Introduction to IBM Wave for z/VM Management

Intelligent Visualization – Simplified Monitoring – Unified Management

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IBM System z Tiger Team: News

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Agenda – Advanced z/VM Systems Management

- Today's Challenges
- IBM Wave for z/VM
- Benefits
- Fit in Portfolio
- Test Drive Environment
- IBM Wave Tiger Team
- IBM Wave Jumpstart
- Features and Architectural Overview
- Demo
- Q&A

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Today's Challenges

- IT management is striving to achieve operational efficiencies and reduce spend on daily management
- Administrators need to become more self sufficient through self service, administration needs to be easier and simpler
- Organizations need better control of configuration and change management especially in a virtualized environment
- IT organizations want to accelerate their migration efforts to cloud and need tools that can help them get started quickly
- Internal and external IT customers expect even faster responsiveness due to ever changing business dynamics
- Faced with reduced budgets, IT management must extend the reach of their existing IT staff to do more with less without sacrificing quality

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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.

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!

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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
- Enhanced Enterprise Linux Server (ELS*) solution is also available with IBM Wave for z/VM
- 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

Enterprise Linux Server is an integrated solution comprised of Hardware, Hypervisor, Memory, Easy to Use Virtualization Management and 3 years Service and Support designed to get customers including FIEs started with low cost scalable computing environment

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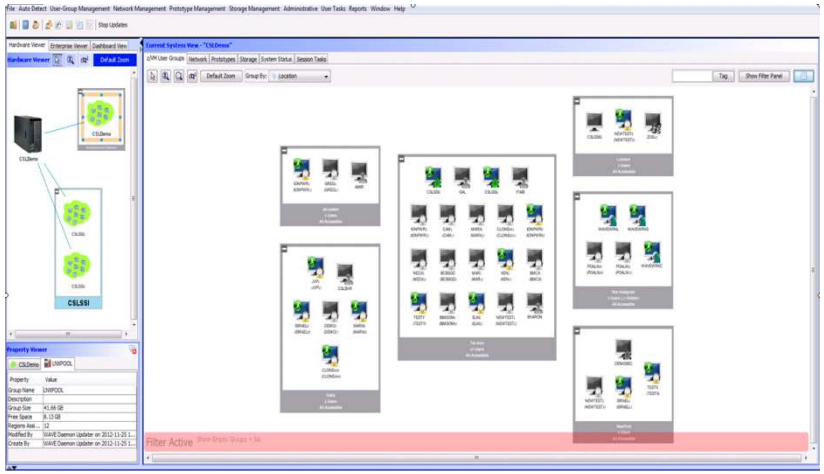
IBM Wave for z/VM

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

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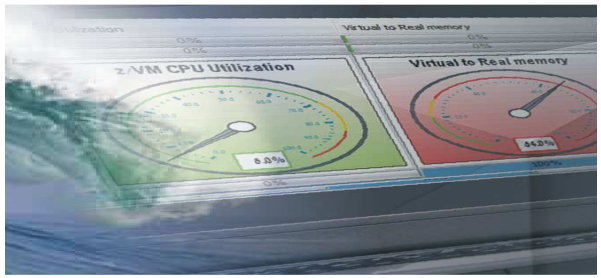
Extend the Reach of Skills with IBM Wave for z/VM

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
- Make existing staff more self-sufficient

Simplified Monitoring



- 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

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

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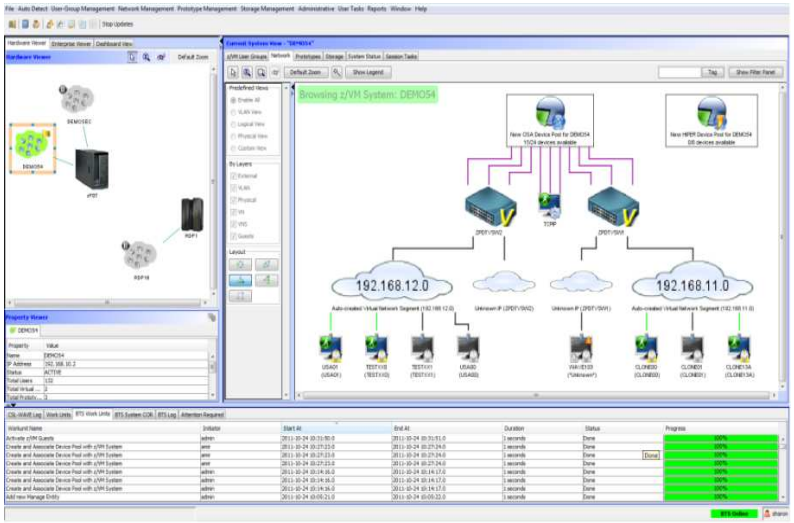
IBM Wave Intelligent Visualization

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



- **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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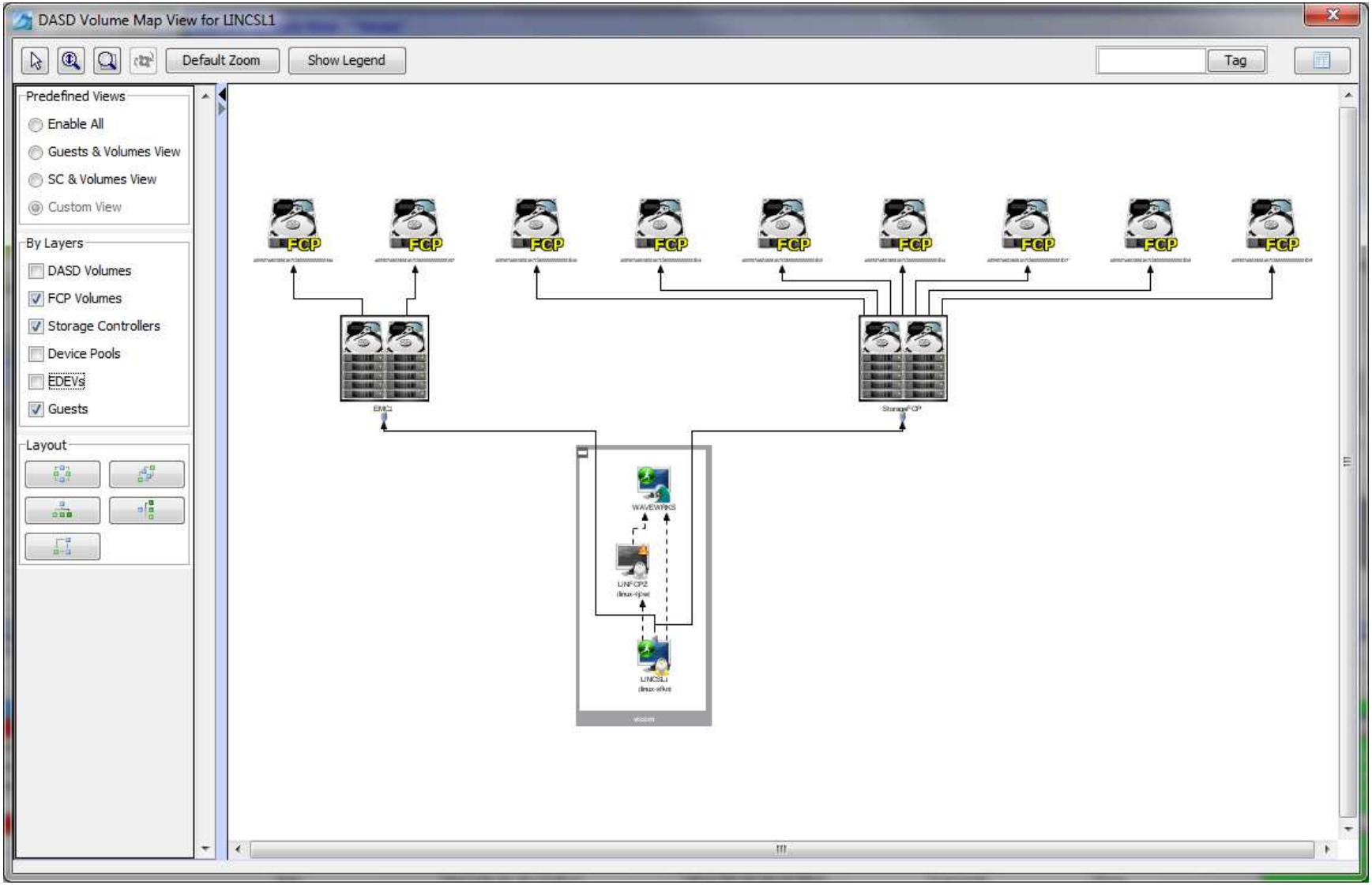
Intelligent Visualization

Mapping Attached Storage to Guests and Storage Controllers



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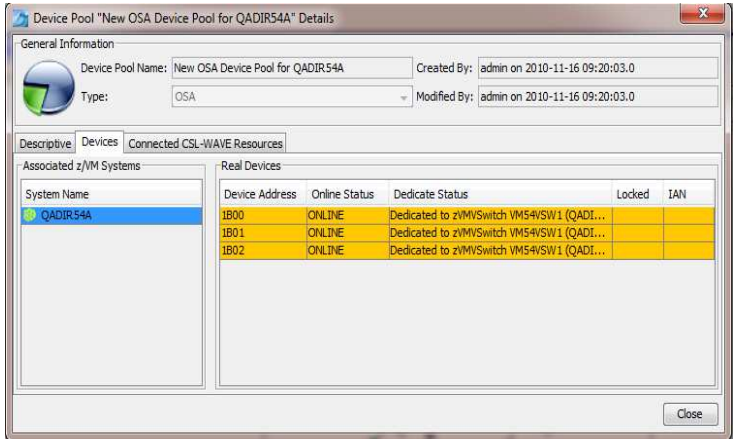
IBM Wave Simplified Monitoring

Automatic Detection and Monitoring of Resources

- **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



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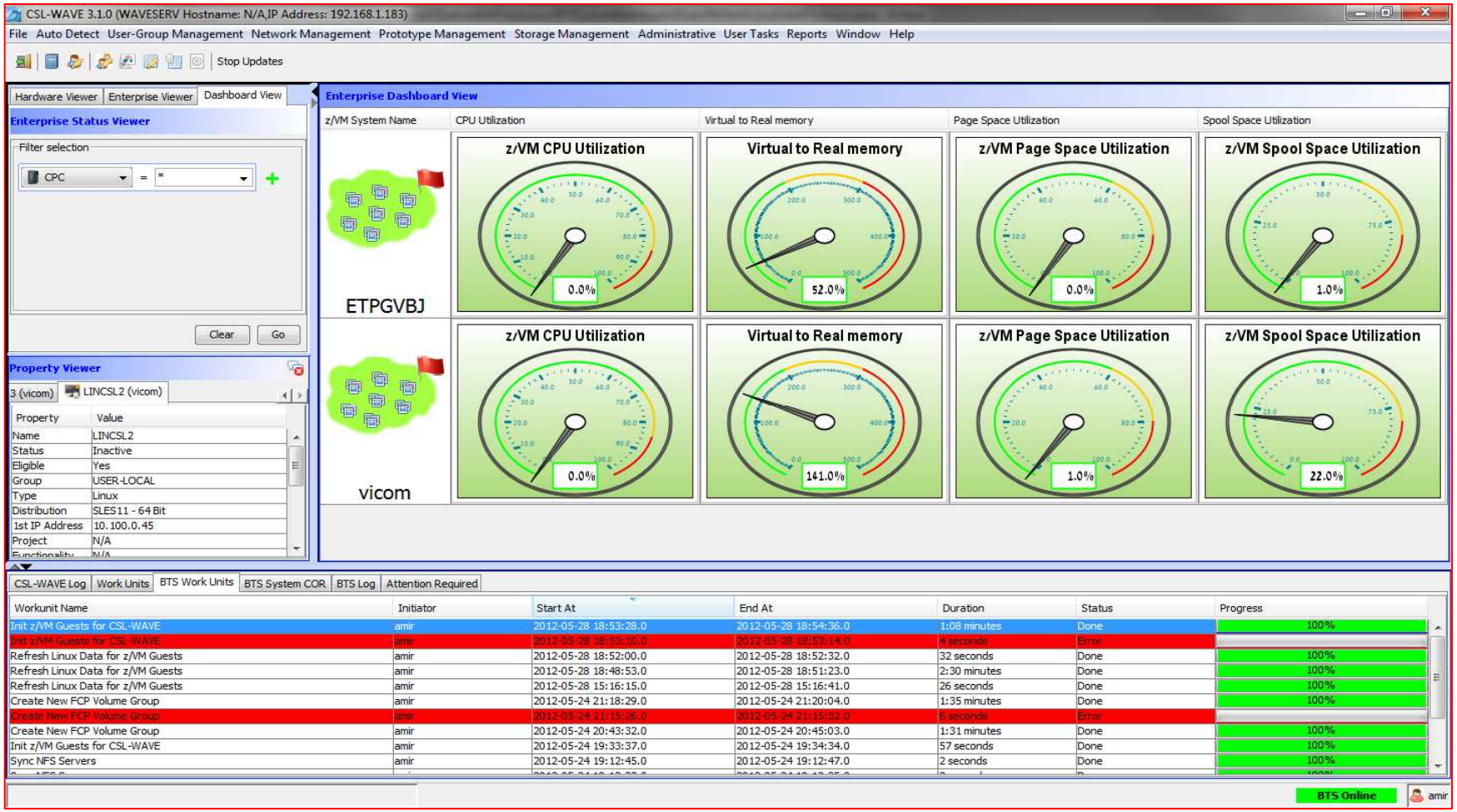
Performance Resource Monitoring

At a Glance Status of all z/VM instances



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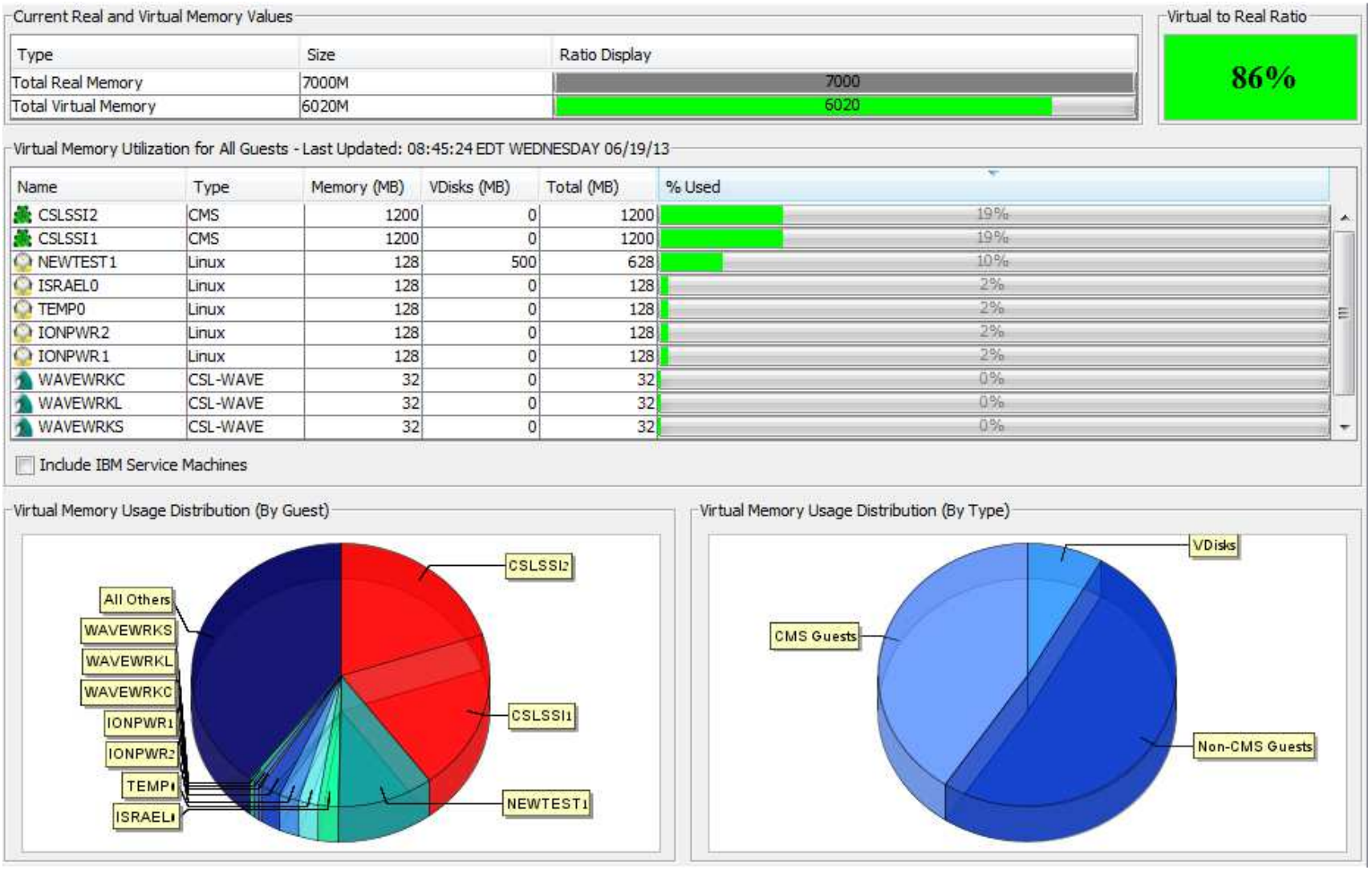
Performance Resource Monitoring

At a Glance Drill down to Virtual Memory Detail



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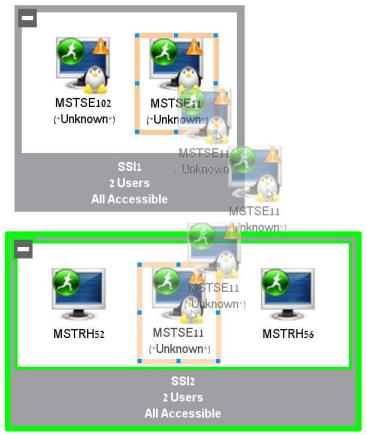
IBM Wave Unified Management

Managing the Entire Pool of Resources Intuitively

- **Simplification**
  - Simplify the process of performing a function across multiple z/VM or Linux systems
- **Manage Networks**
  - Centralized, layer based customizable view of the entire z/VM network topology
  - Define and control all network devices such as VSWITCHes and guest LANs
- **Manage Storage**
  - Manage devices and device pools
- **Provision Resources**
  - Clone resources and virtual servers, apply scripts for more customization
  - Install Linux on virtual machines
  - Adding attached storage to z/VM Guests using IBM Wave's Manage Storage Wizard
  - Activate/Deactivate servers in an ordered fashion
- **Improve Policy Management**
  - Use reminder notes attached to icons to provide advisory and policy notices



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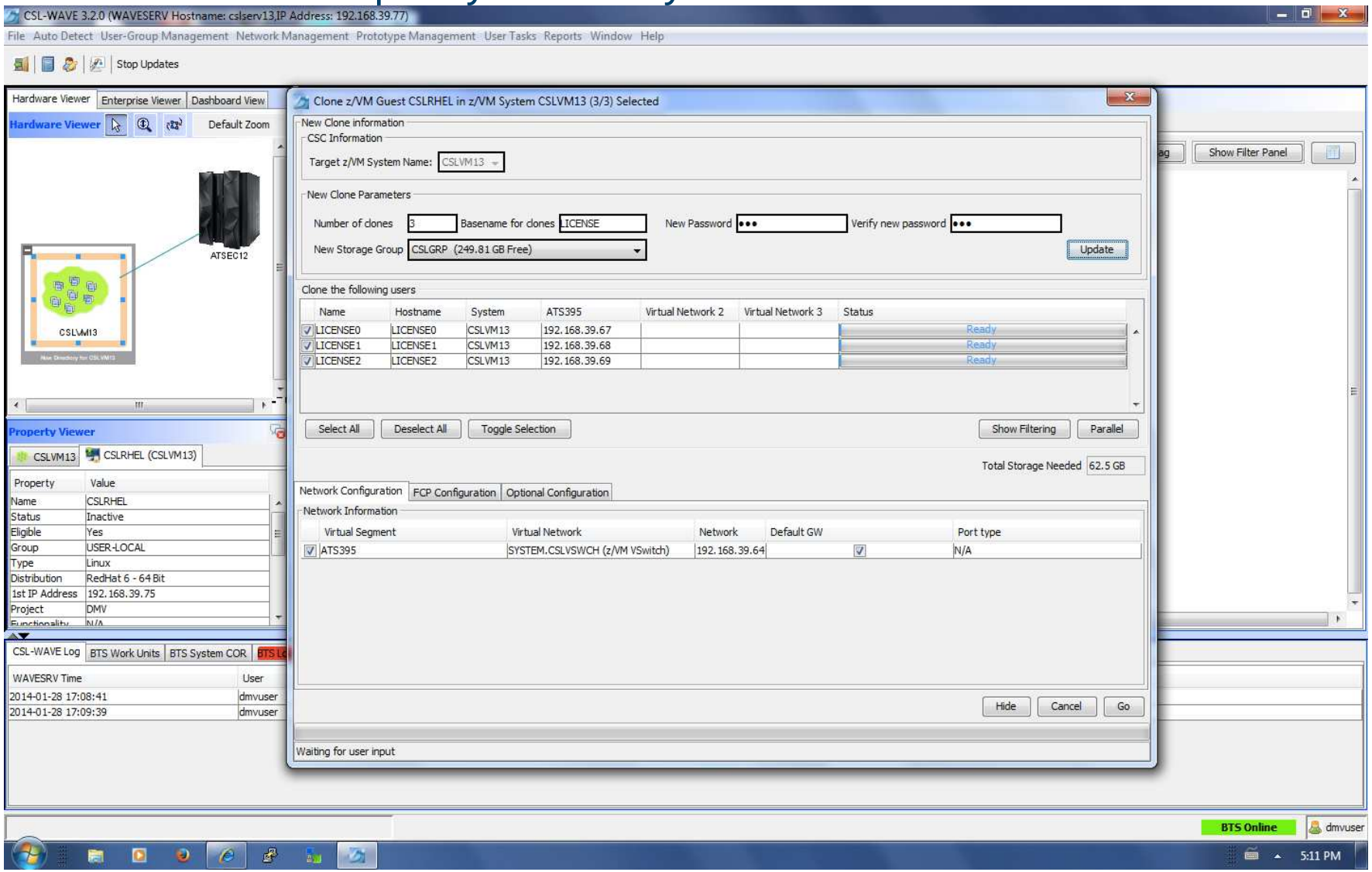
Simplify Systems Management Tasks

Provision resources quickly and easily



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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

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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.

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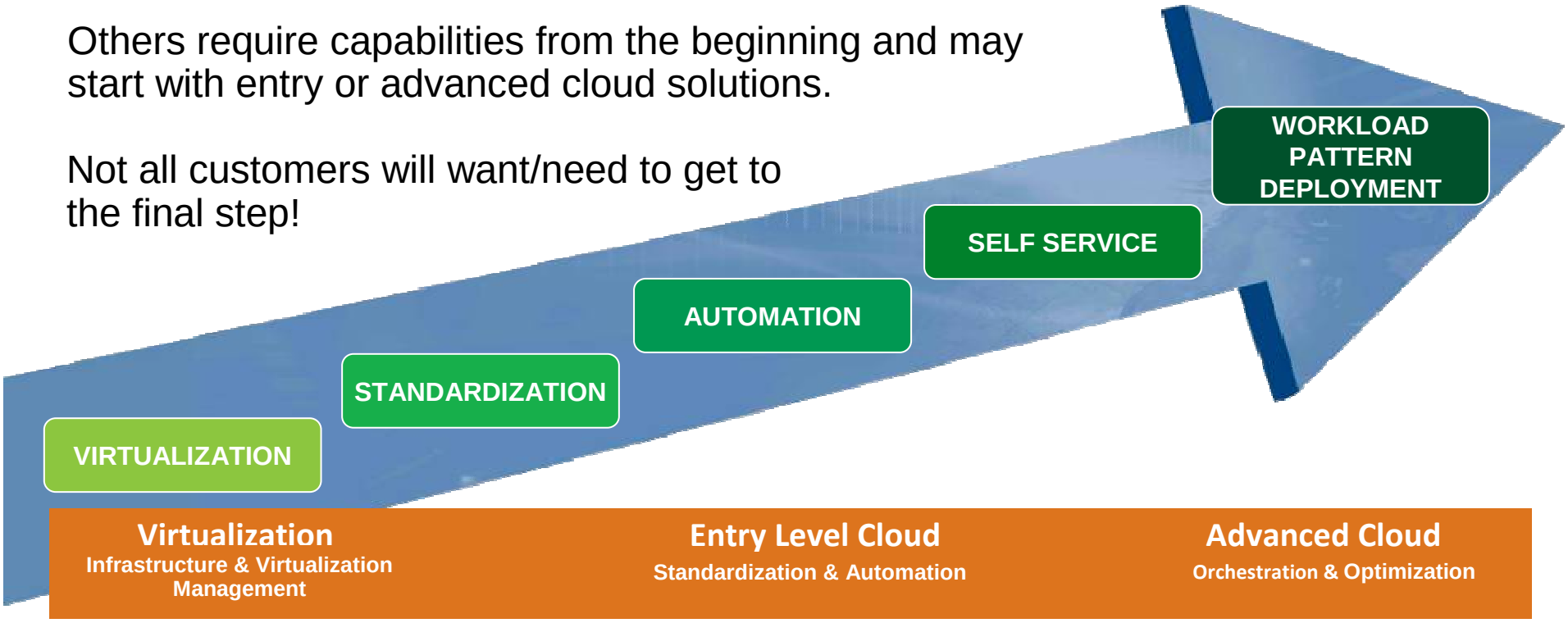
Cloud Computing - Based on Virtualization and Standardization

To position the various technologies in this space, we need to first understand that Cloud computing is a journey beginning with virtualization and consolidation of environments and ending with workload pattern-based deployment of IT services.

This is not always a step-wise progression. Some clients may require advanced cloud capabilities from the start, while others will begin by optimizing their virtualization foundation and then gradually move to cloud.

Others require capabilities from the beginning and may start with entry or advanced cloud solutions.

Not all customers will want/need to get to the final step!



