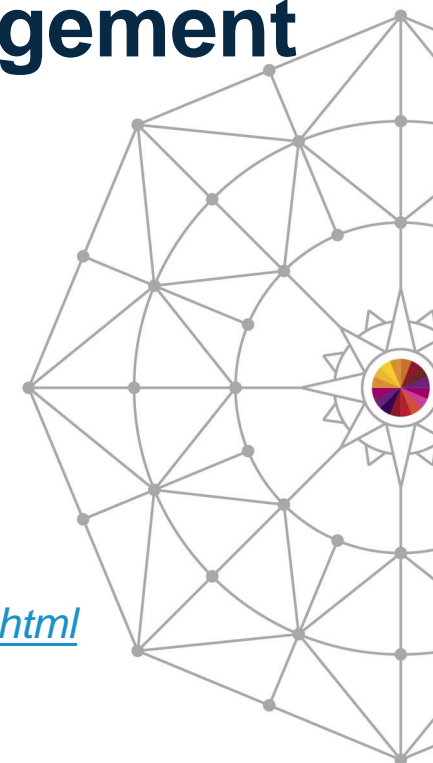# Advanced z/VM Systems Management with IBM Wave for z/VM

Eduardo Costa de Oliveira
WW IBM Tiger Team Lead

August 5th (3:00PM, DLLCC, Room 304)
Session Number: 15498
https://share.confex.com/share/123/webprogram/Session15498.html

IBM System z Tiger Team: News

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DirMaint	OMEGAMON*	System z*
HiperSockets	Performance Toolkit for VM	System z10*
IBM*	RACF*	zEnterprise*
IBM (logo)*	REXX	z/VM*

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.

NEW

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® and Linux® 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 here!

    – **http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ca&infotype=an&supplier=897&letternum=ENUS214-027**

– General availability - February 28th, 2014

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 & IBM Wave for z/VM primary use
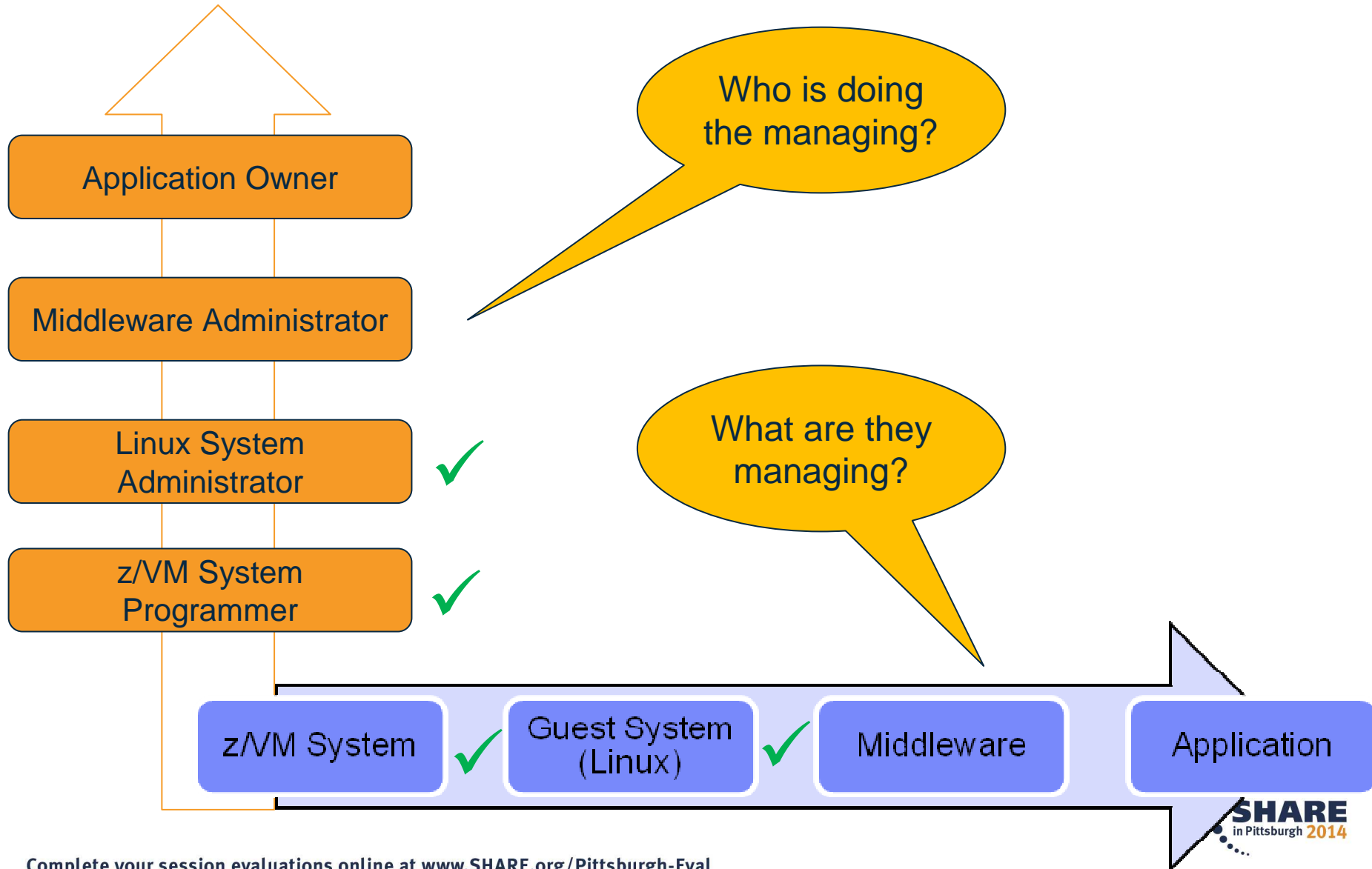
Application Owner

Middleware Administrator

Who is doing the managing?

