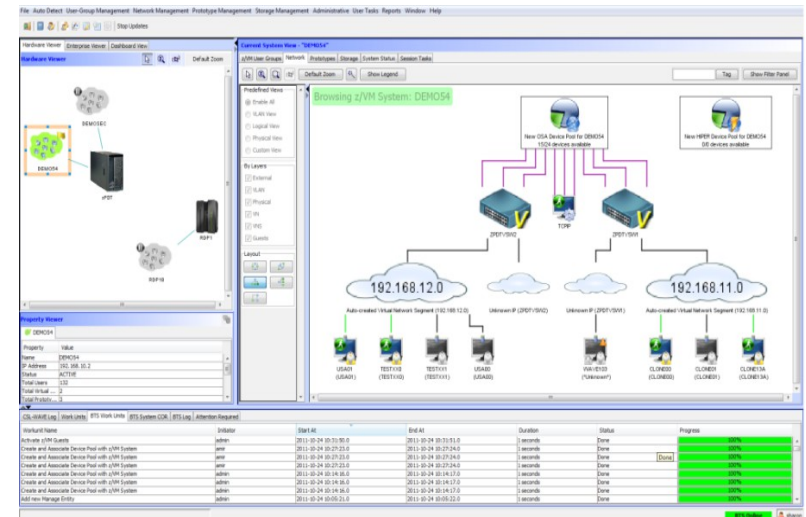
- **Visualize and control virtual resources**
  - Views can be graphical or easily switched to tabular mode
  - View relationships between resources easily and graphically
  - View the entire environment graphically and easily zoom in
- **Advanced filters, tagging, layout and layer based views for every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

Performance Resource Monitoring
At a Glance Status of all z/VM instances

Simplify Systems Management Tasks
Provision resources quickly and easily

FCP/SCSI Support

- **YES!**

- **IBM Wave DOES now and has always supported FCP/SCSI environments.**

- **IBM has a strong commitment to enhance support for FCP/SCSI-only environments.**

- **Fix Pack 5 introduced new and important functionality for FCP/SCSI-only environments (released in July 2014).**

- **IBM will continue to invest in development and enhancement of the capabilities of the IBM Wave product. Investments made on capability enhancements are not limited to just FCP/SCSI-only environments, but across the entire product.**

IBM

Benefits	IBM Wave for z/VM Capabilities
✓ Gain efficiencies in virtualization management ✓ Work with a current, accurate and complete view of your managed z/VM environment	▪ IBM Wave provides a high level view of performance, storage usage, networks at a glance with built-in reporting ▪ 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 ▪ IBM Wave enables automation of management tasks and can incorporate scripts.
✓ Simplify administrative, operations and systems functions ✓ Enable improved self service to reduce costs	▪ 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 Cloning, Storage provisioning, etc.).
✓ Respond quickly to changing business needs ✓ Reduce errors with appropriate delegation	▪ Make common management tasks accessible to more user roles ▪ Easily delegate administrative capabilities to the appropriate users ▪ Enforce segregation policies at the individual administrator as well as the group level ▪ Set scope and permissions to match business requirements

Benefits	IBM Wave for z/VM Capabilities
✓ Improve service levels ✓ Easily respond to changing requirements. ✓ Reduce time spent on administrative efforts	▪ Offers easy, convenient access to performance and management information –at a glance ▪ Helps you quickly and easily administer and provision resources like servers, storage, user accounts. ▪ Tag resources with meaningful notes to help enforce installation defined rules.
✓ Easily manage virtualized environments ✓ Simplify and accelerate your journey to cloud	▪ Lets you provision new servers (bare metal installations) and easily clone Linux virtual servers and other resources ▪ Scripts allow customization of a golden master. ▪ Support early virtualization steps needed to get to a private cloud.
✓ Create audit trails of IBM Wave users' activities	▪ List tasks and status requested by the users with respect to their scope. ▪ 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.
✓ Simplify your administration ✓ Extend the reach of your existing IT staff	▪ IBM Wave automates a sequence of VM commands, reducing steps needed to complete common administrative and management tasks —and improve consistency. ▪ IBM Wave helps your team manage additional servers even if you do not have a deep expert skills bench available.

