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Preface

This version of the white paper is for WebSphere® Virtual Enterprise *Version 6.1.0.5*.

If you are using Version 6.1.1, you can download the Version 6.1.1 white paper from the WebSphere Virtual Enterprise wiki.

This information changes frequently. Download the latest copy of this document on the WebSphere Virtual Enterprise Wiki or view the information in the WebSphere Extended Deployment information center.

Chapter 1. Virtualization and WebSphere Virtual Enterprise

By configuring application infrastructure virtualization in WebSphere Virtual Enterprise, you can pool together resources that are normally kept separate to accommodate the fluctuations of workload in your environment and increase the quality of service. You can also use application infrastructure virtualization with server virtualization capabilities that are provided by the physical hardware on which WebSphere Virtual Enterprise is hosted.

Application infrastructure virtualization

With *application infrastructure virtualization*, you can separate applications from the physical infrastructure on which they are hosted. Workloads can then be dynamically placed and migrated across a pool of application server resources, which allows the infrastructure to dynamically adapt and respond to business needs. Requests are prioritized and intelligently routed to respond to the most critical applications and users.

Typically, applications and Java™ 2 Platform, Enterprise Edition (J2EE) resources are statically bound to a specific server. Some of these applications might experience periodic increases in load that last a short time. The most costly time for an application to become unavailable is during a period of high demand. You must build your IT infrastructures to be able to accommodate these peaks. During the majority of time when your systems experience normal load, a large percentage of your computing capacity might go unused, making inefficient use of IT investments.

In a static environment, applications often span multiple enterprise archives (.ear files), and are not comprehensively defined so that the application can be portable between environments. Statically deployed applications rely on information that is found in the server to which they are deployed.

In the virtualized dynamic operations environment of WebSphere Virtual Enterprise, the static relationship is replaced with a dynamic relationship with looser coupling of applications or resources and server instances. Instead of statically binding applications to servers or clusters, you deploy applications to dynamic clusters, which are application deployment targets that can expand and contract depending on the workload in your environment.

After you deploy your applications to be mobile by using dynamic clusters, the placement of the applications is determined by the operational policies that you define. Autonomic managers control the placement of the server instances and how workload is routed for each application. If workload increases for a specific application, the number of server instances for the dynamic cluster that is hosting the application can increase, using available resources from other applications that are not experiencing increased workload.

Application infrastructure virtualization benefits:

- **Improved management of software and applications:** Management processes become more repeatable and less error-prone by using automated services and operational policies.

- **Allocation of software resources:** Dynamic reallocation of resources can occur based on shifting distributions of load among applications.
- **Increased number of applications:** More applications can run in a virtualized application environment than in a static configuration.
- **Reduced configuration complexity:** Loosened coupling between applications and the application server instances reduces the overall complexity and provides for a better, more usable environment.

Application infrastructure virtualization example

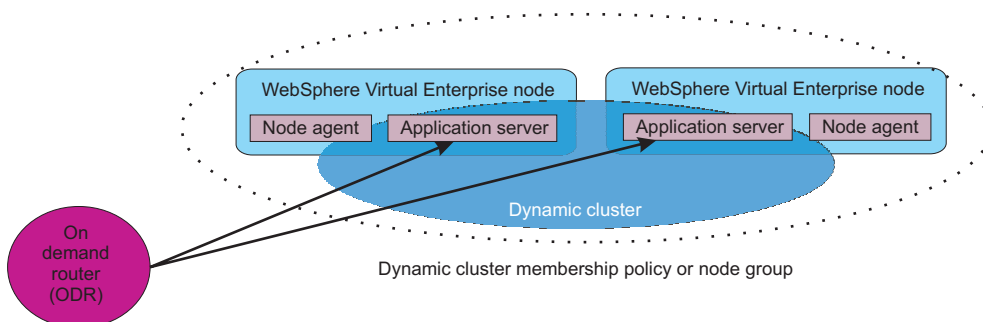


Figure 1. Application infrastructure virtualization in a WebSphere Virtual Enterprise environment. You deploy an application to a dynamic cluster that has a specified membership policy or node group. You do not deploy your applications to specific application servers. Instead, the application placement controller starts application server instances for your dynamic cluster based on the settings that you chose for the dynamic cluster.