Linux System Administrator ✓

What are they managing?

z/VM System Programmer ✓

z/VM System ✓ Guest System (Linux) ✓ Middleware Application

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

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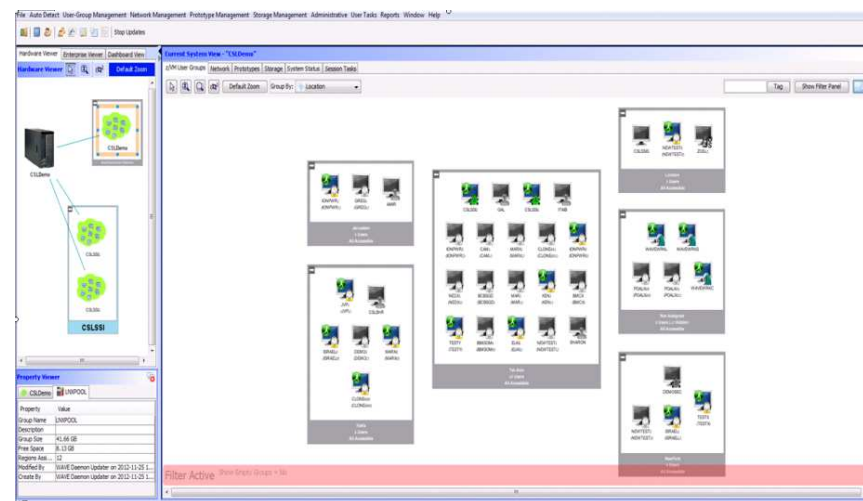
A simple, intuitive virtualization management tool providing management, provisioning, and automation for a z/VM environment supporting Linux® virtual servers

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

Intelligent 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; understand the status of system resources with Intelligent icons
- Reduce unnecessary steps using highly customizable views
- Graphical or tabular displays with layered drill down
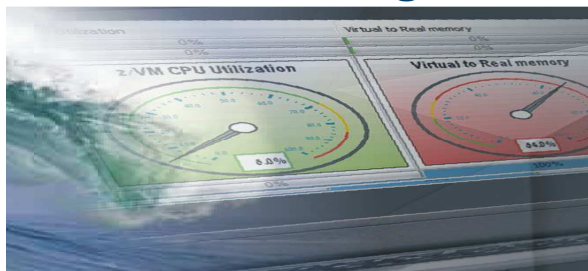
- Monitor the status of z/VM systems through an innovative interface
- Monitor performance of CPU, paging devices, spool disks and more;
- Use agentless discovery to detect an accurate view of your environment
- Use advanced filters, tagging, layout and layer selection to make monitoring and management 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

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™ and FCP-SCSI)
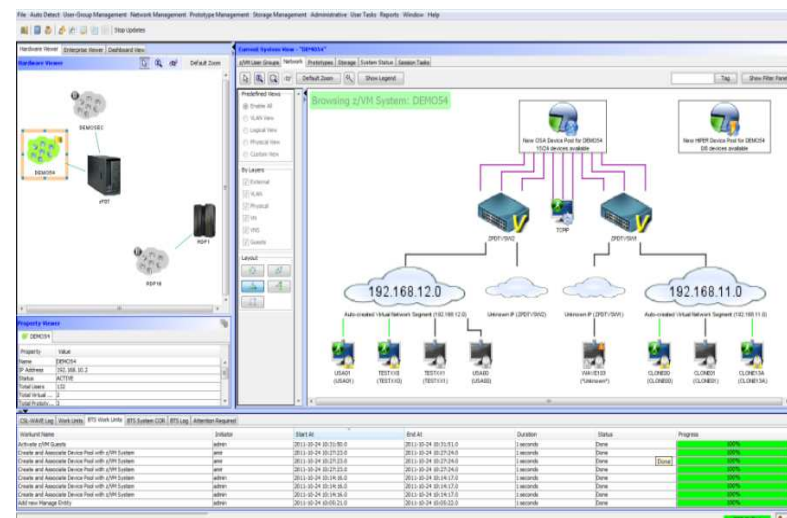
- **Visualize and control virtual resources**