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How IBM Wave fits into the Cloud Blueprint

Integrate	Automate	Orchestrate
Virtualization *Infrastructure & Virtualization Management*	**Entry Level Cloud** *Standardization & Automation*	**Advanced Cloud** *Service Lifecycle Management*
Differentiation	*Standardization*	*Service Management*
▪ Rapid deployment of Linux virtual servers for less than $1 a day ▪ Industry leading "gold standard" security for tenant isolation ▪ Elastic scaling achieved by dynamically adjustable capacity at sustained performance ▪ Simplified and empowered virtualization management with IBM Wave	▪ Automated provisioning and de-provisioning ▪ Pool standardized virtualized building blocks ▪ Plug-and-play capacity across hardware generations ▪ Capture and catalog virtual images in the data center ▪ Automated methods for faster delivery of services with higher levels of control	▪ Integrated virtualization management with IT service delivery processes ▪ Self-service provisioning ▪ Automated service lifecycle management including dynamic instantiation of cloud services ▪ Pay for use ▪ Optimize IT resources to reinvent business processes
z/VM **IBM Wave for z** **Linux on IBM System ®**	**xCAT** **SmartCloud Entry***	**Cloud Ready for Linux on System z** **SmartCloud Provisioning*** **SmartCloud Orchestrator***

** System z support currently in development*

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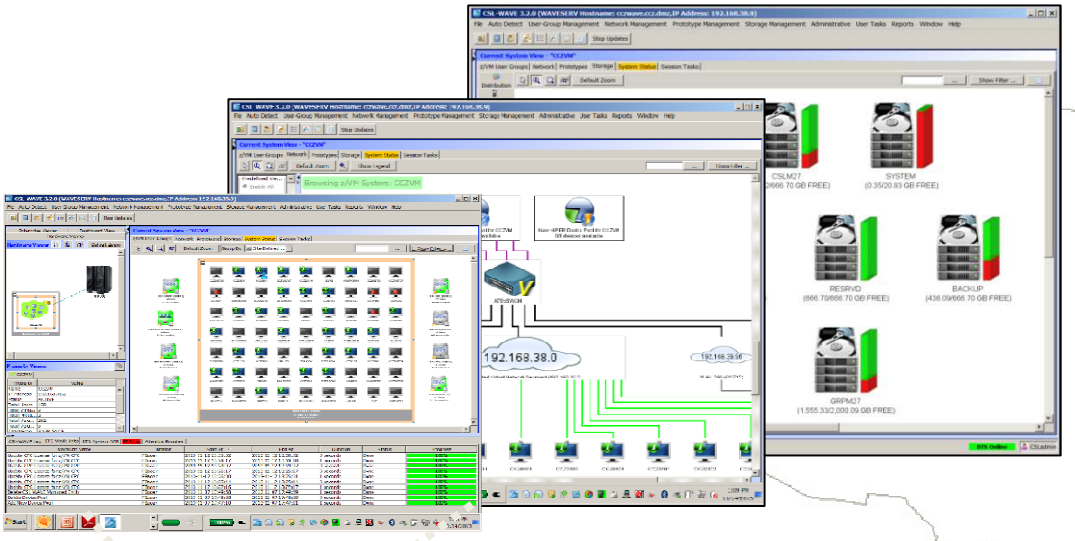
Learn More with IBM Wave Client Hands on Experience



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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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zGrowth IBM Wave for z/VM TIGER TEAM – WW Coverage

Marty Horan,
Manager

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Ernest Horn

Eduardo Oliveira,
Team lead

Ivan Dobos

Luis Ramos

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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 System z experts have years of experience in working with IBM Wave

ZSP03858-USEN-00

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IBM Wave for z/VM Features and Architectural Overview

IBM System z Tiger Team: News

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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 Linux on System z 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

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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

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Feature overview – Graphical control

- Rich GUI with graphical views of all managed objects
- Advanced filters, tagging, layouts and layers for every display
- Multiple objects may be selected

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Feature overview – Auto-detection

- Agentless technology
- Automatic initial detection of all virtual server farms components (servers, prototypes, networks, network devices and storage)
- Any changes to the system, done by any IBM Wave component or user are immediately propagated to all GUI users
- Ongoing monitoring of changes made outside of IBM Wave for z/VM after the initial auto-detection

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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.

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IBM Wave Architecture

Client

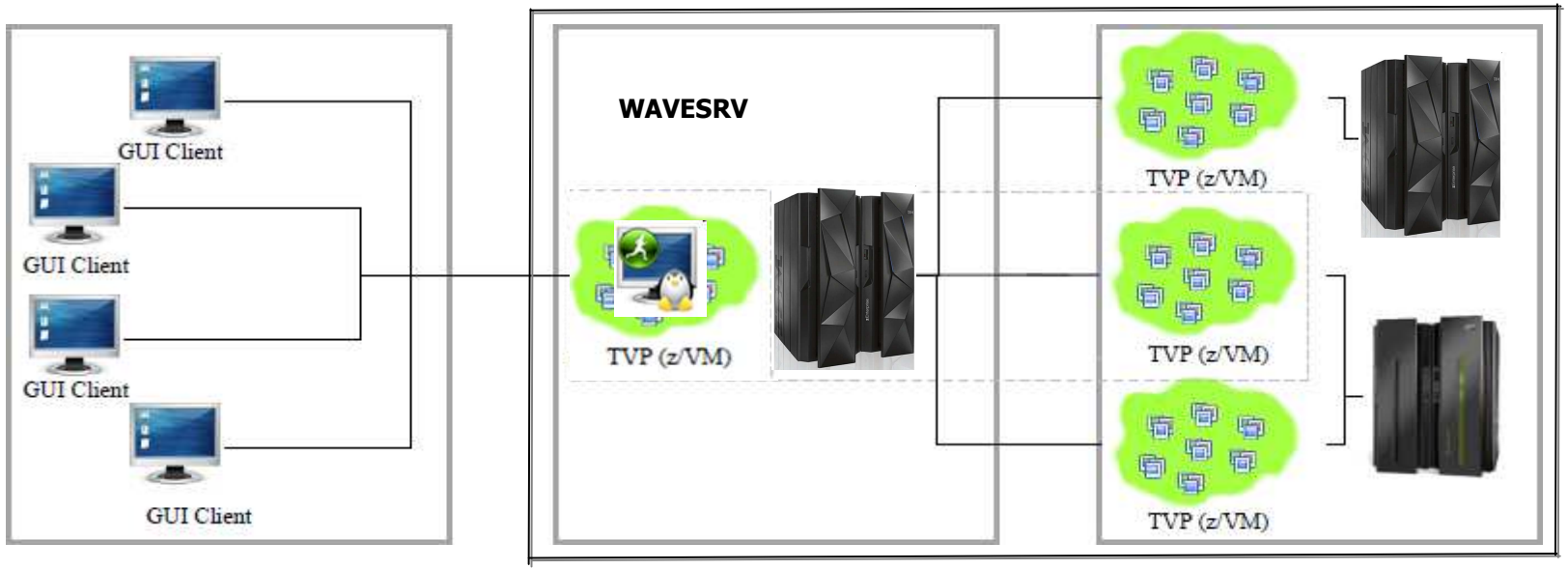
- The Client can run on Microsoft® Windows®, running Java™ 1.7
- Graphic interpretation of the TVP through communication with WAVESRV using Point-and-Click and Drag-and-Drop operations

WAVESRV

- This server (virtual or physical) hosts the application database and Background Task Scheduler
- One BTS server can manage many Target Virtualization Platforms.

TVP

- The Target Virtualization Platform (TVP) represents the hypervisor which hosts the virtual guests that are managed.
- The BTS utilizes the TVP API to query and perform changes to the TVP and hosted virtual guests.



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IBM Wave Requirements

Client

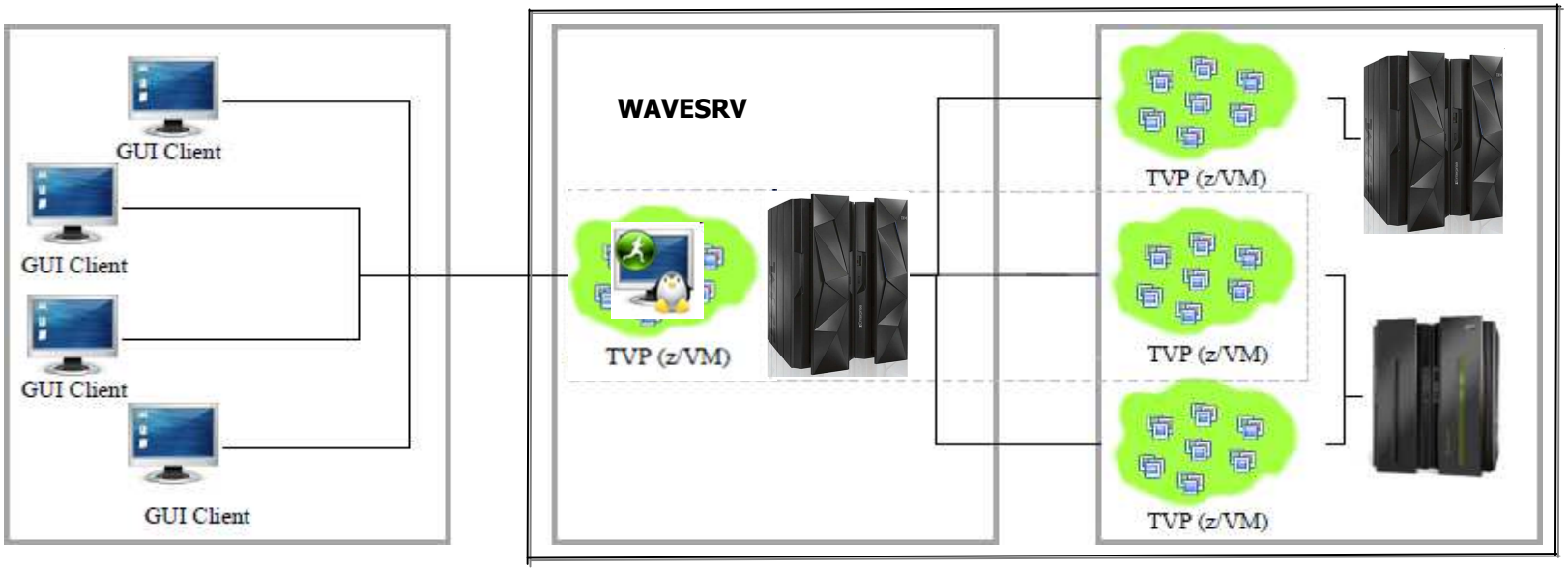
- Windows 7 Workstation
- Internet Explorer or Firefox
- Java Runtime 1.7 with Web Start Support
- PuTTY or equivalent telnet/SSH client

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)



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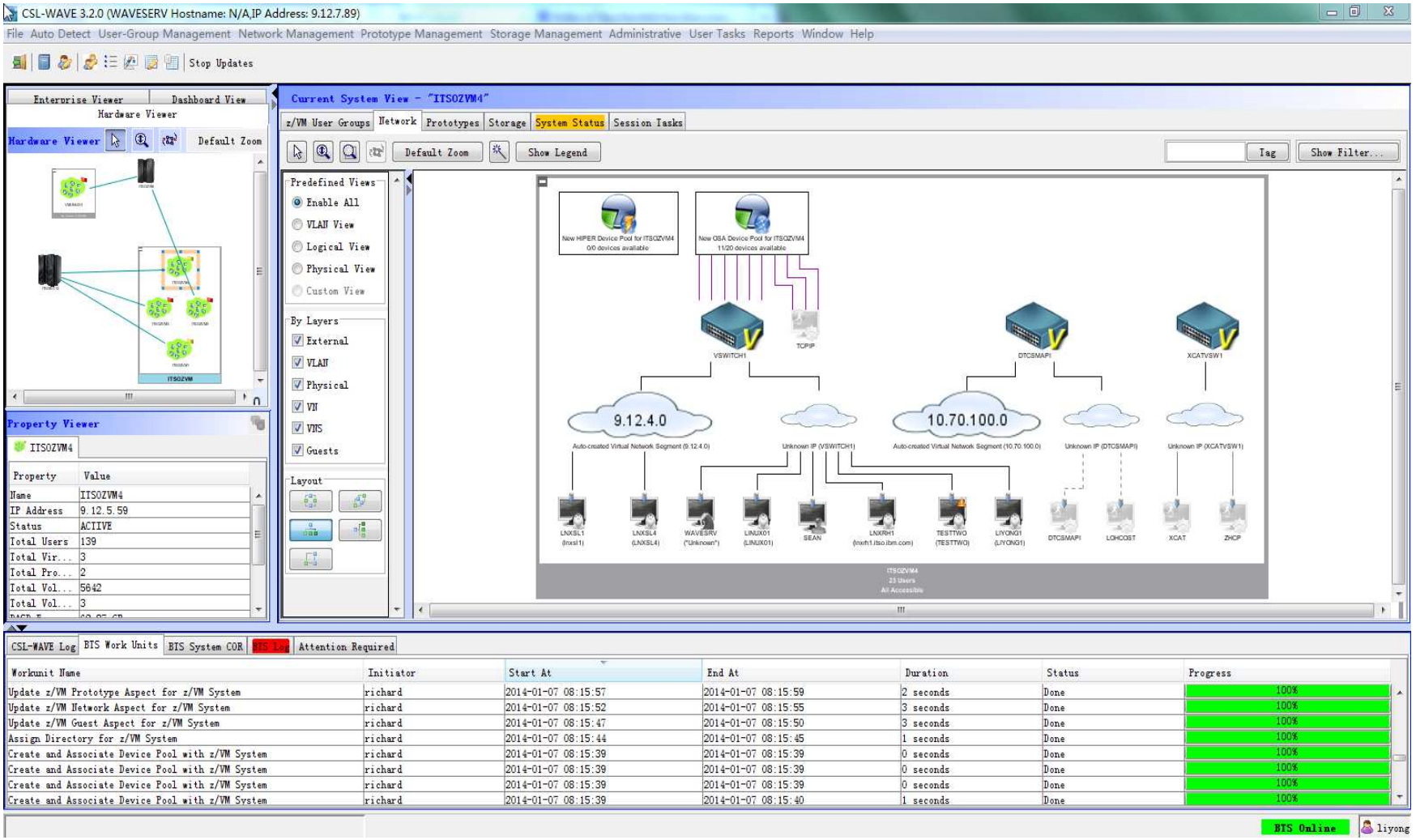
IBM Wave for z/VM: Tier 1- GUI



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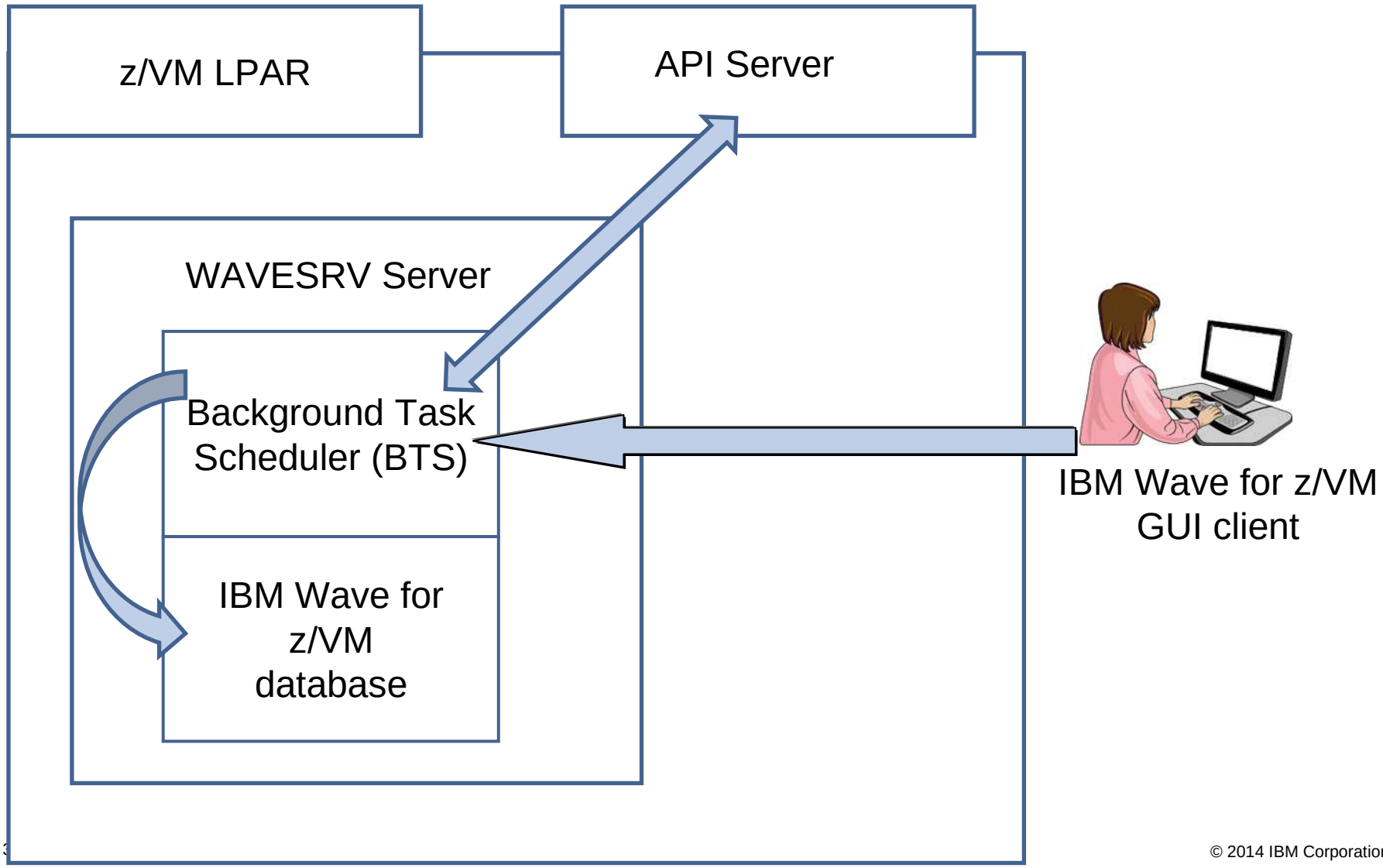
IBM Wave for z/VM: Tier 2 – WAVESRV server



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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

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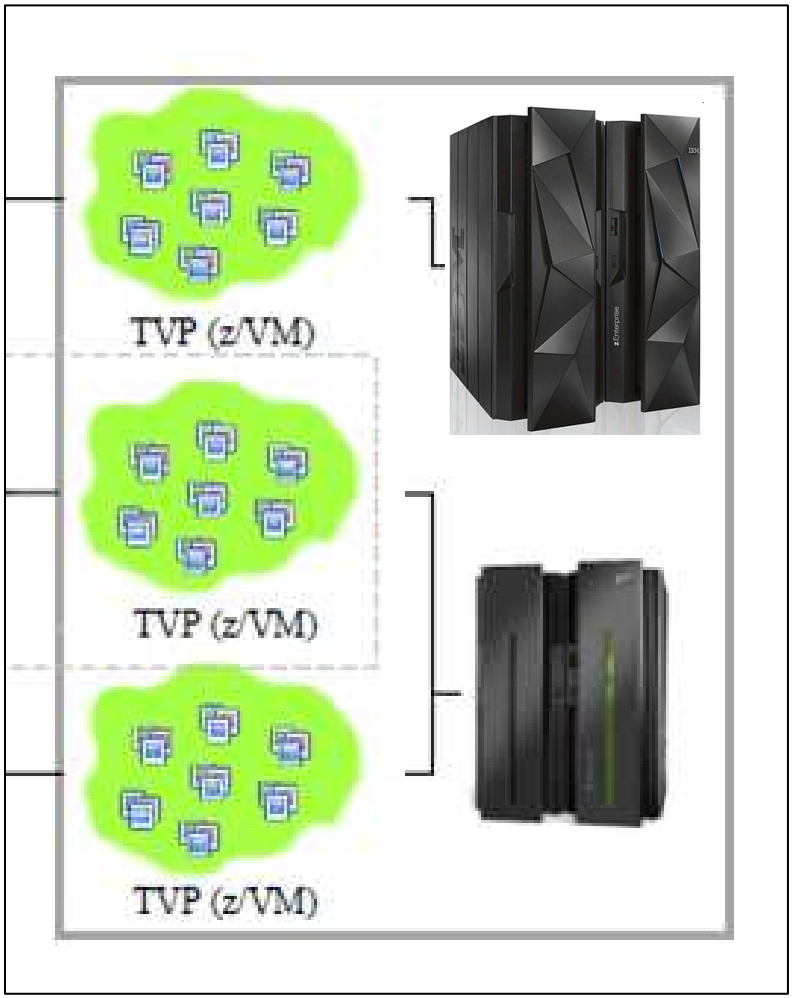
IBM Wave for z/VM: Tier 3 – Target Virtualization Platform (TVP)



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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.

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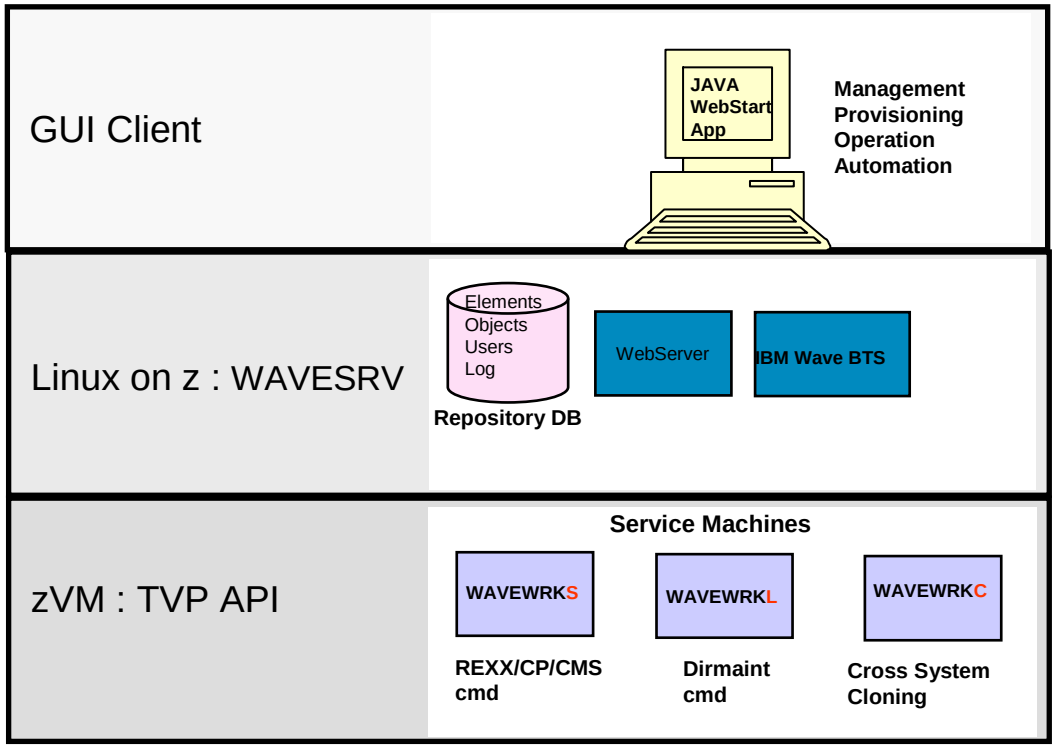
IBM Wave Operational Model



Scope

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

- Elements
- Objects
- Users
- Log

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

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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.

