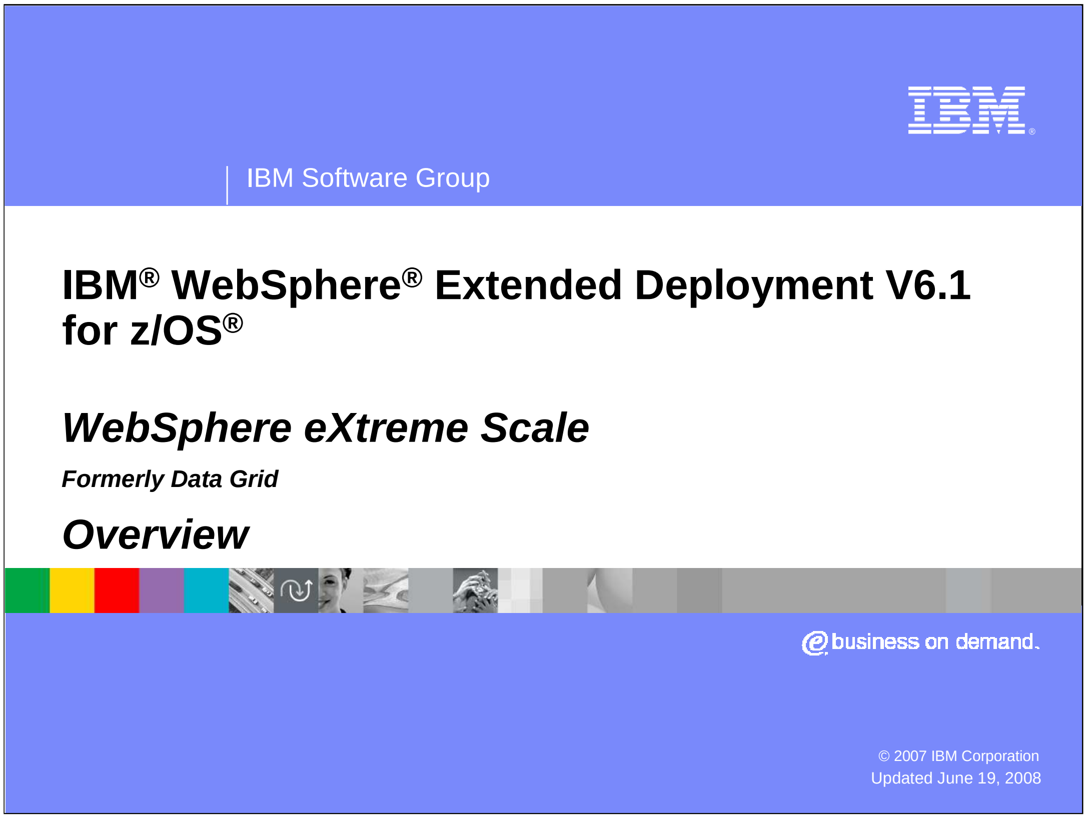

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IBM® WebSphere® Extended Deployment V6.1 for z/OS®