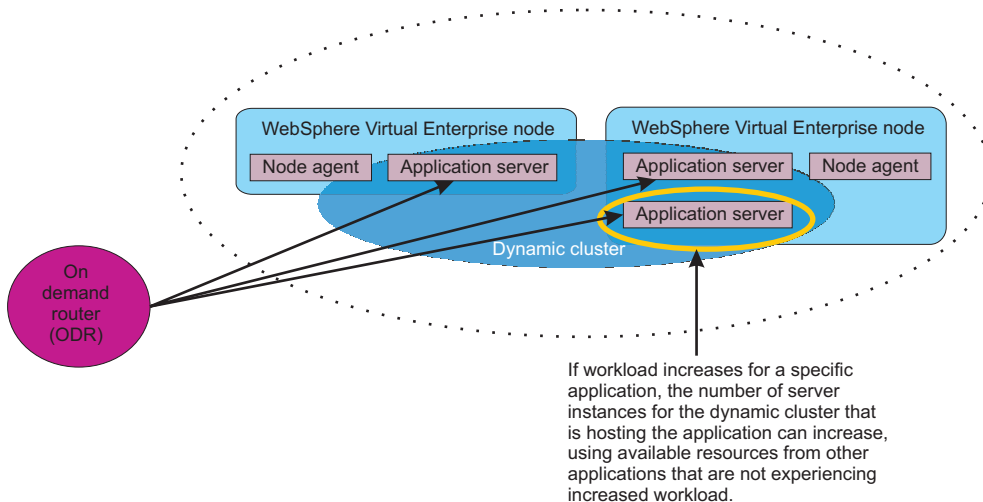


Figure 2. The starting of an additional application server to react to changes in application load. Additional application servers can start on the nodes that are selected by your dynamic cluster membership policy to handle additional requests that are coming in for the application.

Server virtualization

While WebSphere Virtual Enterprise provides virtualization of applications in your environment, you can also deploy WebSphere Virtual Enterprise on virtualized servers, such as VMware ESX, to take advantage of the capabilities provided by the hosting environment.

Server virtualization benefits:

- **Reduced amount of hardware in your environment:** You can run multiple WebSphere Virtual Enterprise nodes on the same physical hardware.

- **Improved server management:** You can more easily manage your environment because you have fewer physical computers and can use the server virtualization software to manage your images.
- **High availability of hardware:** By configuring server failover, your physical hardware can be highly available. When one server fails, it can be replaced by another server.
- **Dynamic allocation of hardware:** The physical resources, such as processors and memory, on your hosting computers can be shared among the virtual servers in your environment and dynamically allocated as needed. Because the resources are dynamically allocated, restarting the servers is not necessary.
- **Shared storage:** Multiple virtual servers or logical partitions can share the same physical storage. You do not need a physical hard drive for each virtual machine or LPAR.

WebSphere Virtual Enterprise in an environment with server virtualization

WebSphere Virtual Enterprise can operate in supported virtualized server environments. Different server vendors provide different virtualization capabilities, so the behavior of WebSphere Virtual Enterprise in different server virtualization environments can vary. However, common themes exist in server virtualization environments, such as the ability to share hardware resources across the virtual servers or logical partitions. Server virtualization environments can run in *shared processor mode* or *dedicated processor mode*. When you use shared processor mode, the physical processors are pooled and shared between the servers or logical partitions that are running on the physical computer. When you use dedicated processor mode, the physical processors are statically assigned to each virtual server or logical partition.

