

zEnterprise and ensembles deliver a logically integrated and managed view of the infrastructure resources.

- The ensemble management capabilities of zEnterprise improve the ability to integrate, monitor, and dynamically manage heterogeneous server resources as a single logical virtualized environment.

Value of zEnterprise and ensembles:

Reduced Cost

- Simplified infrastructure of system resources and operational policies
- Maximized utilization
- Savings on power consumption with better monitoring and planned usage during peak workloads
- IT management reductions through intelligent automation of resource provisioning, management of all firmware updates from a single point of control, system monitoring, and problem resolution
- Integration of computationally intensive functions to specialty processors

Managed Risk

- End-to-end customized governance and management of multi-tiered infrastructure
- Extension of mainframe management to heterogeneous resources of a multi-tiered infrastructure
- Improved security and automated problem resolution
- Reduced human error for firmware maintenance
- Dynamic policy-based workload management across a multi-tiered infrastructure
- Ensured assignment of needed resources to highest priority workloads
- Enterprise wide virtualization across systems, storage, networks, and applications
- Controlled access to data and information, protect network and physical infrastructure against threats and vulnerabilities

Improved Service

- Integration, monitoring, and management of multiple platform resources as a single, logical, virtualized system
- Intelligent, automatic, and dynamic resource allocation to maximize cross-platform efficiencies
- Integration of real-time analytics with operational data.

Planning for in-band monitoring

- In-band monitoring enables a System p virtual server or a System x virtual server to access performance data collected by the hypervisor.
- When an application running on a guest operating system needs information about virtual system performance and resources, in-band monitoring makes this data available.

Such data typically includes information about:

- Virtualization configuration (version and host name of hypervisor)
- Processor consumption on host system and other virtual servers
- Available processor resources on host that can be assigned to a guest
- Memory consumption on host system and other virtual servers
- Available memory resources on host that can be assigned to a guest
- NOTE: A virtual host metric daemon writes this data to a vhostmd disk, which is over written every 60 seconds.

z/OS WLM classification rules for Unified Resource Manager

- For virtual servers running z/OS, you can map service class goals in a Unified Resource Manager workload resource group performance policy to z/OS WLM service classes to achieve end-to-end goal-based performance management for multitenant applications.
- Through classification rules for the IBM-defined EWLM subsystem type, z/OS WLM administrators can assign work requests that originate from virtual servers in an ensemble workload resource group to service classes and report classes on z/OS.
- The EWLM subsystem work requests include DB2 distributed data facility (DDF) requests that originate from an ensemble, through virtual servers (or hosts) that are classified within a Unified Resource Manager workload resource group performance policy.
- Unified Resource Manager workload resource group policies have service classes that specify either discretionary or velocity performance goals that the Unified Resource Manager uses to manage virtual servers in the ensemble workload resource group.
- When you correlate these Unified Resource Manager service classes to WLM service classes, you enable z/OS WLM to manage the work differently than it does for local work:
- z/OS WLM assigns the incoming work request to the appropriate WLM service class immediately, instead of going through the z/OS classification process.
- z/OS WLM can manage the work processed by a z/OS subsystem, such as DDF, according to different performance goals than those used for local z/OS work.
- z/OS WLM also can assign the work requests originating from virtual servers in the ensemble to different report classes than those used for local z/OS work.
- Mapping Unified Resource Manager service classes to WLM services classes requires the following configuration tasks.
- Ensemble workload administrators, performance management administrators, and z/OS WLM administrators collaborate to complete these tasks.

Guest platform management providers

- Use guest platform management providers to collect data to help identify and resolve performance problems for specific virtual servers in the ensemble.
- An advantage to using a guest platform management provider is the ability to collect and view application data from IBM middleware products that are instrumented to the Open Group Application Response Measurement (ARM) 4.0 standard.
- To collect data from ARM-instrumented applications, you install, configure, and activate a guest platform management provider.