WebSphere eXtreme Scale

Formerly Data Grid

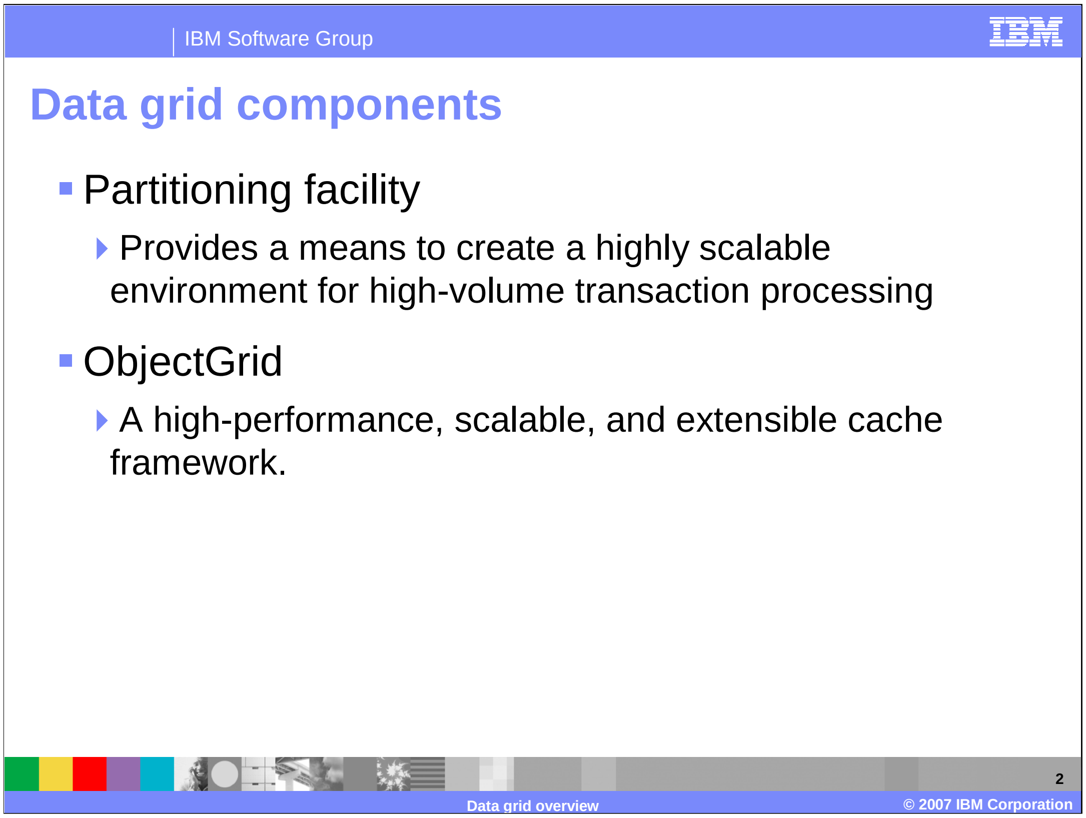
Overview

business on demand.

Updated June 19, 2008

This presentation will give an overview of the data grid components of WebSphere Extended Deployment Version 6.1.

This module was originally recorded for WebSphere Extended Deployment Data Grid, which is now called WebSphere eXtreme Scale. Though the module uses the previous names, the technical material covered is still accurate.

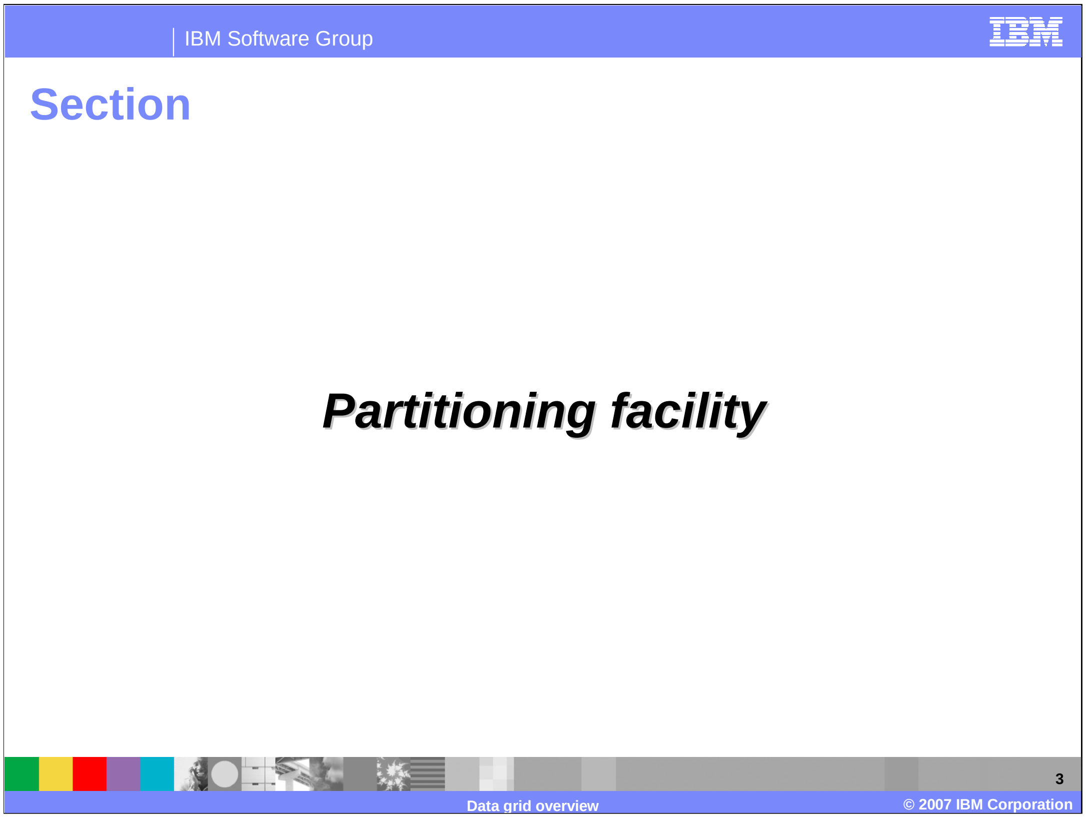


Data grid components

- Partitioning facility
  - Provides a means to create a highly scalable environment for high-volume transaction processing
- ObjectGrid
  - A high-performance, scalable, and extensible cache framework.

The WebSphere Extended Deployment data grid package contains two primary components: the partitioning facility, and ObjectGrid. The partitioning facility provides a programming model and runtime environment for implementing highly scalable solutions for transaction processing. ObjectGrid is a high-performance, transactional, and extensible object cache for Java™ applications.

Each of these components will be discussed briefly in this presentation, and covered in more detail in other presentations.