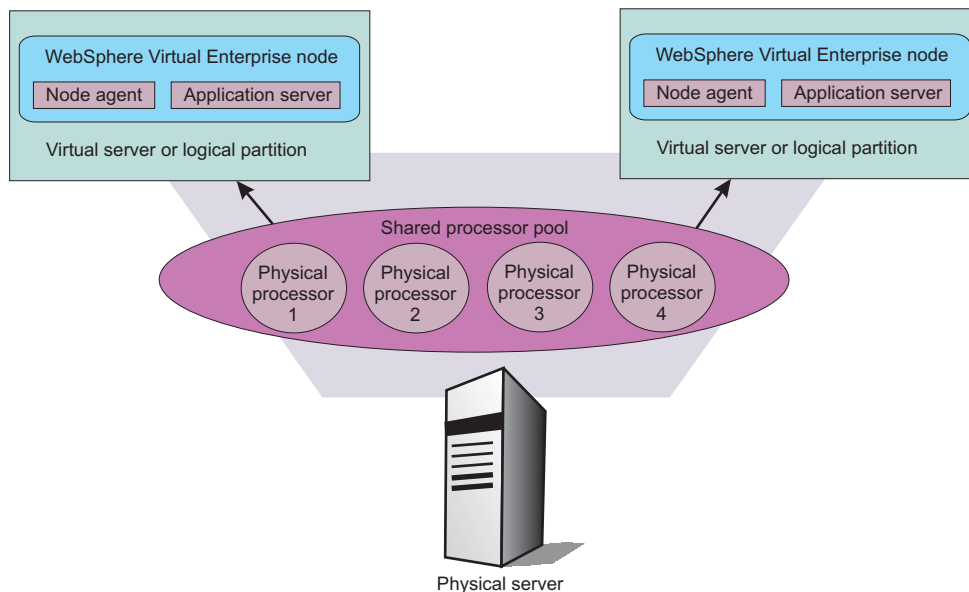


Figure 3. *Shared processor mode.* In shared processor mode, the physical processors are pooled and shared among the virtual servers or logical partitions.

Restriction: Using the traffic management and application infrastructure virtualization placement features of WebSphere Virtual Enterprise in an environment with shared processor mode is supported only for specific

virtualization platforms. See Chapter 2, “Supported server virtualization environments,” on page 5 for a list of virtualized server environments.

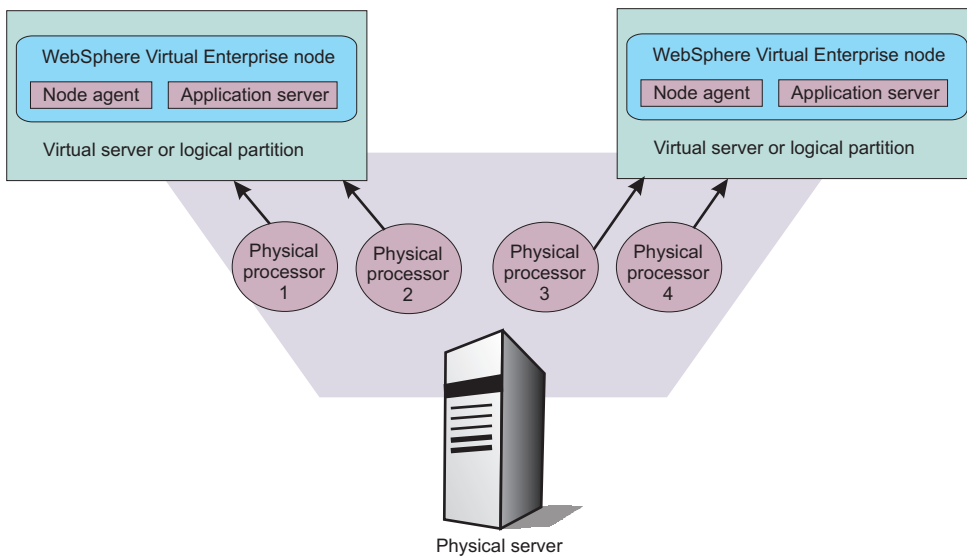


Figure 4. Dedicated processor mode. In dedicated processor mode, the physical processors are statically assigned to each virtual server or logical partition.