IBM

Cloud Computing – Based on Virtualization & Standardization
Helps facilitate better integration between infrastructure – system admins – and middleware/applications - developers/architects

Patterns and workflows are the connectors

WORKLOAD PATTERN DEPLOYMENT

SELF SERVICE

AUTOMATION

STANDARDIZATION

VIRTUALIZATION

Virtualization	Entry Level Cloud	Advanced Cloud
Infrastructure & Virtualization Management	Standardization & Automation	Orchestration & Optimization
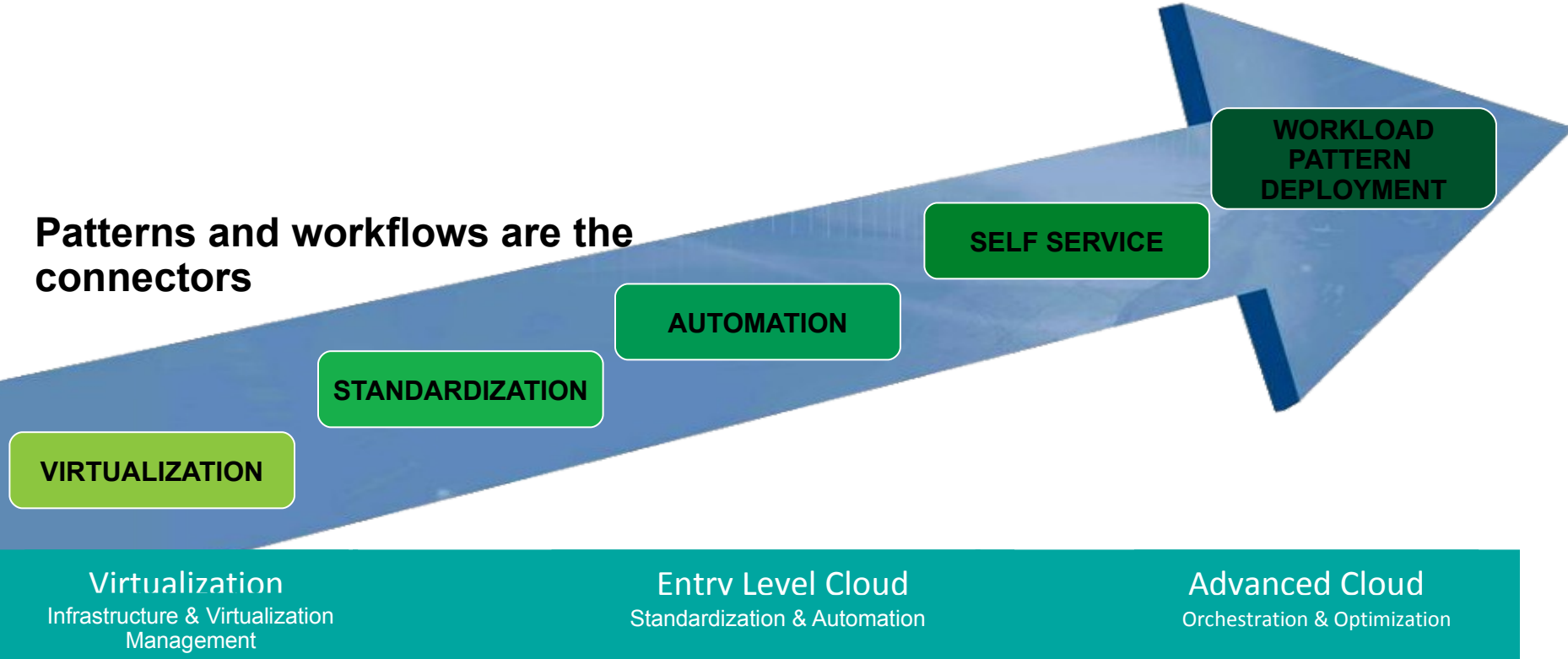
Virtualization and Cloud Portfolio for Linux on z Systems

Virtualization	Entry Level Cloud	Advanced Cloud
Infrastructure & Virtualization Management	Standardization & Automation	Orchestration & Optimization

zEnterprise: zEC12, zBC12

- Massively scalable
- Characterized by great economics / efficiencies
- Highly secure / available

z/VM 6.3

- Support more virtual servers than any other platform in a single footprint
- Integrated OpenStack support