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Section

Partitioning facility

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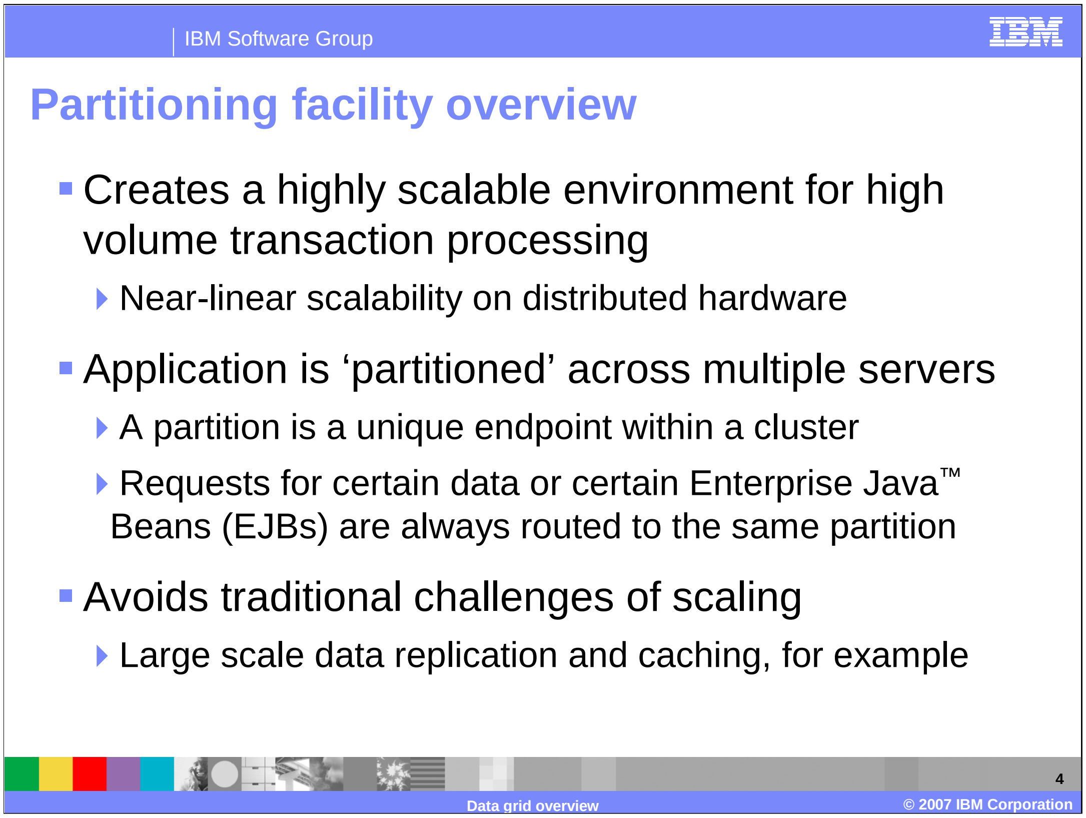
Data grid overview

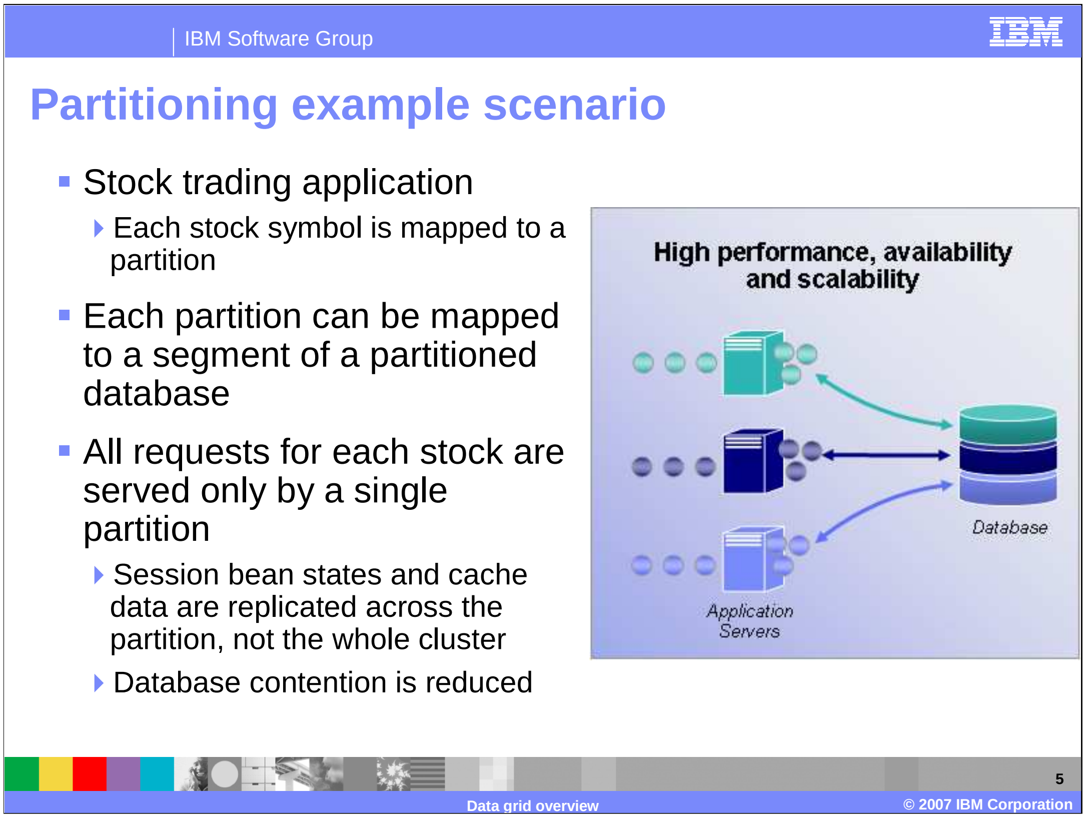
This section covers the partitioning facility feature of WebSphere Extended Deployment data grid.