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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 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
*************************************************************
```


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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

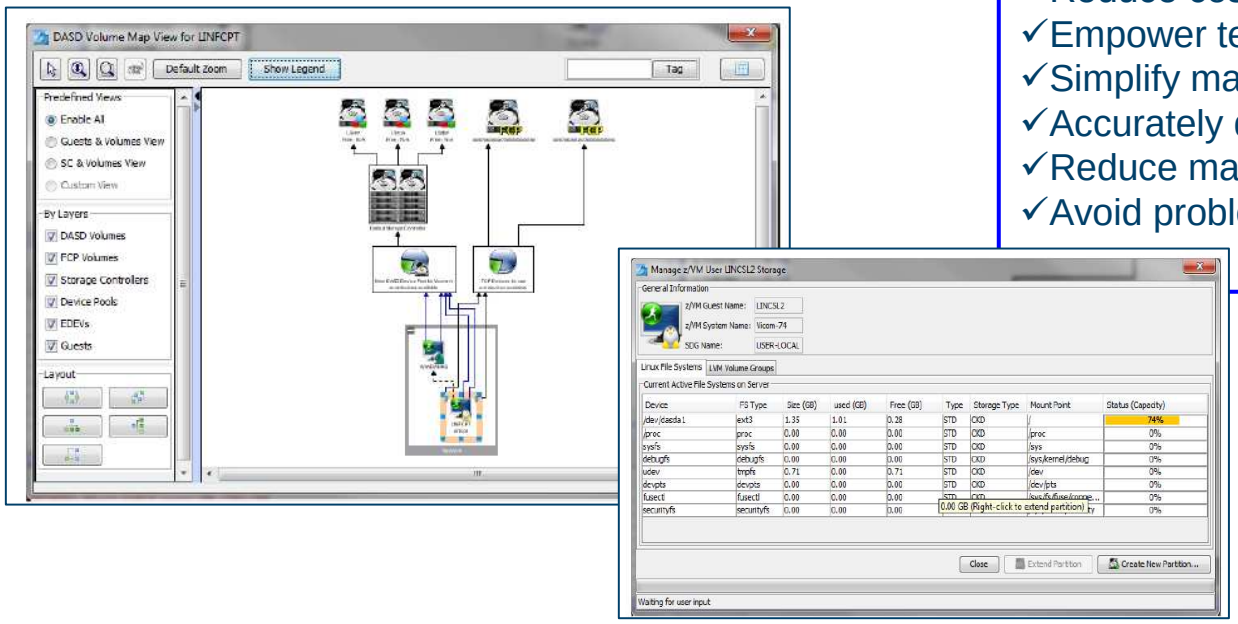
With IBM Wave

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



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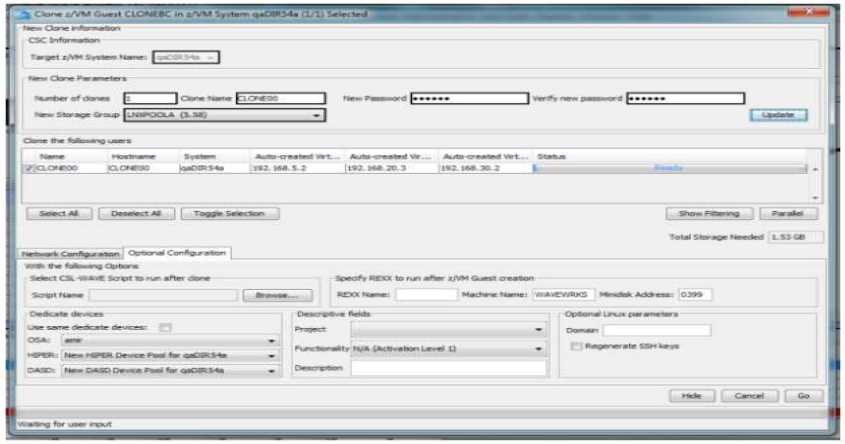
IBM Wave Systems Management Task Example:
Clone a Virtual Machine

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



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

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IBM Wave Systems Management Task Example

Live Guest Relocation

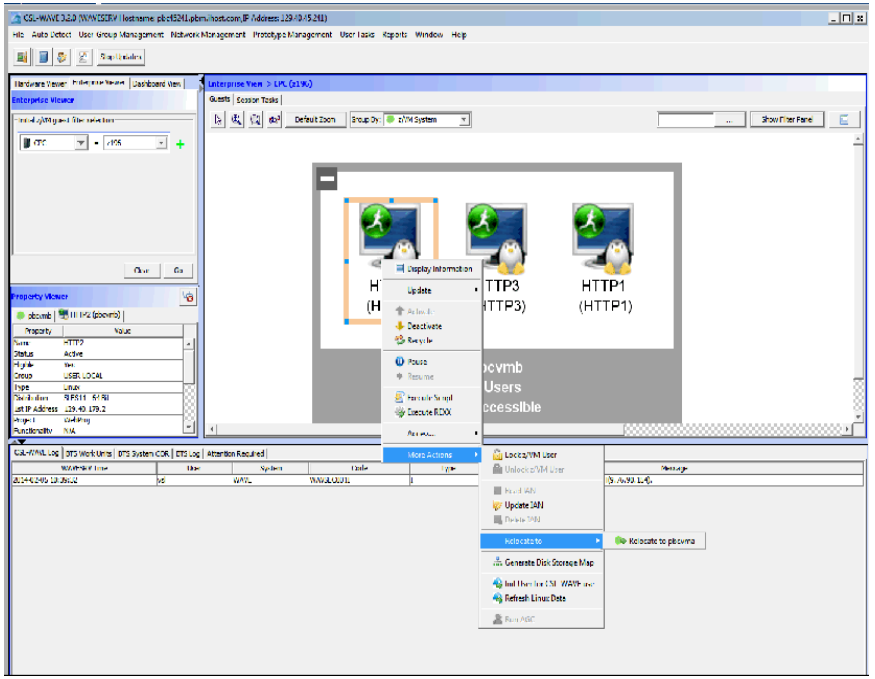
Without IBM Wave

- 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



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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.

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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 can be snapped out
  - –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.

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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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IBM Wave for z/VM

Pre-Recorded Demo or
Live Demo or
Slides Guided Demo

IBM System z Tiger Team: News

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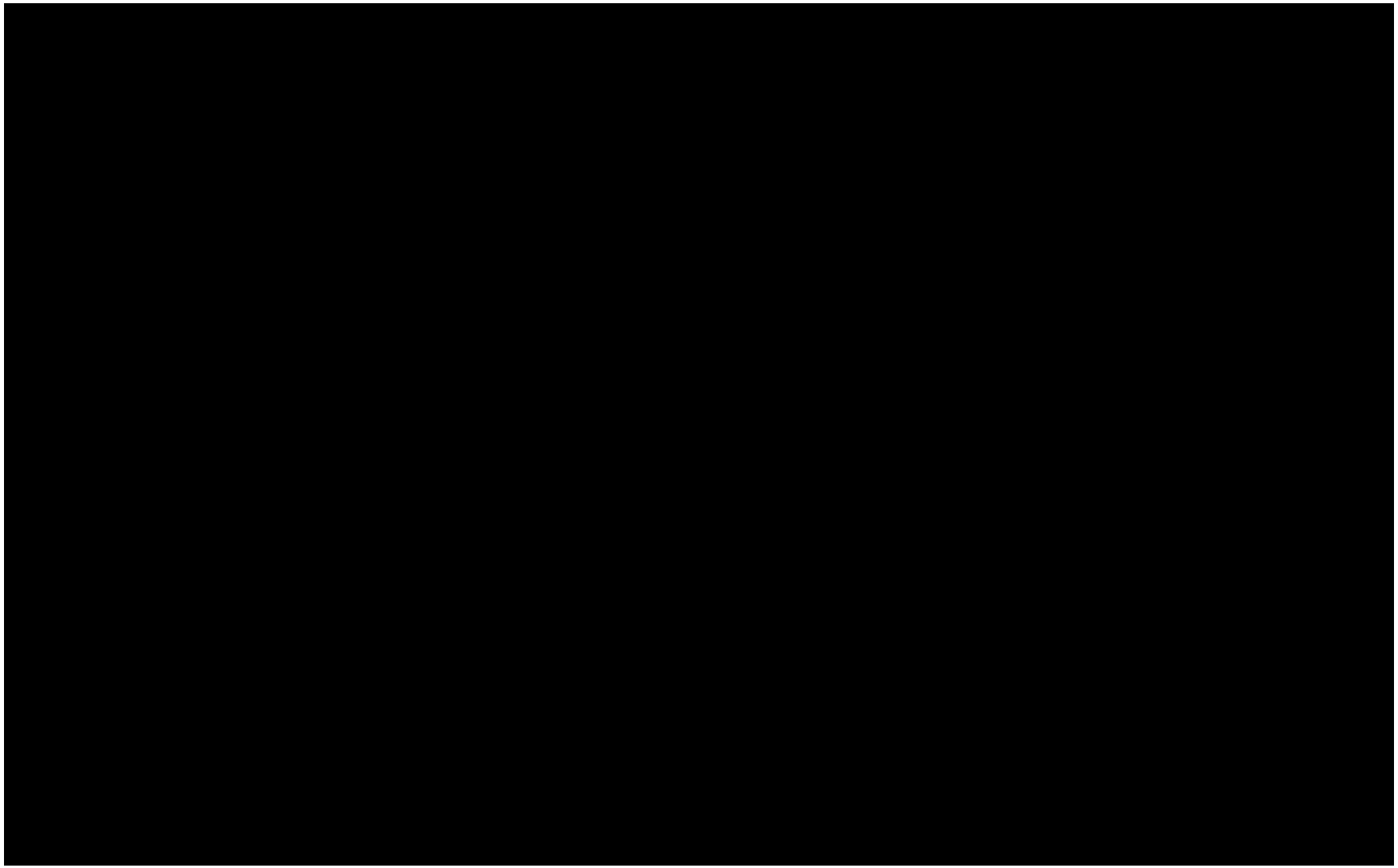
IBM Wave for z/VM – Demo (16min 45sec) http://www.youtube.com/watch?v=N3L5lJKisrY



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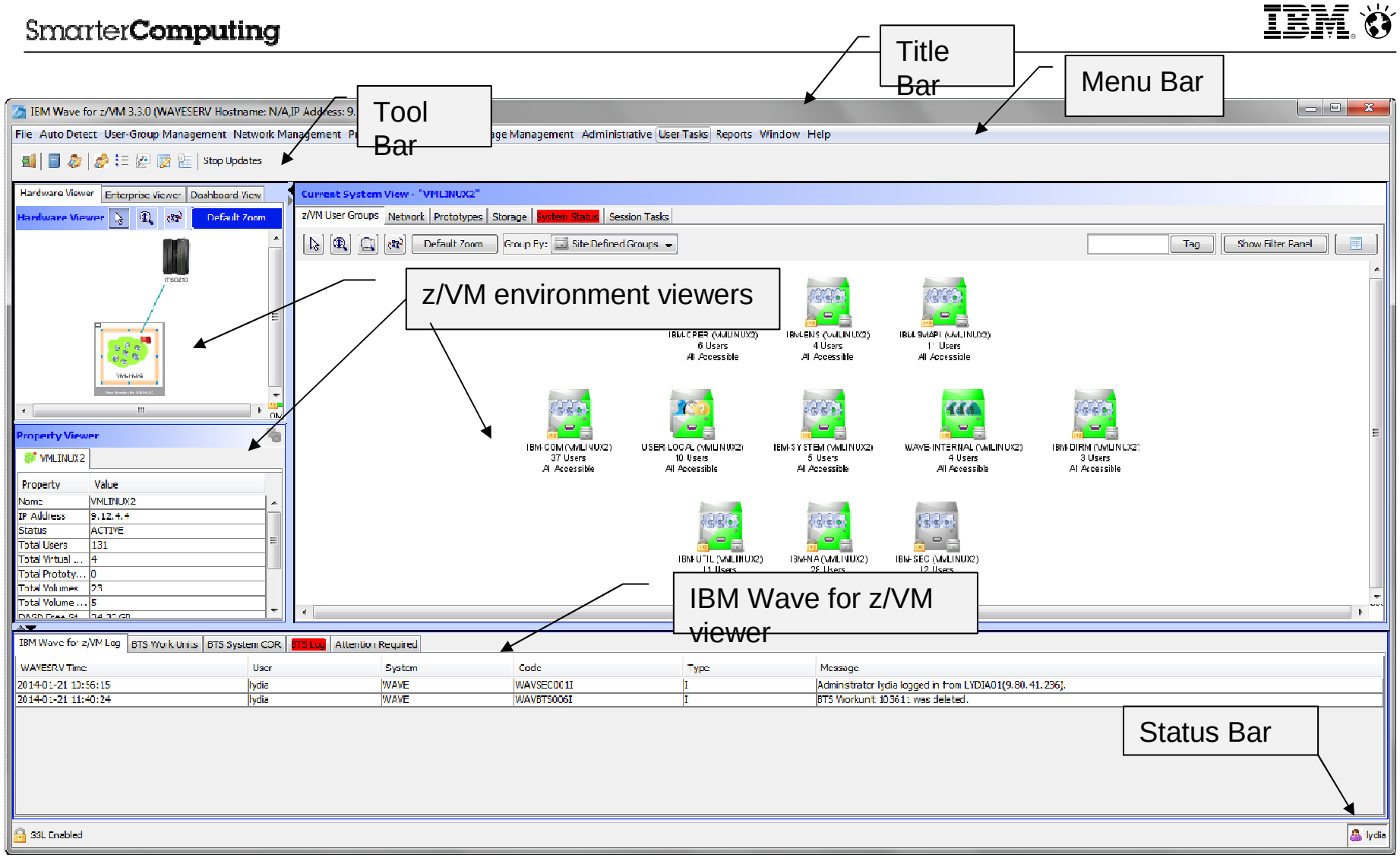