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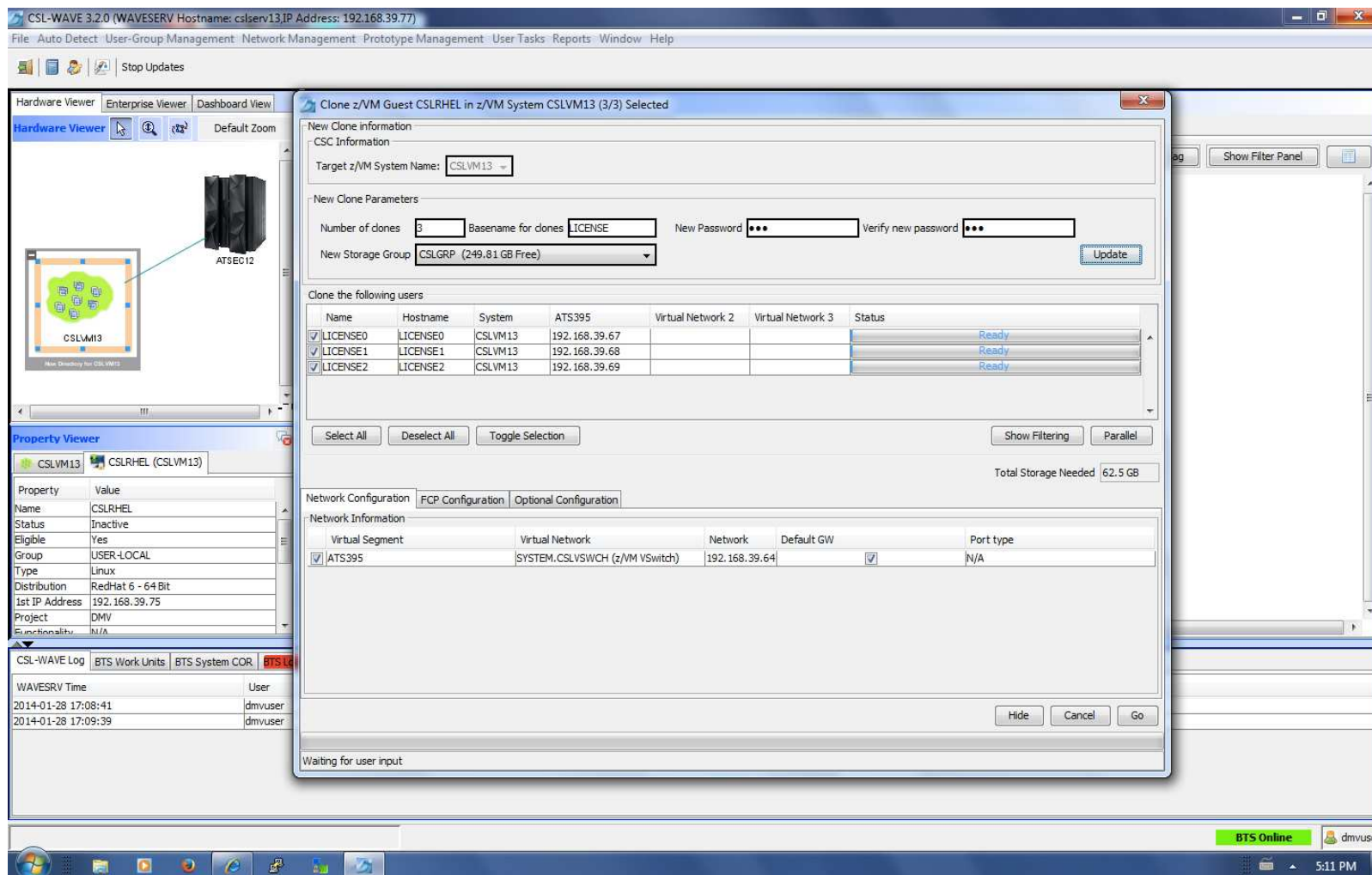
Performance Resource Monitoring
At a Glance Status of all z/VM instances

Complete your session evaluations online at www.SHARE.org/Pittsburgh-Eval

Simplify Systems Management Tasks
Provision resources quickly and easily

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/SCSI-only 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 28th 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
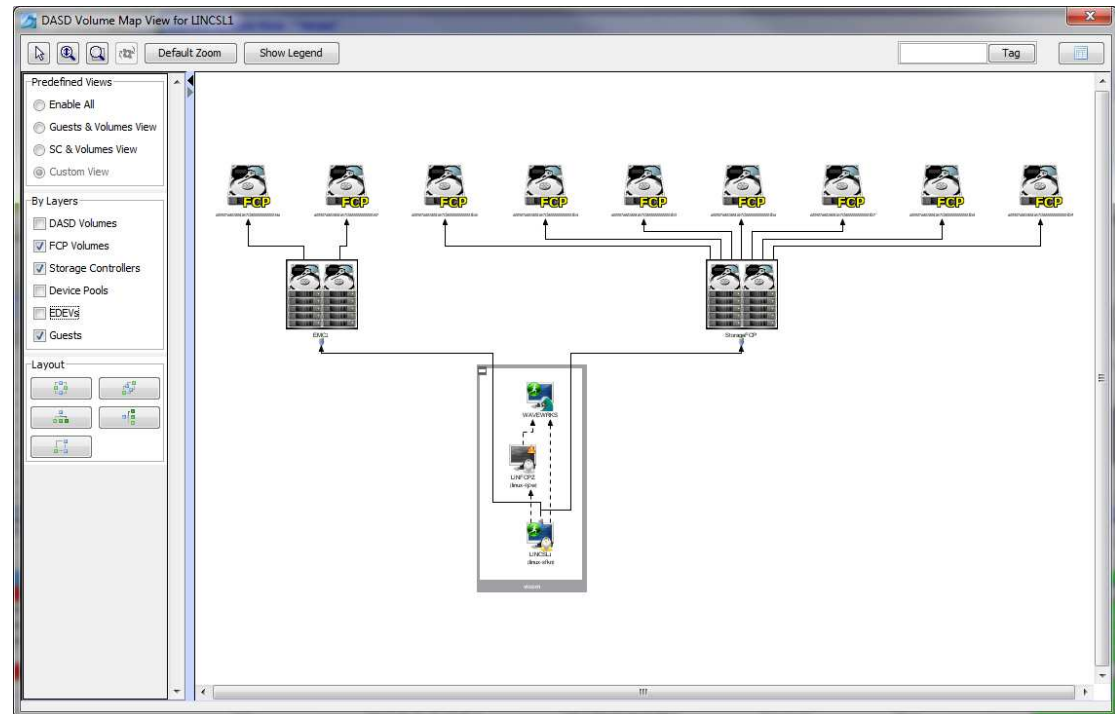
- At GA in February:
    - The IBM Wave installation itself was possible, requiring one to manually create the IBM Wave service machines prior to installing the IBM Wave RPM. Note that IBM Wave utilizes EDEVs for its own disk space.

