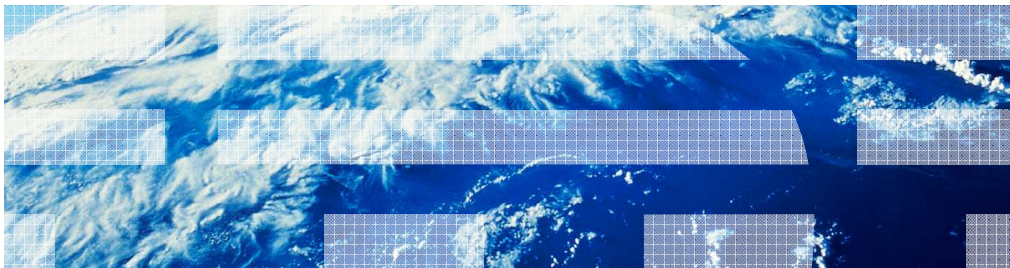

IBM WebSphere DataPower XC10

Overview



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This presentation provides an overview of the IBM WebSphere DataPower XC10 product.

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- IBM WebSphere DataPower XC10 product overview
- eXtreme Scale concepts
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- Product benefits

The presentation provides an introduction to the IBM WebSphere DataPower XC10 Appliance, including the product overview, background on some of the eXtreme Scale concepts incorporated into the product, supported runtime scenarios, and the product benefits.

Section

Product overview

This section contains the product overview.

IBM WebSphere DataPower XC10 overview



- Easy-to-use, high performance caching appliance
- Provides simplified deployment at the caching tier of your enterprise application infrastructure
- Designed for rapid, "drop-in" use in conjunction with WebSphere Application Server
- Data-oriented caching functions can scale cost effectively with consistent performance

The IBM WebSphere DataPower XC10 is a purpose-built, easy-to-use appliance designed for simplified deployment at the caching tier of your enterprise application infrastructure. The DataPower XC10 is designed for rapid, "drop-in" use in conjunction with WebSphere Application Server and other WebSphere family products. Because your needed data can be stored on the appliance in an in-memory grid, application caching functions can be performed extremely fast and can scale with consistent performance. Note the box displayed is a 9004 box which is what was available for version 1.

IBM WebSphere DataPower XC10 V2 (New in V2!)



- ✓ New Form Factor (2U)
- ✓ Larger Cache (240 GB)
- ✓ Better Performance (Faster SSD, Use of RAM)
- ✓ Improved monitoring (SNMP Support)
- ✓ Support for non-Java Applications (REST Gateway)
- ✓ Grid Capping

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IBM WebSphere DataPower XC10 V2 9005 box is slightly different from the version 1 box seen in the previous slide. It is a 2-U form factor with a larger cache and better performance

The cache size is 240 GB. The cache scales elastically without application downtime. The result is a linear, predictable scaling at predictable cost. The ability to quickly and easily increase cache capacity as needs grow, unbinds cache from application server memory constraints. The hardware specific comparisons are displayed on the next slide.



IBM WebSphere DataPower XC10 capacity

Platform	DataPower 9004	DataPower 9005 (New in v2!)
Form	1U mountable appliance	2U mountable appliance
Ram	32Gb	96GB
Solid-state drive	160GB	320GB
Effective cache size	107GB	240GB
Cache architecture	32-bit	64-bit
Processor	Dual 4-core Intel Xeon processor	Dual 6-core Intel Xeon processors
Ethernet	4 x 1Gb	2 x 10Gb 8 x 1Gb