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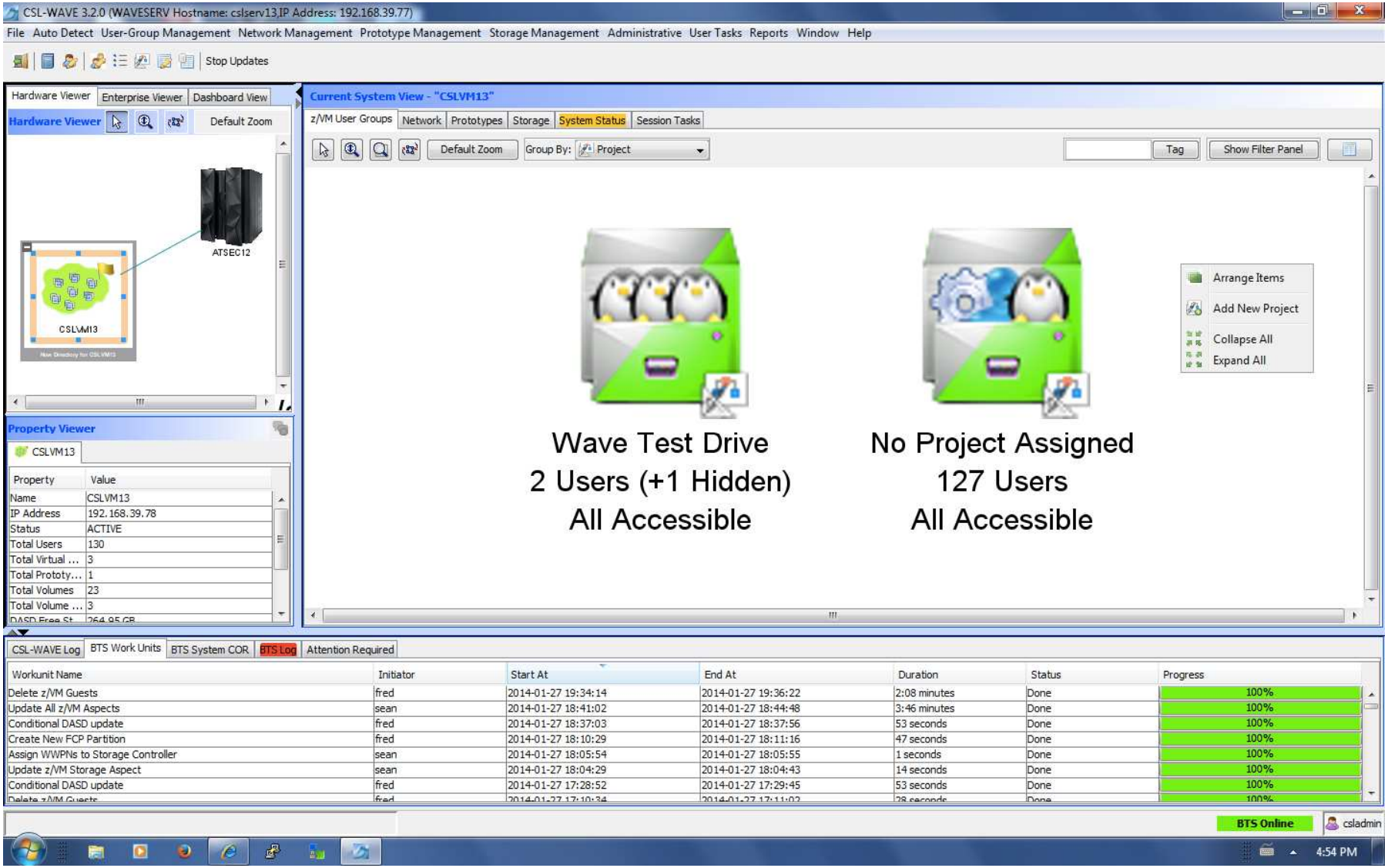

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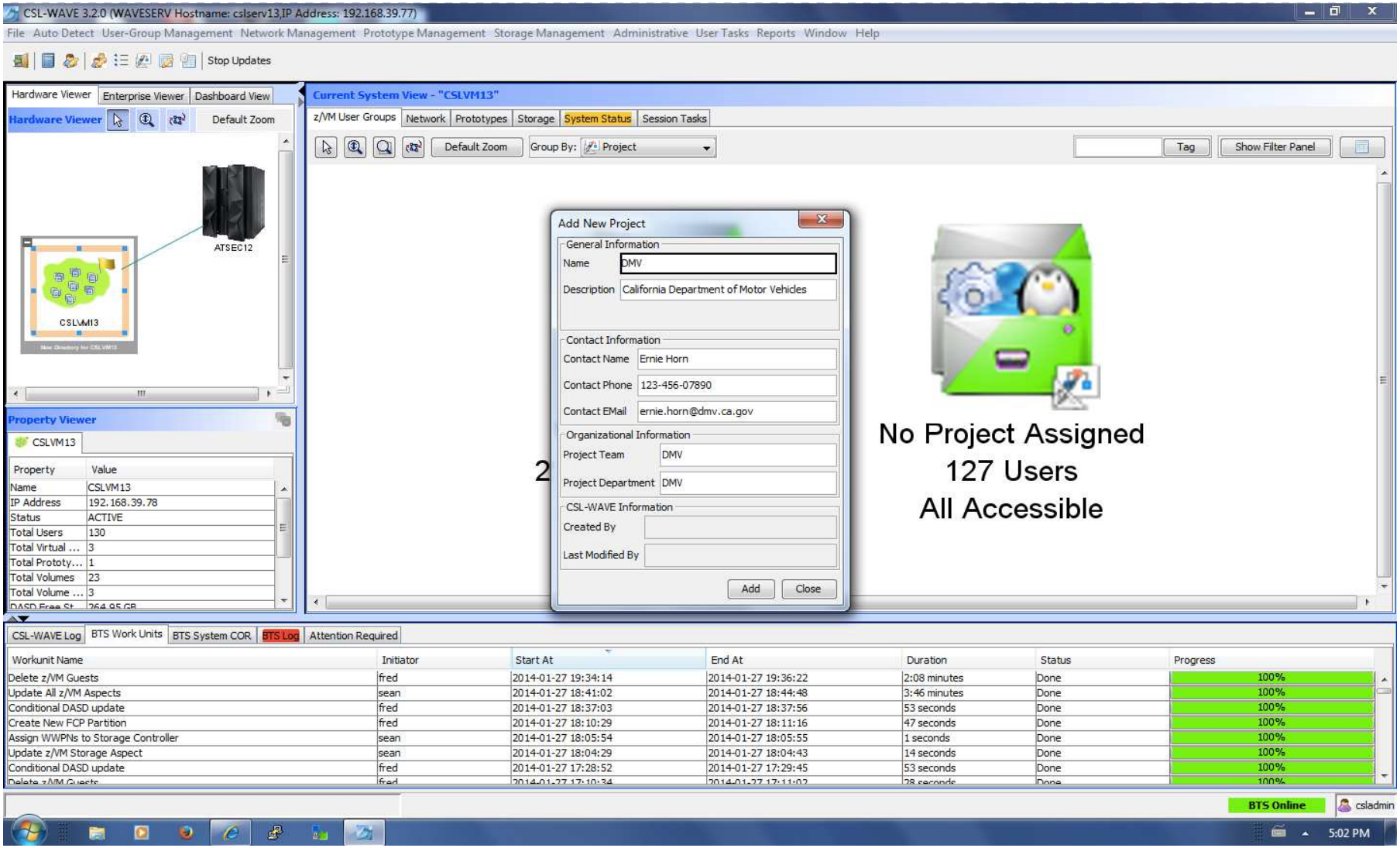

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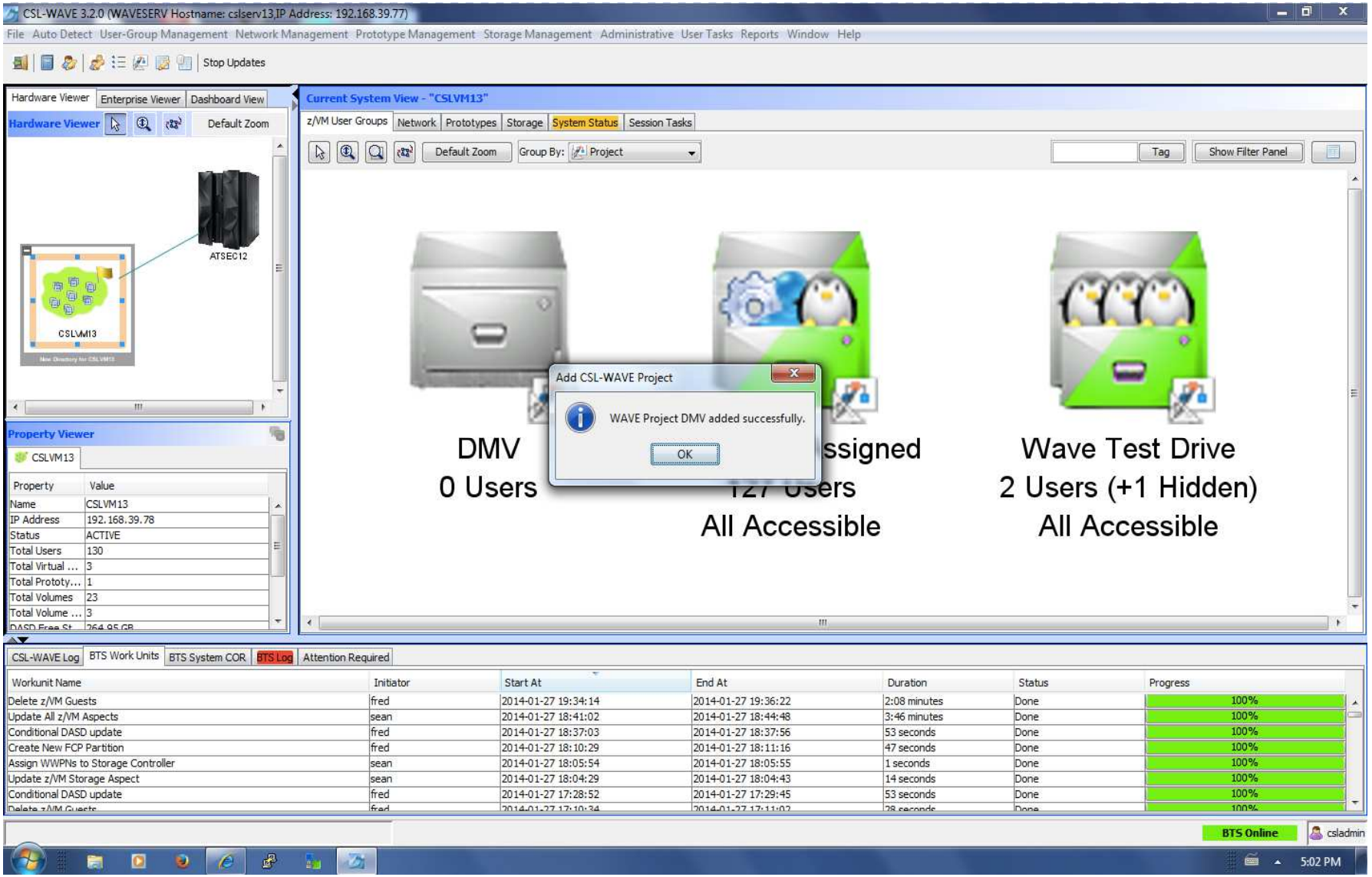

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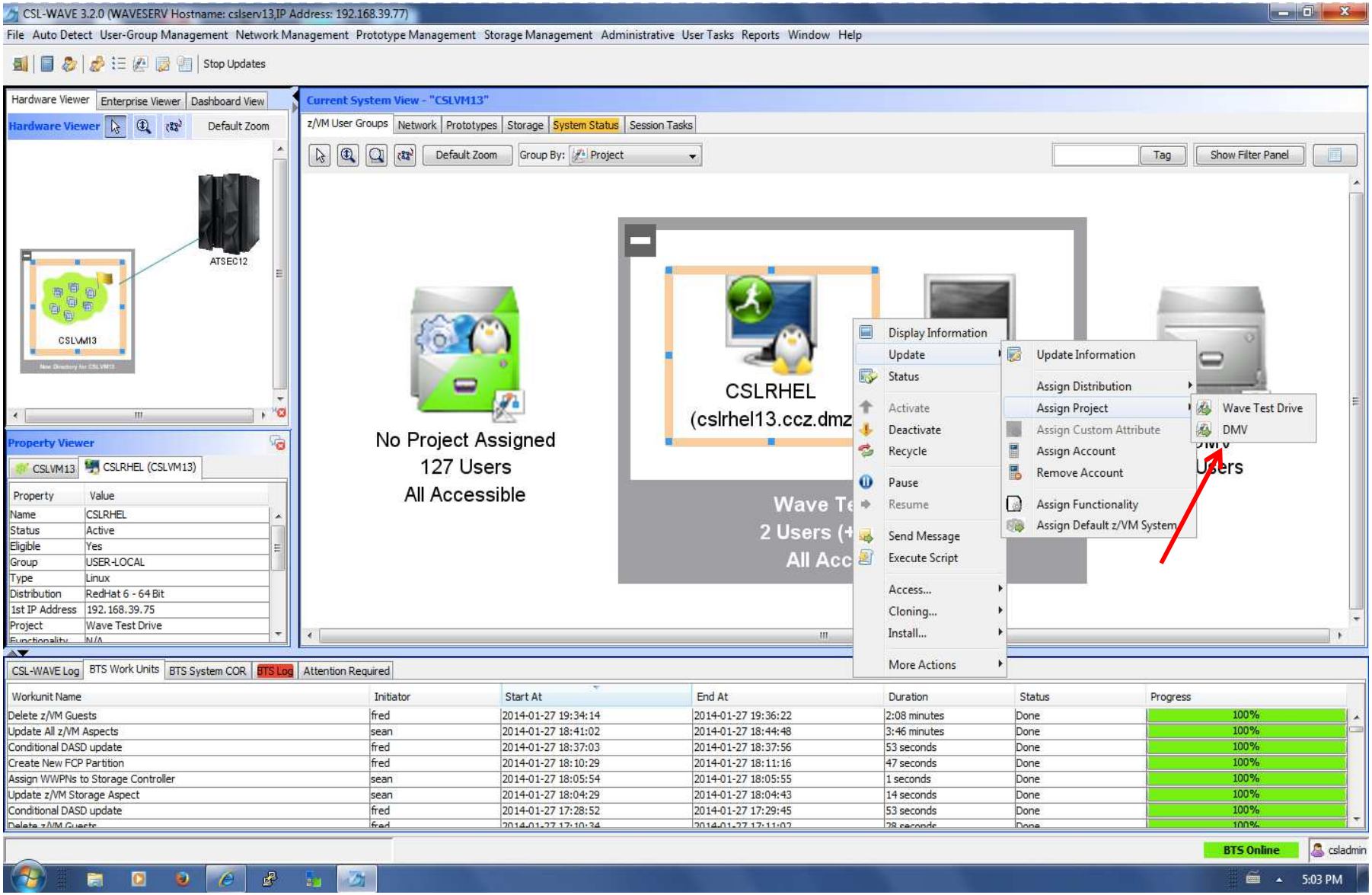

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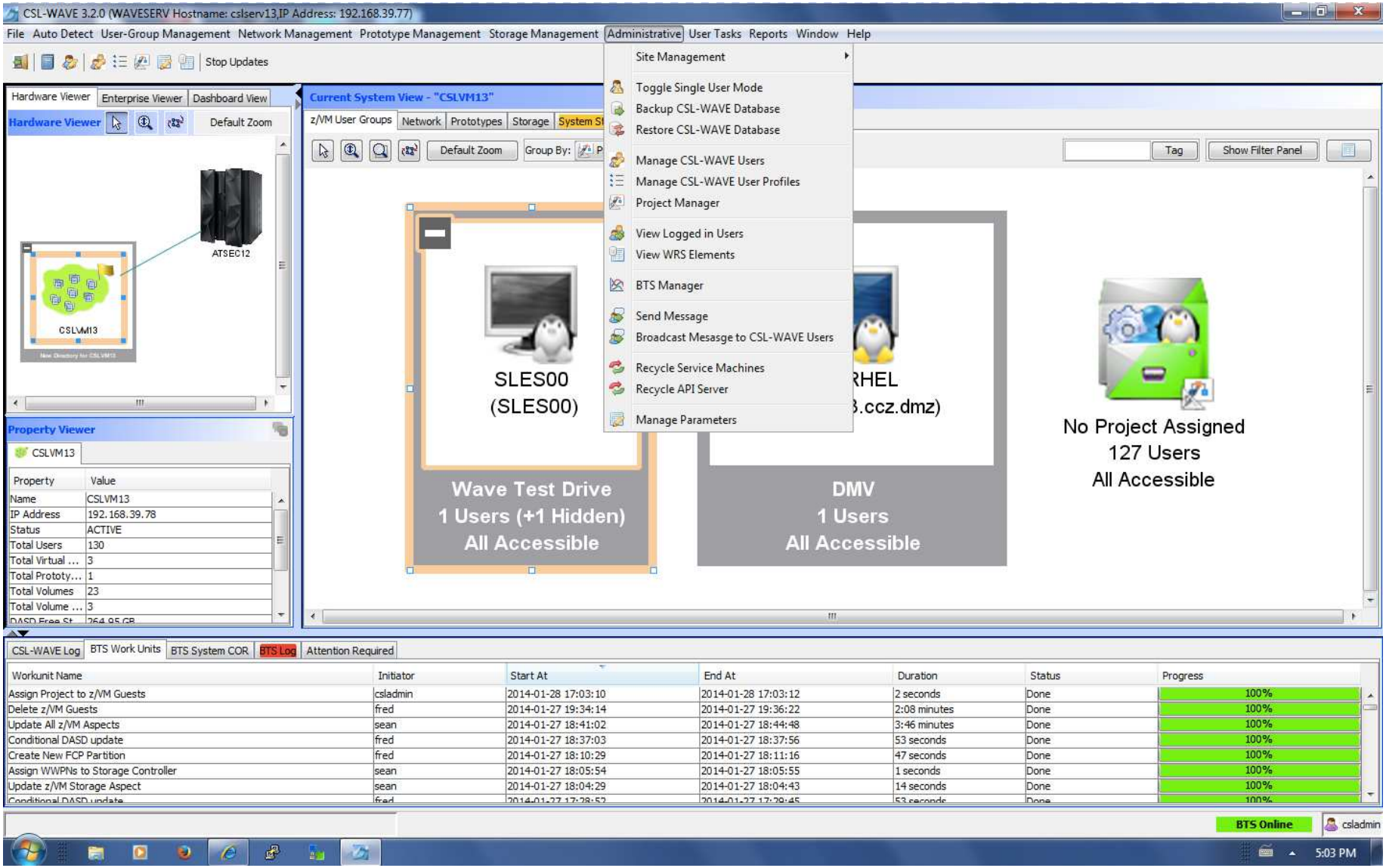

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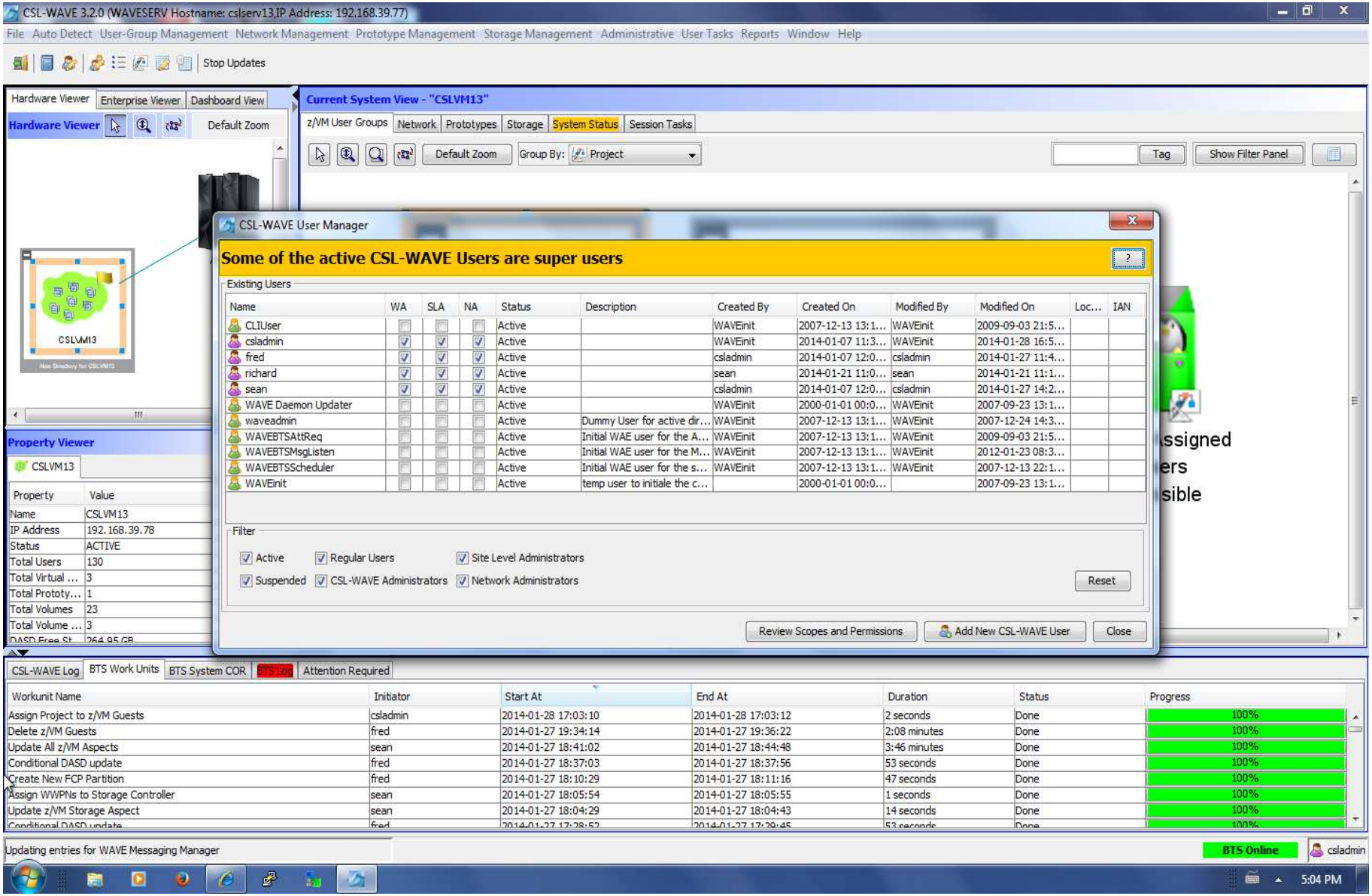

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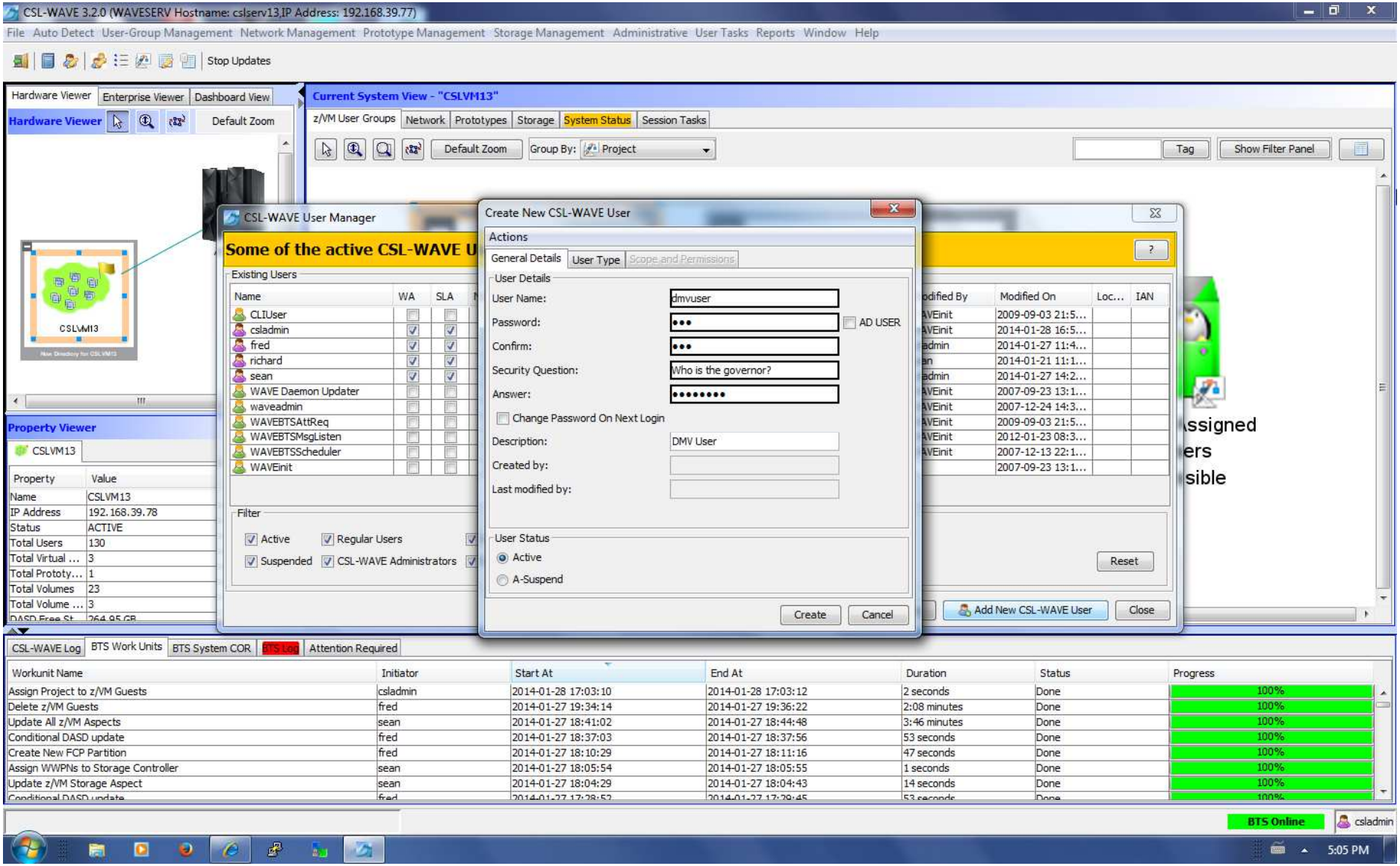

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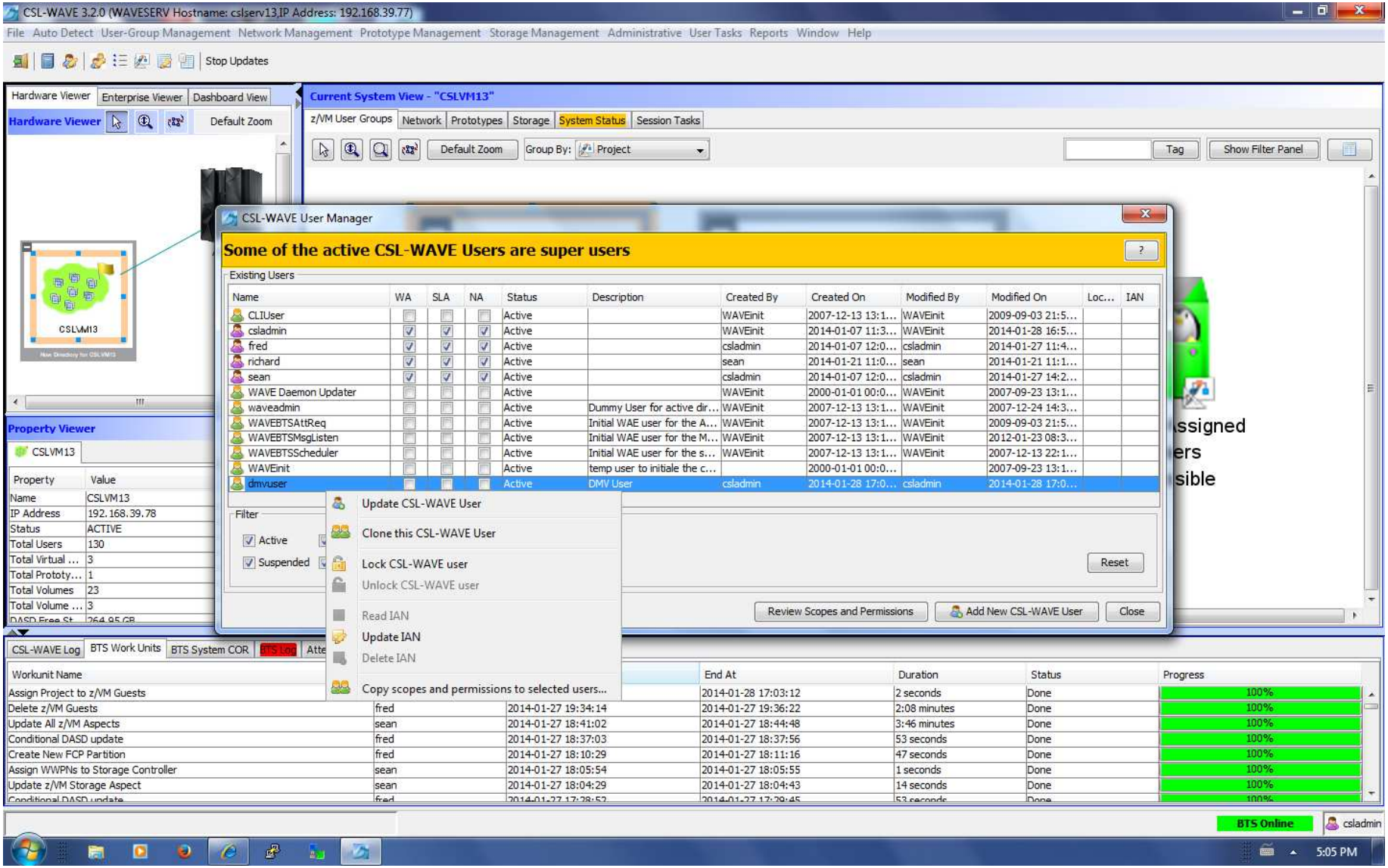

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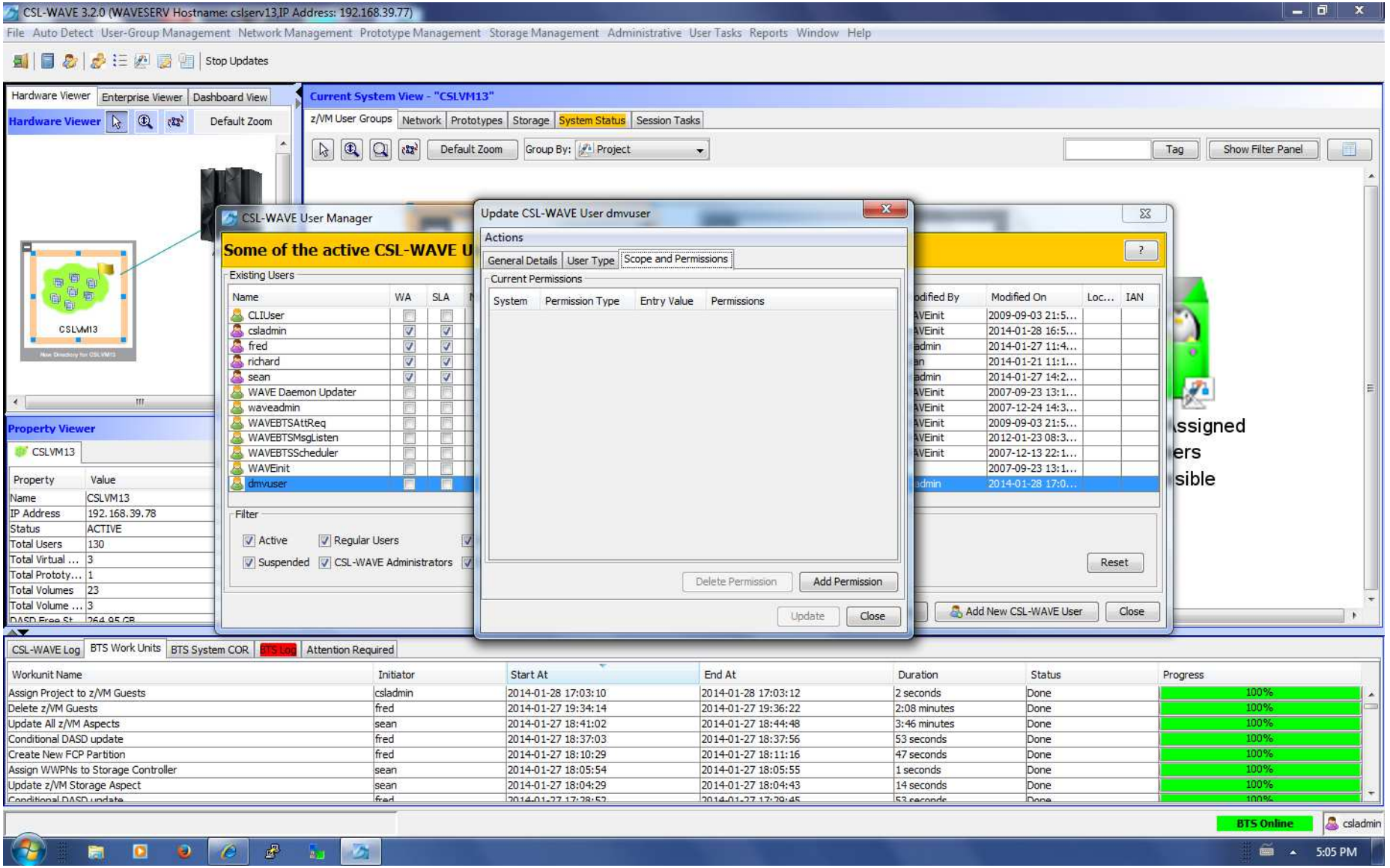

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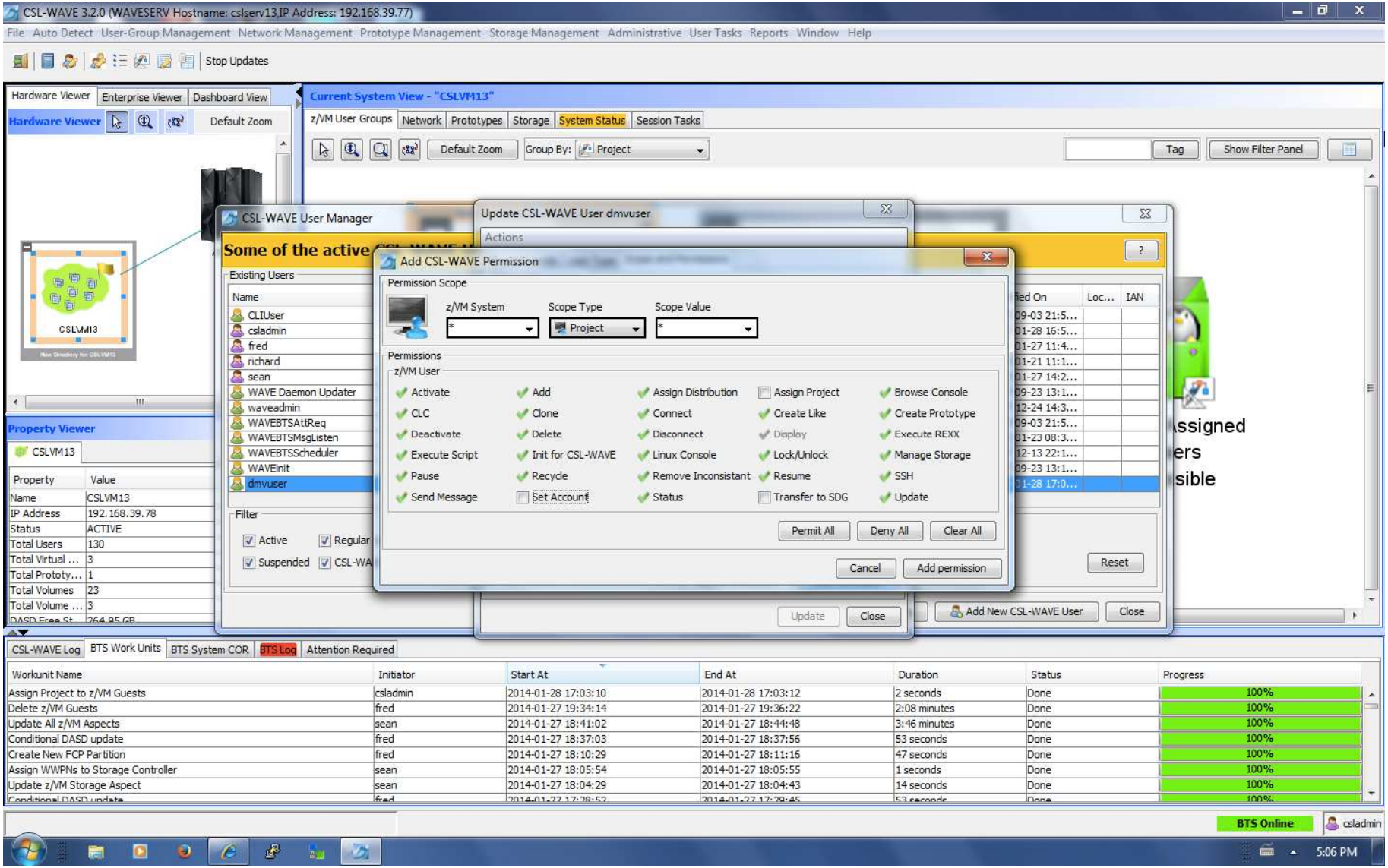

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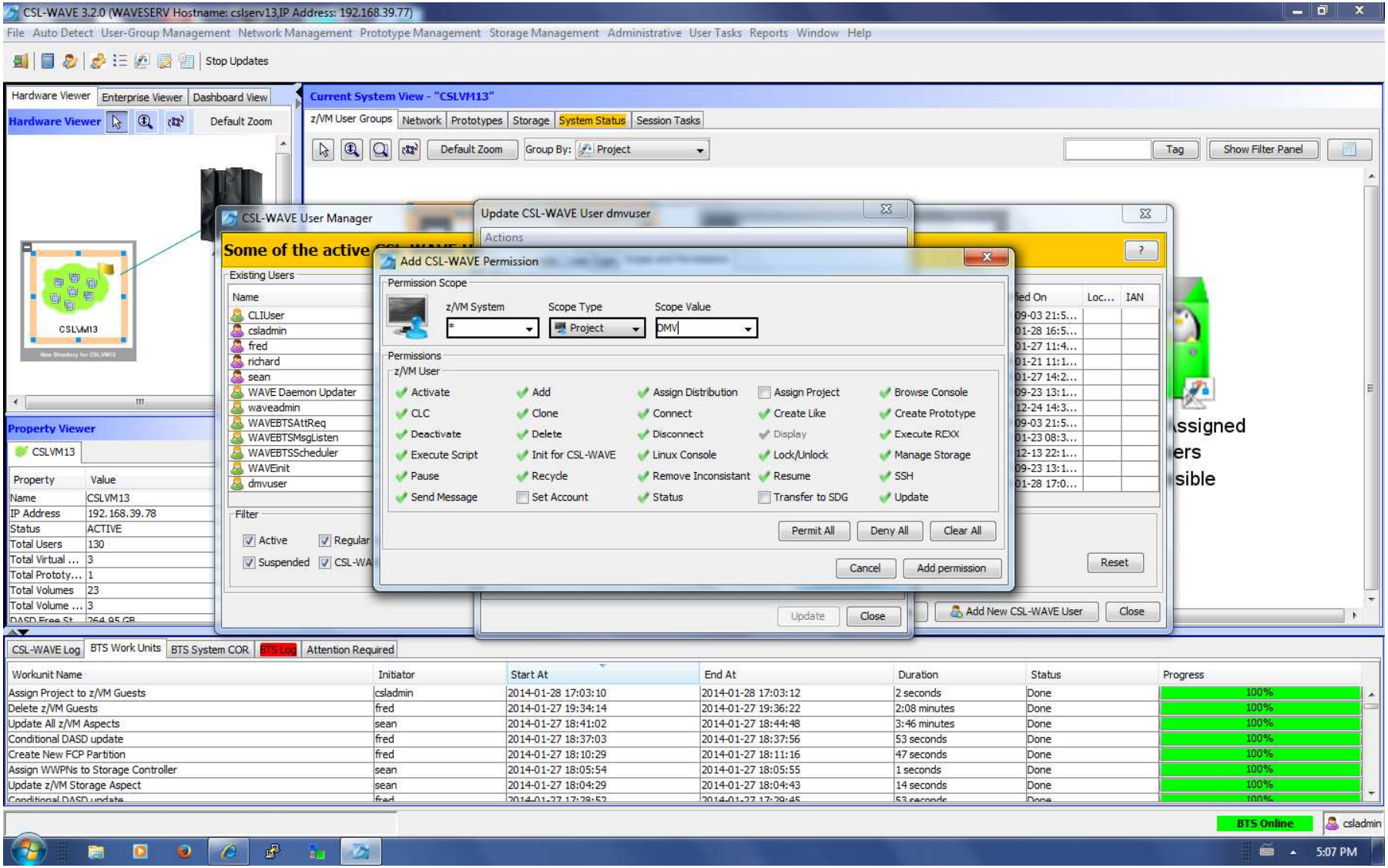

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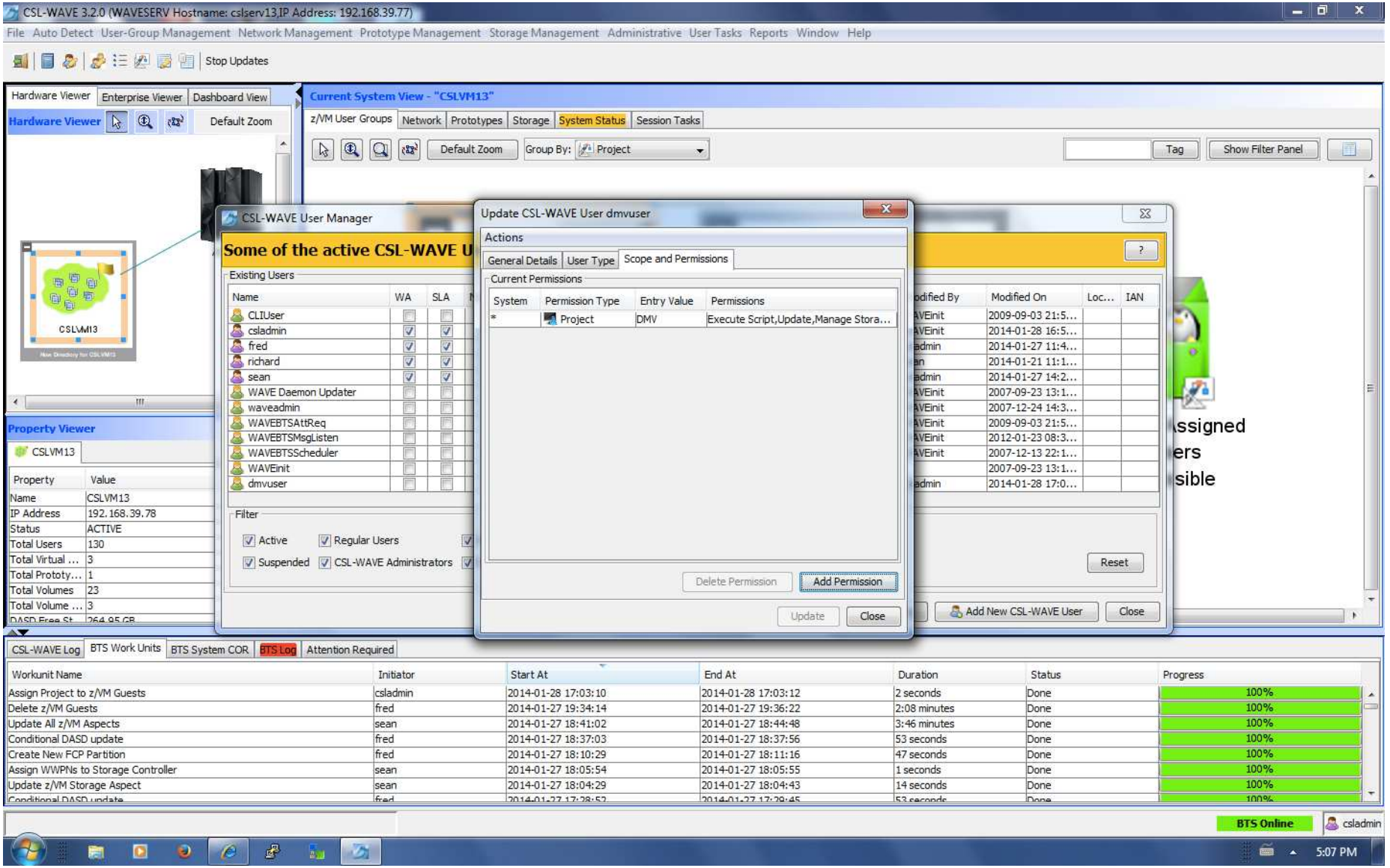

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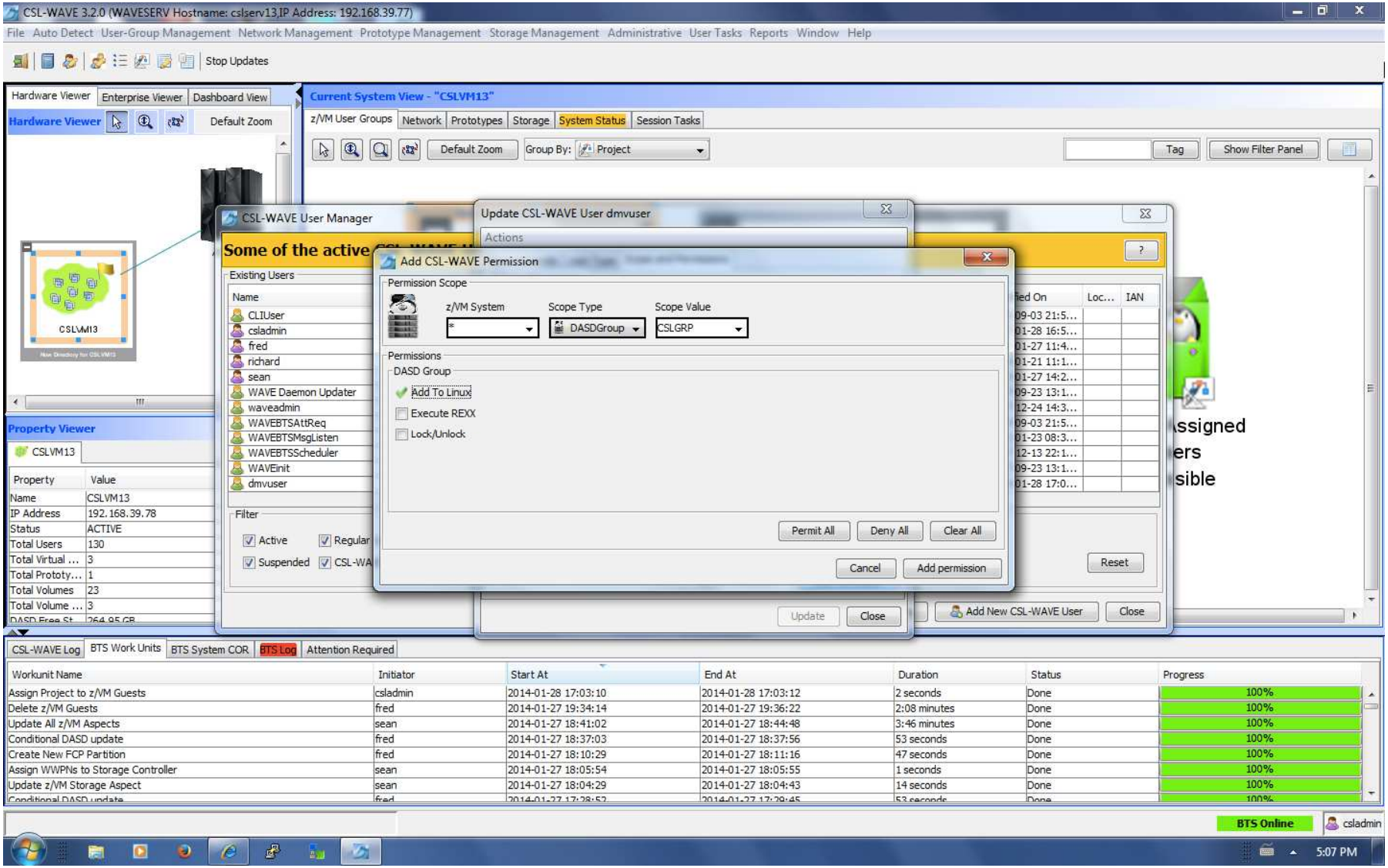

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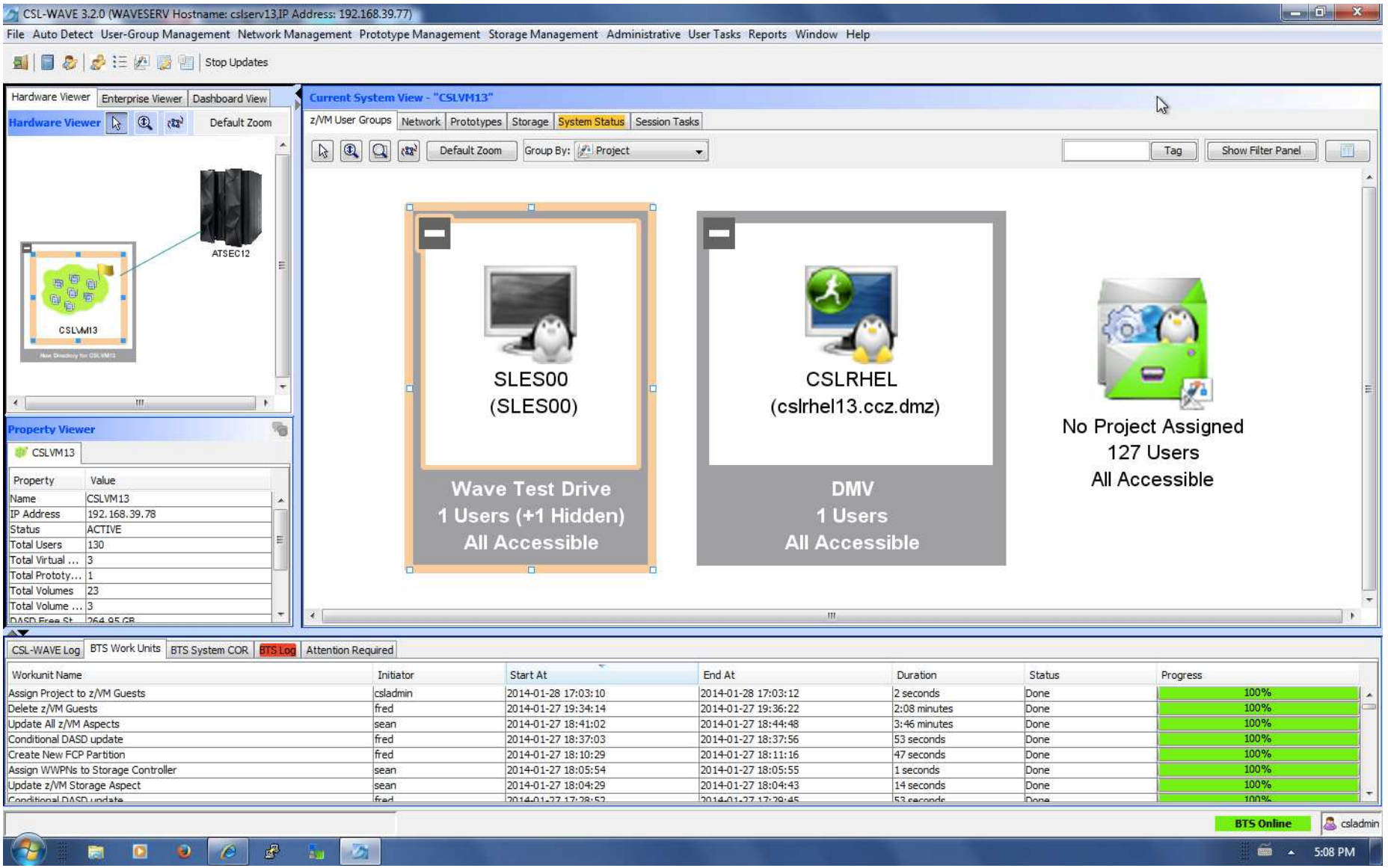

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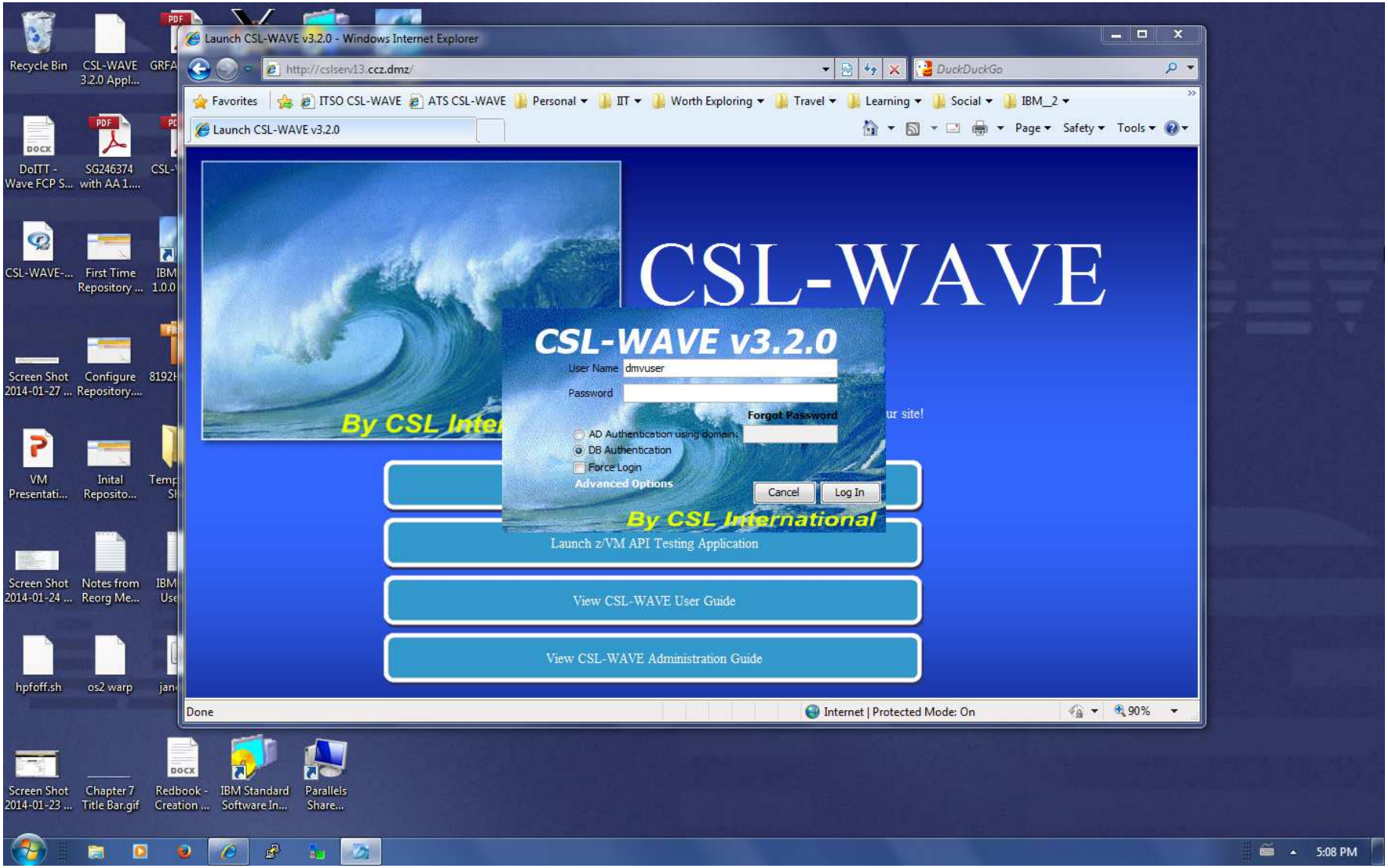

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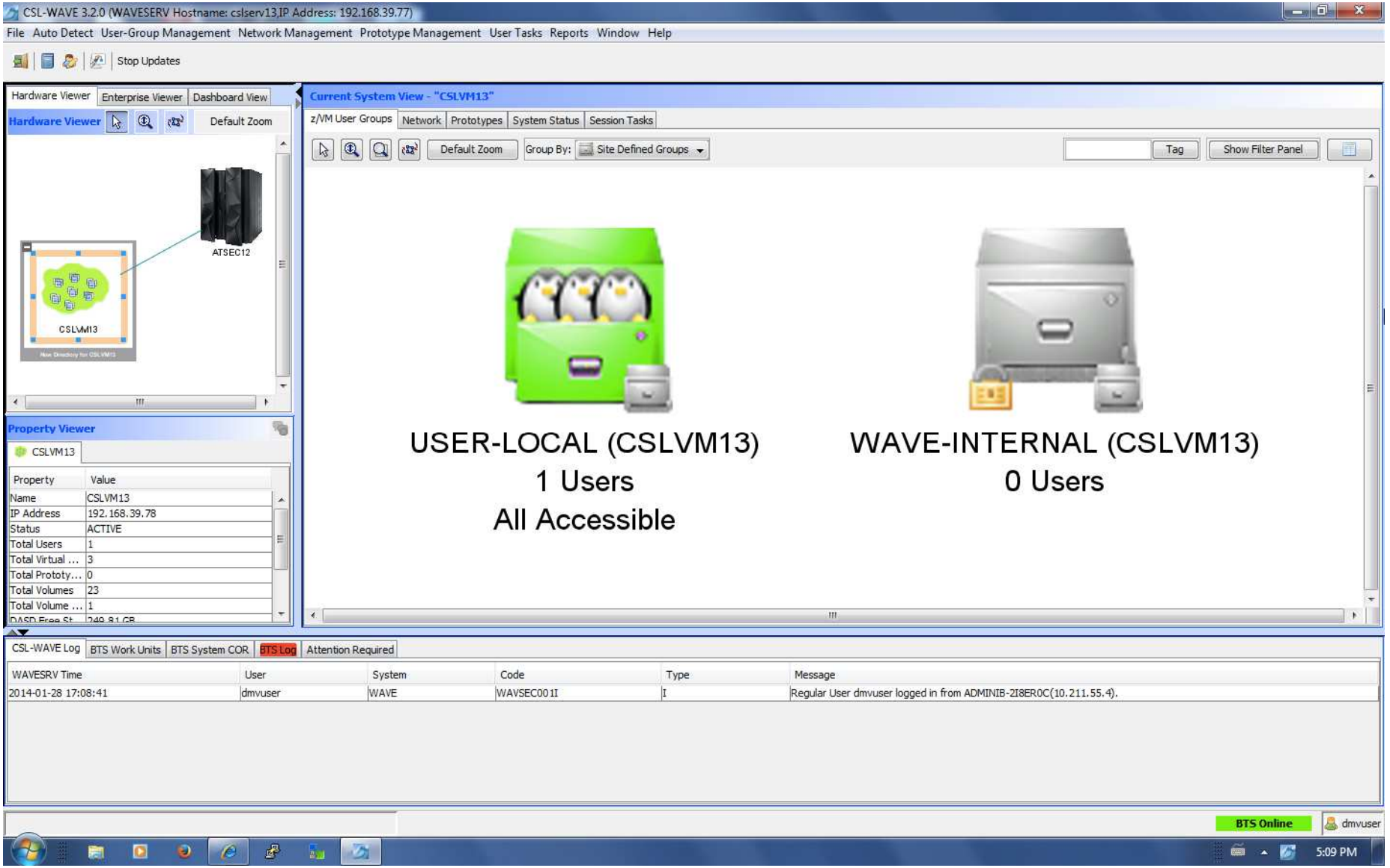

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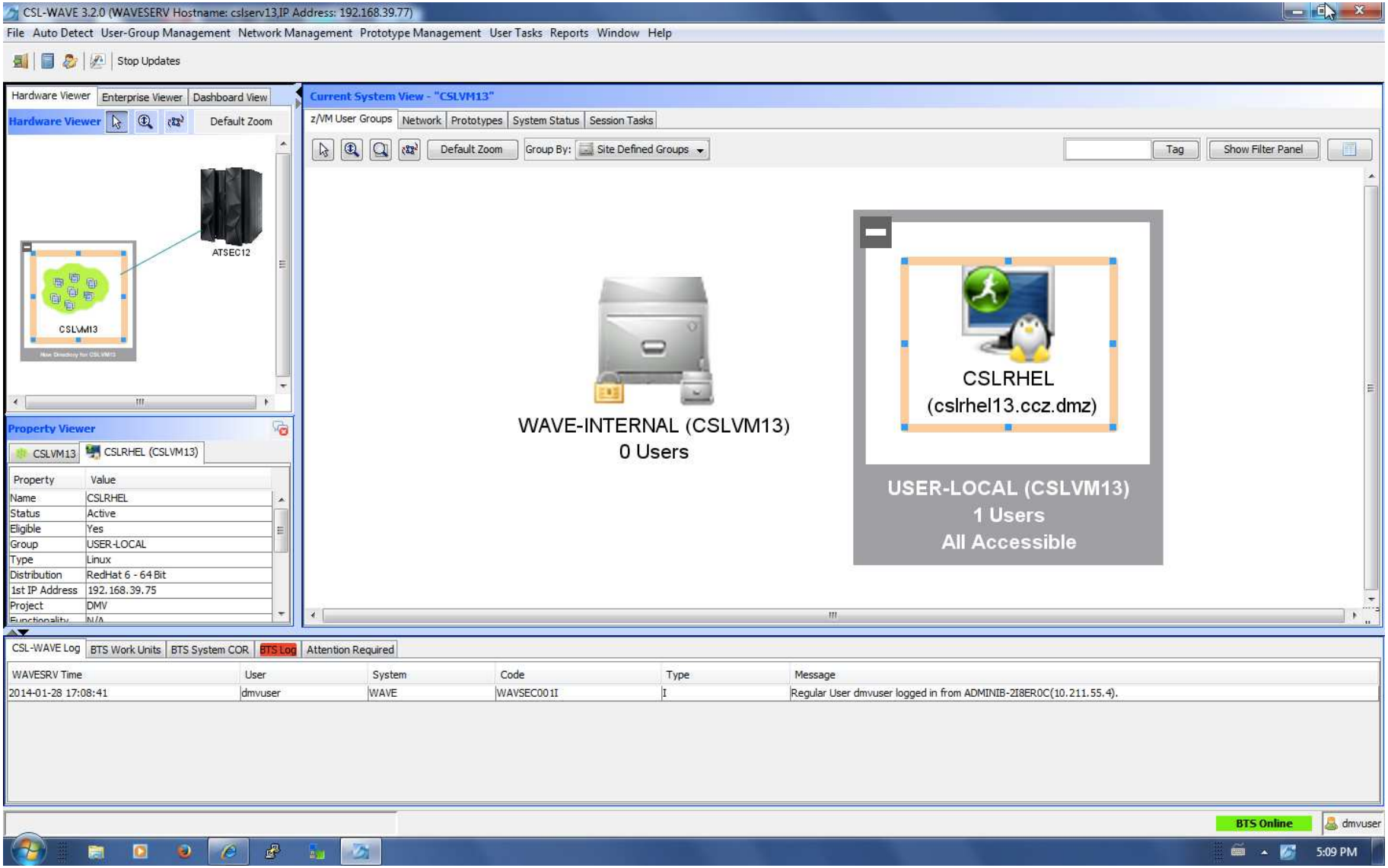

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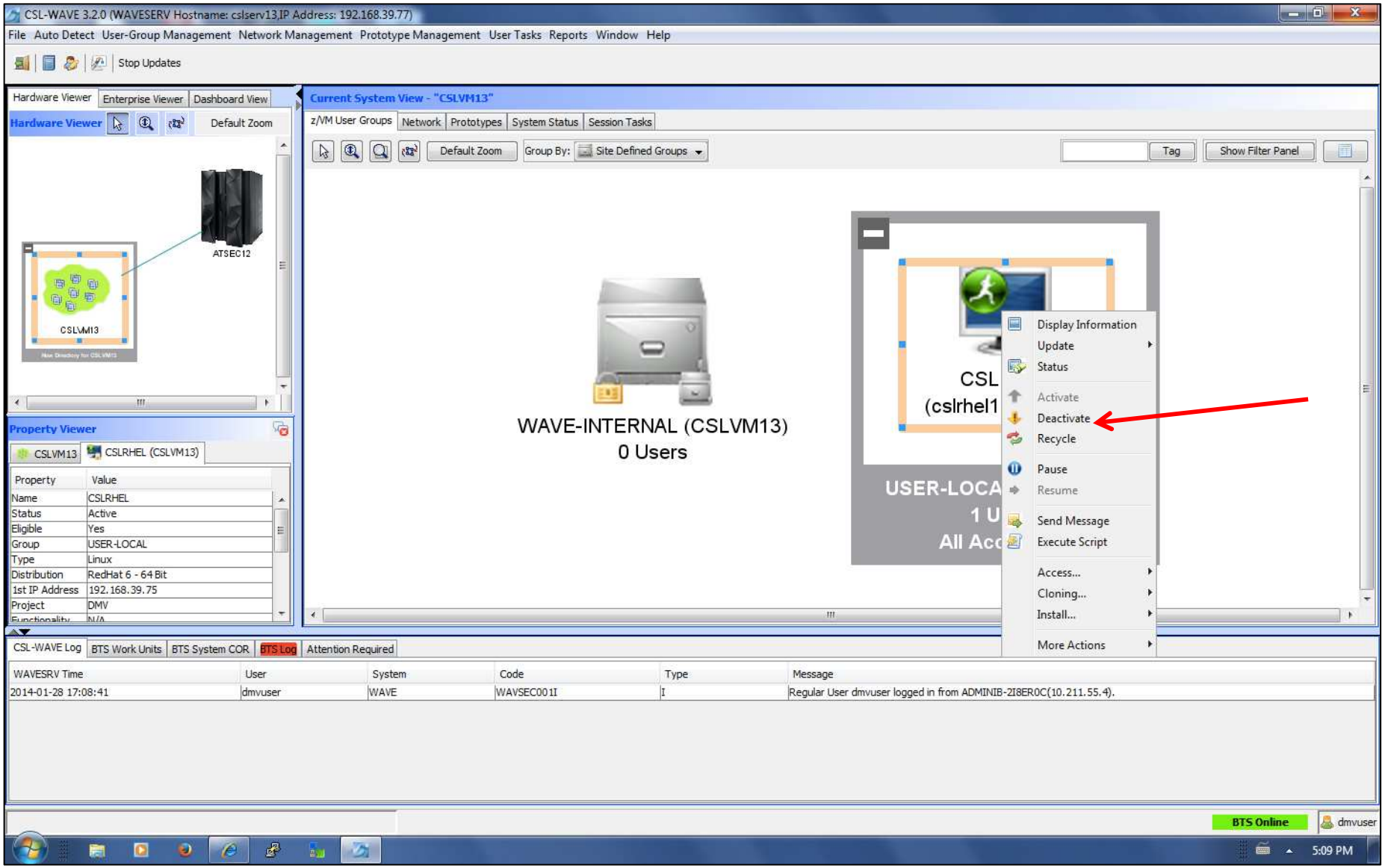