Launching the New Workload Resource Group task for an ensemble

- The **New Workload Resource Group** wizard is an HMC guide that steps you through the process of defining a workload resource group, creating performance policies and service classes, and activating one policy.
- The **New Workload Resource Group** wizard is particularly useful when you are setting up an ensemble for the first time and its elements, including workload resource groups and policies.

With an upgrade path, you can promote your z196 with a zBX Model 002 to a zEC12 with zBX Model 003. The z196 Support Elements must be at firmware level 2.11.1 before applying the MES.

An ensemble is managed as a single virtualized pool of server resources and can be geographically dispersed.



Choosing one or more business solutions to migrate to Ensembles Considerations

- The affinity with System z. The ensemble is designed for efficient interaction between IBM blades, optimizers, and zEnterprise.
- The opportunity for added value in running the solution in an ensemble, such as centralized control through the Unified Resource Manager.
- The computer architecture of each component of the business solution. For instance, part of a multi-tiered application might run on POWER servers, and part might run on System z.
- The resources that the solution consumes, such as:
 - Processing capacity and memory
 - Storage resources, I/O activity, and bandwidth
 - Networking
- Business resiliency: availability, backup and restore, and redundancy.
 - Integration, monitoring, and management of multiple through sharing large pools of compute resources
 - Maintenance of continuous business operations 24x7.

The Unified Resource Manager firmware options: There are different Unified Resource Manager options or suites that provide different levels of functionality. This licensed firmware is configured to the zEnterprise CPC serial number of your zEnterprise system. All zEnterprise CPC servers come with a default management suite that provides basic functions. **Manage suite:** Provides functions that can be used to control and monitor the zBX.

Automate suite: supports the same functions as the manage suite. It also expands on the capabilities of workloads and performance management. With the automate suite you can define custom workloads by name. You can differentiate between multiple workloads in an ensemble by creating named workload definitions. The performance management capabilities are also improved.

NEW Advanced management suite provides functions for virtual servers on System x blades. It provides the same workload and performance management functions with the exception of dynamic processor resource adjustments.

- It supports the following functions:

- Wizard function to set up resources associated with a workload and the capability to associate those resources with a named business process.
- Power capping
- Performance monitoring and reporting.

NOTE: Advanced management suite is the highest suite available for select IBM System x blades.

API - Asynchronous notification facility More sophisticated management applications, including those for discovery, monitoring, and advanced provisioning, are not single-request-and-forget with respect to the Unified Resource Manager. Rather, such applications need to obtain and retain (that is, cache) information about the inventory, configuration, and status of many Unified Resource Manager resources, and to keep that cached information up to date. To support these applications, the web services API provides an asynchronous notification facility by which Unified Resource Manager can inform interested client applications about changes to the resources managed by Unified Resource Manager.

The API's asynchronous notification facility is designed around the Java Message Service (JMS), an open, standard framework and API for sending messages between two or more applications.

Ensemble automation - The scheduled operations task of the HMC can be used to perform a variety of tasks on a regular and automated basis.

For traditional System z machines this functionality is included in the normal day-to-day operations.

- An operation can be scheduled to occur one time or it can be scheduled to be repeated.
- The System Operator enters the time and date that the operation is to occur.
- Operations can be scheduled to be repeated on specific days or at a particular interval, and the total number of repetitions can be specified.

The Unified Resource Manager scheduled operations task can be used to automate tasks performed on the System z machine as well as those performed on the zBX.

Using the HMC to manage an ensemble Managing an ensemble requires an extended role for the HMC since the traditional role of the HMC is to manage one or more System z servers.

- HMC now includes management functions to control an ensemble.
- Up to eight zEnterprise CPCs, with or without blades, can be managed as an ensemble by an HMC.
- The Unified Resource Manager suite installed on the HMC is required to manage an ensemble.