Partitioning facility overview

- Creates a highly scalable environment for high volume transaction processing
  - Near-linear scalability on distributed hardware
- Application is ‘partitioned’ across multiple servers
  - A partition is a unique endpoint within a cluster
  - Requests for certain data or certain Enterprise Java™ Beans (EJBs) are always routed to the same partition
- Avoids traditional challenges of scaling
  - Large scale data replication and caching, for example

The partitioning facility is a programming framework and runtime environment that makes it possible for high transaction-volume applications to scale linearly by adding hardware capacity. To accomplish this, an application is partitioned across multiple servers in a cluster. Each partition is a uniquely addressable endpoint within the cluster, to which requests for certain data sets are always routed. Partitioning solves some of the traditional challenges of very large clustering, because it can reduce data contention and reduce the overhead of replicating shared data, like caches or state information.



Partitioning example scenario

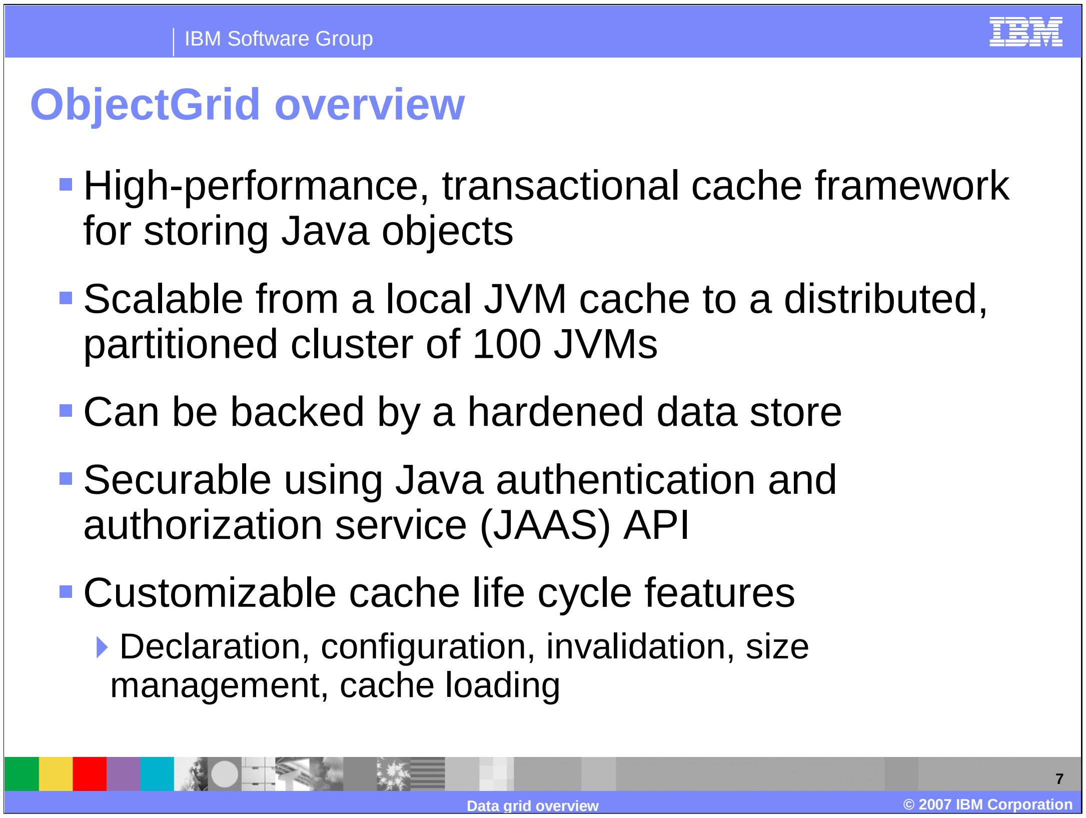
- Stock trading application
  - Each stock symbol is mapped to a partition
- Each partition can be mapped to a segment of a partitioned database
- All requests for each stock are served only by a single partition
  - Session bean states and cache data are replicated across the partition, not the whole cluster
  - Database contention is reduced

In this example scenario, consider a high-volume stock-trading application that has very high year-to-year traffic growth. The application is partitioned across a cluster of servers, such that buy or sell requests for each stock symbol are routed to a partition associated with that symbol. There may be more partitions than servers in the cluster, meaning each server is running multiple partitions. The work is effectively divided into unique data sets across the cluster, simplifying data replication and reducing overhead. Further, if the underlying database is designed such that separate database instances correspond to the data that would be accessed by individual partitions, then contention on the database will be reduced as well. This type of an environment scales extremely well. Adding additional hardware will reduce the number of partitions that must be hosted by each individual server, giving the cluster added capacity without additional overhead normally associated with large-scale clustering. This capability is particularly important for data bases other than DB2 or when data is maintained in memory only.

Section

Object grid

This section covers the object grid feature of WebSphere Extended Deployment Data Grid.