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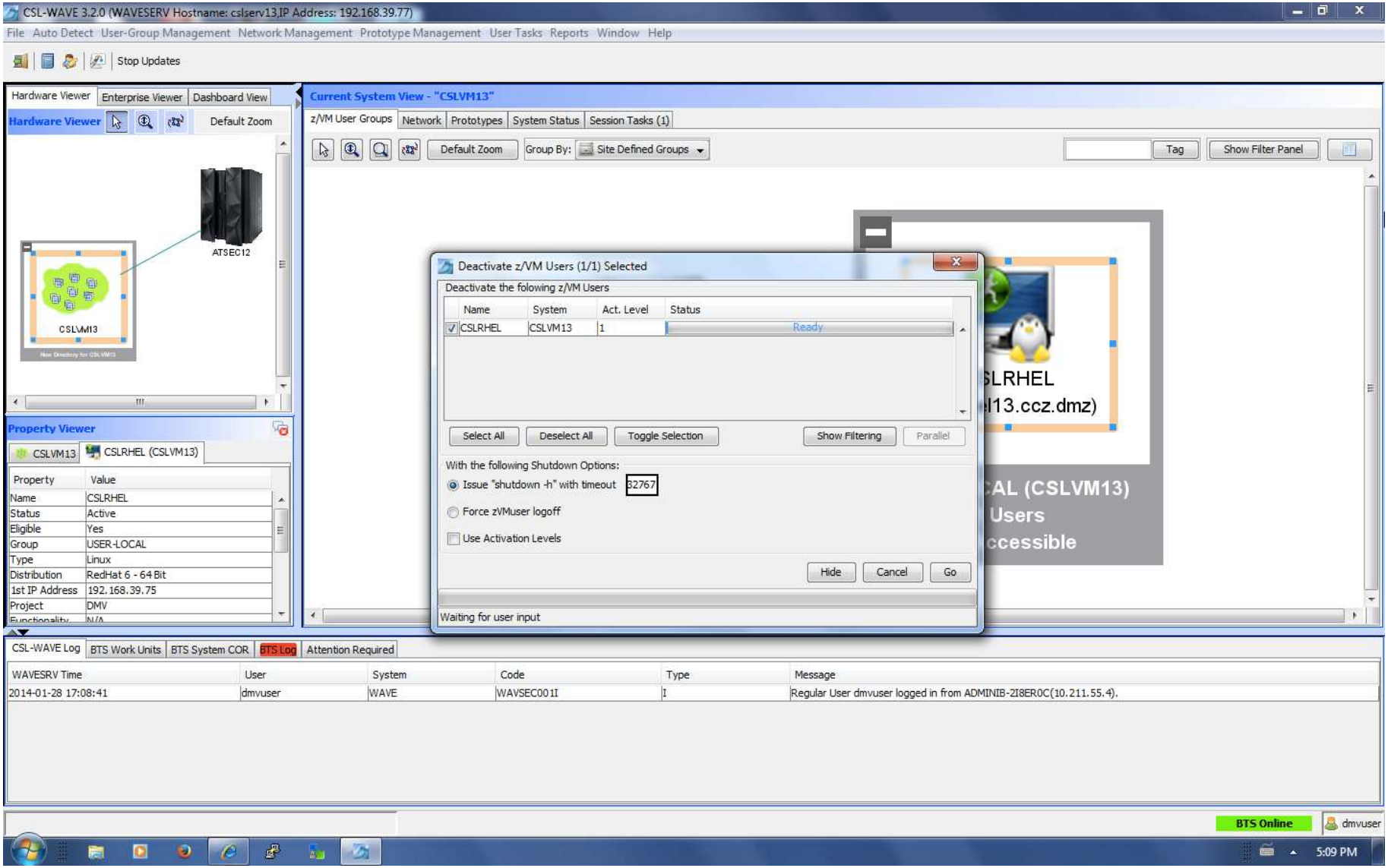

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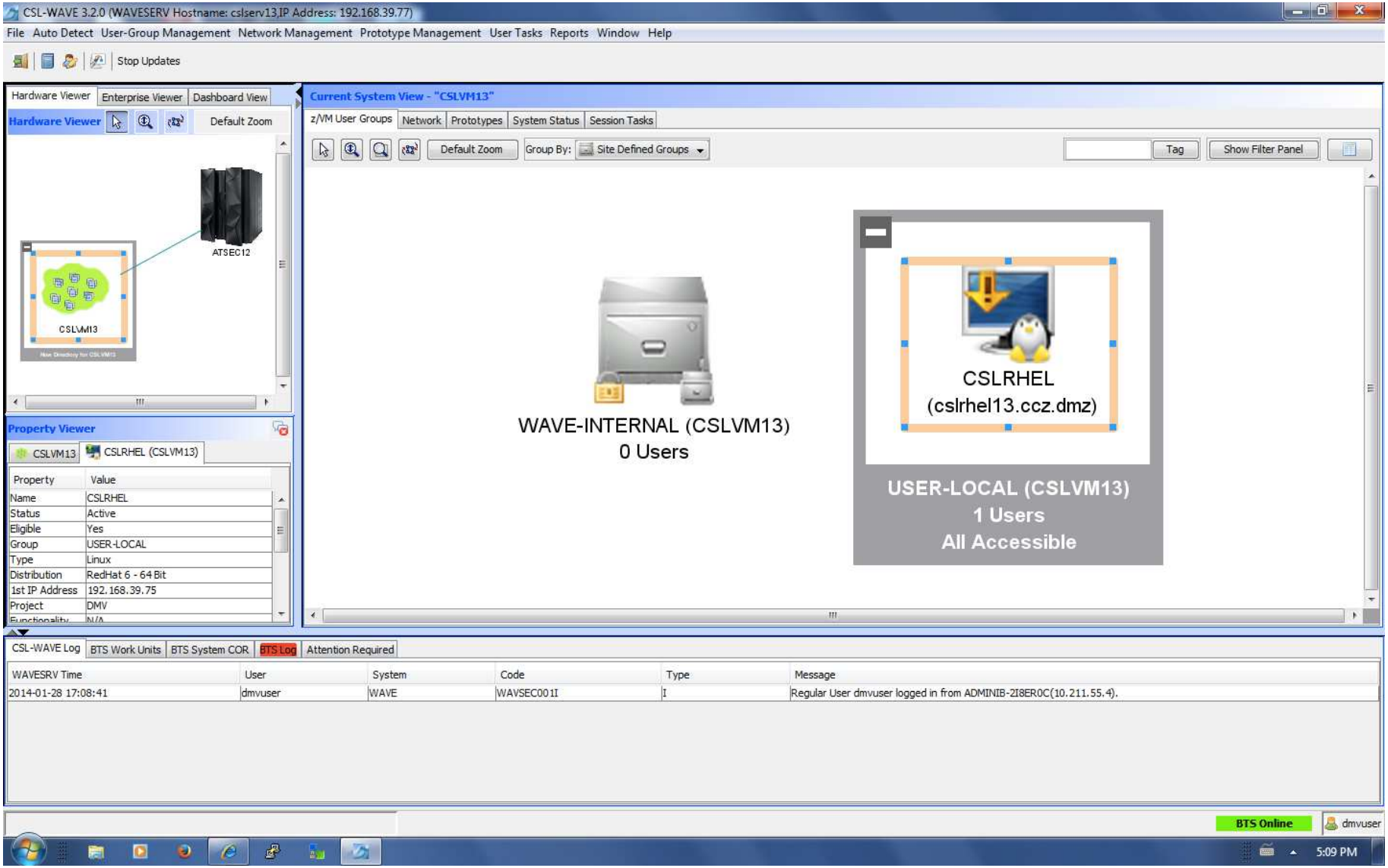

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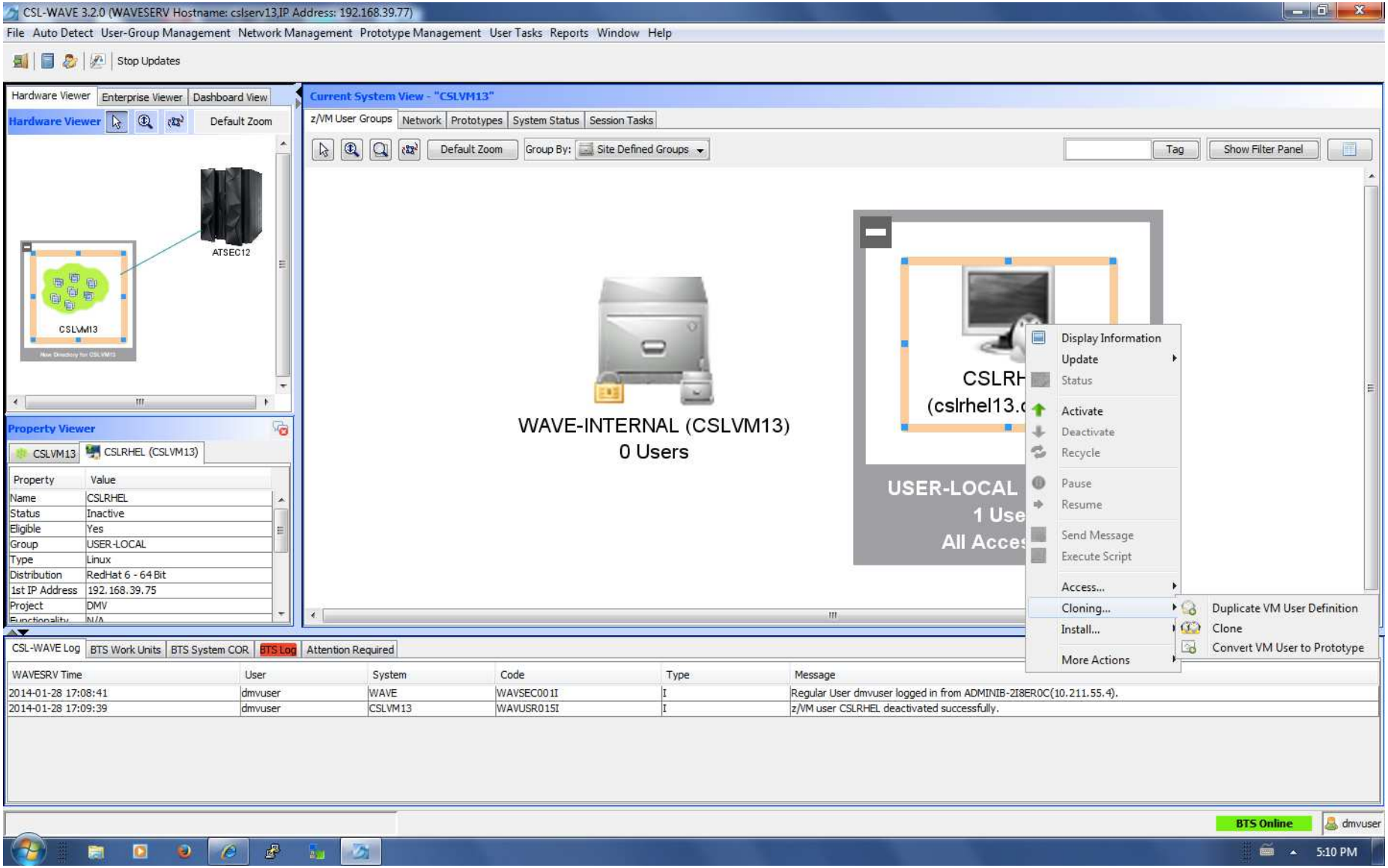

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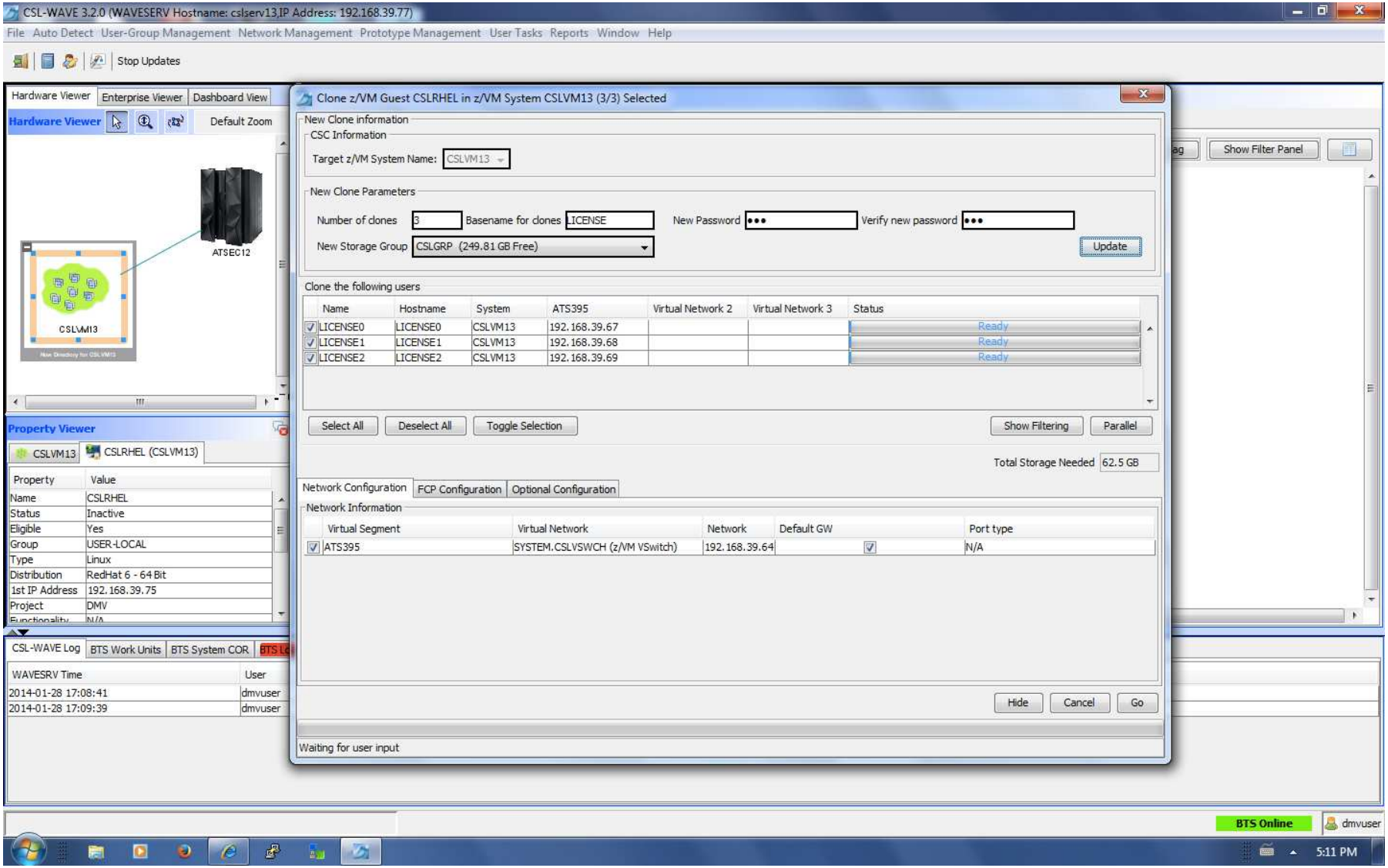

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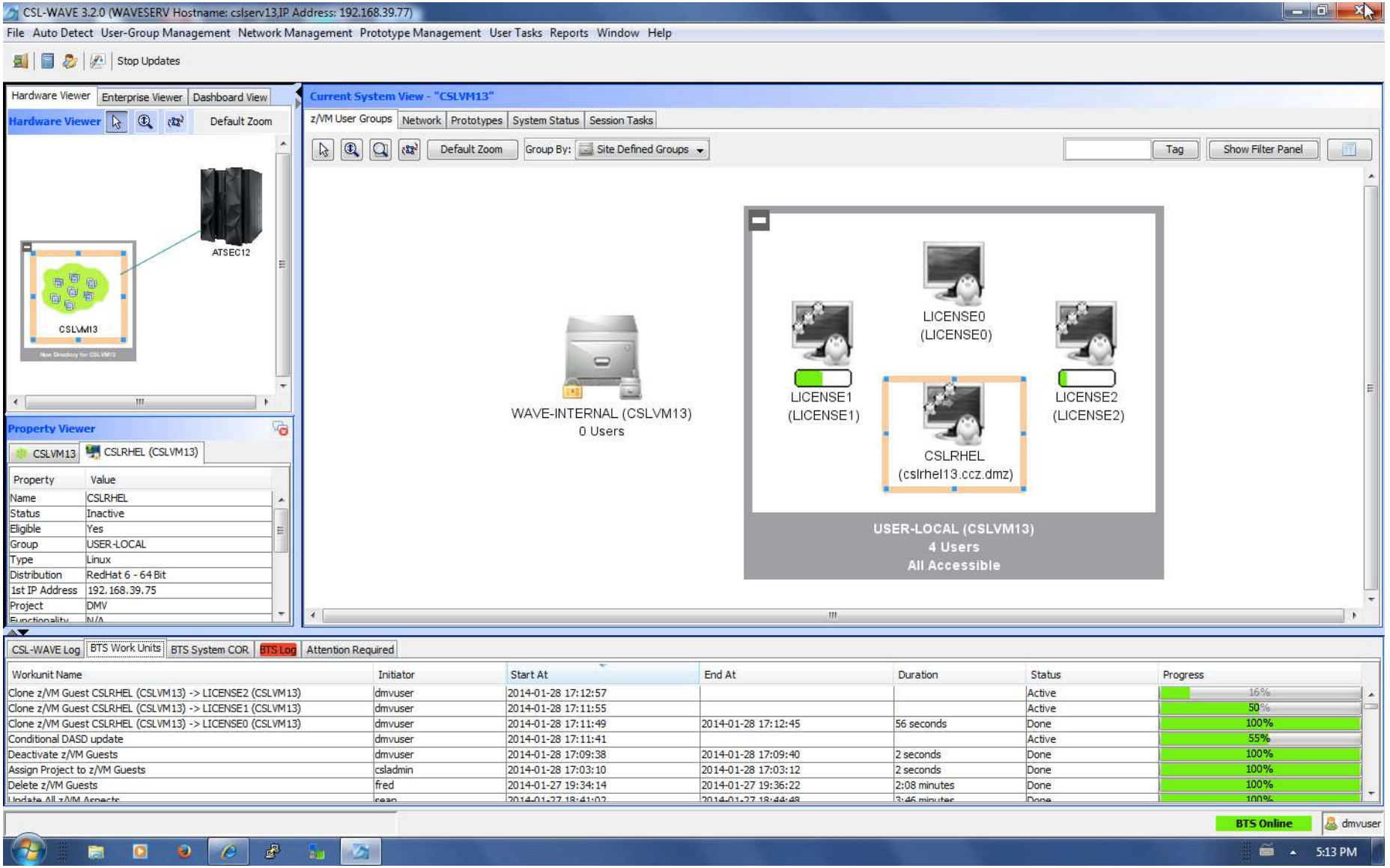

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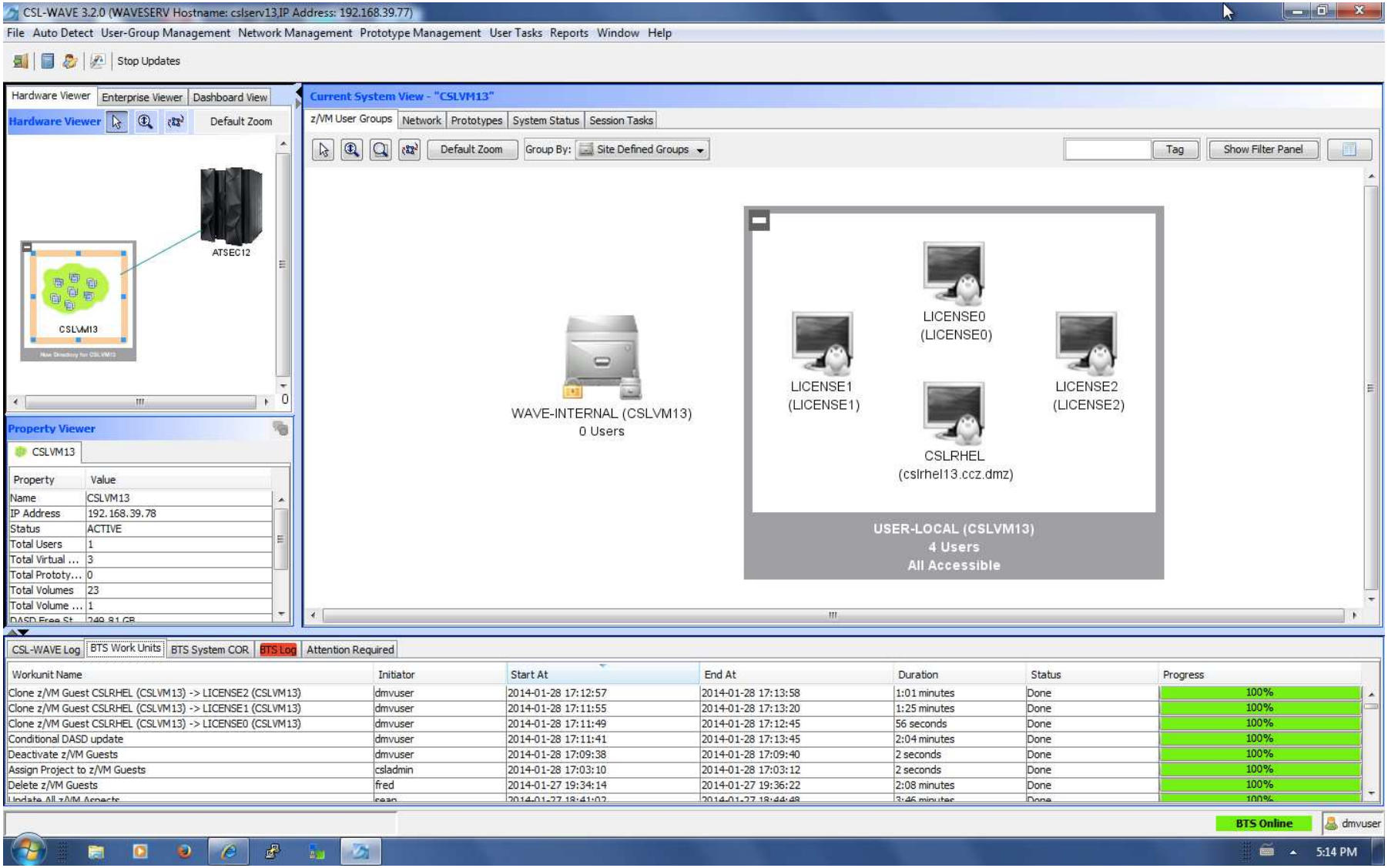

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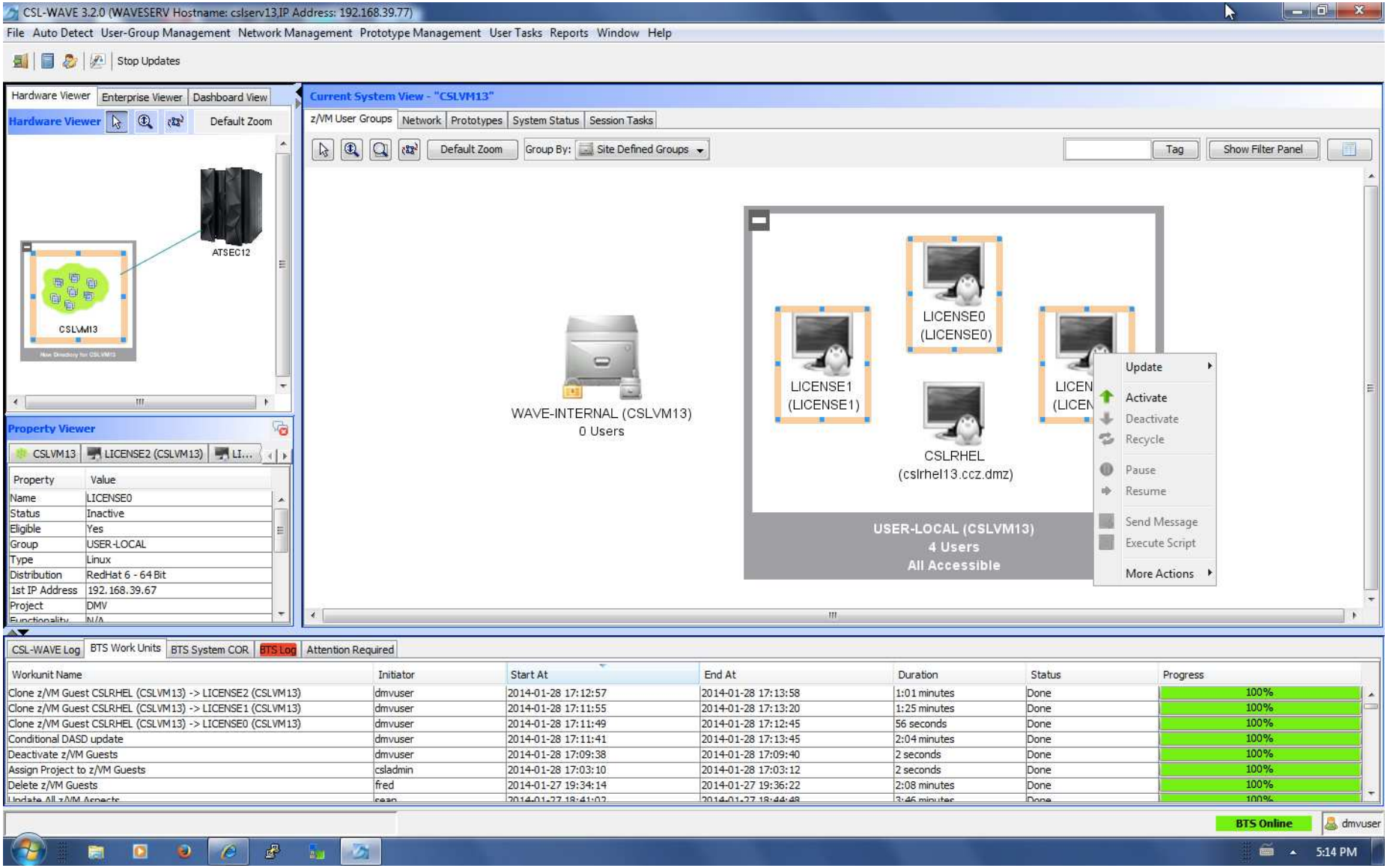

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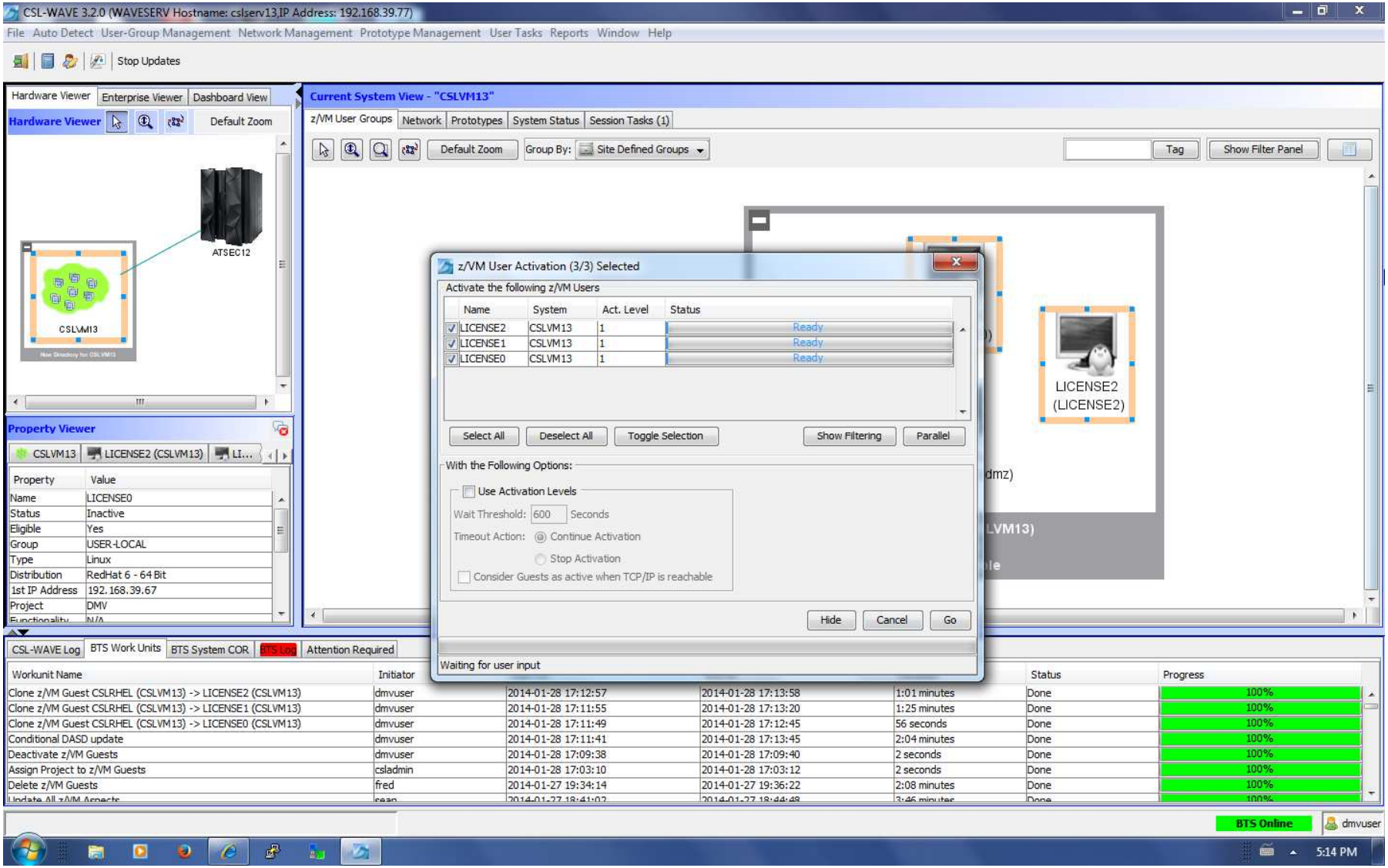

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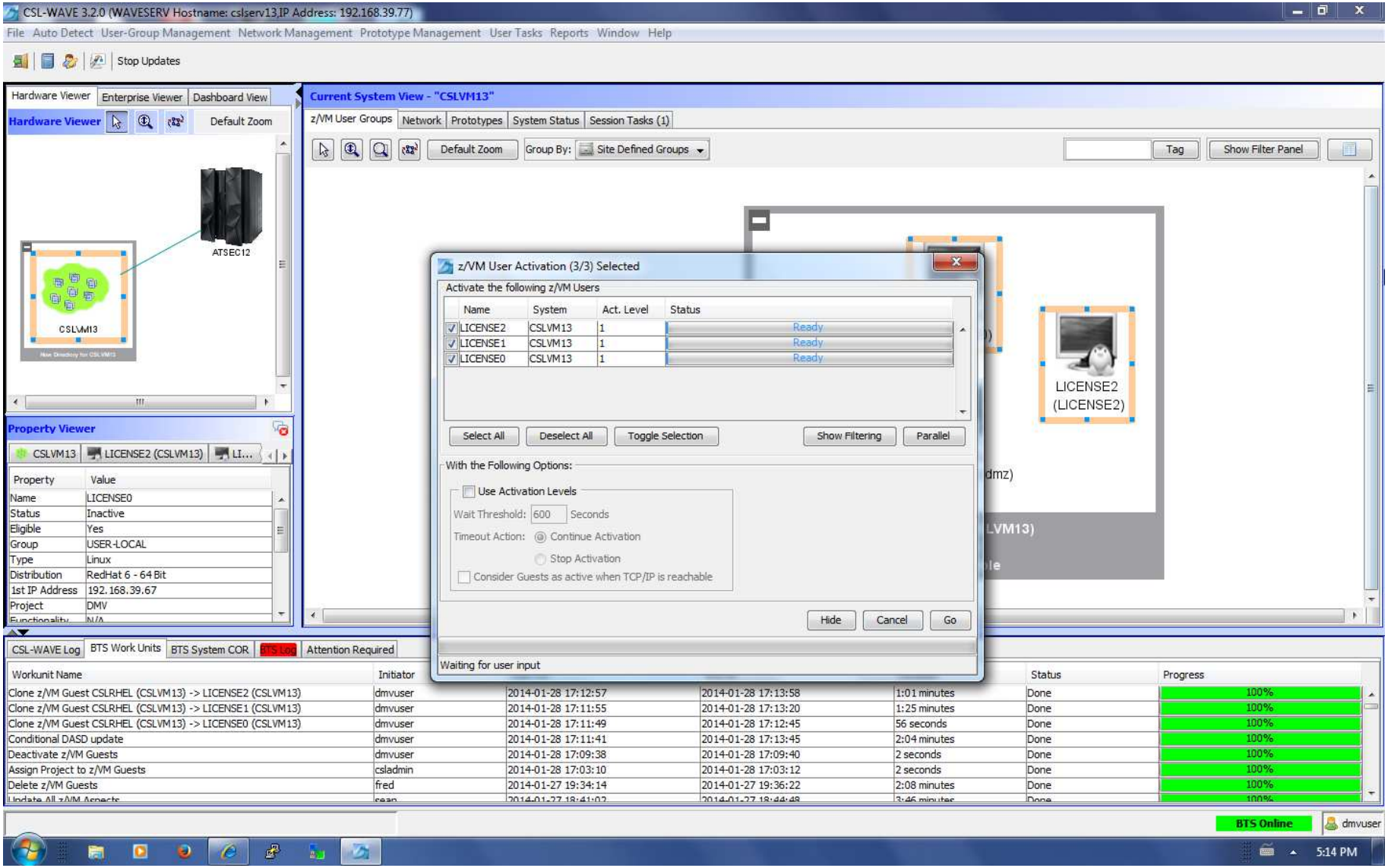

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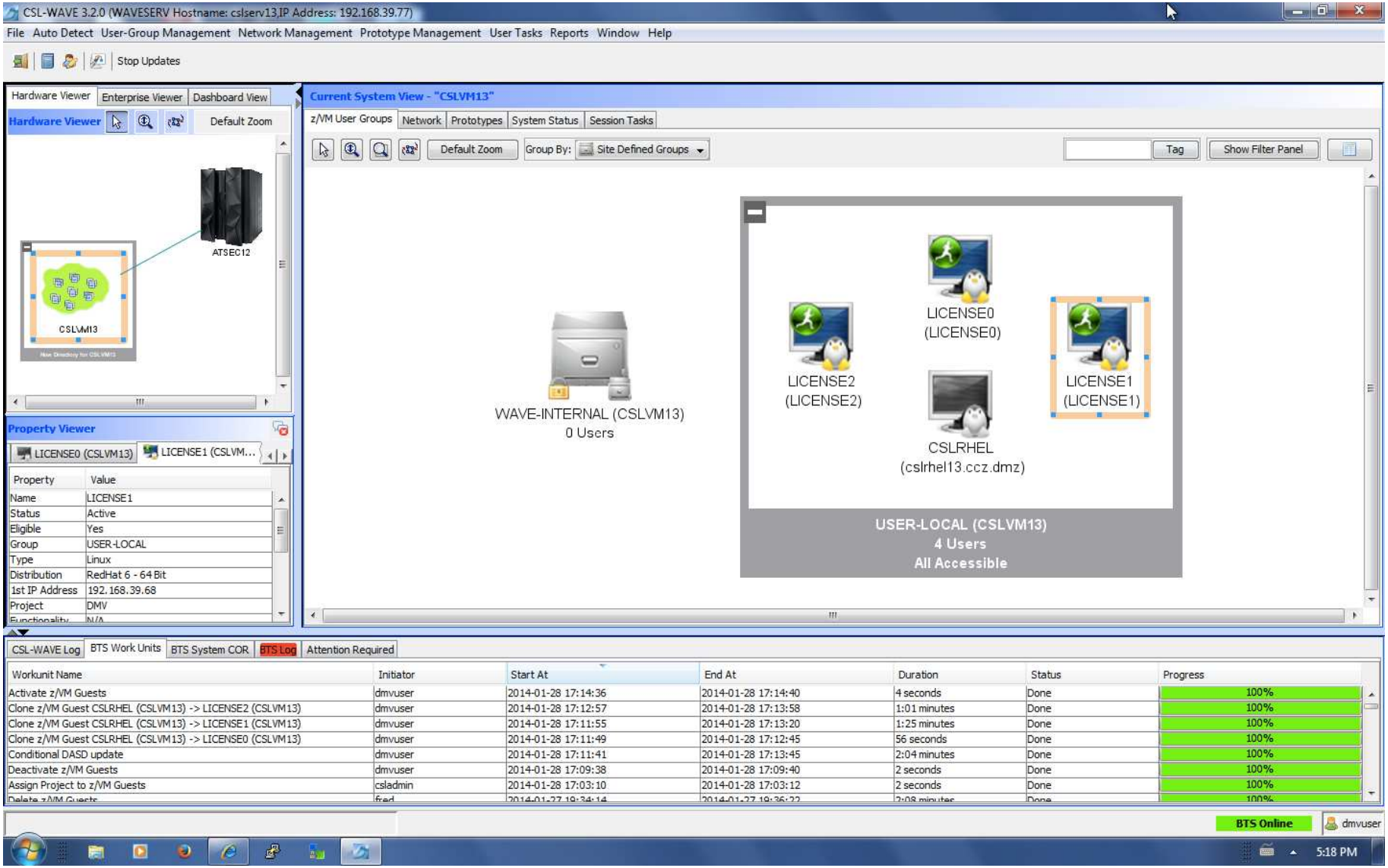

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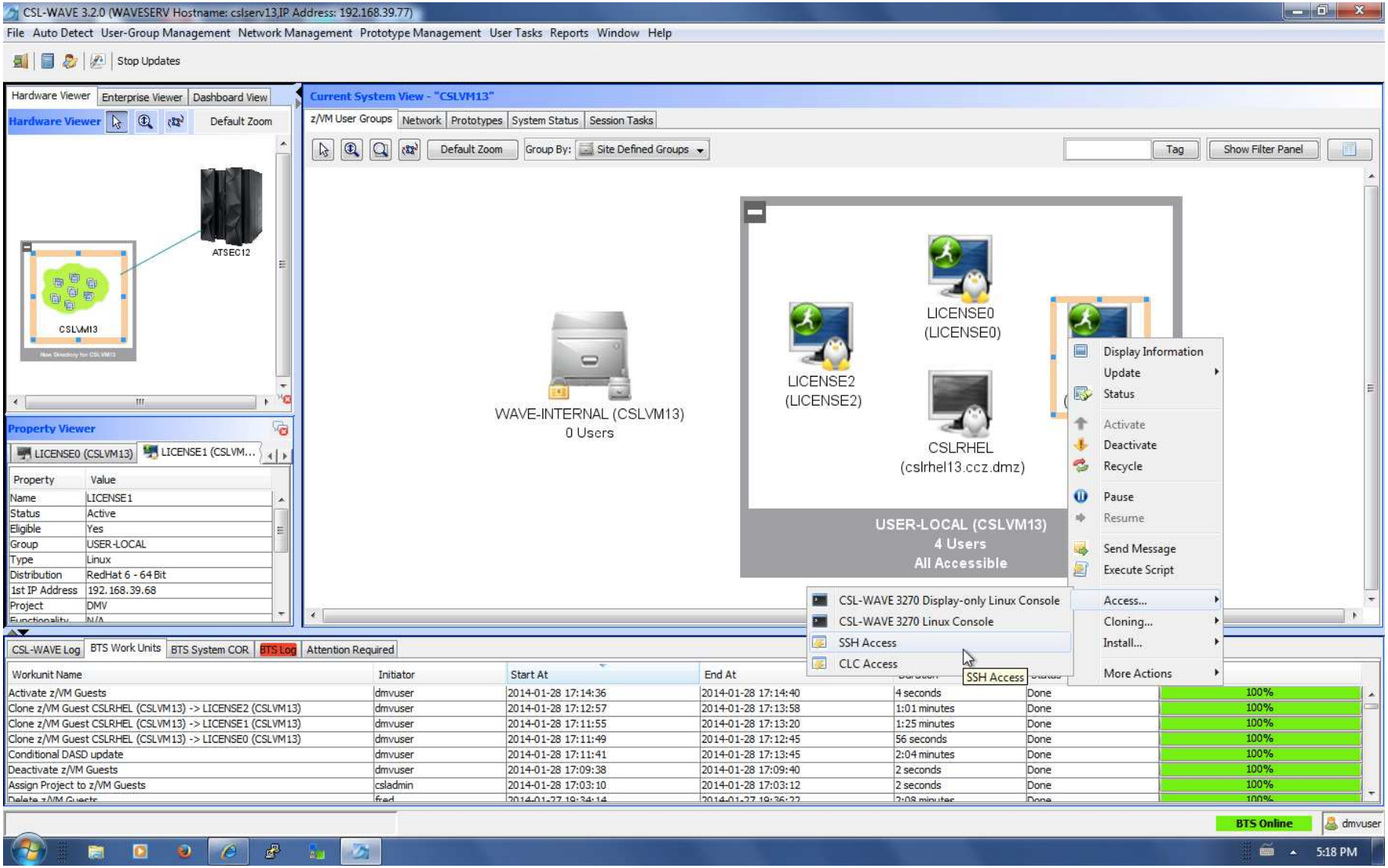

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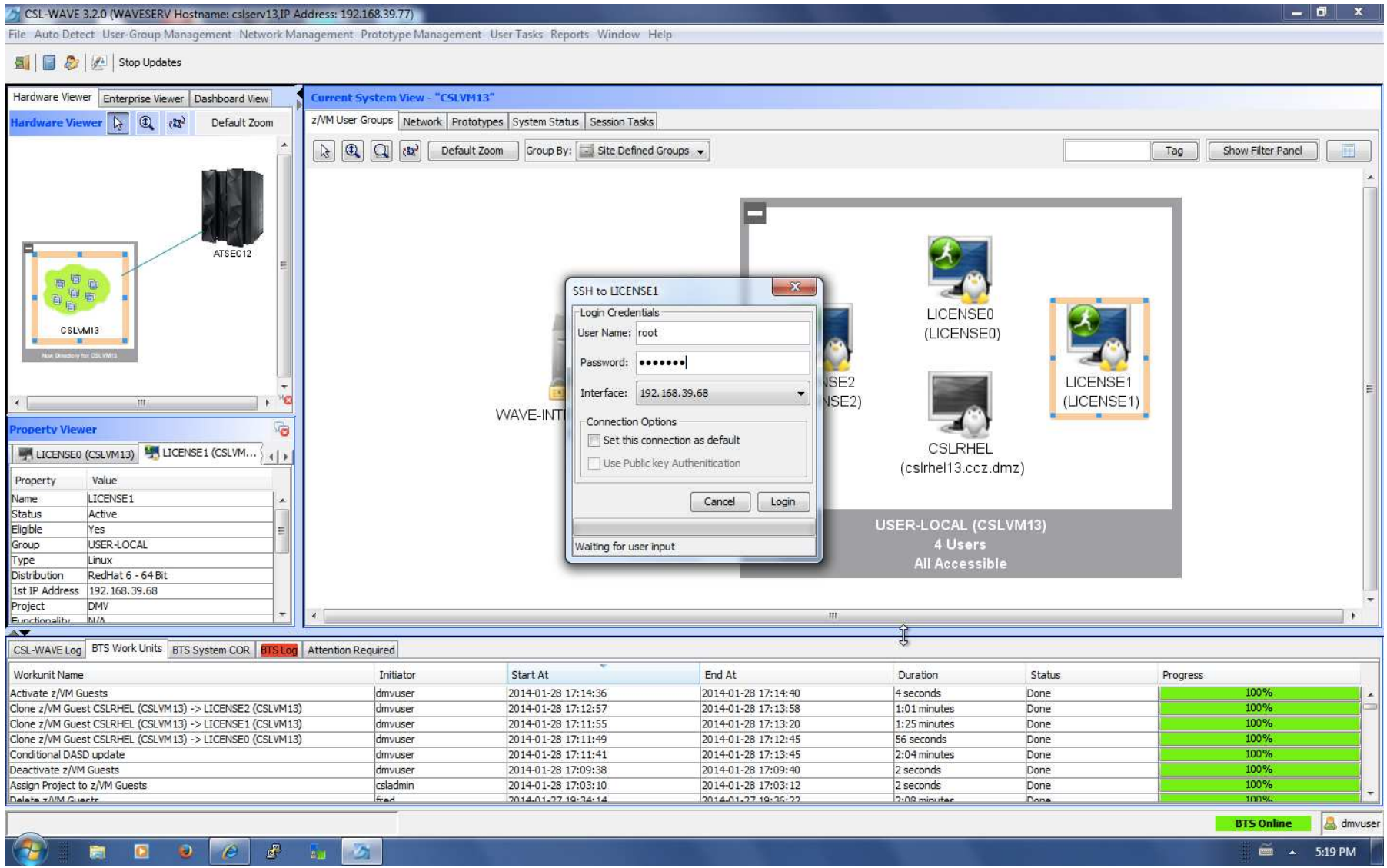

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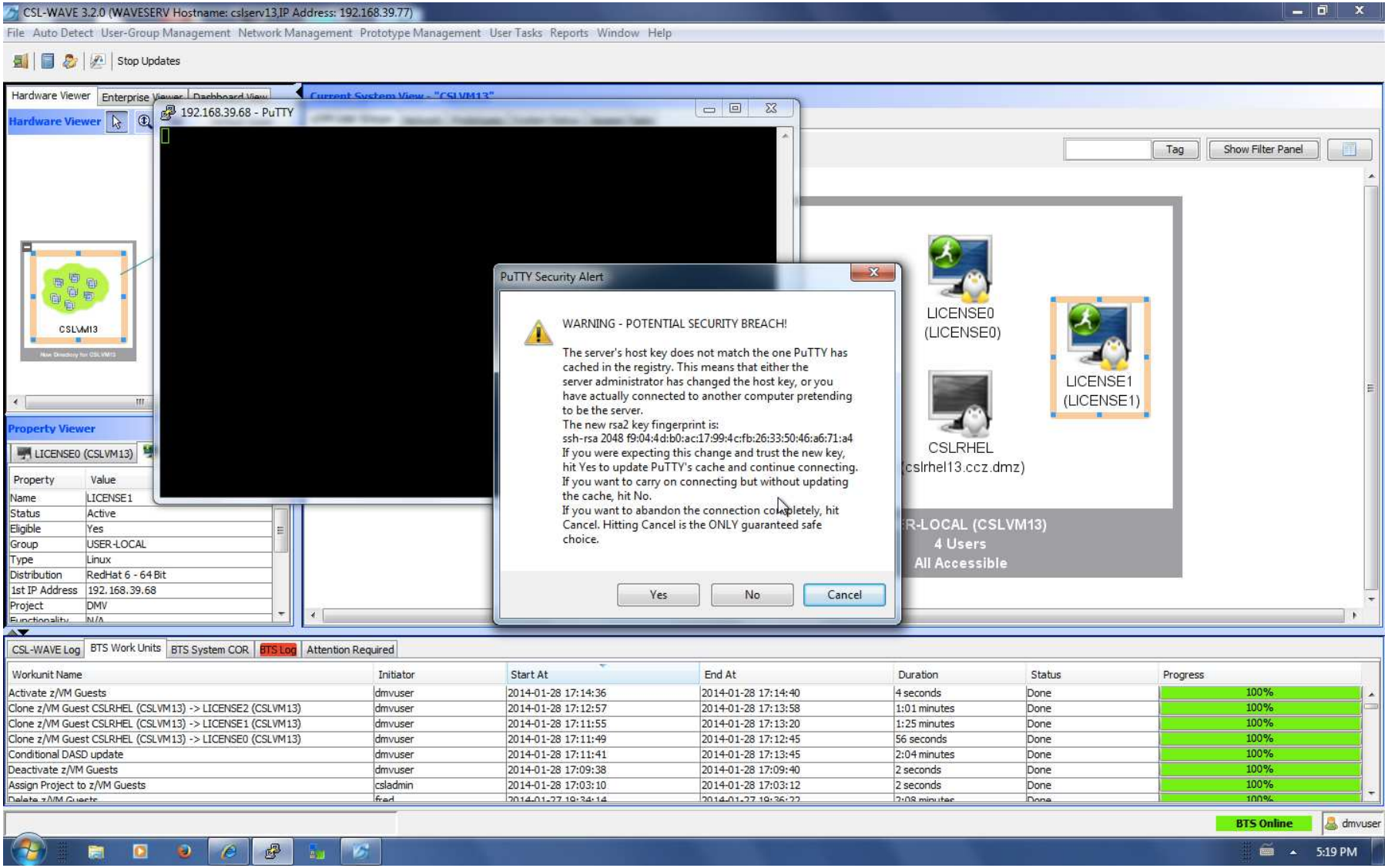

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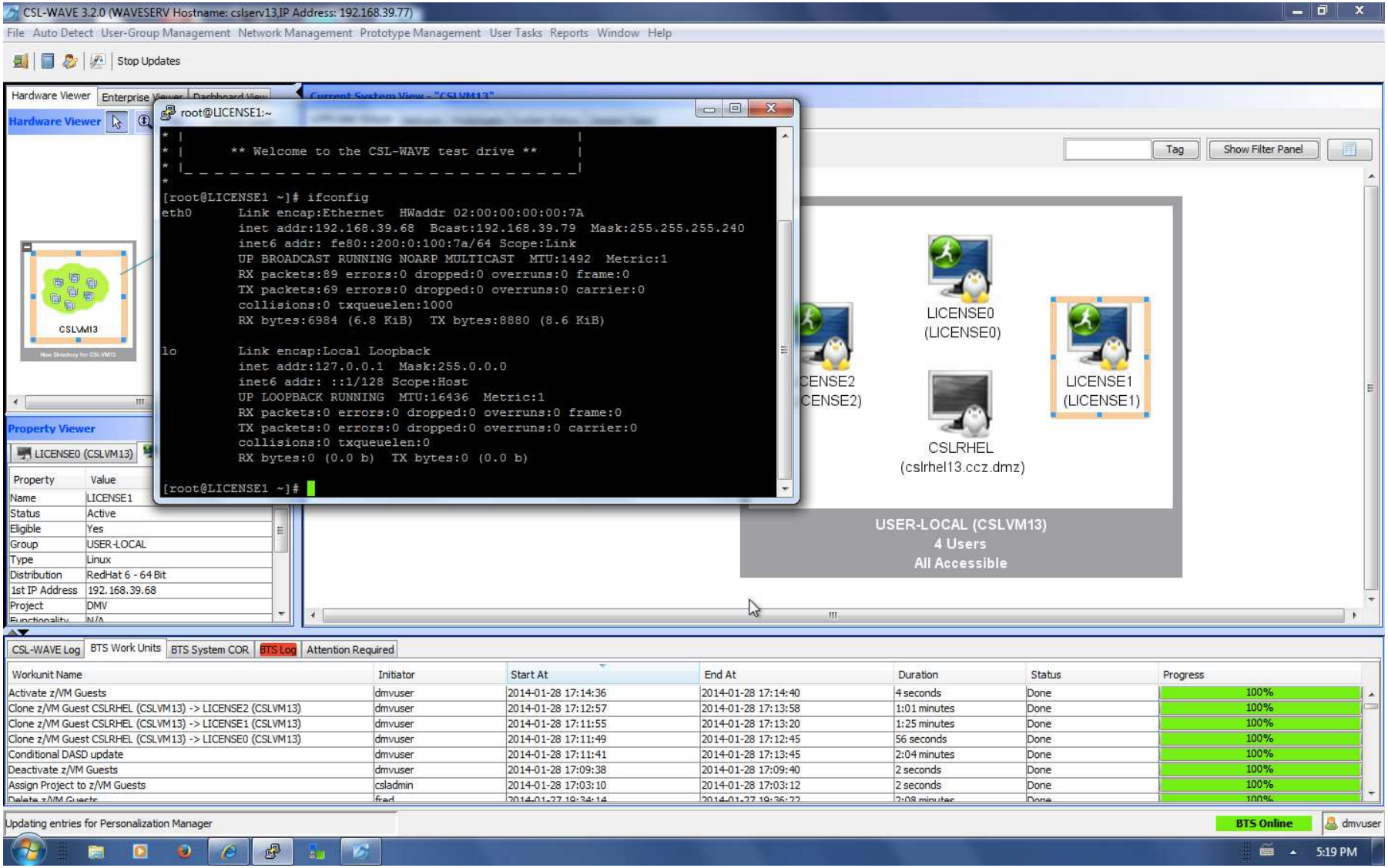

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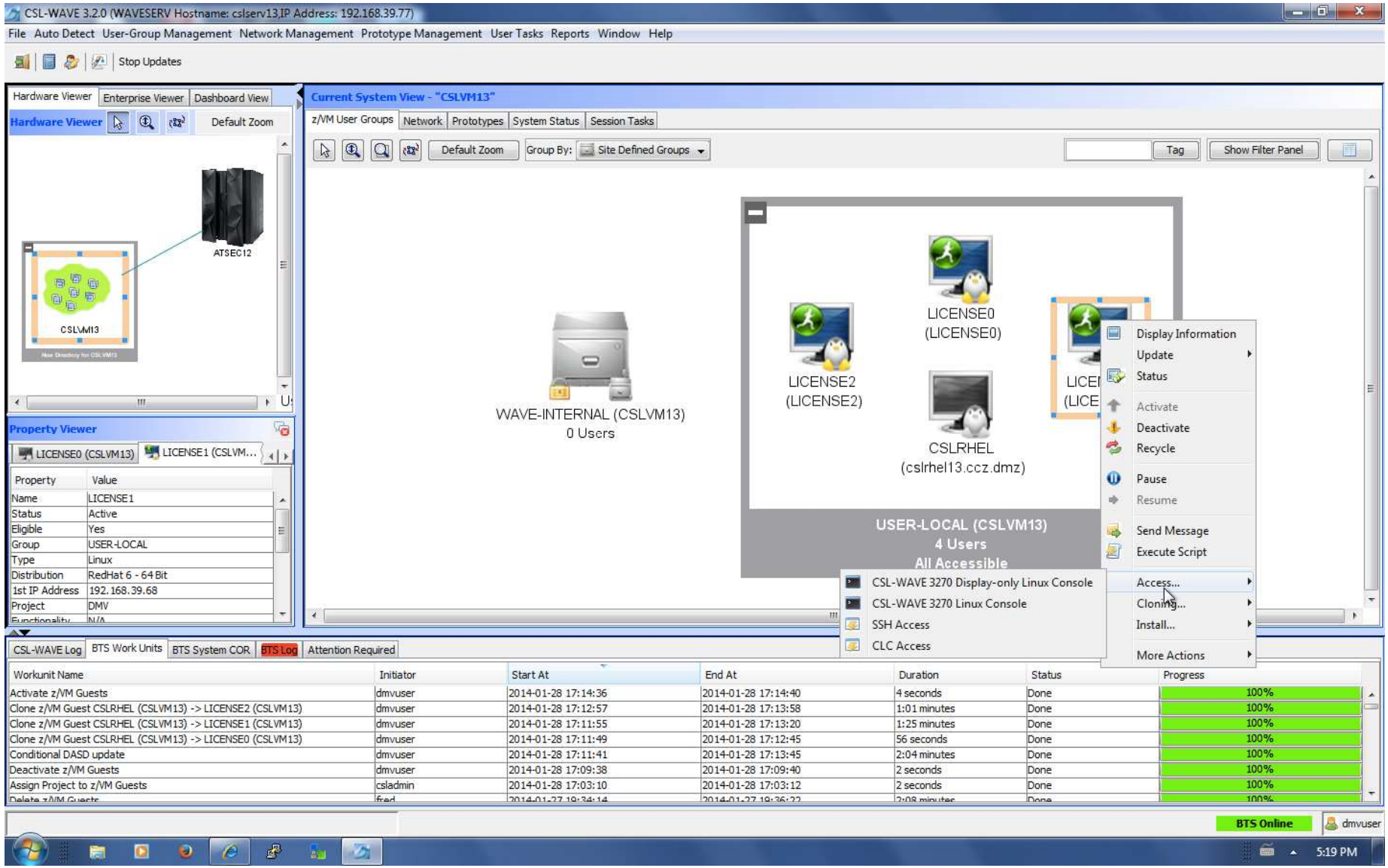

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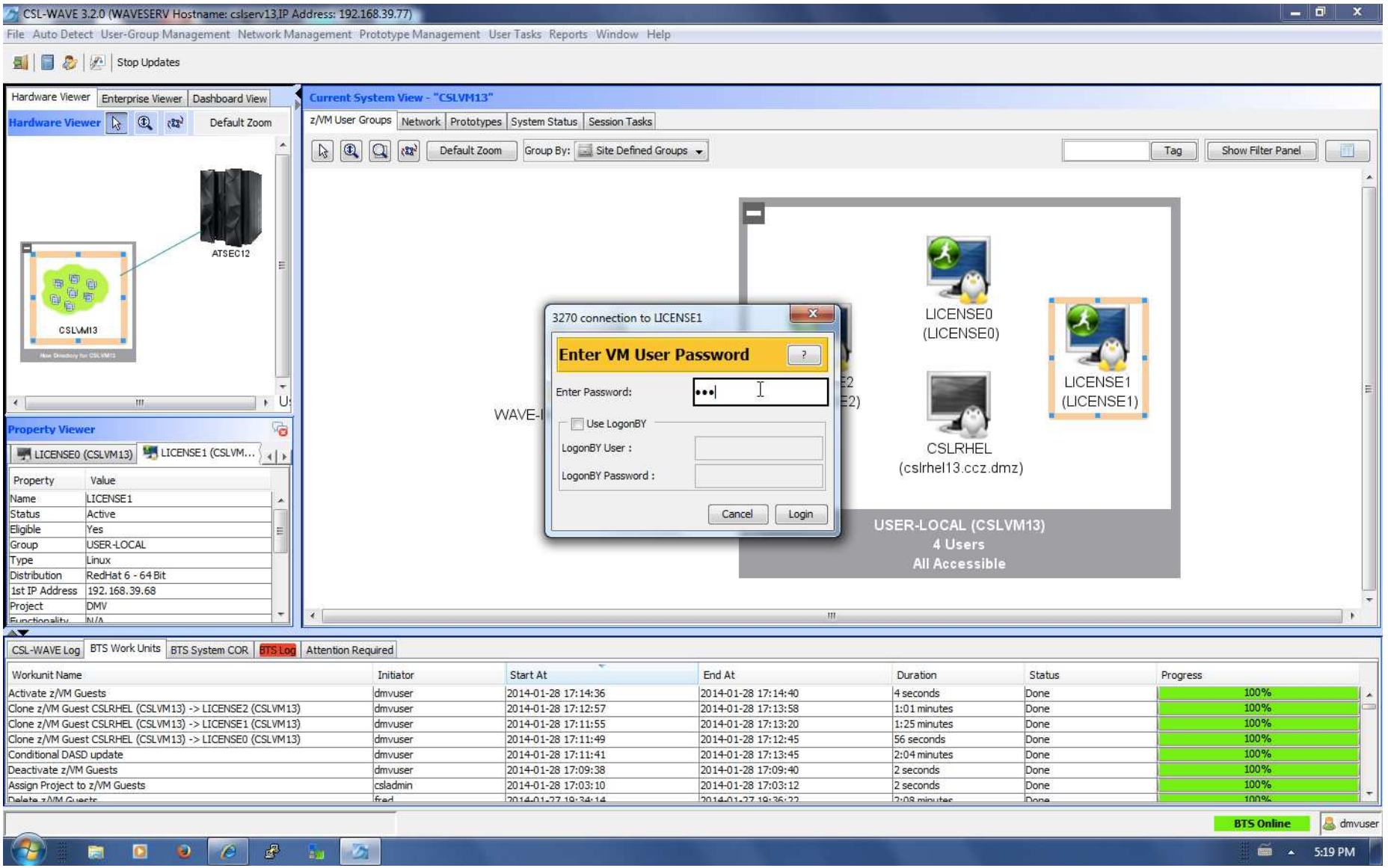

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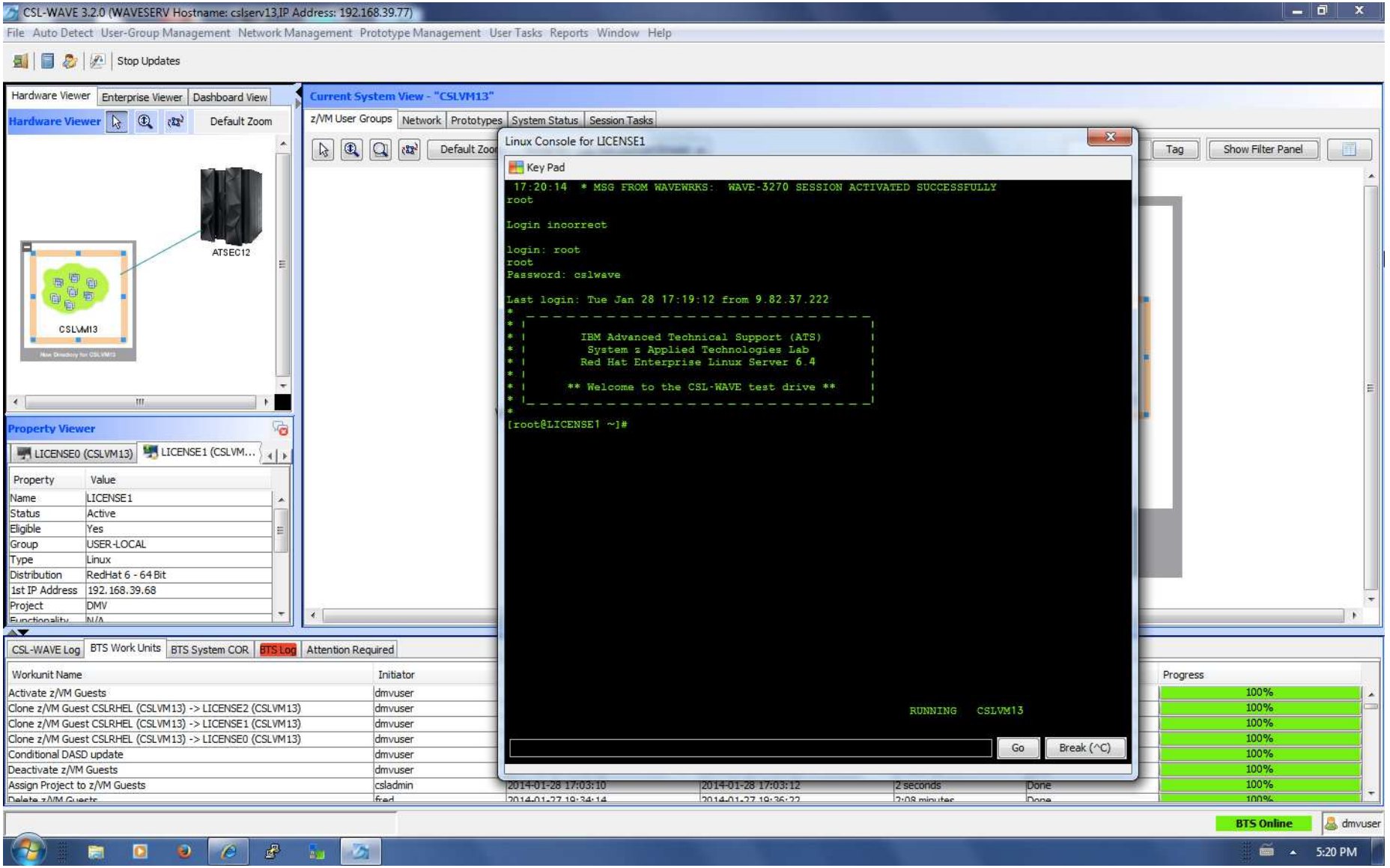

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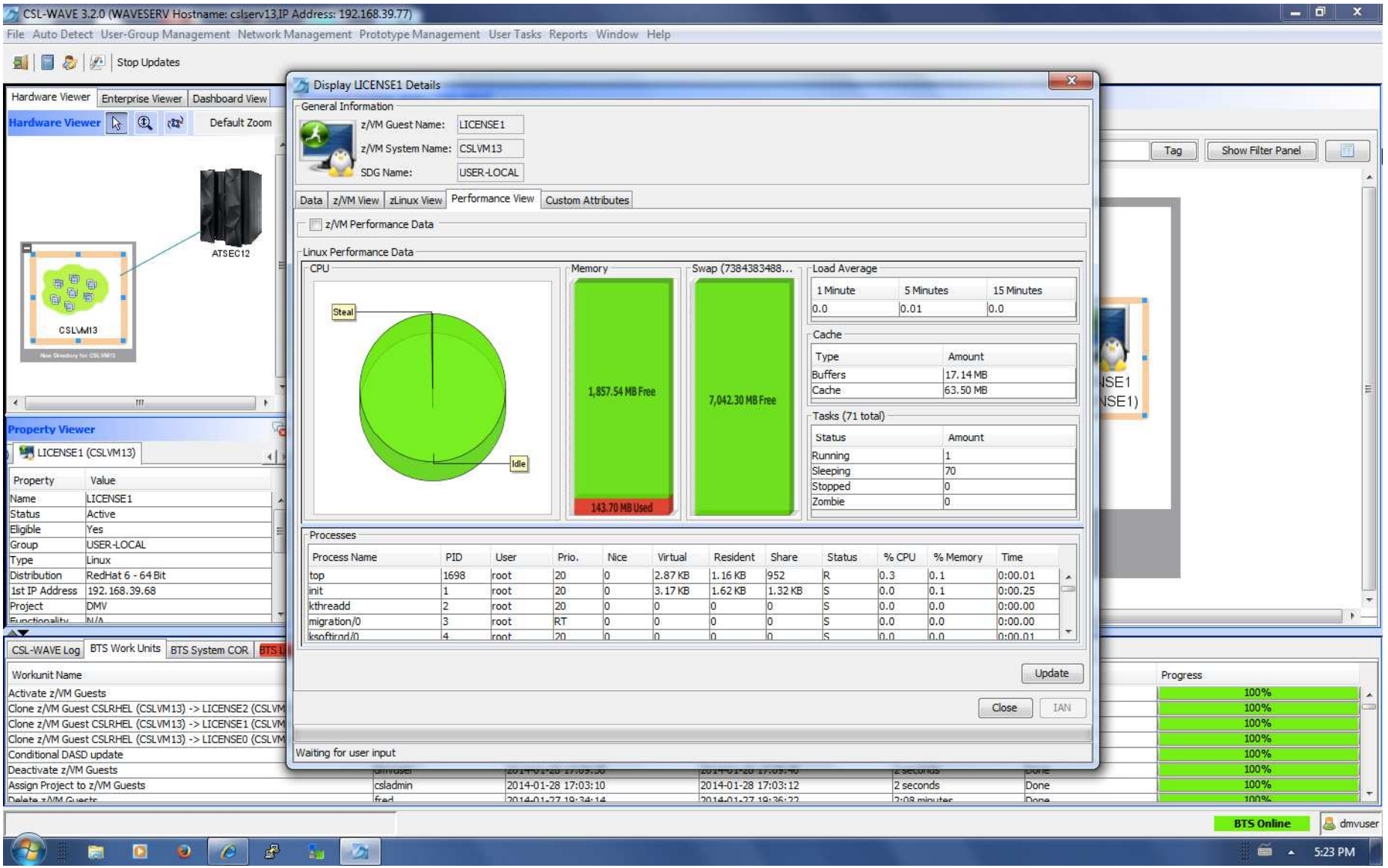