Benefits	IBM Wave for z/VM Capabilities
✓ 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.

Cloud Computing – Based on Virtualization and 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
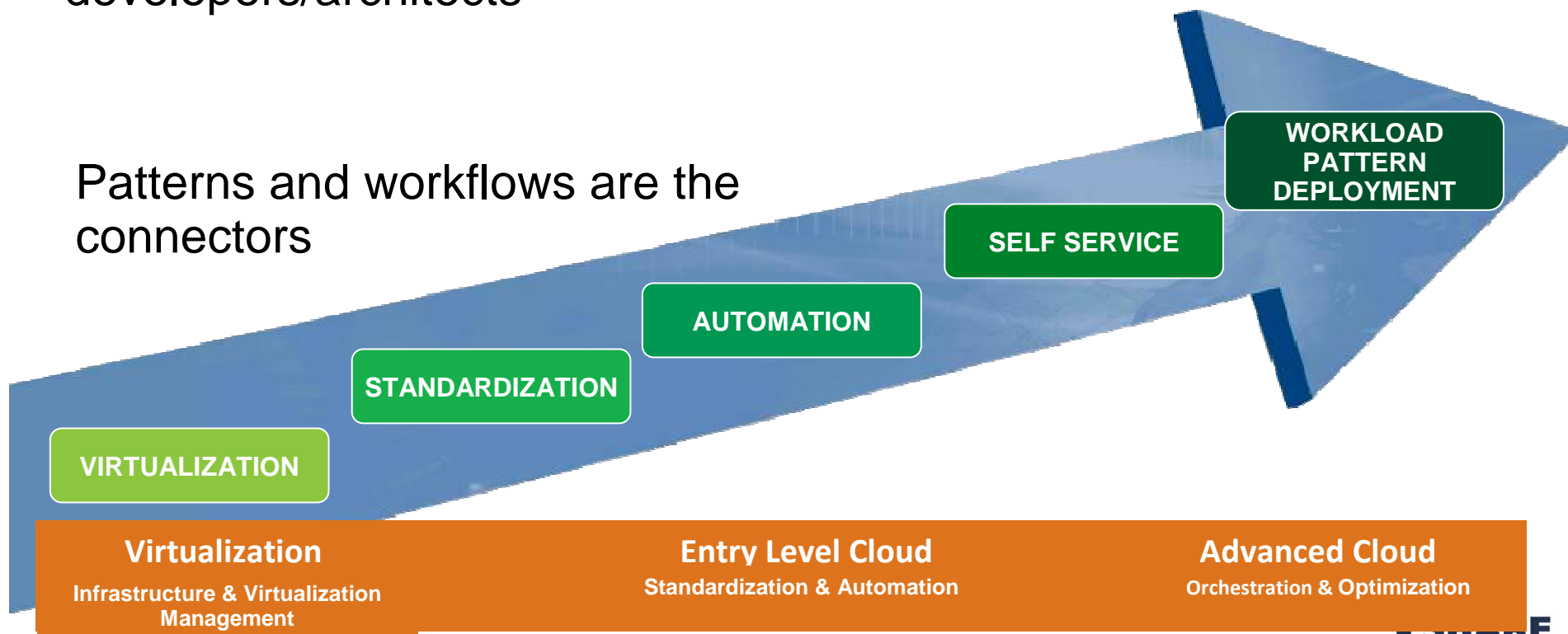
Virtualization and Cloud Portfolio for Linux on System z