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ObjectGrid overview

- High-performance, transactional cache framework for storing Java objects
- Scalable from a local JVM cache to a distributed, partitioned cluster of 100 JVMs
- Can be backed by a hardened data store
- Securable using Java authentication and authorization service (JAAS) API
- Customizable cache life cycle features
  - Declaration, configuration, invalidation, size management, cache loading

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Data grid overview

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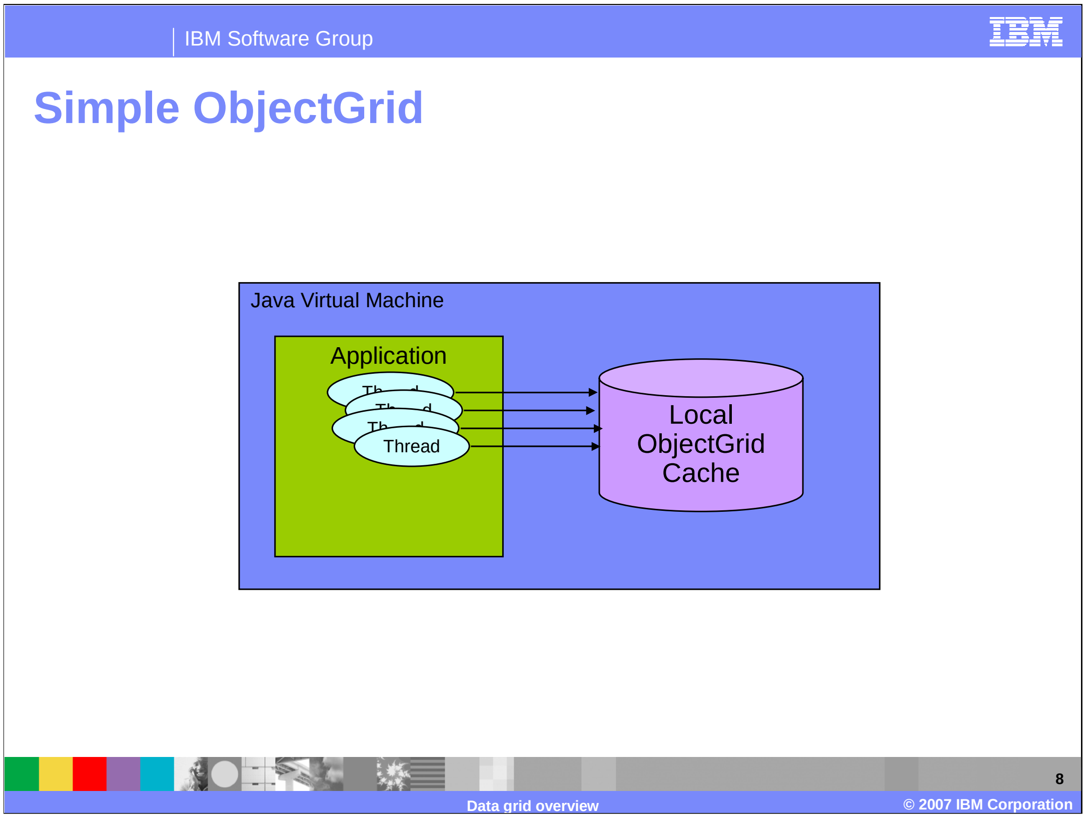
ObjectGrid is a WebSphere Extended Deployment technology that provides a high-performance, transactional cache framework for storing Java objects. An ObjectGrid can be used as a generic object cache, and optionally persisted to a hardened store. It can in the same fashion also be used as a local cache for objects stored in a database. ObjectGrid is a highly customizable feature, with interfaces provided for custom data loaders, invalidation and size management schemes, and more.