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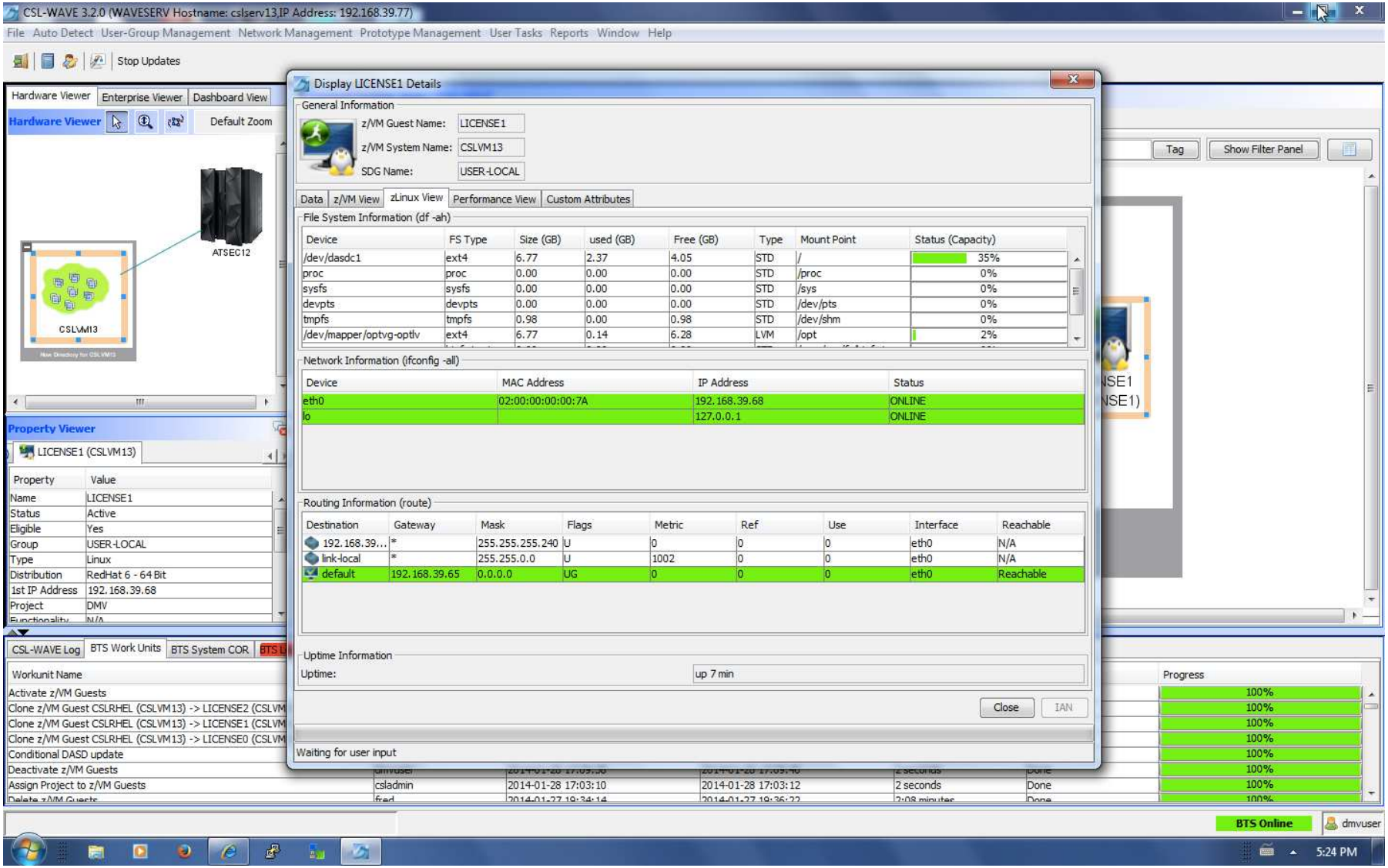

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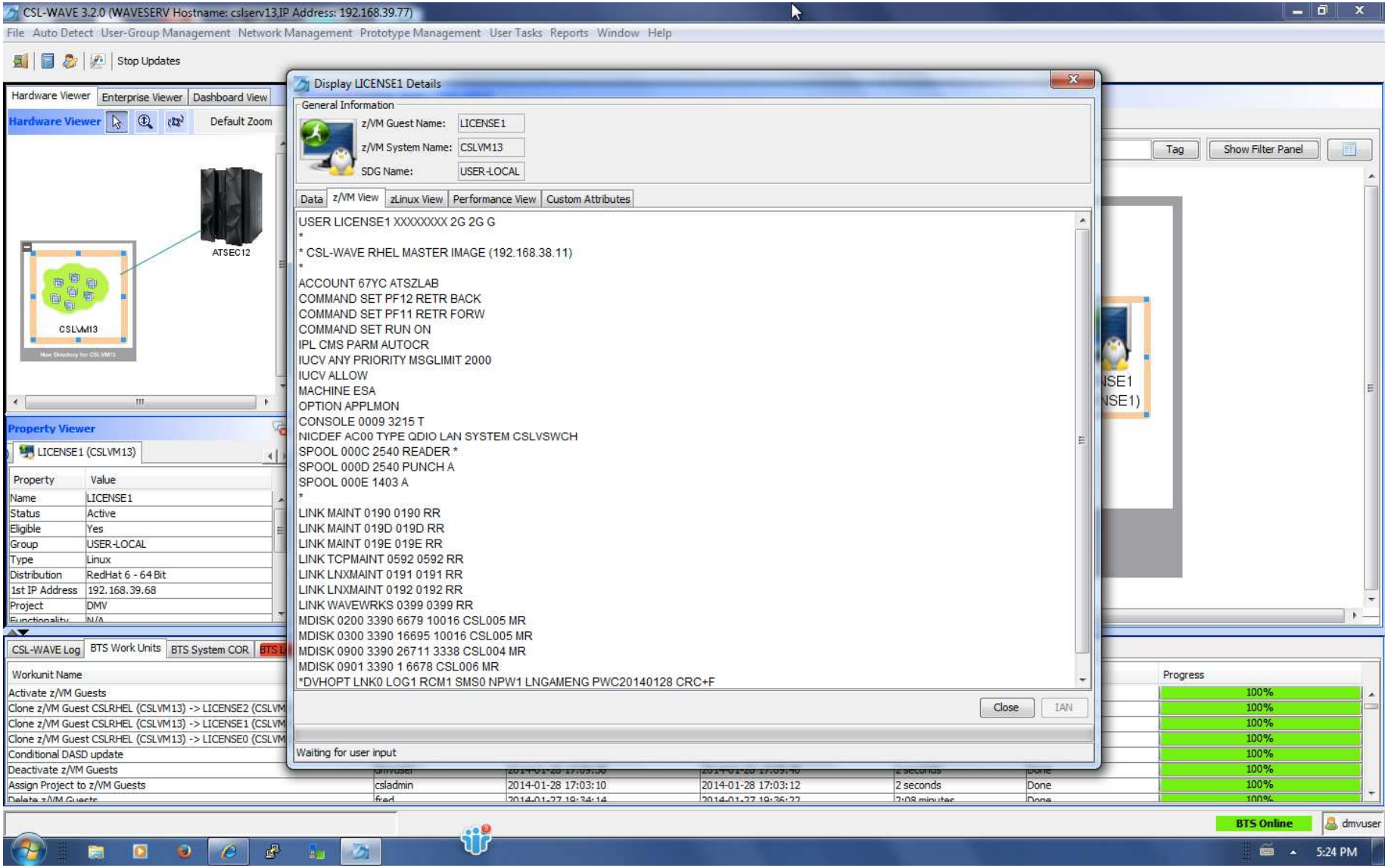

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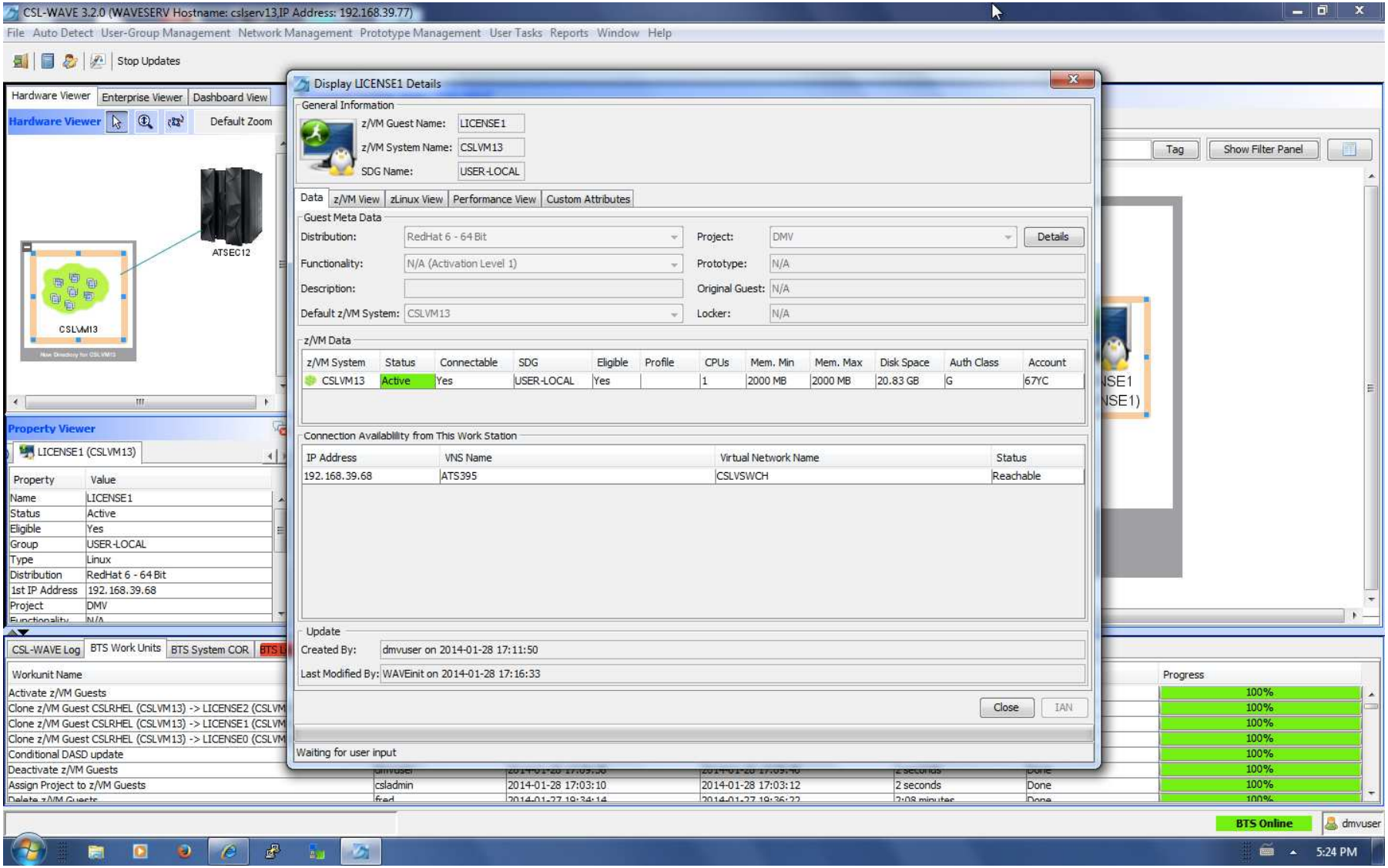

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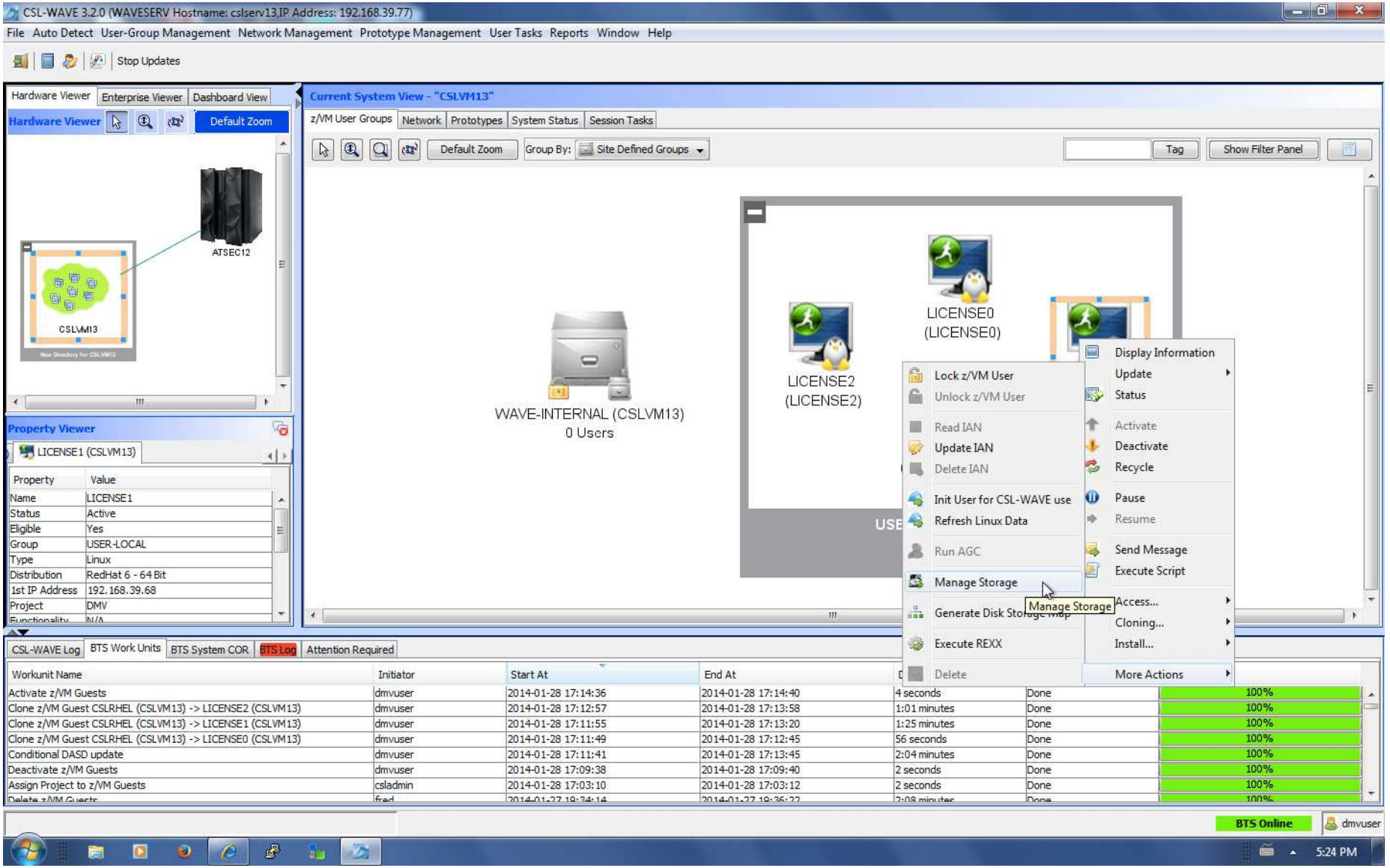

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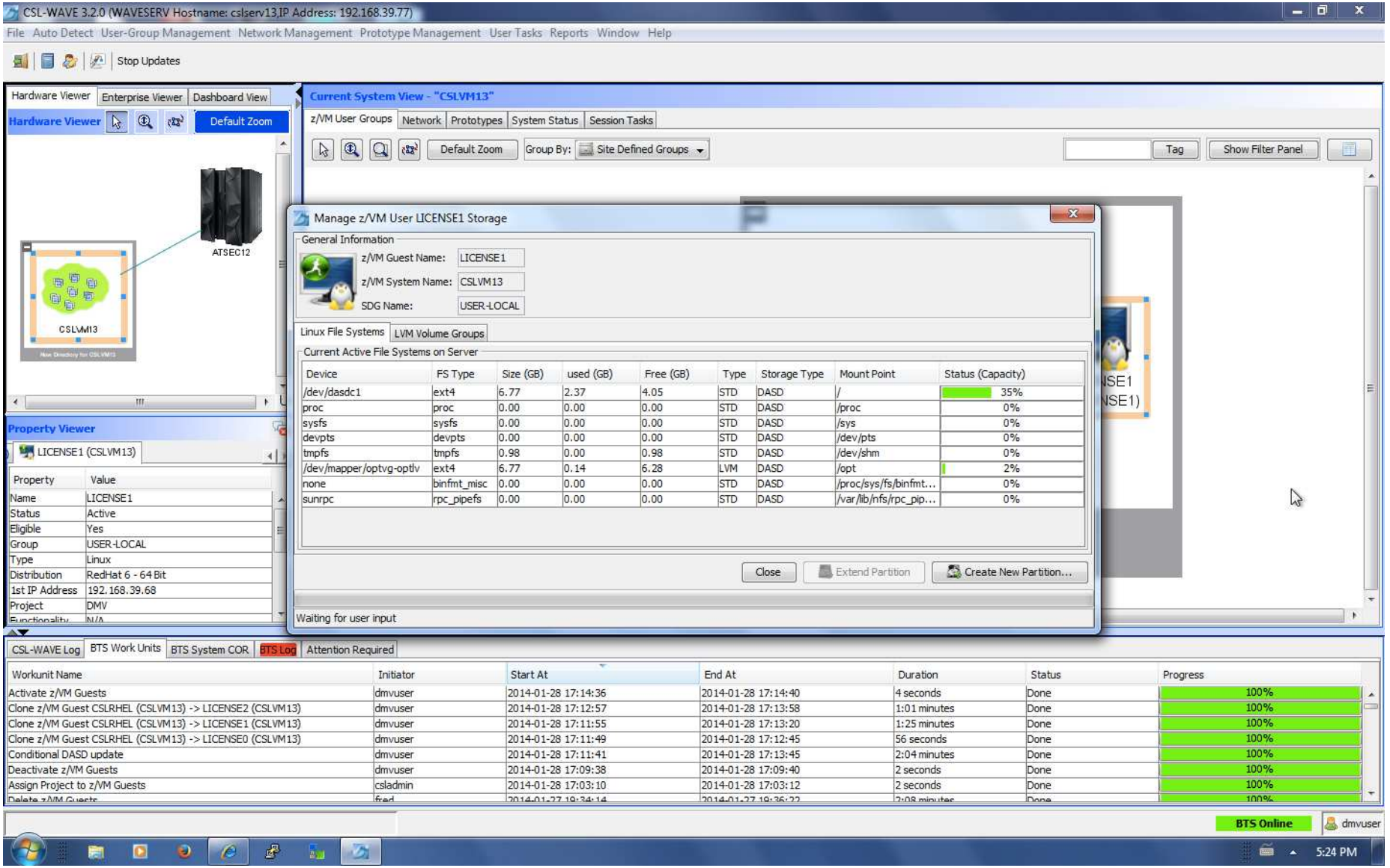

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IBM Wave for z/VM
Q&A

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Frequently Asked Questions

Q1: How does IBM Wave for z/VM fit in the System z portfolio?

A1: IBM Wave for z/VM provides the graphical interface that simplifies and helps to manage z/VM resources and provision Linux on System z virtual servers. It fully abstracts and visualizes virtual and physical resources to enable system programmers and system administrators to manage z/VM environments.

Q2: How do Cloud and Smarter Infrastructure (Tivoli) products complement IBM Wave for z/VM?

A2: IBM Wave for z/VM interacts with z/VM and Linux guest virtual machines. There are no programming interfaces between IBM Wave for z/VM and Tivoli products at this time. However, to the extent that other products affect the environment, IBM Wave for z/VM will detect and adapt to those changes dynamically. For example, if Tivoli Provisioning Manager creates and provisions a new virtual machine, IBM Wave for z/VM will automatically detect that virtual machine and allow it to be managed. In general, IBM Wave for z/VM fills a gap that Tivoli products do not address, rounding out the suite of systems management tools available for z/VM from IBM. The Tivoli product portfolio provides complementary monitoring, automation and orchestration capabilities that further enhance the z/VM and Linux environments managed by IBM Wave for z/VM.