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Overview

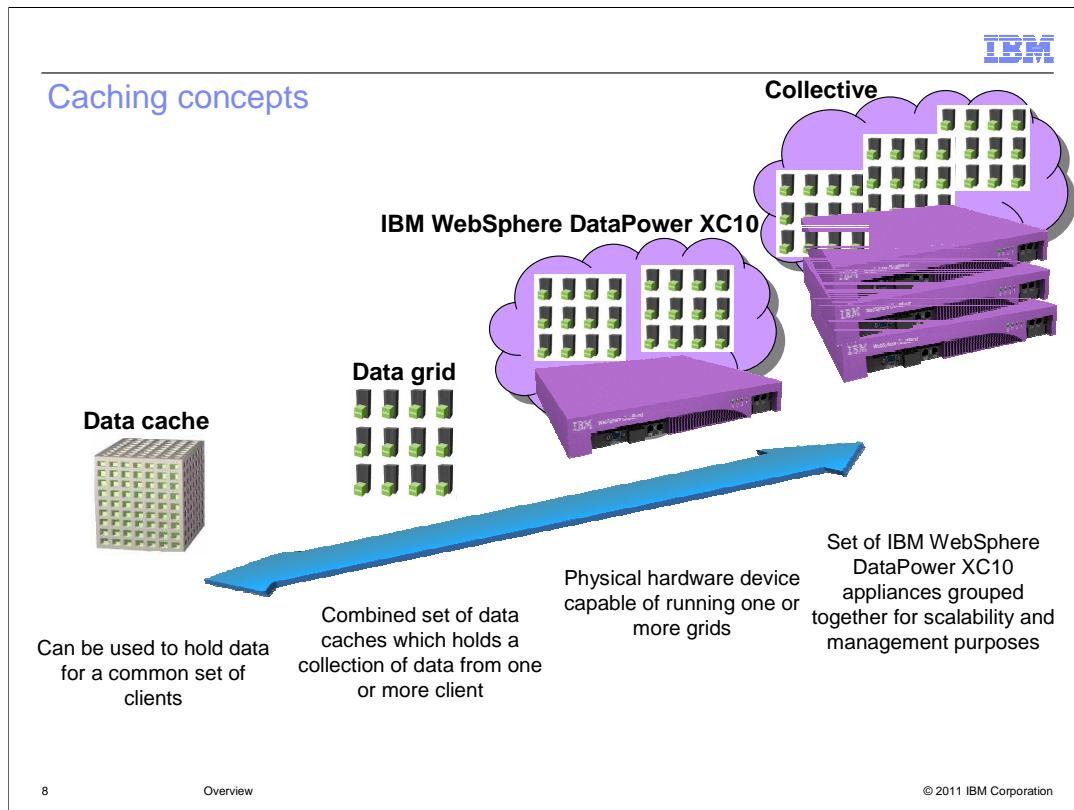
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This slide shows you the comparison numbers for the hardware 9004 versus 9005.

The IBM WebSphere DataPower XC10 V1 was based on the DataPower 9004 platform and contained 160 Gigabytes of storage per unit. On the contrary, IBM WebSphere DataPower XC10 V2 is based on 9005 platform which contains 320 Gigabytes of storage per unit (twice as much). Ram is 240, cache size is 240 GB and it's a dual 6-core intel processor. The performance improvement between these two pieces of hardware is tremendous. It's approximately 6 times comparing a 9004 v1.x to a 9005 v2.x .

eXtreme Scale concepts

This section explores some eXtreme Scale caching concepts to provide an understanding of how IBM applied its market-proven capabilities in caching software to an appliance offering.



Starting on the left of the diagram, at the base level, there is a data cache that can be used to hold data for a common set of clients. It is topology independent.

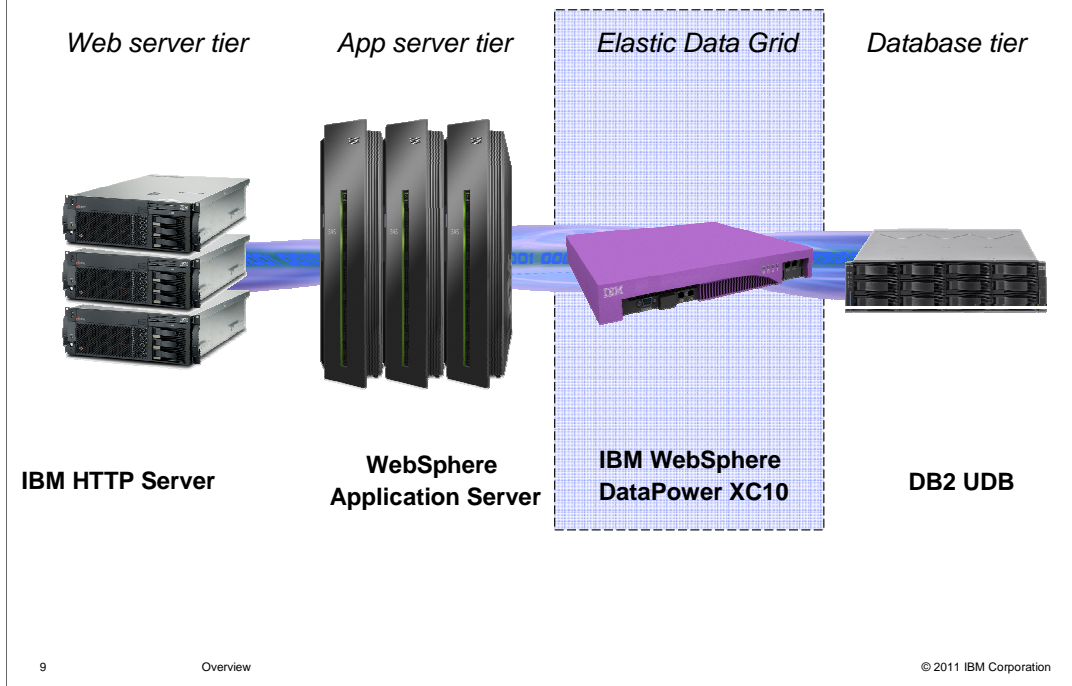
Moving to the right, a grid extends the capacity of your data cache by combining a collection of data caches together to act as a single, loosely-coupled, cache entity.