Linux on z Systems

- Distributions available from RedHat and SUSE

IBM Wave for z/VM

- A tool that simplifies the management and administration of the z/VM and Linux on System z environments via an intuitive graphical user interface

Cloud Manager with OpenStack

- A simple, entry level cloud management stack
- Based on OpenStack
- Formerly known as SmartCloud Entry

Cloud Management Suite for z Systems

- Builds on functionality of Cloud Manager with OpenStack and adds runbook automation and middleware pattern support for workload deployment
- Includes SmartCloud Orchestrator
- Also includes Tivoli Storage Manager and OMEGAMON XE on z/VM and Linux

Differentiation

Standardization

Service Lifecycle Management

A hands-on experience with IBM Wave for IBM clients!

IBM Wave Test Drive

Client Sites Worldwide

IBM Advanced Technical Support
Washington Systems Center
Gaithersburg, Maryland US

IBM Wave Test Drive: Now Available!

- **A hands-on experience for clients with a dedicated and fully functional instance of IBM Wave on an IBM zEnterprise EC12 (zEC12) in IBM's Washington Systems Center.**
- **Secure remote access 24 hours a day, 7 days a week* from anywhere in the world.**
- **Thorough, guided exercises provide experience with functions, features, and use cases.**
- **Contact your representative to get started today!**

*Occasional scheduled system maintenance is necessary

STG Lab Services – IBM Wave Jumpstart Services for zEnterprise

- This Jumpstart service can help to accelerate your IBM Wave implementation.
- This service offering provides planning, installation, and usage assistance.
- We tailor the installation to your environment and provide skills transfer by reviewing common use cases of the interface with your support staff.

Key Features:

▪This service helps accelerate the implementation and ROI with IBM Wave

▪Assistance in planning the implementation by those who have implemented and used for several years

▪Provide recommendations on integration and configuration in your environment

▪Demonstrate how to implement custom REXX™ Execs with IBM Wave to extend functionality

▪Integration with your AD for authentication

▪Demonstration and review of common IBM Wave use cases with your staff in a workshop setting

▪Demonstrate how to enable existing Linux servers to be managed by IBM Wave

▪The Jumpstart is usually typically complete in one week depending upon the size of the deployment

Target Audiences:

▪zEnterprise z/VM and Linux Administrators
▪Existing and First in Enterprise customers
▪Organization who want augment the System z support staff with less experienced IT professionals

Business Drivers:
- Reduced staff z/VM experience requirements
- Increased IT staff productivity
- Reduce systems management costs

Contact:
- stgls@us.ibm.com for questions specific to this service.

Our z Systems experts have years of experience in working with IBM Wave

ZSP03858-USEN-00

Worldwide IBM Wave for z/VM Tiger Team
A part of the zGrowth (former ATS) organization at the Washington Systems Center

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**

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.

