# Z / hp

## TECHNICAL WHITE PAPER

# HP CENTRALIZED WORKSTATIONS OVERVIEW AND SETUP GUIDE

## THIS DOCUMENT DESCRIBES RECOMMENDED PRACTICES TO ADMINISTER HP CENTRALIZED WORKSTATIONS.

## CENTRALIZED COMPUTING

In certain environments it may be desirable to move desktop workstations into a central location away from the desks of individual users. Motivations for centralizing systems include limited space, power and cooling requirements, closer proximity to central storage, data security policies or frequent desk moves. This document describes how to configure an environment to use centralized workstations.

## CONTENTS & NAVIGATION

## HARDWARE COMPONENTS OF A CENTRALIZED WORKSTATION ENVIRONMENT
Hardware



**Figure 1.** Traditional workstation

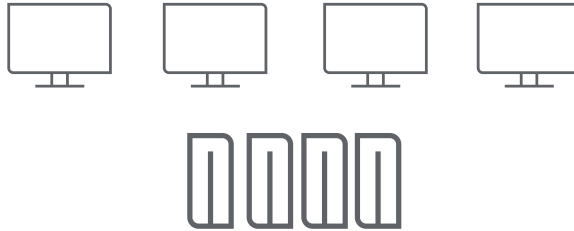Traditionally, a desktop workstation resides at each users' desk.



**Figure 2.** Centralized Workstation environment

In a centralized workstation environment, the users are separated from their workstations. The high-performance workstation computers with important data and applications reside in a central location while the users sit at a client device such as a thin client, laptop or general-purpose PC. A network connects the workstation with the client device in a one to one relationship.

### CLIENT SYSTEMS
Each user will generally have one client system to connect to a workstation unit in the centralized location. The client may be a thin client, notebook computer, or another desktop. The client may run Windows, Linux or MacOS.

### CENTRALIZED WORKSTATIONS
The centralized workstations may be racked, placed on the floor, or on shelves. They can be in closets, server rooms, stacked at the end of the aisle or even in an off-site data center. Generally, the Workstations will not have displays, keyboards, or mice attached.

### RACKED WORKSTATIONS
HP offers rack kits for every desktop Z Workstation.
A White Paper for racking HP Workstations is available here: http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA7-1800ENW.pdf

| Workstation | Size | Rack Kit | Rack Mount Bracket Kit |
|---|---|---|---|
| HP Z2 Mini G3/G4 | 7 units in 5U | 2HW42AA HP Z2/Z4/Z6 Depth Adjustable Fixed Rail Rack Kit | 3RW67AA HP Mini Chassis ePSU Rack Bracket Kit |
| HP Z2 Tower G4 HP Z4 G4 HP Z6 G4 | 4U | 2HW42AA HP Z2/Z4/Z6 Depth Adjustable Fixed Rail Rack Kit | n/a |
| HP Z240 Tower HP Z440 | 4U | WH340AA HP Z2/Z4 Depth Adjust Fixed Rail Rack Kit | n/a |
| HP Z640 | 4U | 2FZ77AA HP Z640/Z840/Z8G4 Rail Rack Kit | n/a |
| HP Z8 G4 | 5U | 2FZ77AA HP Z640/Z840/Z8G4 Rail Rack Kit  2FZ76AA HP Z8 Rack Rail Upgrade Kit | n/a |
| HP Z840 | 5U | 2FZ77AA HP Z640/Z840/Z8G4 Rail Rack Kit | n/a |

Note: All HP Rack Kits listed support IT and Broadcast Racks.

REMOTE SYSTEM ADMINISTRATION

The centralized workstations can be managed in the same way desktop workstations are managed. If the location of the centralized workstations presents a challenge, then remote manageability is an option.