The IBM WebSphere DataPower XC10 is a physical hardware device capable of holding one or more grids. This allows you to easily bundle multiple data caches to create a grid and use an appliance that can hold and manage one or more grids.

Looking at the last picture on the right, to extend the appliance grid, a collective is a set of IBM WebSphere DataPower XC10 appliances grouped together for scalability and management purposes.

The collective offers high availability and fault tolerance. If an appliance housing the primary data grid fails, a replica on another appliance in the collective is automatically promoted to be the primary. Multiple replicas can be supported and are transparent to the application that uses the DataPower XC10 appliance to store data. The collective lowers risk of data loss through automatic replication of data. The result is business application data is available whenever the client needs it.

Scale with simplicity



Scalability is the ability of a system to handle increasing load in a graceful manner. Traditionally, to scale out to accommodate increasing load you have to scale at all tiers, which means proliferation of web server and application server tiers and the complexity or manual work that can be required to manage and maintain them. You also have a database that you continue to scale up, but eventually it can become a bottleneck for your transaction processing, and you reach the physical and cost limitations quickly. But there is a simpler way to address the scaling needs for your applications. Introduce the IBM WebSphere DataPower XC10 into your environment. If you look at your total caching solution, you will likely grow your web tier and your application server tier some over time. By adding an elastic data grid into your architecture and “adding a few more” DataPower XC10 appliances to your environment when needed, you can very quickly and easily scale out, increase your cache capacity and your data transaction volumes with minimally invasive changes to your applications and architecture. In doing this, you also drastically reduce your reads and writes on the database, cutting back on those time and resource intensive calls that created your bottleneck in the traditional approach.

Supported runtime scenarios

This section covers the supported common usage scenarios that the IBM WebSphere DataPower XC10 can be used for.

Simple cache

- Used to store data for fast, lower-cost access than a database
- Uses ObjectMap APIs from WebSphere eXtreme Scale
- Every time data is needed, the web side cache on the DataPower XC10 Appliance is checked first
- If the value is not found (cache miss), then the data is retrieved from the backend database and inserted into the cache
- Client can run in a standard Java EE compliant server environment or in any Java Virtual Machine compliant with Java SE V1.5 or beyond

The IBM WebSphere DataPower XC10 can be used as a primary data store to cache catalogs, master data, profiles, or any “session” type data, for fast, lower-cost access than a database. The side cache uses the ObjectMap APIs derived from eXtreme Scale. Your application checks the side cache first to see if it contains a record. If there’s a cache miss, then the data is retrieved from the backend and inserted into the cache. The next time a call for that data is made, it will reside in the appliance side cache. The DataPower XC10 client can run either in a standard Java EE compliant server environment or any Java Virtual Machine compliant environment with Java SE V1.5 or beyond.