Prerequisite 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® or later
- z/VM V5.4, V6.2 or higher with Systems Management API configured
- IBM Directory Maintenance for z/VM (DirMaint™) or equivalent
- Performance Toolkit for VM™ (Perfkit, optional but suggested)
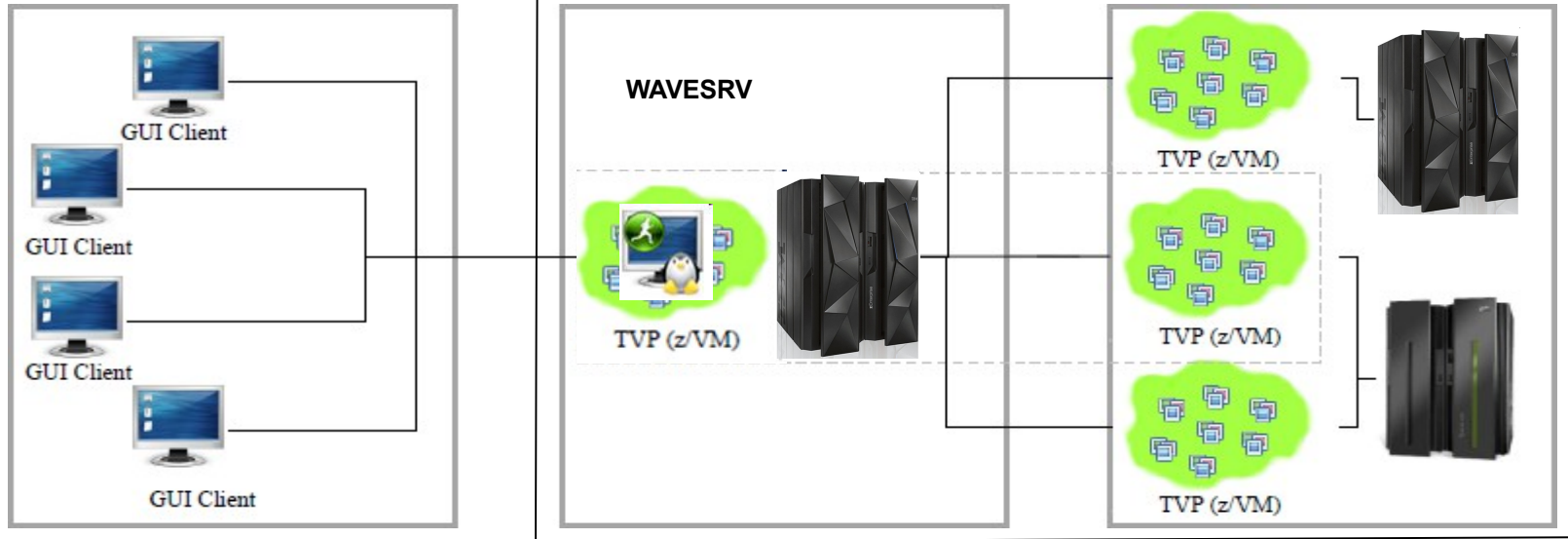
IBM Wave for z/VM WAVESRV server foundation

- **Background Task Scheduler (BTS)**
  - Employs Work Unit processing architecture for BTS worker threads
- **Knowledge Base**
  - Keeps track of the managed system components and their associated metadata
- **Common Output Repository (COR)**
  - Stores output generated by each BTS work unit
- **Message Brokers**
  - Efficiently moves messages across all system components
- **Security Enforcer**
  - Controls the scope and permission of every user action
- **Device Management**
  - Simple and automatic control of all virtual and real/dedicated devices

IBM Wave for z/VM Target Virtualization Platform (TVP)

- IBM Wave utilizes the SMAPI interface in order to mediate requests from the BTS and the GUI Client.

- Specific functions executed on the z/VM System using the following Service Machines:

  - **WAVEWRKS**

    - The Short Service Machine executes various compiled REXX EXECs to interact with the z/VM environment

  - **WAVEWRKL**

    - The Long Service Machine provides an additional thread of execution to run longer scripts or executes some directory manager commands

  - **WAVEWRKC**

    - This Cross-System Cloning Service Machine is used to stream minidisks from a source z/VM system to a target z/VM system during cloning actions.

- As part of the auto-detection process when adding a new z/VM System to IBM Wave management, these 3 service machines are created and started on the z/VM System automatically.