Simple ObjectGrid

Java Virtual Machine

Application

Thread

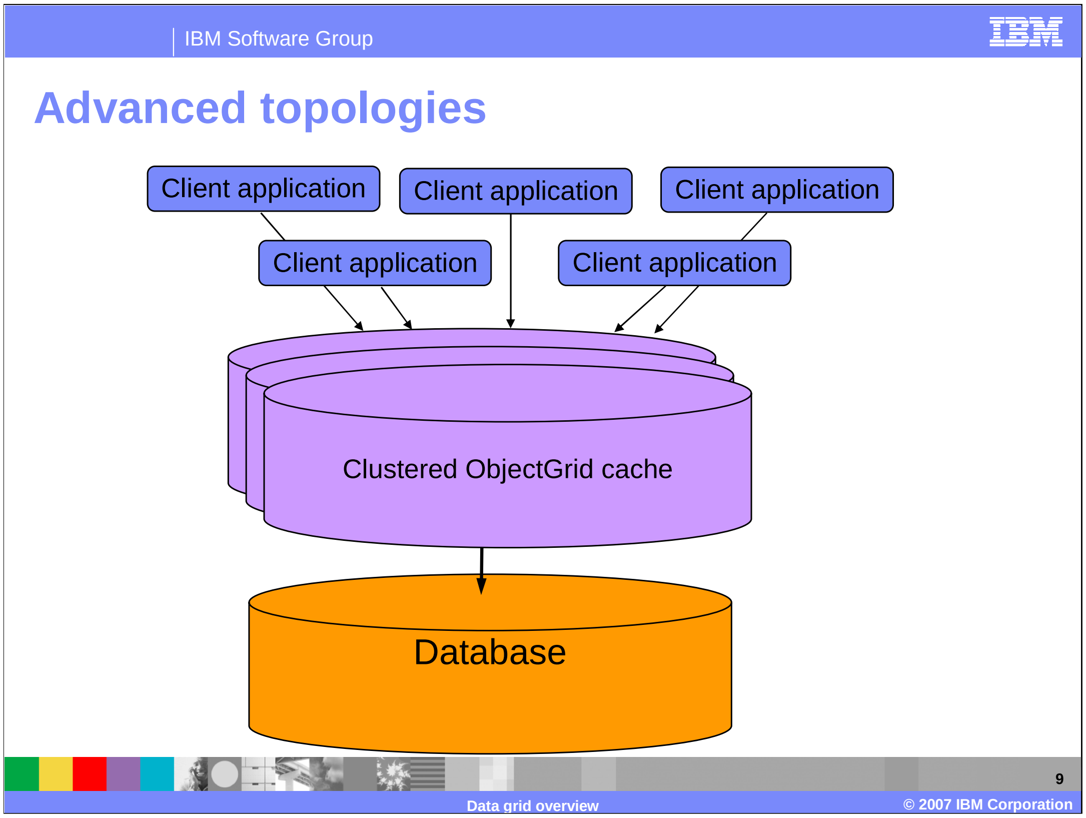
Thread

Thread

Thread

Local ObjectGrid Cache

In the simplest case, the ObjectGrid can be used as an in-memory cache. It can be used to provide consistent, transactional access to temporary data within a single Java Virtual Machine. This can especially benefit high-concurrency applications where multiple threads need to access and modify transient data. The data kept in a local ObjectGrid can be indexed and retrieved using ObjectGrid's query support.



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Advanced topologies

Client application

Client application

Client application

Client application

Client application

Clustered ObjectGrid cache

Database

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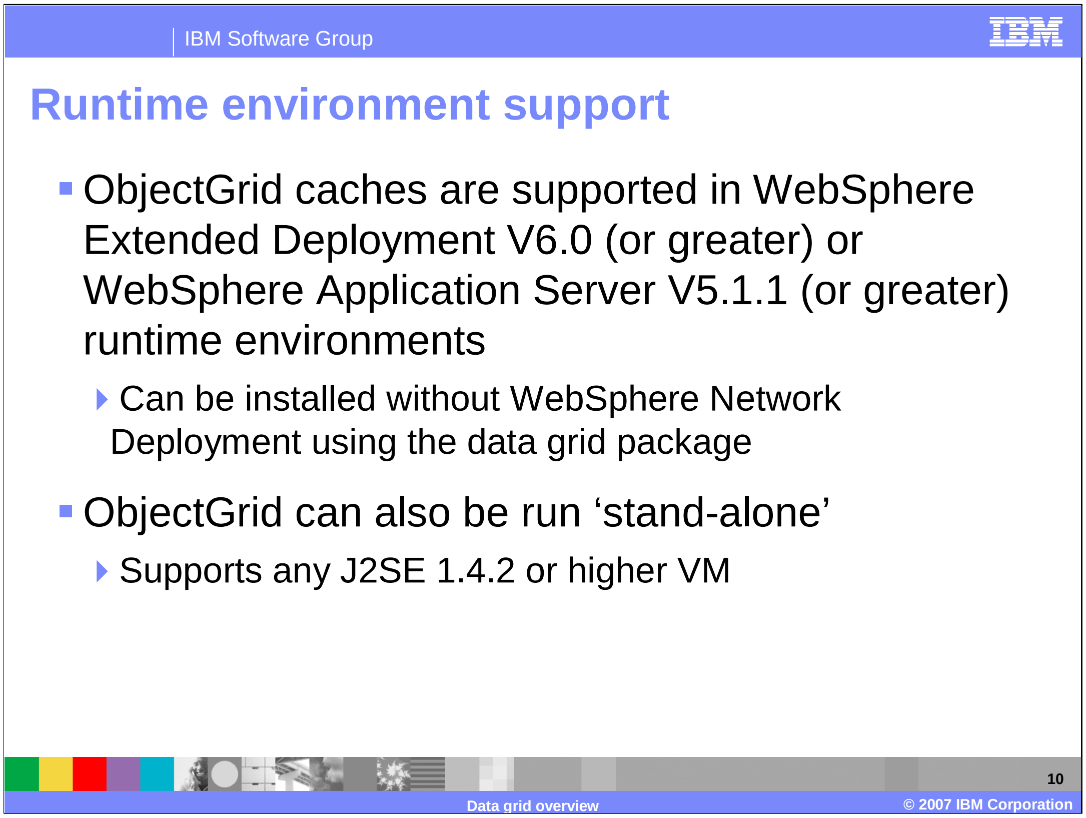
Data grid overview