The primary administration tasks for Centralized Workstations include:

| Task | Description | Suggested Tools |
|---|---|---|
| Remote OS and application deployment | Remotely install and update the operating system and applications | For Windows:<br>• Microsoft SCCM<br>• HP MIK plugin to SCCM<br><br>For Red Hat Enterprise Linux:<br><br>• Red Hat Kickstart |
| Remote BIOS configuration | Remotely modify BIOS settings | • HP MIK plugin to SCCM<br>• Intel SCS plugin to SCCM<br>• MeshCommander |
| Remote power control | Power systems on and off; reboot | • Intel AMT web-interface<br>• Leostream Connection Broker |
| Auto reboot after OS errors/freezes | Set up systems so they reboot after catastrophic OS errors (e.g. "blue screens" on Windows). Because systems are not within a user's reach, it is helpful to reboot after catastrophic errors | OS configuration options |
| Connecting to full GUI of central workstation after OS load. | Remotely view and control the central workstation after the OS has booted. Allows full admin access with admin credentials | • HP Remote Graphics Software<br>• Microsoft Remote Desktop |
| Managing Connections between users and systems | Assign users to systems.<br>Assignments may be:<br>• One-to-one, that is, one user always connects to the same central workstation<br>• One to pool, that is, one user will be assigned a system from a pool of systems. This allows users to share systems, although not simultaneously.<br><br>Note: It is possible to have fewer central workstations than users. This can make it easier to provide access too expensive applications that are needed only occasionally by a broad user base. | • Leostream Connection Broker |

The following sections describe Suggested Tools for Remote System Administration in more detail.

### REMOTE OS AND APPLICATION DEPLOYMENT
Loading the operating system and applications is usually accomplished remotely even in an environment with traditional workstations.

Common tools for remote administration are listed below. Separate documentation exists for each of these tools and is not included in this whitepaper.

- **Microsoft System Center Configuration Manager (SCCM).** SCCM supports the remote management of systems including:

  - Windows OS deployment (new and upgrades)
  - Application installation and updates
  - Hardware inventory
  - Additional remote management functions

For more information search the internet for "Microsoft System Configuration Manager."
A useful web-site: https://docs.microsoft.com/en-us/sccm/

SCCM requires a separate system or VM to run the System Center Configuration Manager.

- **HP Manageability Integration Kit (MIK)** accelerates and optimizes Windows® system image creation and enables remote management of HP BIOS, security, hardware, and software through a centralized solution. It is certified for Microsoft® (SCCM). HP MIK customizes SCCM for HP systems:

  - It eases image creation, can download and import HP Driver Packs
  - Set and report BIOS settings with a graphical UI or as part of an image rollout

For more information search the internet for "HP MIK."
A useful document: http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA7-2767ENW.pdf

- **Red Hat® Kickstart** is used to perform unattended operating system installation and configuration. Kickstart files are created and kept on a central server and read by individual computers during installation.

For more information search the internet for "Red Hat Kickstart."
A useful web-site: https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/7/html/installation_guide/chap-kickstart-installations

### REMOTE BIOS CONFIGURATION
- **HP MIK**
In addition to providing a GUI for modifying BIOS settings on systems with Windows installed, the settings may be configured as part of an image rollout.

The Graphical UI can be used to remotely set and deploy 100+ BIOS settings, such as:

  – Unified Extensible Firmware Interface (UEFI) vs legacy
  – Boot order
  – BIOS version lock

- **Intel® Setup and Configuration Software (SCS)**
Intel® SCS is a collection of software components and utilities used to manage Intel features such as Intel® AMT (Active Management Technology).

The SCS plugin to SCCM uses Intel AMT to modify BIOS settings.

To use Intel SCS, the remote systems must be provisioned for Intel AMT. For more information see the "Intel AMT Provisioning" section below. In addition, the Out of band management component must be configured with the option "**Allow serial over LAN and IDE-Redirect for AMT devices**" in the Out of Band Management Properties: AMT Settings Tab.

In general, either KVM or Serial over LAN may be used with Intel AMT to access the BIOS Setup Menu to modify settings. However, systems with CPUs without integrated graphics (which include most of HP's workstations) do not support KVM and Serial over LAN must be used.

To configure BIOS settings of a computer by using out of band management and the SCS plugin, refer to this website: https://technet.microsoft.com/en-us/library/cc161871.aspx

To access the "Out of Band Management Console" right click on the desired computer in the Configuration Manager Console, select "Manage Out of Band", then select "Out of Band Management Console."

For more information search the internet for "Intel SCS." A useful web-site for integrating the Intel SCS plugin with SCCM: https://sccmguru.wordpress.com/2014/01/31/integrating-configuration-manager-2012-r2-with-intel-scs-9-0-part-8-out-of-band-management-options/

• MeshCommander
MeshCommander is an open source application that provides in interface for Intel AMT. MeshCommander provides a Serial over LAN interface to a remote system. It is available here: http://www.meshcommander.com/meshcommander

To access the BIOS Setup menu of a remote system:

1. Open MeshCommander and click on "Add Computer" to add the AMT enabled host to the list of systems.

2. Click on "Connect" to access the system.

3. Select the Serial-Over-LAN tab on the left-hand side.

4. Choose "Power Actions" and make a selection to go to BIOS. If the machine is powered down this will be "Power up to BIOS" if the machine is already powered up the message will read "Reset to BIOS".