IBM Wave Operational Model

Scope

GUI Client

JAVA
WebStart
App

**Management
Provisioning
Operation
Automation**
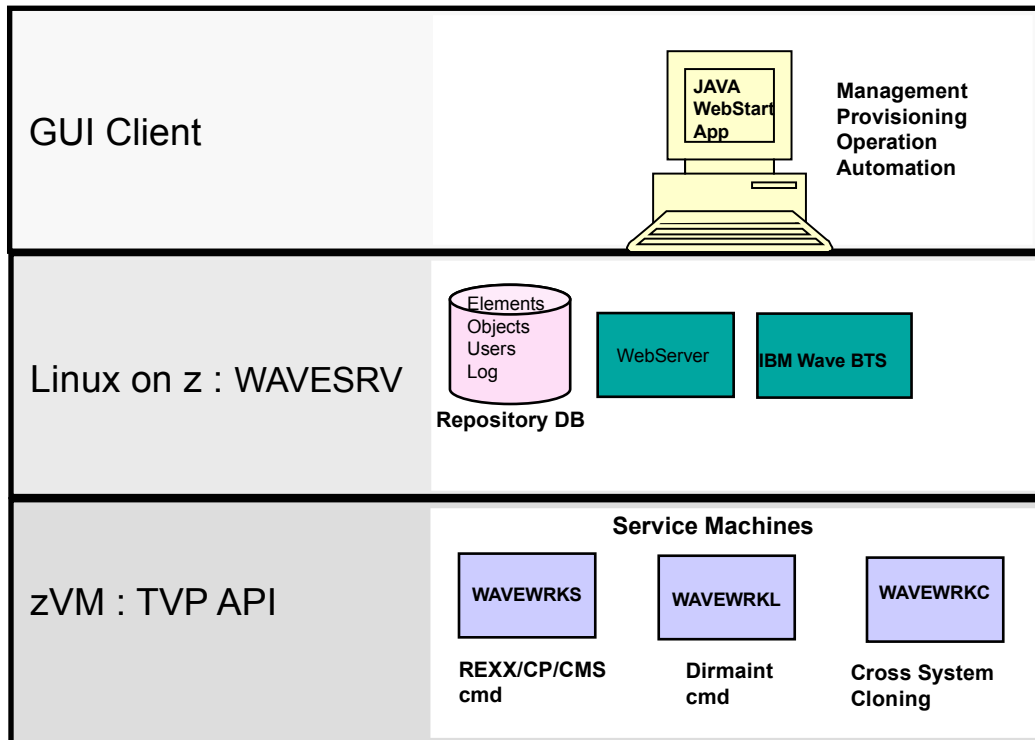
- Physical Servers
- z/VM instances, Virtual Linux Server Objects
- Virtual Networks (Guest LANs/VSwitches)
- Virtual-servers-to-Virtual Networks Connections
- Storage Volumes/Groups

Linux on z : WAVESRV

Elements
Objects
Users
Log

Repository DB

WebServer

IBM Wave BTS

- Elements
- Objects
- Users
- Log

zVM : TVP API

Service Machines

WAVEWRKS

WAVEWRKL

WAVEWRKC

**REXX/CP/CMS
cmd**

**Dirmaint
cmd**

**Cross System
Cloning**

- WAVEWRKS – REXX executables, CP/CMS commands
- WAVEWRKL – Directory Manager commands
- WAVEWRKC – Cross System Clone feature

Planning and Design

- **Sizing**

  - **1GB 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.

Sample directory entry for the WAVESRV virtual server

```
********************************************************************
USER WAVESRV {PASSWORD} 1G 2G GC
CPU 00
IPL CMS
MACHINE ESA 4
OPTION QUICKDSP
CONSOLE 0009 3215
NICDEF 0800 TYPE QDIO LAN SYSTEM {VLAN/VSWITCH}
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 0003 {DASD VOLUME NAME} – VM/CMS minidisk
MDISK 0150 3390 1 3000 {DASD VOLUME NAME} – minidisk for Linux / (root FS)
MDISK 0151 3390 1 4500 {DASD VOLUME NAME} – minidisk for Linux /var
MDISK 0152 3390 1 0200 {DASD VOLUME NAME} – minidisk for Linux swap
********************************************************************
```

Saving Time with IBM Wave for z/VM

- **Clone from Guest** - as often an one would like to create a new virtual server. Developers could do this on an hourly basis, but more likely every few days, depending on the job

- **Activate/Deactivate Guest** - turn guests on and off. A restart may be necessary to check the application, or possibly to stop a job from completing so another action could be taken

- **Add Virtual Switch** - creating virtual LANS and switches might be performed depending on the needs of the developer and what they are looking to accomplish. This may be part of a one-time setup.

- **Execute Scripts for Guest** - could be on a near continual basis. Creating a new guest may likely require a script to run. More guests, more scripts

- **Monitor z/VM** - continual process. This is already part of the application so this dashboard will be accessed often. Additional guests generate additional monitoring activity and are added to the monitoring pool automatically - no manual intervention is needed

- **Live Guest Relocation** will be used most often when patching z/VM and as a low-level failover. One could invoke the failover manually rather than utilize another tool for policy-based automated failover.