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 System z

- 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 System z

- 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*

Learn More with IBM Wave Client Hands on Experience
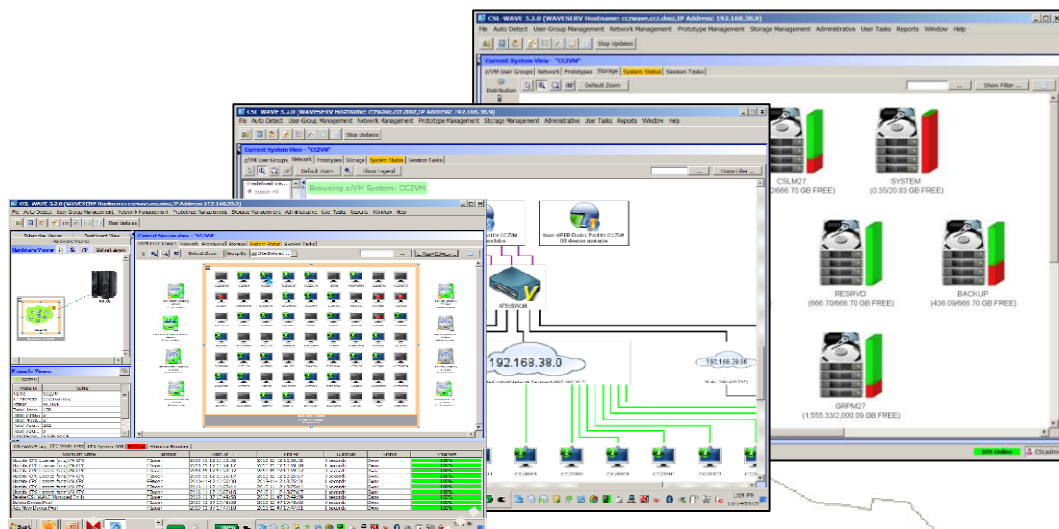
IBM Advanced Technical Support
Washington Systems Center
Gaithersburg, MD

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

Client Sites Worldwide

Washington Systems Center - IBM Wave for z/VM TIGER TEAM – WW Coverage

Roland Trauner

Ivan Dobos

Marty Horan, Manager

Ernest Horn

Eduardo Oliveira, Team lead

Luis Ramos

IBM Wave for z/VM

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

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® 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)
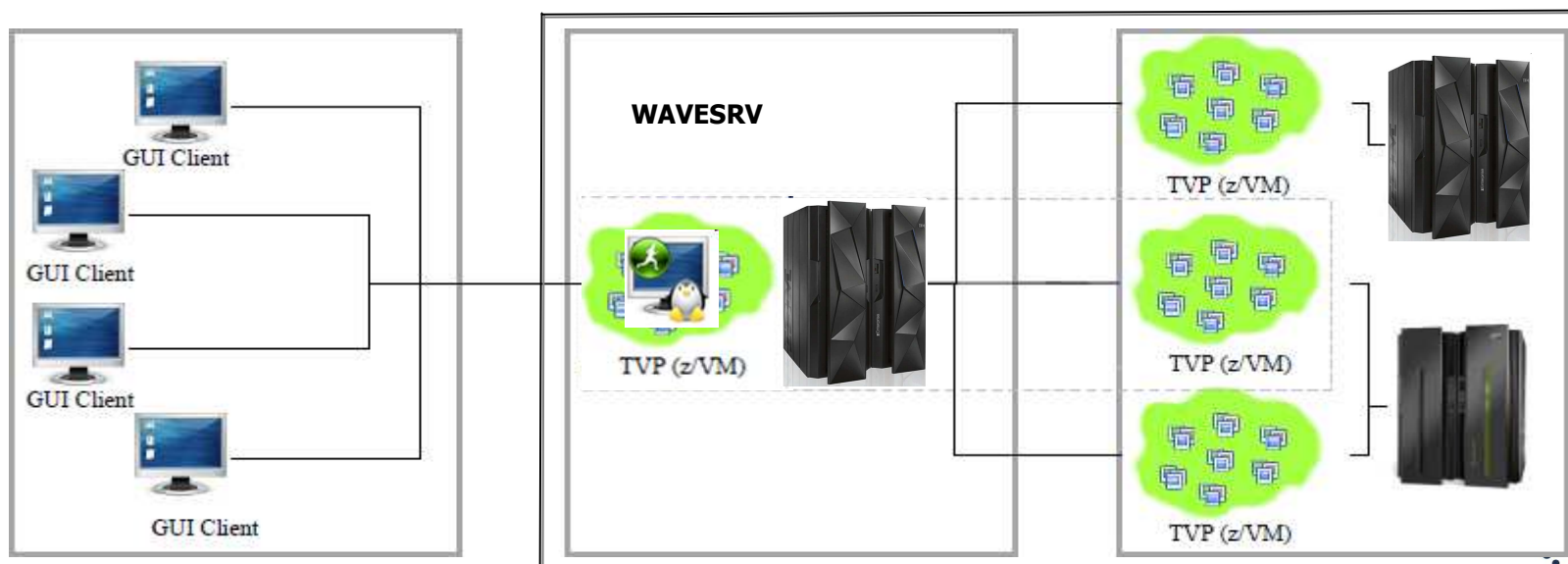
IBM Wave for z/VM: Tier 2 – WAVESRV server

z/VM LPAR

API Server

WAVESRV Server

Background Task Scheduler (BTS)