WebSphere Virtual Enterprise can also run in server virtualization environments with dedicated processor mode. The processor capacity is statically fixed to each virtual server or logical partition. The capacity and assignment do not change dynamically. Because the processor resource does not change for each virtual server or logical partition, using dedicated processor mode does not affect the traffic management and virtualization features of WebSphere Virtual Enterprise.

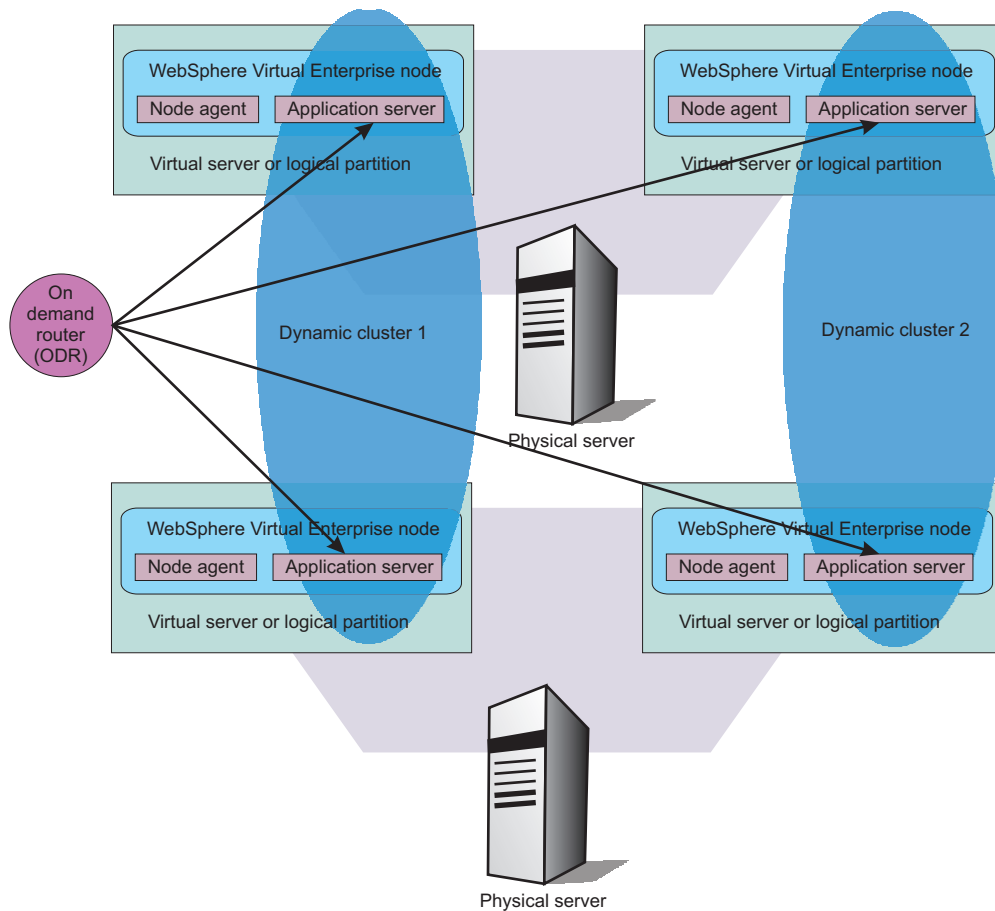


Figure 5. Coexistence of application infrastructure and server virtualization.

Chapter 2. Supported server virtualization environments

Before you deploy WebSphere Virtual Enterprise on virtualized servers, you must understand the limitations for the server virtualization platform that you are using.

Remember: This information changes frequently. Download the latest copy of this document on the WebSphere Virtual Enterprise Wiki or view the information in the WebSphere Extended Deployment information center.