Offloaded session management for HTTP requests

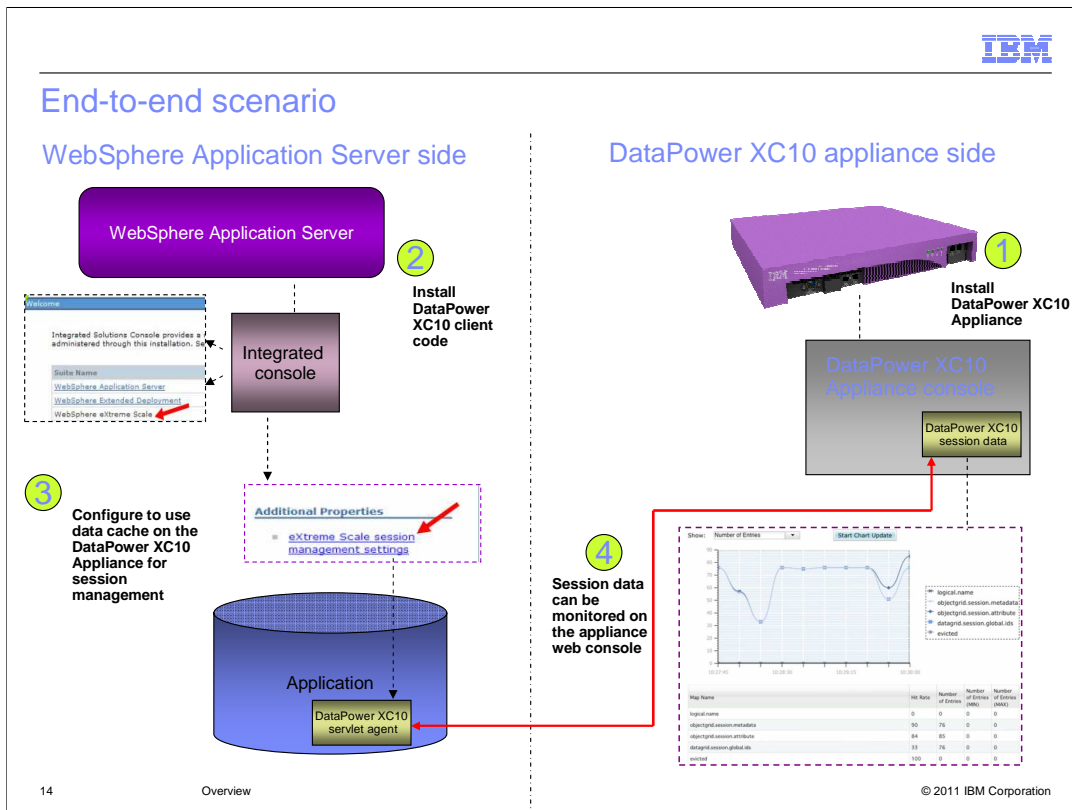
- WebSphere Application Server connects seamlessly to the DataPower XC10 appliance
 - Client code must be installed on WebSphere Application Server systems
- Easily configure WebSphere applications to store HTTP session data to a data cache on the DataPower XC10 appliance through the WebSphere Application Server administrative console
- Replaces other session replication mechanisms

Client code is provided that it easily plugs into an existing application on a WebSphere Application Server for seamless caching of HTTP session data on the DataPower XC10 Appliance. The integration is non-intrusive and just requires the integration of the persistence framework to the DataPower XC10 through a simple configuration panel in the WebSphere Application Server administrative console.

Elastic Dynamic Cache service support

- DataPower XC10 provides client code and a plug-in for WebSphere Application Server applications to support DynaCache API
- Allows applications deployed to WebSphere servers to use DataPower XC10 as a “drop-in” cache, instead of storing cache data in local memory or multiple instances of a disk cache

DataPower XC10 also provides client code and a plug-in for WebSphere Application Server applications to support the DynaCache APIs. Instead of storing cache data in local memory or multiple instances of a disk cache, applications can use DataPower XC10 as an alternative caching mechanism.



In this example, a WebSphere Application Server application deployer wants to configure an application that uses HTTP session management using the IBM WebSphere DataPower XC10 Appliance. First, ensure the IBM WebSphere DataPower XC10 Appliance is installed and configured in your company's computing environment. Second, ensure the eXtreme Scale V7.1 client code is installed in your WebSphere Application Server environment. When the deployer logs into the WebSphere administrative console, the Welcome screen will display the client code package and version number. A new step is displayed in the application installation flow and a session management configuration section is added to the server and application "Additional Properties" menus. In these three panels, you should enter the security credentials, ip address or host name of the DataPower XC10 Appliance, and specify the name of the data grid you want to use to cache your data. The Deployment Manager will then connect to the appliance, create the data grid if necessary, and retrieve the required configuration files to use the DataPower XC10 appliance for HTTP session persistence. You can then run your application to generate session data to be cached on the appliance. Finally, you can log into the IBM WebSphere DataPower XC10 web console to monitor the performance and health of the data grid.

Simplified Administration

One area that also contributes to that accelerated time to value is the easy to use administration features. (It can also keep administration costs down over time.)