5. Click on "Connect" above the terminal emulator to start the SOL session. Once the session is connected and the machine has reached the Startup Menu the text-based menus will be rendered in the terminal window.

6. Use the arrow keys to highlight the "BIOS Setup" selection and hit enter. This will bring up the BIOS Setup Menu where settings may be changed and saved.

REMOTE POWER CONTROL
One difference in managing central workstations compared to deskside workstations is the inability of the end user to reach down and hit the power button of a centralized workstation. Some solutions allow a system to be powered up or down or rebooted only after the OS is running.

| Solution | Shutdown, Reboot possible? | Powerup possible? |
|---|---|---|
| Intel AMT | Yes | Yes |
| MeshCommander | Yes | Yes |
| HP RGS | Only from OS | No |
| Leostream | Yes, if Leostream agent is installed and OS is booted | Yes, if Wake-on-LAN is enabled |

REMOTE POWER CONTROL WITH INTEL AMT
Intel AMT allows for remote management of a system's power state. The current power state is displayed and may be changed. Alarms can be used to perform power operations at specific times. Alarms can be used to save power by automatically powering off workstations when users are typically not working and power them on before a shift starts.

These can be useful in automating power on/power off operations before or after users typically use their workstation, saving power when users are out of the office.

### REMOTE POWER CONTROL WITH MESHCOMMANDER
MeshCommander supports power control for remote systems either before or after the OS has loaded. Add the remote systems to MeshCommander. To access power controls, click on "Connect" next to the name of the system. Click on "Power Actions" to view and select the power actions available. The actions will depend on the current state of the system and whether it has booted to the OS.

### REMOTE POWER CONTROL USING LEOSTREAM
Leostream supports shutdown and reboot for a system that has booted to an OS and power up for systems that have Wake-on-LAN enabled. The following power control options are also available:

- Power control action (e.g. shut down, reboot, start-up) on a group of desktops given necessary role permissions including administrators and end users
- Execution of a power control action when a system is released or is idle, or when the user disconnects or logs out
- Shutdown and reboot is available for desktops with an installed Leostream Agent. Reboot must be done using the Shutdown and Start option.
- Rebooting systems from the Web-client (available when Leostream Gateway is used)

### REMOTE POWER CONTROL USING HP RGS
When using RGS to connect to a remote system, you have access to the power control available from that system's desktop. There is no way to power on a system that has been powered off through HP RGS.

### AUTO REBOOT AFTER CATASTROPHIC OS ERRORS
Systems may be configured to reboot automatically after catastrophic OS errors. This is useful when the systems are not within reach of the user or administrator.

**Windows 7 & Windows 10**
- Go to Control Panel ➡ System and Security ➡ System ➡ Advanced System Settings
- On the "Advanced" tab click on "Settings..."
- Make sure that in the "System failure" section, the checkbox next to "Automatically restart" is checked
- Click "Ok", "Apply/Ok", and "Ok"
- Reboot the system

### RHEL 7, SUSE 12 SP 4, AND ANY OTHER LINUX OS
- Edit the following file **/etc/sysctl.conf and add kernel.panic=n** to it
- Replace n with the number of seconds that the system should wait before restarting.
- Reboot the system

### INTEL AMT PROVISIONING
Intel Active Management Technology (Intel AMT) supports remote applications running on Microsoft Windows or Linux®. Intel AMT is part of Intel® vPro™ technology and allows systems to be managed remotely in any power state before or after an OS is loaded. Intel AMT must be provisioned on a system before that system can be remotely managed.

Intel AMT is available on processors that have vPro technology. Most HP Workstation processors include Intel vPro technology.

Intel AMT must be provisioned to use MeshCommander.

There are 3 methods of provisioning:

1.  Intel SCS for remote provisioning

2.  Manually through BIOS

3.  Locally with a USB key

Once provisioned, systems can be managed using SCCM or using software that uses AMT SDK such as MeshCommander.