Systems management task example:
add disk space to a virtual server

Without IBM Wave

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

View Storage at a Glance

With IBM Wave

1. Open the "Add Storage" form
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
- ✓ View storage at a glance
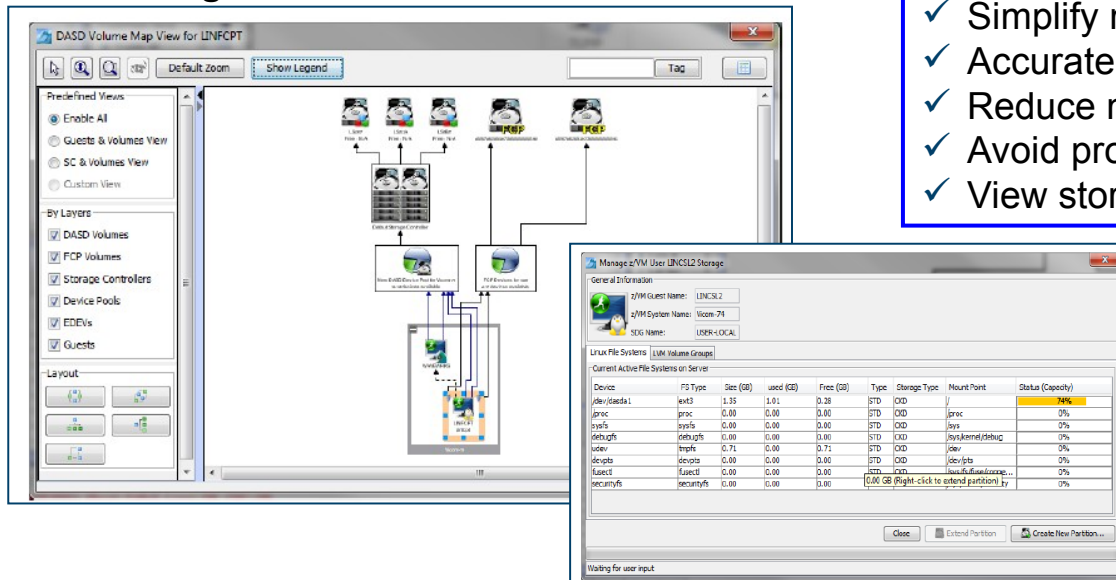
Systems management task example: clone a virtual machine

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

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

Systems management task example:
live guest relocation

Without IBM Wave

- Using manual control program commands

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

With IBM Wave

- Using the GUI's Drag-and-Drop techniques
- Or Execute via menu selection
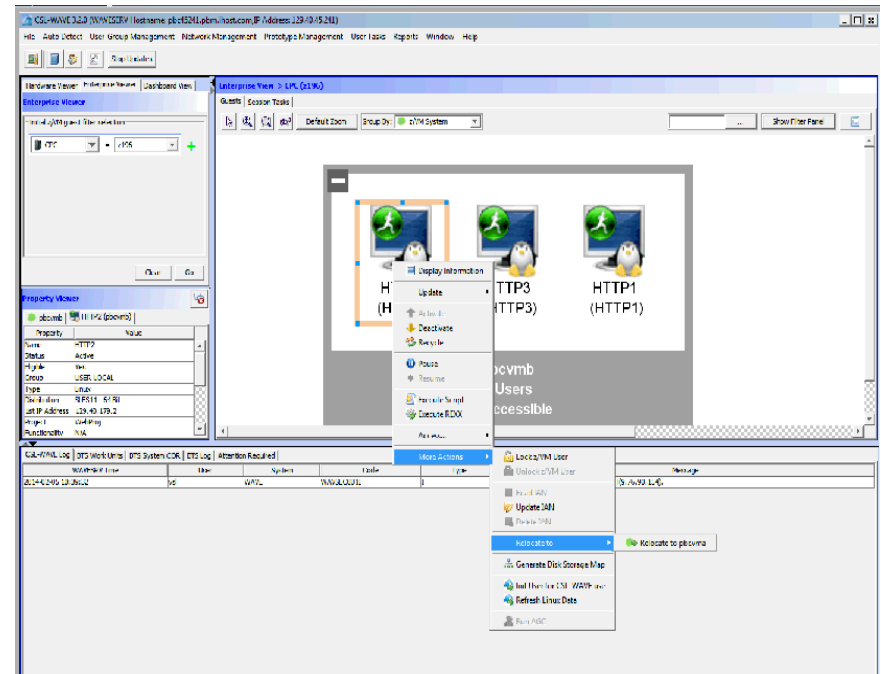
IBM Wave for z/VM Tested Productivity Savings*