Built-in console for management and administration

WebSphere DataPower XC10 Appliance Welcome, Administrator | Help | About

Home Data Grid Monitor Collective Tasks Appliance profile Log Out

Get Started

Configuring the IBM WebSphere DataPower XC10 Appliance

With IBM WebSphere DataPower XC10 Appliance, your applications can use fast, simple and elastic data caching in a variety of scenarios. Ensure your appliance administrator has configured the appliance before proceeding with any caching scenarios.

Step 1: Set up the appliance

Customize the appliance settings. Create users and groups with defined permissions.

[Customize settings](#) | [Create users](#)

[More information](#)

Step 2: Create an appliance collective for high availability

Form a collective by adding another single appliance to the configuration. Add to the collective by assimilating additional appliances.

[Add appliances to this collective](#)

[More information](#)

Step 3: Create and configure zones

Define zones to specify the physical location of each appliance in the collective. Zones determine where to place the primary and replica data in the data grid.

[Create and configure zones](#)

[More information](#)

Get Caching

Enabling applications to leverage IBM WebSphere DataPower XC10 Appliance

Applications can quickly begin to exploit the caching services of the IBM WebSphere DataPower XC10 Appliance through one of three supported caching scenarios.

Scenario 1: Simple data grid

You can use a generic data grid to speed up dynamic Web applications by alleviating database load. Key-value pairs of arbitrary data are stored in-memory.

[More information](#)

Create a simple data grid

Create a general use data grid for storing strings or objects.

[Create a simple data grid](#)

Scenario 2: Session management

IBM WebSphere DataPower XC10 Appliance can be used for storing HTTP application session information by creating session data grids.

[More information](#)

Create a session data grid

You can create a session data grid in the appliance console and associate the data grid with an application, or you can create a session data grid automatically when you install your application in the WebSphere Application Server configuration.

[Manually create session data grid](#)

Scenario 3: Dynamic cache provider

If you are not using HTTP session APIs then you can cache your application information with dynamic cache. The dynamic cache service attempts to provide performance benefits for retrieving data that may otherwise be expensive to get.

[More information](#)

Create a dynamic cache data grid

You can use the provided script to connect your existing dynamic cache configuration with a data grid. See the information center for more information about this script.

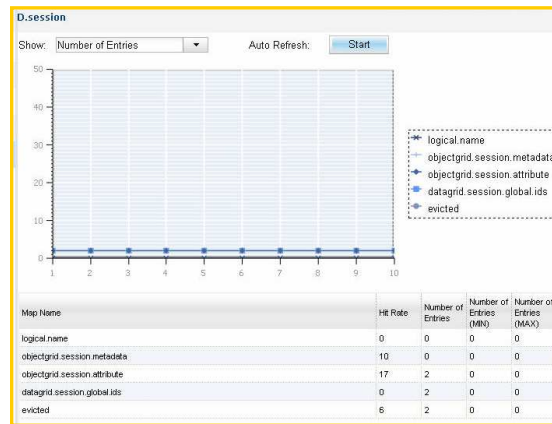
[View dynamic cache data grids](#)

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DataPower XC10 offers a built-in, simplified administration and monitoring console to enable efficient setup, configuration, and management of the appliance and transaction load within your datacenter.

Reporting and Monitoring

- Real-time monitoring that dynamically updates with the number of entries in the grid



Simplified monitoring of the runtime/health of the appliance (appliance specific): *DataPower XC10 includes status widgets to report key metrics pertaining to your transaction load and memory. Two examples of the reported metrics are memory/disk usage and average response time.*

New Version 2 features

The XC10 Version 2 firmware includes new features that can significantly accelerate time-to-value. A key feature is the easy to use administration features which will help administration costs down over time. This section will introduce those features

IBM DataPower XC10 version 2 additions

- Rest Gateway
- SNMP monitoring support
- Integration with other products:
 - WebSphere Commerce
 - WebSphere Portal
 - WebSphere Enterprise Service Bus
 - Xi50 (XC10 appliance as a side cache for Xi50)

