IBM Software Group

IBM® WebSphere® Extended Deployment V6.1

Compute grid overview

This presentation will give an overview of WebSphere Extended Deployment Compute Grid version 6.1.

This module references WebSphere Extended Deployment Operations Optimization, which is now called WebSphere Virtual Enterprise.

Though the module uses the previous names, the technical material covered is still accurate.

Compute grid overview

- **WebSphere Application Server has traditionally focused on transactional applications**
  - ▶ Applications typically are designed to handle large volumes of relatively small tasks
  - ▶ Not all applications fit this type of design
- **Long-running work often requires different capabilities**
  - ▶ Work manager (asynchronous beans) and message-driven beans support some of these needs

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Applications designed to run on WebSphere Application Server tend to be transaction-oriented applications, made up of several relatively short-lived tasks. However, not all types of work fit this model. WebSphere Application Server has some features that can be beneficial to long-running applications, such as the work manager and message-driven beans for running asynchronous tasks in the EJB container. WebSphere Extended Deployment expands on these features by providing a full set of capabilities for running and managing long-running work.

Compute grid capabilities

- Compute grid provides further support for these needs
  - ▸ Asynchronous submission and execution
  - ▸ Greater separation of submitter and execution environment
    - ▪ Supports work being submitted from outside the WebSphere environment
  - ▸ Work is persisted to highly available and non-volatile data stores
  - ▸ Administrative controls to monitor and manage units of work
  - ▸ Capability to prioritize and schedule work

Compute grid enhances WebSphere Application Server to support long-running applications
  - ▸ Provides capabilities to deploy long-running applications along with transactional applications

- Compute grid balances the work across different nodes within a cell

Compute grid expands the types of work that WebSphere Extended Deployment is designed to handle. Compute grid adds to WebSphere Extended Deployment the capability to run and manage long-running applications in the same cell as your transactional applications. WebSphere Extended Deployment dynamically manages both workload types and allocates server resources as necessary. This feature includes a special execution environment for long-running work, a separate job submission and scheduling environment, and the administrative tools to monitor and manage long-running work.

Types of Long Running Work

- WebSphere Extended Deployment V6.0 supports two styles of long-running work
- Batch applications focus on doing large amounts of work based on a specific task, for example record processing
  - ▶ Application will provide logic for a single unit of work (process one record)
  - ▶ Container provides support for transactions and mechanisms checkpoint and restart work
- Compute-intensive applications focus on large amounts of processor-bound work
  - ▶ Container provides thread of execution and has limited contact with the work after it is started
  - ▶ Application provides all other logic
- Native executables
  - ▶ Java™ "main" applications that run in an independent JVM
  - ▶ Native applications (C, C++, FORTRAN,…) running as their own process
  - ▶ Lightweight grid processing nodes with no WebSphere Server

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Long-running work can generally be divided into two types, both of which are supported by WebSphere Extended Deployment. A batch application is designed to repeatedly perform some specific unit of work, such as processing a database record over a large set of data. If an application provides the logic for performing the work, WebSphere Extended Deployment can manage the transaction support and life cycle aspects, such as restarting the work at the point it was stopped in the case of an interruption. Compute-intensive applications are also long-running tasks with little user interaction, but focus on performing a large amount of work that tends to be processor-bound, such as large-scale simulation work.

WebSphere Extended Deployment version 6.1 supports running compute intensive work within a WebSphere application server, and outside of WebSphere as native executable. When run within an application server WebSphere Extended Deployment provides a runtime environment and a thread of execution, and all other logic is implemented by the application. Compute intensive work outside of WebSphere can consist of Java programs or native executables. These long running executables are monitored and controlled through the WebSphere Extended Deployment middleware agent for compute grid.

Compute grid packaging

- WebSphere Extended Deployment Compute Grid V6.1 is an 'add-on' product for middleware platforms
  - As an extension to WebSphere Network Deployment
    - Adds new components to WebSphere
  - Middleware agent to add other middleware servers to WebSphere cell
    - Does not require WebSphere Network Deployment on other middleware node

If installed as an extension to a WebSphere Network Deployment or WebSphere Extended Deployment Compute Grid functionality adds components to the base WebSphere system to enable you to run and manage long-running and compute-intensive J2EE applications in a WebSphere Extended Deployment environment. When installed in conjunction with Operations Optimization, the Compute Grid component integrates with that package's dynamic operations features to enable a virtualized, dynamic environment for goal-oriented workload management in order to take better advantage of hardware resources in a distributed environment.

You can also install the stand-alone WebSphere Extended Deployment Middleware Agent for Compute Grid which allows you to run and manage long-running native programs from within the WebSphere administrative environment.

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Summary

- Compute grid
  - ▶ An environment for running and managing compute-intensive and batch style J2EE applications

Compute grid overview

In summary, WebSphere Extended Deployment Compute Grid is an add-on product that provides several advanced features for WebSphere Application Server. The Compute Grid package provides an environment for running and managing compute intensive and batch style J2EE applications within a WebSphere cell.

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