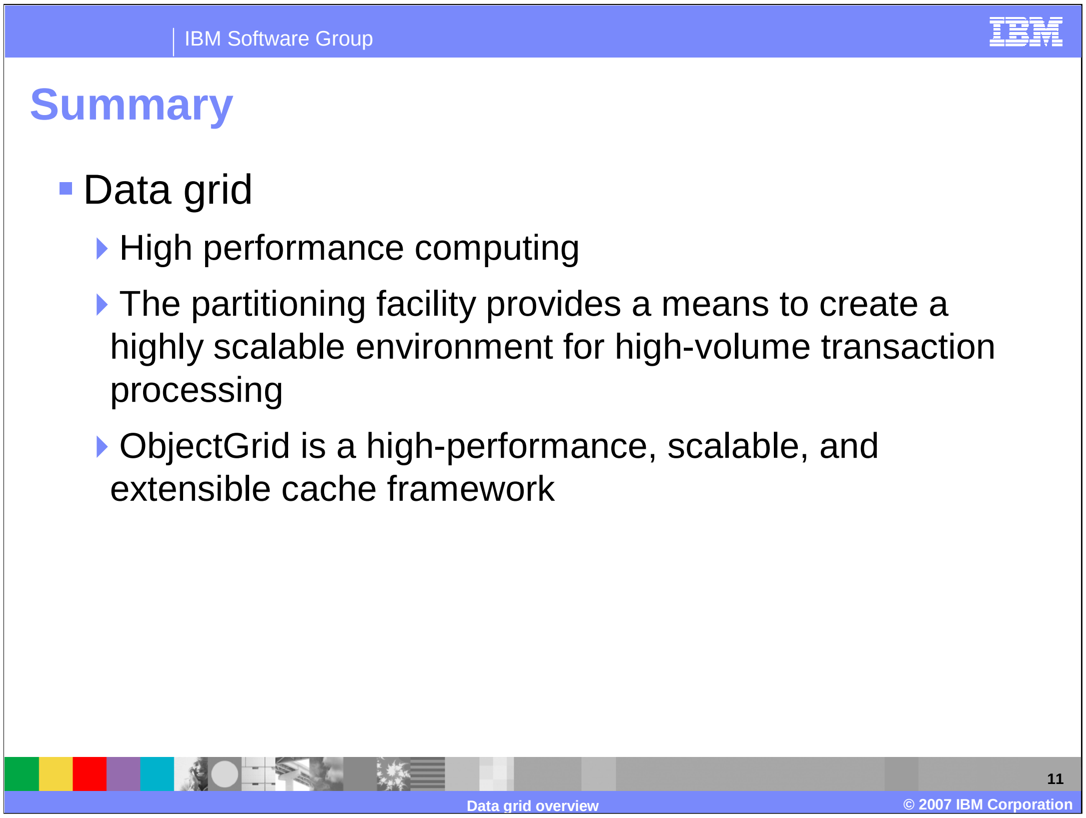
ObjectGrid also supports more complicated topologies, supporting highly available distributed, partitioned and replicated cache which can scale to thousands of containers containing terabytes of data. Distributed ObjectGrid caches offer increased performance, availability and scalability.   Local and distributed ObjectGrid topologies both provide the same application programming model for interacting with the cache.



Runtime environment support

- ObjectGrid caches are supported in WebSphere Extended Deployment V6.0 (or greater) or WebSphere Application Server V5.1.1 (or greater) runtime environments
  - Can be installed without WebSphere Network Deployment using the data grid package
- ObjectGrid can also be run ‘stand-alone’
  - Supports any J2SE 1.4.2 or higher VM

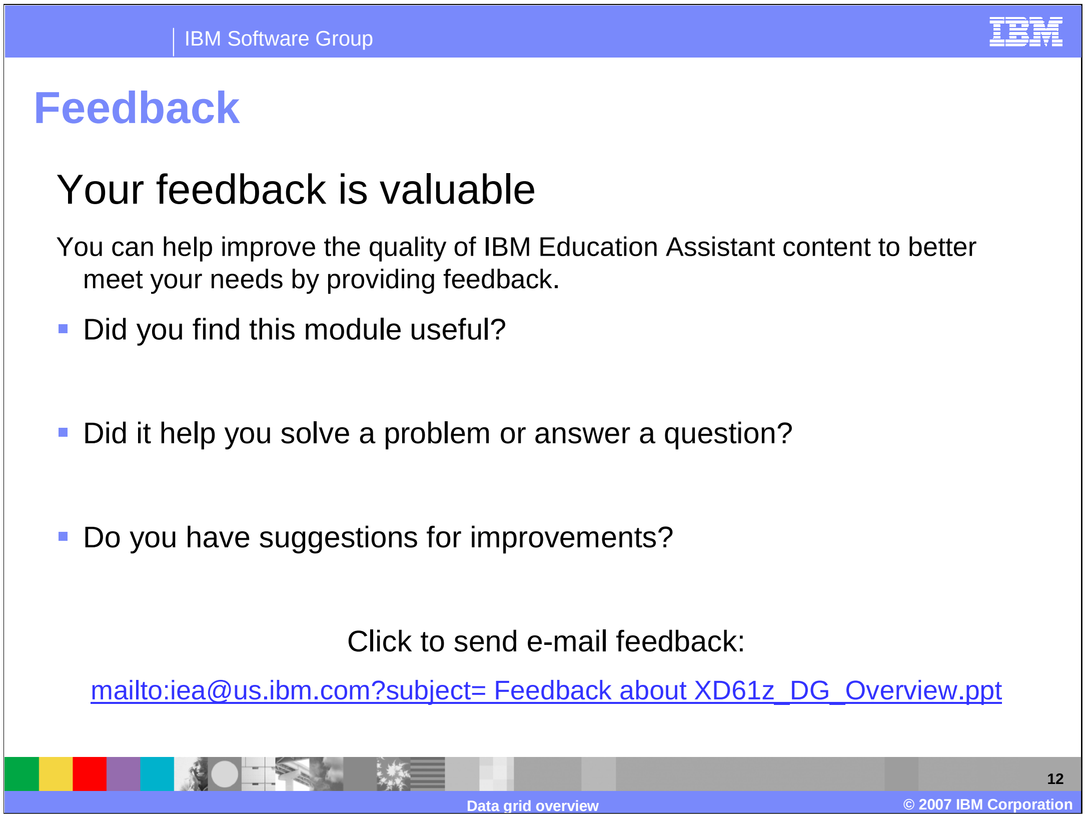
While ObjectGrid technology is provided only with WebSphere Extended Deployment Data Grid, ObjectGrid caching is also supported in a WebSphere Application Server Network Deployment version 5.1 (or higher) server by including the ObjectGrid library in your application classpath. Similarly, ObjectGrid can run in a stand-alone JVM or other application server product. ObjectGrid requires a Java 1.4.2. virtual machine to run, but can take advantage of capabilities of newer Java versions, such as Java 5 annotations.