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Frequently Asked Questions *(cont.)*

Q3: What is the positioning of IBM Wave for z/VM with xCAT and OpenStack?

A3: IBM Wave for z/VM enables system programmers and system administrators to manage z/VM environments using an intuitive graphical user interface. For many clients, it may offer a complete solution and eliminate the need to implement additional capabilities. xCAT enables clients to create a rudimentary z/VM-based cloud environment. As an open source tool, it may be enhanced by community development over time. OpenStack is an open source effort that is the basis of IBM's cloud strategy and will provide the foundation for future cloud offerings from IBM. At this time there is no upgrade path to an environment based on OpenStack from either IBM Wave for z/VM or xCAT.

Q4: What is the positioning of IBM Wave for z/VM with Omegamon XE on z/VM and Linux?

A4: Both IBM Wave for z/VM and Omegamon XE on z/VM and Linux provide real-time monitoring of virtual server (z/VM) resources. But with Omegamon XE on z/VM and Linux, you have the ability to get additional performance metrics from each individual Linux guest environment and a historical view of all monitoring data. IBM Wave for z/VM is not a substitute for Omegamon XE on z/VM and Linux and we expect customers to use both products in their environment. In addition, Omegamon XE on z/VM and Linux is part of the overall IBM Tivoli Monitoring and OMEGAMON infrastructure - allowing you to monitor performance of servers and systems on multiple platforms throughout your enterprise.

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Frequently Asked Questions *(cont.)*

Q5: Is IBM Wave for z/VM mutually exclusive with the SmartCloud suite of products that provide cloud management software?

A5: No, we envision both to be used in customer environments. IBM Wave for z/VM provides virtualization management which would be used by the system programming and system administration staff to manage the z/VM environment, as well as project managers and application developers. The SmartCloud suite of products (SmartCloud Entry, SmartCloud Provisioning, SmartCloud Orchestrator) would be used by cloud administrators and end-users to provide cloud management and allow end-users to deploy workloads in their cloud environment.

Q6: What is the difference between virtualization management and cloud management?

A6: Virtualization management focuses on managing the entire pool of virtualized resources including operational oversight, monitoring, usability and availability through a single application management console. This is also known as hypervisor management. Cloud management on the other hand, focuses on providing capabilities to deploy and manage a cloud environment in a virtualized infrastructure. These capabilities include automated self-service provisioning and deprovisioning of system resources (server, storage, network) for workload deployment and visibility to performance metrics of these virtual machines. Advanced capabilities include workflow orchestration to manage the process for usage approvals and track resource utilization for billing and metering.

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Thank You!

IBM System z Tiger Team:

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