IBM Wave for z/VM database

IBM Wave for z/VM GUI client
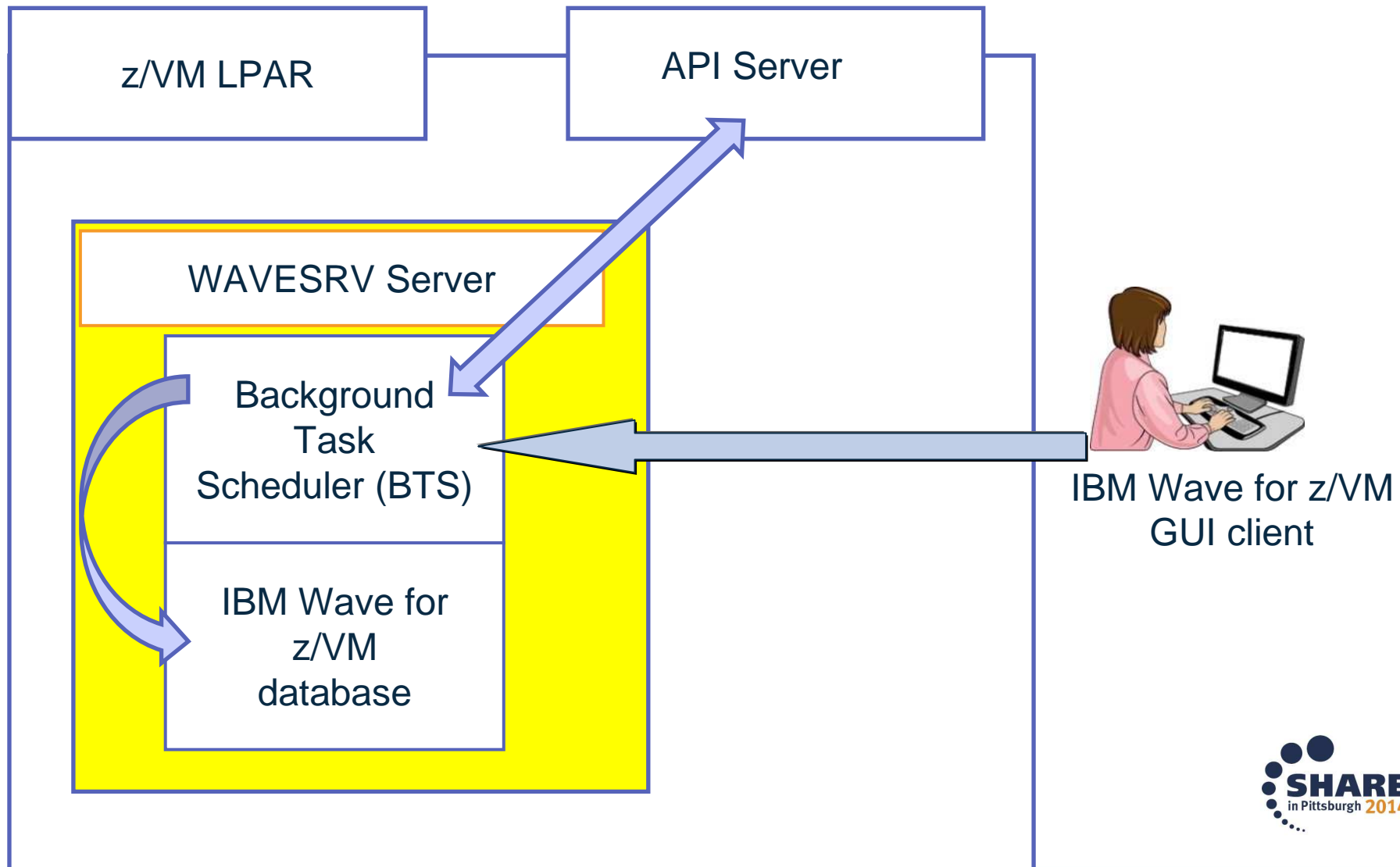
Planning and Design

- **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 Here> 1G 2G GC
CPU 00
IPL CMS
MACHINE ESA 4
OPTION QUICKDSP
CONSOLE 0009 3215
NICDEF 0800 TYPE QDIO 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

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
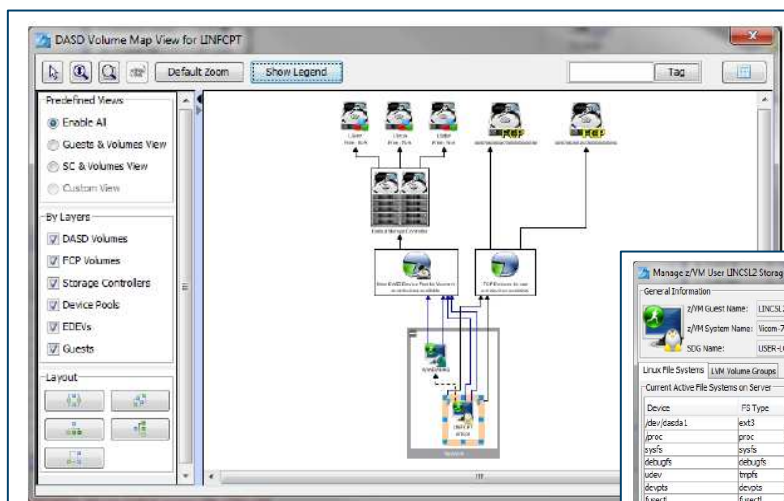
With IBM Wave

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
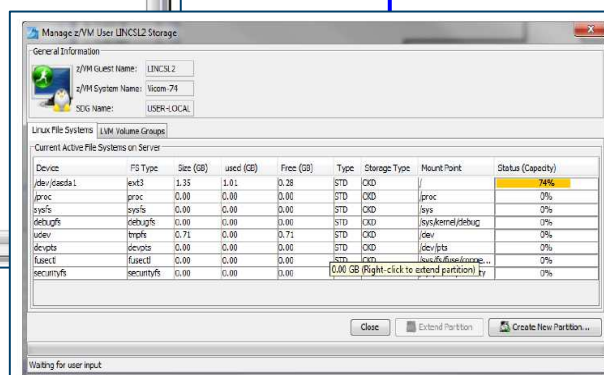✓Reduce manual procedure errors
✓Avoid problematic situations downstream