IBM Wave is designed to help automate and improve the productivity of many administrative tasks. Tests were run on a zEnterprise processor both with and without the IBM Wave interface**.

Tasks	Manual Times in seconds	With IBM Wave Times in seconds	Reduction in time
Clone a Guest Linux Server	576	29	95%
Activate/deactivate a guest	65	10	85%
Add a virtual switch	88	20	77%
Execute scripts for a guest	96	18	81%
Monitor z/VM	30	13	58%
Live guest migration	95	13	87%

 *These are sample task timings conducted by the IBM Competitive Project Office. Manual test times assumed a base knowledge of z/VM and assume no additional scripting. Individual test results may vary.

**Tests used a zEnterprise 196.model 2817-H10 running z/VM 6.3 with 6 cores shared by LPARS in the test. Each z/VM has 128G of memory.

Summary
Overall benefit of IBM Wave for z/VM

- ✓ **Simplify the administrative and management of virtualized servers all from a single dashboard**

- ✓ **Reduce the time it takes to perform complex virtualization management tasks**

- ✓ **Extend the reach of existing skills to manage even the most complex tasks like live guest relocation**

- ✓ **Improve the quality and consistency of operations with a current and accurate view of your system using IBM Wave discovery**

- ✓ **Reduce risk of errors by delegating management scope to the appropriate teams**

- ✓ **Accelerate virtualization steps like virtual server cloning and provisioning to make the transformation to cloud easier**

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Complete Solution for administration and management of the z/VM and Linux on z Systems environment

IBM Infrastructure Suite

Linux on z Systems

OMEGAMON XE on z/VM and Linux

> Performance monitoring of z/VM and Linux guest

Tivoli Storage Manager

> File Level backup and recovery for Linux Virtual Machines

z/VM

Wave for z/VM

> Simple, intuitive, graphical z/VM management tool

Operations Manager for z/VM

> Facilitate automated operations, take action based on events

Backup and Restore Manager for z/VM

> Backup and restore full z/VM environment

Gain the Competitive Edge

Enterprise Linux Server features IBM Wave for z/VM

Enterprise Linux Server includes IBM zEnterprise® 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™, RACF®, Performance Toolkit for VM™, 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.

1 28-32 GB memory on zBC12, 24 GB memory per core up to 5 IFLs on z114.

Deploy up to 40 virtual servers per core or 520 in a single footprint

As low as $1.00/day per virtual server

Save up to 55% on TCO over 5 years

Enterprise Cloud System
(Pre-configured and integrated system)

- **Server:**
- IBM zEnterprise® EC12 **or** IBM zEnterprise BC12 (zEC12, zBC12)