Summary

- Data grid
  - High performance computing
  - The partitioning facility provides a means to create a highly scalable environment for high-volume transaction processing
  - ObjectGrid is a high-performance, scalable, and extensible cache framework

In summary, WebSphere Extended Deployment Data Grid is an add-on product that provides several advanced features for WebSphere Application Server to enable highly scalable, high transaction applications. The partitioning facility provides a programming model and runtime environment for implementing highly scalable solutions for transaction processing. ObjectGrid is a new high-performance, transactional, and extensible object cache for Java applications.



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Data grid overview

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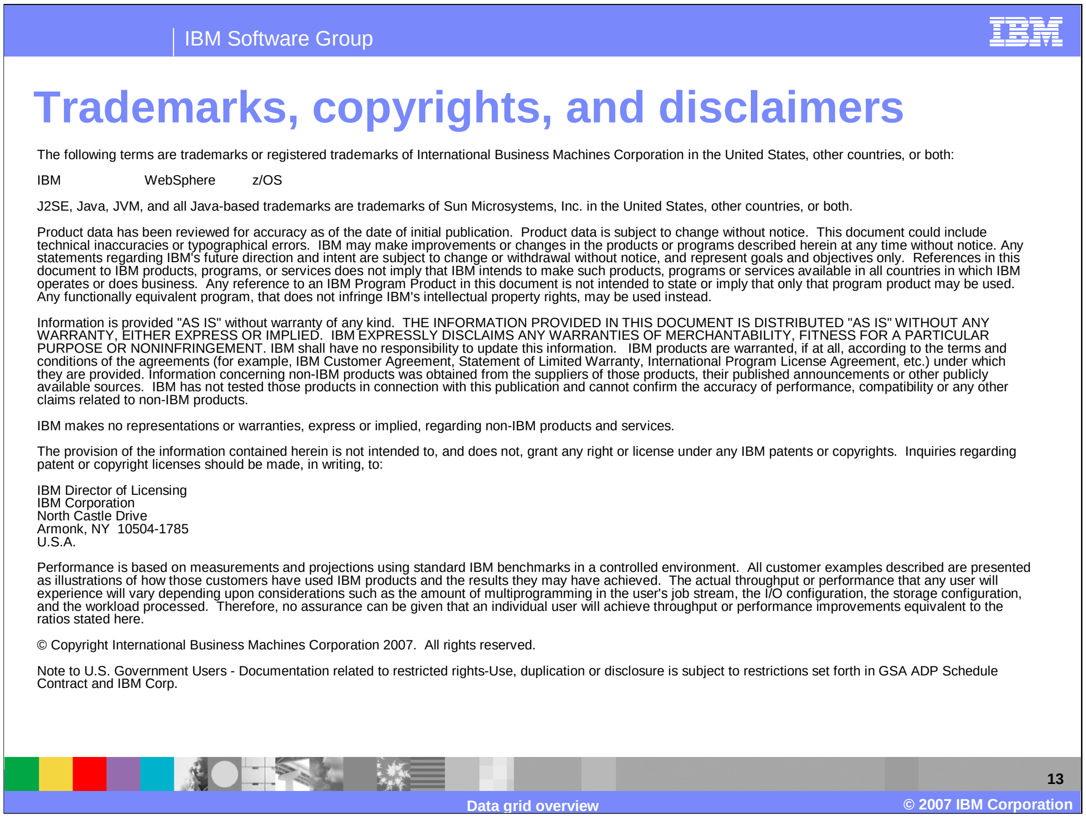

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