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.
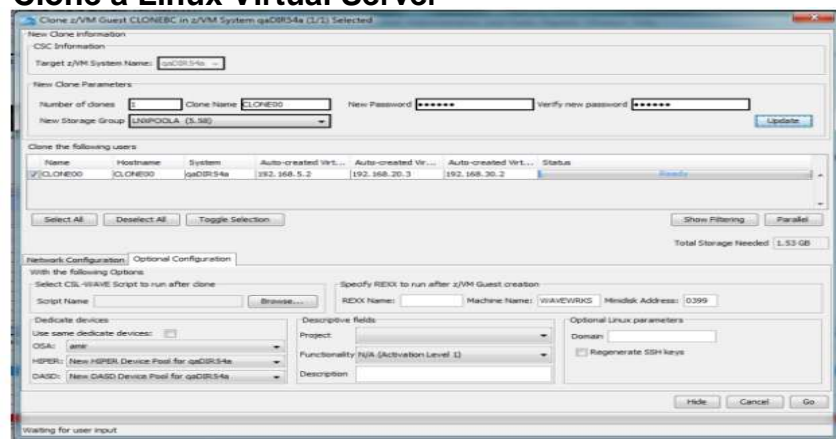
Clone a Linux Virtual Server

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

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
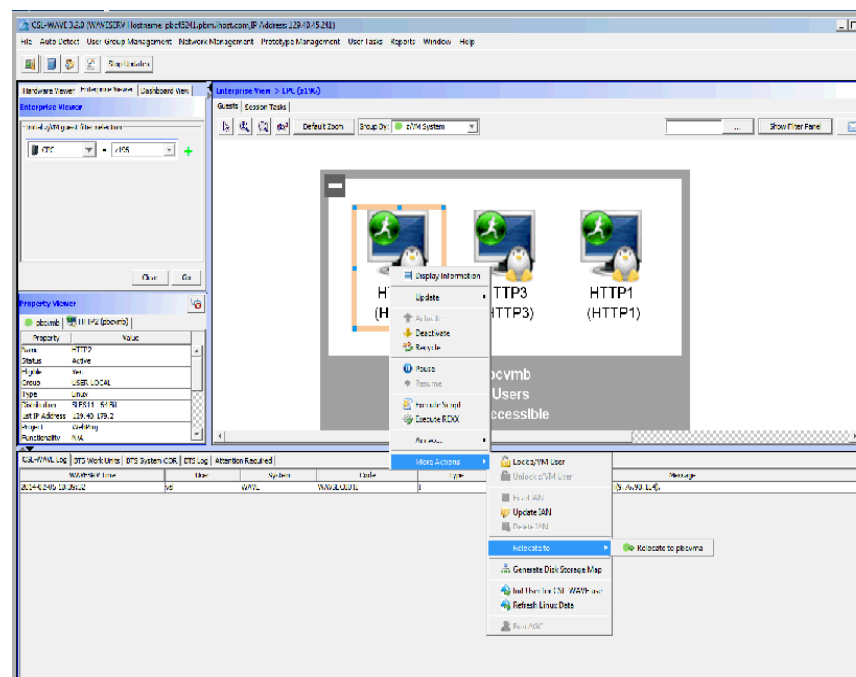
Enterprise Linux Server features IBM Wave for z/VM

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**
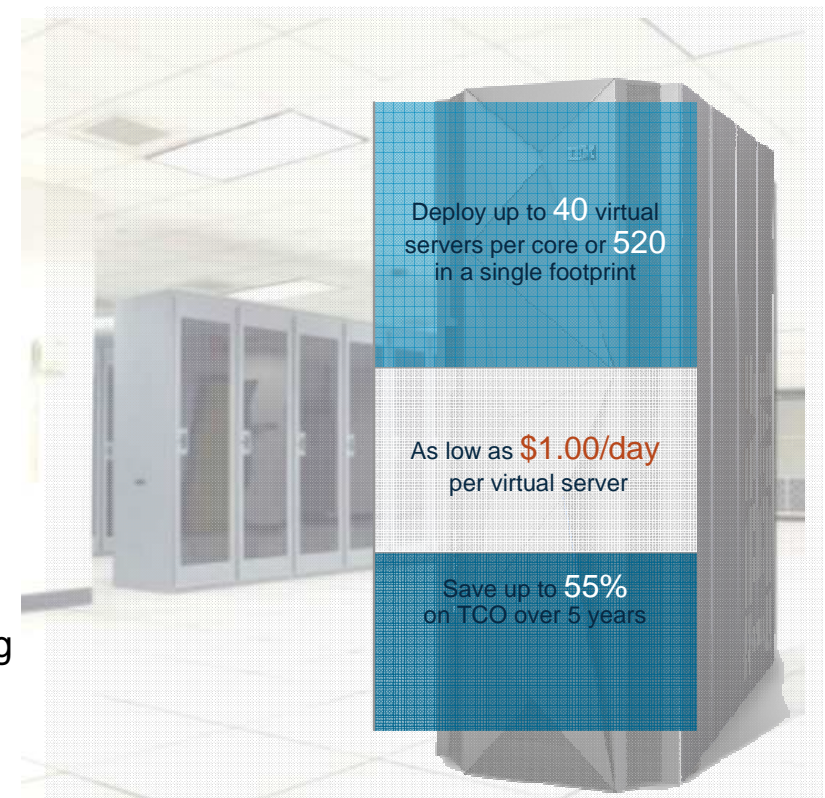   - IBM z/VM Version 6
    - z/VM basic features:
        - Dirmaint™, RACF®, Performance Toolkit for VM™, RSCS
    - **NEW! IBM Wave for z/VM** included
    - 3-5 years S&S
    - Note: Linux ordered from Red Hat or SUSE

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.