Table 1. Server virtualization environments

Virtualization platform	Restrictions	Supported processor sharing mode
VMware ESX Version 3.5	<ul style="list-style-type: none"> • You must use Version 6.1.0.3 or later. • See VMware Infrastructure 3 platforms and WebSphere Virtual Enterprise in the information center for a list of limitations. 	Shared and dedicated modes are supported for VMware ESX, but you must configure WebSphere Virtual Enterprise to communicate with the VMware ESX hypervisor or the VMware VirtualCenter that is in control of the hypervisors where WebSphere Virtual Enterprise is running.
AIX® 5.3 and AIX 6.1 on POWER® (Micro-Partitioning™)	<ul style="list-style-type: none"> • Using logical partitions (LPARs) in uncapped mode with shared resource pools is not supported for the traffic management and application infrastructure virtualization features of WebSphere Virtual Enterprise. See Table 2 on page 7 for a list of features that are supported in uncapped mode. • With Version 6.1.0.5 or later, no additional interim fixes are required. If you are using Version 6.0.2.4, 6.1.0.2, 6.1.0.3, or 6.1.0.4, apply the interim fix for APAR #PK74519. 	Dedicated and shared.
Linux® on POWER (Micro-Partitioning)	None for dedicated.	Dedicated.

Table 1. Server virtualization environments (continued)

Virtualization platform	Restrictions	Supported processor sharing mode
Linux on z/VM [®]	<ul style="list-style-type: none"> The guest operating system must be RHEL 5.0, 5.1, 5.2 or SLES 10. Mapping a Linux on zSeries[®] operating system image to a physical logical partition (LPAR): WebSphere Virtual Enterprise can balance workload across multiple z/VM virtual machines that are running Linux as the guest operating system. However, it does not have knowledge of the LPAR that is hosting the virtual machines on the z/VM image and is therefore unable to make workload balancing decisions based on the workload at the LPAR level. Service policy goals: Workload that is not under the control of WebSphere Virtual Enterprise might be running on other Virtual Machines on the same z/VM image. This workload might affect service policy goals. 	Dedicated and shared.
Solaris Operating Environment 10 on Sun (Zones)	None for dedicated.	Dedicated.
HP-UX 11i v3 on HP using Virtual Partitions (vPars) or Integrity VMs	Currently not supported.	None.
Linux Xen	Currently not supported.	None.
Microsoft [®] Hyper-V	Currently not supported.	None.

Table 2. Supported features with AIX Micro-partitioning

Feature	Supported in a capped partition	Supported in an uncapped partition
Service policies	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Differentiate service	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No

Table 2. Supported features with AIX Micro-partitioning (continued)

Feature	Supported in a capped partition	Supported in an uncapped partition
CPU overload protection	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Memory overload protection	Yes	Yes
Dynamic clusters (application placement)	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Application lazy start	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Application isolation or co-location policies	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Weighted least outstanding request load (WLOOR) routing	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Dynamic weights	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Monitoring according to service goals	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Real-time charting	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Performance data logging	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Chargeback logging	Yes (with Version 6.1.0.5 and later or APAR #PK74519 applied)	No
Multi-cluster routing policies	Yes	Yes
Custom routing rules	Yes	Yes
Application edition aware routing	Yes	Yes
Customizable edition routing rules	Yes	Yes
Atomic edition rollout	Yes	Yes
Edition rollout with a server start or stop	Yes	Yes
Edition rollout with an application start or stop	Yes	Yes
Health management	Yes	Yes
Custom health policies	Yes	Yes
Custom health policy action plans	Yes	Yes
Task management	Yes	Yes

Table 2. Supported features with AIX Micro-partitioning (continued)

Feature	Supported in a capped partition	Supported in an uncapped partition
Task management event logger	Yes	Yes
Operations view	Yes	Yes
Operational alerts	Yes	Yes
High availability (HA) deployment manager	Yes	Yes
Centralized installation manager	Yes	Yes
Maintenance mode	Yes	Yes
Manage BEA WebLogic servers	Yes	Yes
Manage Apache Tomcat servers	Yes	Yes
Manage JBoss servers	Yes	Yes
Manage Geronimo servers	Yes	Yes
Manage generic servers	Yes	Yes
Manage WebSphere Application Server Community Edition servers	Yes	Yes
Automatically discover WebSphere Application Server Community Edition servers	Yes	Yes
Install WebSphere Application Server Community Edition applications	Yes	Yes

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