For remote provisioning in an enterprise environment, the administrator must purchase, use, and maintain digital certificates configured in specific ways and from specific providers (e.g. Comodo, GoDaddy, Verisign). The Intel ME firmware has built-in trust for certain certificate authorities. There is a provision for establishing private certificate authorities for use with AMT (see section 10.5.3 of the SCS User Guide). Using private authorities requires touching each system, going into the MEBx BIOS and manually entering the fingerprint of the trusted root certificate.

A web interface to systems that have been provisioned for Intel AMT may be accessed using the one of the following URLs:

- http://<IP address>:16992
- https://<IP address>:16993

where the <IP address> is the IP address of the Intel AMT-enabled system.

The web interface provides the following information about the remote system:

- Power status
- IP address
- System ID
- Date and Time

LINKS:
Configuration Utility User Guide (Released Dec 2015)
https://www.intel.com/content/dam/www/public/us/en/documents/guides/amt-configuration-utility-user-guide.pdf

Intel AMT SDK Guide (under "Setup and Configuration of Intel AMT")
https://software.intel.com/sites/manageability/AMT_Implementation_and_Reference_Guide/default.
htm?turl=WordDocuments%2Faboutintelamt.htm

Intel SCS User Guide (Released Sep 2017)
https://www.intel.com/content/dam/support/us/en/documents/software/Intel_SCS_User_Guide.pdf

Intel AMT Implementation and Reference Guide (2016)
https://software.intel.com/en-us/documentation/amt-reference/setup-and-configuration-of-intel-amt

Setting up and configuring Intel AMT in HP Business Notebooks, Desktops, and Workstations
http://h10032.www1.hp.com/ctg/Manual/c03975296

## END USER ACCESS TO CENTRALIZED SYSTEMS

### Connection Broker
A connection broker such as Leostream facilitates HP RGS connections between users and systems.
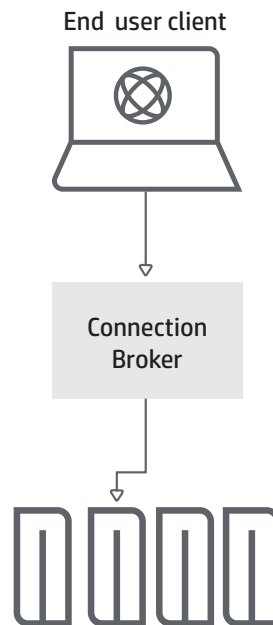


Leostream functionality includes:

- Controls user access to remote resources based on the user's identity and current location
- Initiates an HP RGS connection between a user and a remote system without the user needing to know the hostname or IP address of the remote system

- Allows administrators to define pools of systems available to groups of users
- Defines policies such as action taken when a user disconnects from a remote system
- Monitors and manages remote system utilization
- Leostream Gateway (optional) provides access across firewalls without a corporate VPN
- Supports collaboration, allowing users with an active RGS session to invite other Leostream users to connect to their session

For more information and to purchase Leostream visit https://www.leostream.com/

### HP REMOTE GRAPHICS SOFTWARE (RGS)
HP RGS enables remote access to high-performance workstations.



End  user client          Remote workstation
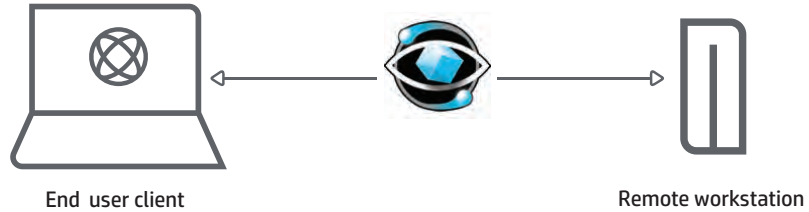
The RGS Receiver is installed onto the end user client system (Windows, Linux, or macOS). The RGS Sender is installed onto the remote workstation (Windows or Linux). HP RGS transmits pixels from the remote workstation to the end user client and not the data or application. Collaboration, or screen sharing, between multiple users, remote USB and audio are supported. Advanced Video Compression (AVC) and HP Velocity improve performance where network bandwidth is limited. Real-time adjustment of image quality allows real-time performance tuning.

HP RGS Receiver is included on for all client systems and the HP RGS Sender is included e for all HP Z Workstations.

For more information and to download HP RGS, visit https://hp.com/go/rgs/.

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