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

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

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

IBM Wave for z/VM - Live Demo

IBM-NA (CSLVM17)
28 Users
All Accessible

IBM-SEC (CSLVM17)
12 Users
All Accessible

IBM-DIRM (CSLVM17)
6 Users
All Accessible

IBM-UTIL (CSLVM17)
11 Users
All Accessible

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

WAVE-INTERNAL (CSLVM17)
4 Users
All Accessible

IBM-SYSTEM (CSLVM17)
5 Users
All Accessible

IBM-SMAPI (CSLVM17)
11 Users
All Accessible

IBM-COM (CSLVM17)
37 Users
All Accessible

IBM-OPER (CSLVM17)
6 Users
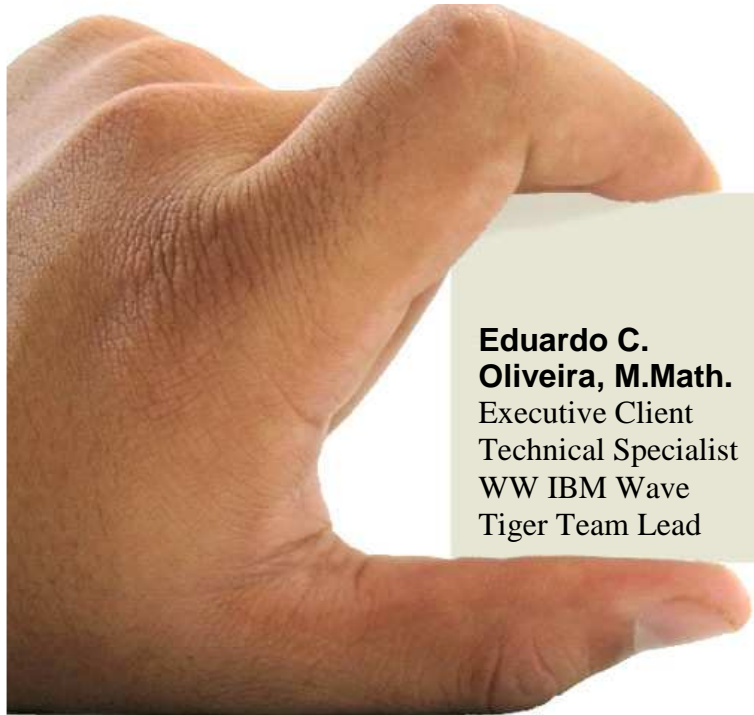All Accessible

IBM-ENS (CSLVM17)
4 Users
All Accessible

IBM System z Tiger Team: News

IBM Wave Tiger Team: News

Engage with me socially:

http://twitter.com/ecolive

Eduardo C. Oliveira, M.Math.
Executive Client
Technical Specialist
WW IBM Wave
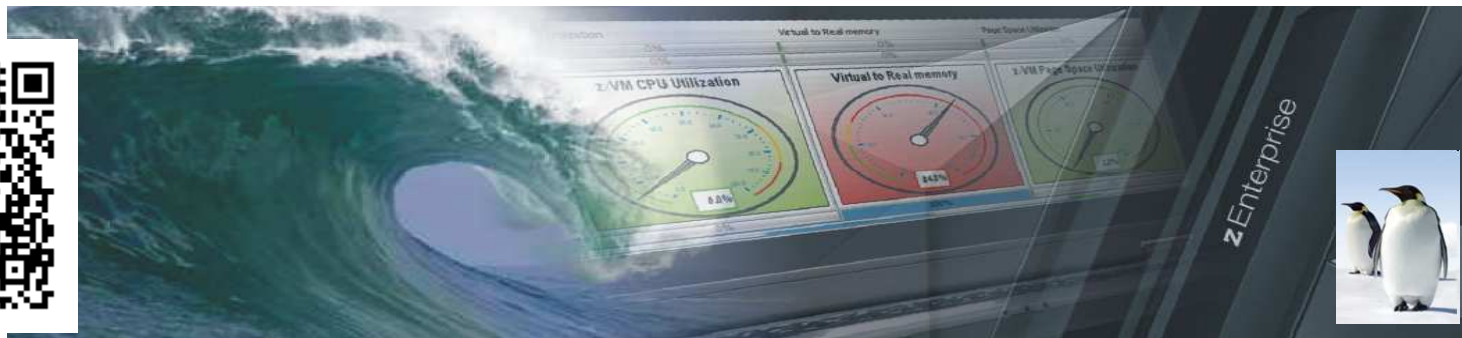Tiger Team Lead

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eduardoc@us.ibm.com

Linked in.

http://www.linkedin.com/pub/eduardo-costa-de-oliveira/0/362/266

z/VM CPU Utilization   Virtual to Real memory   z/VM Page Space Utilization

zEnterprise

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in Pittsburgh 2014