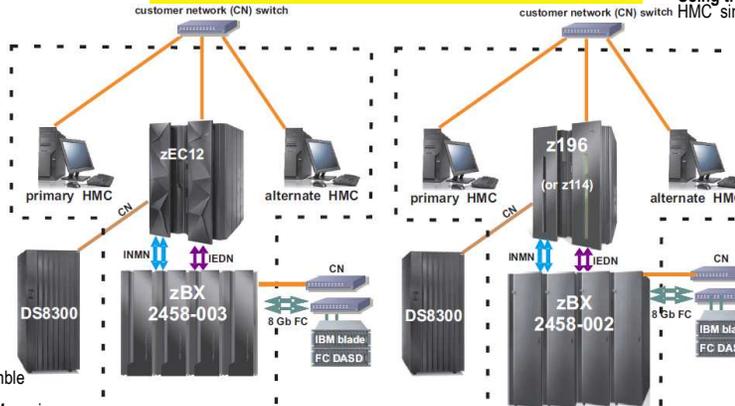
Rapid deployment and provisioning The Unified Resource Manager can be used for rapid deployment and provisioning of virtual servers, storage, and networking that are used by workloads across the heterogeneous platform.

The Unified Resource Manager via the HMC interface provides a simplified uniform approach to provision new resources.

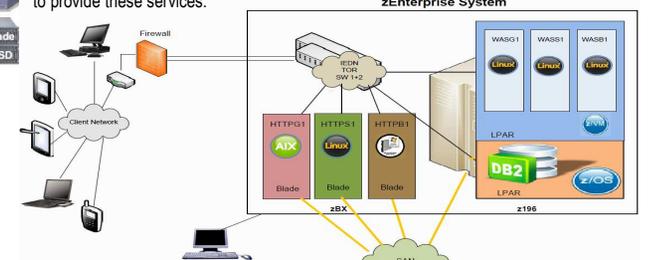
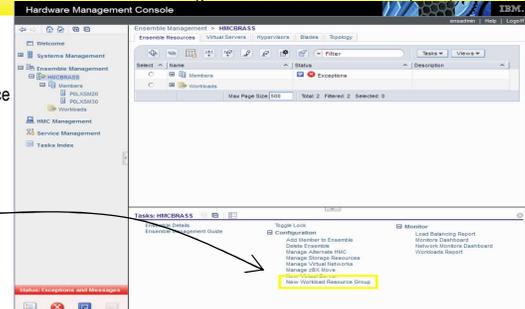
- Using the HMC ensemble tasks, virtual resources can be defined by completing entries and selections identified for that virtual resource. Only the entries that require a response are presented to the user.

After the appropriate HMC windows are completed the Unified Resource Manager takes care of all the underlying tasks to provision the required resource.

The Unified Resource Manager requires the management suite with enhanced functions to provide these services.



The common theme with all of these specialized hardware components is their seamless integration within the mainframe. The zBX components are also configured, managed, and serviced the same way as the other components of the System z CPC. Despite the fact that the zBX processors are not z/Architecture PUs, the zBX is in fact, handled by System z management firmware called the IBM zEnterprise Unified Resource Manager. The zBX hardware features are integrated into the mainframe ecosystem, not add-ons.



Planning for service and lifecycle management

Service and lifecycle management for blades in a zBX is different for a zEnterprise system than blades in a traditional BladeCenter.

Tasks that you normally perform manually are automated. When a zBX is serviced by IBM (under warranty or post-warranty maintenance service contract), IBM delivers service on POWER and System x blades installed in the zBX as if those blades were Components of the zBX, unless you request to have such service delivered according to the blade's entitlement.

- The zBX is managed by the Unified Resource Manager, accessible through the HMC, and the supporting processor Support Elements (SE). The following support is provided:
 - Trained IBM service technicians perform maintenance actions from the supporting System z processor Support Elements.
 - Firmware upgrades are downloaded and applied from the supporting System z processors Support Elements from the Unified Resource Manager through the Support Elements.
 - Failures are reported to IBM and the IBM support structure engaged using the host RETAIN@ connection (24x7).
 - Operators are able to monitor and control all the zBX blades from the Unified Resource Manager windows through the HMC.