- **Storage:**
- IBM DS8870 **or** Storwize® V7000

- **Software:**
- z/VM® 6.3 with following features:
  - Directory Maintenance (DirMaint™) Feature
  - Resource Access Control Facility (RACF®)
  - Performance Toolkit for VM™ 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
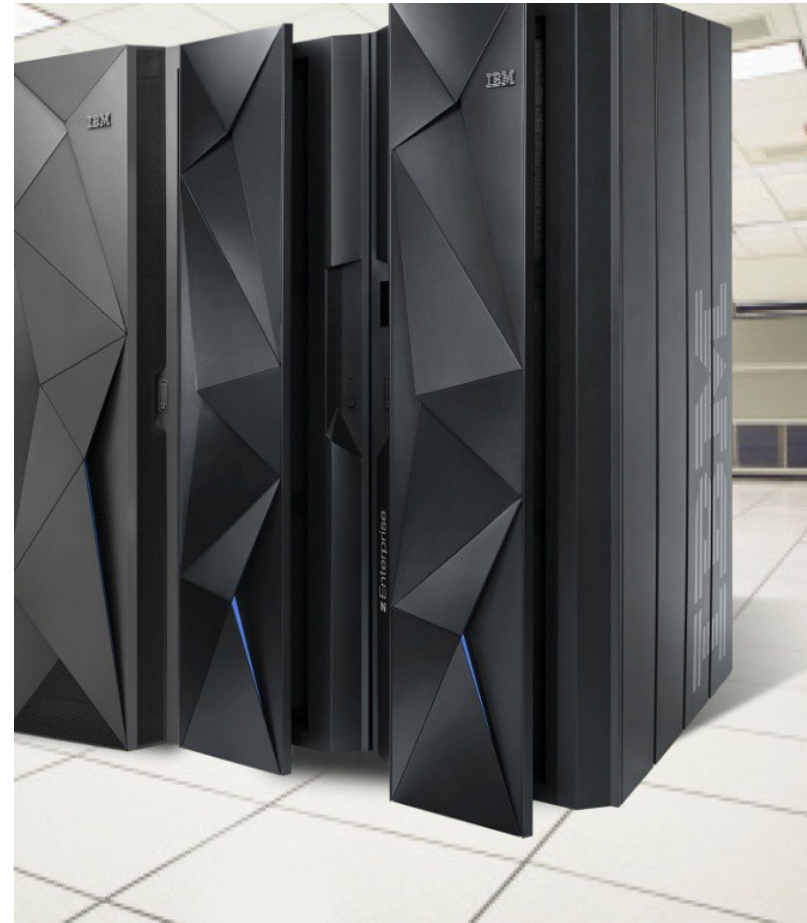
Top Reasons Why you Need IBM Wave

	IBM Wave

- Does you company need to simplify advanced virtualization functions? ✓

- Do you need to accelerate the productivity of less experienced staff ? ✓

- Would you like the convenience of reporting capabilities without having to navigate to another product? ✓

- Would it be convenient to easily visualize configuration and status of virtual guests? ✓

- Do you ever need to limit authority to effect resource changes to certain staff? ✓

- Could you use automatic notifications to alert staff from performing certain operations during critical periods? ✓

- Would you like to be able to perform easy drag and drop connections, like connecting z/VM to a virtual network? ✓

- Can you group and filter virtual resources and manage them in a way that is meaningful to your users? ✓

- Would you like to perform complex tasks like LGR in seconds? ✓

- Would you like to simplify the capturing and cloning of virtual Linux guests in a few clicks? Would you like to be able to customize cloning and add scripts? ✓

Would you like to do all of this with <u>one</u> product?

Continue growing your IBM skills

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  - Private training is also available with our Global Training Providers

·Demanding a high standard of quality –
view the paths to success
  - Browse Training Paths and Certifications to find the course that is right for you

·If you can't find the **training that is right for you** with our Global Training Providers, we can help.
  - Contact IBM Training at dpmc@us.ibm.com

Global Skills Initiative

Who to contact

- **Sales Reps and Business Partners should engage the WW IBM Wave Tiger Team**

Marty Horan (Manager)	WW	Martin Horan/Gaithersburg/IBM@IBMUS
Eduardo Oliveira (Team Lead)	US East, Fed, CAN, ANZ, JAPAN & WW	Eduardo Oliveira/Atlanta/IBM@IBMUS
Ernest Horn	US West & EUROPE (Nordics only)	Ernest Horn/Poughkeepsie/IBM@IBMUS
Ivan Dobos	EUROPE (SPGI,UKI,CEE), MEA, India*	Ivan Dobos/Slovakia/IBM@IBMSK
Roland Trauner	EUROPE (BENELUX,DACH,FR,ITA)	Roland Trauner/Germany/IBM@IBMDE
Luis Ferreira Ramos	LATIN AMERICA	Luis Ferreira/Uruguay/IBM@IBMUY
Brant Zhang	GCG, ASEAN, ISA (except India), KOR	Brant BZ Zhang/China/IBM@IBMCN

Thank you!

Thanks for listening!