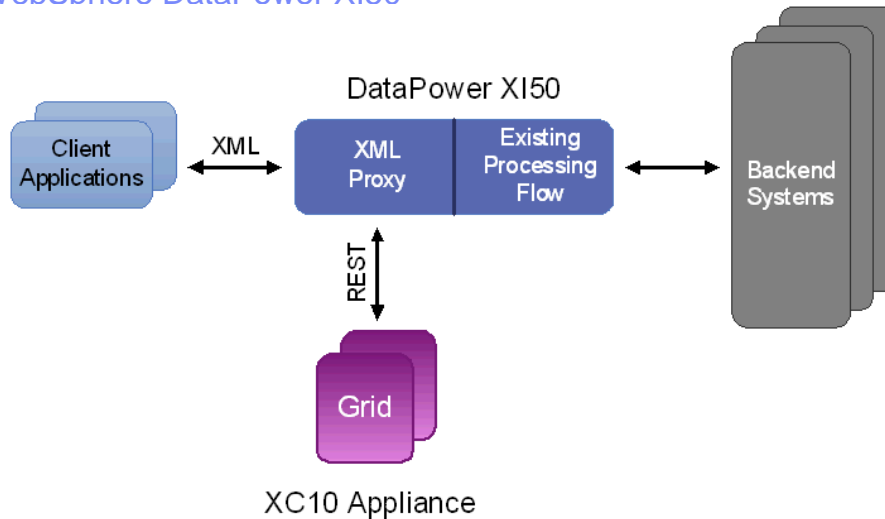
Some new features that have been added include the Rest gateway, SNMP monitoring, and integration with other products such as WebSphere Commerce, WebSphere Portal Server, WebSphere Enterprise Service Bus and support for using the XC10 appliance as a side cache for Xi50

REST Gateway

- Enables non-Java based clients access to simple data grids using a set of HTTP based operations. (e.g. .NET, php)
- Simple HTTP methods
 - HTTP POST method to insert/update data in the grid
 - HTTP GET method to get data from the grid
 - HTTP DELETE method to delete data from the grid.
- Supports creation of dynamic maps with 3 Time to Live (TTL) templates
 - None (no time to live expiration)
 - Last Access Time
 - Last Update Time
- Non-Java clients and Java clients can access the same data grids

The 1.0.0.4. release of the WebSphere DataPower XC10 firmware introduces a new feature, a REST Gateway. The REST Gateway provides non-Java based clients access to simple data grids using a set of HTTP based operations. This new feature expands the range of clients capable of utilizing the XC10 appliance for elastic caching to any client with HTTP capabilities, including php and .NET clients. Using the REST Gateway feature, the XC10 can be used as a Service Oriented Architecture (SOA) results side cache for the WebSphere DataPower XI50 Integration Appliance. Using the XC10's simple data grid as a side cache for an XI50 can significantly reduce the load on the back-end systems by eliminating redundant requests to the back-end systems, improve the response time to the clients and increase total system throughput. This article will highlight the REST Gateway feature of the XC10 and provide a high-level overview of XI50/XC10 integration.

WebSphere DataPower XC10 used as a Side Cache for WebSphere DataPower XI50

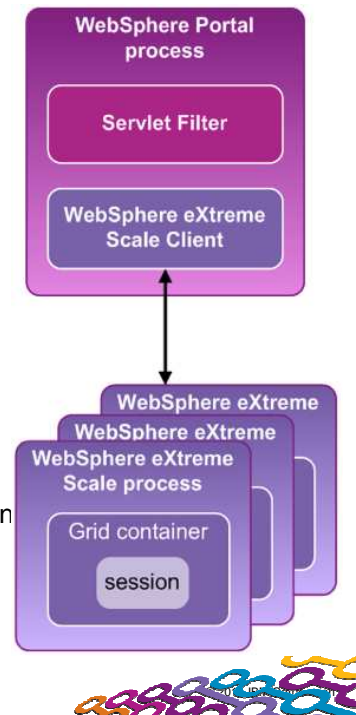


This figure shows the high-level design of the XI50 using the REST APIs to use XC10 simple data grids as a SOA results side-cache. As incoming client application requests are received, the XML proxy inspects the URL and the XML body contents to determine if the request meets the criteria for being cached, based on the caching policy rules. If the request is cacheable, the XML proxy will perform a standard side cache operation. Using the REST based HTTP GET method, the XML proxy will look to see if the request is cached in the simple data grid. If the HTTP GET returns an HTTP 404 NOT FOUND, signifying a cache miss, the XML proxy will allow the request to pass through to the existing processing flow to the application hosted in the back-end systems. The XML proxy will use the REST based HTTP POST method to insert the request into the request cache. The XML proxy will also cache the result to the result cache as it flows back through the XML proxy to the client application. If the incoming request was found in the request cache, then the result is retrieved from the result cache bypassing the back-end systems, thus removing the latency introduced by the application and data layers.

WebSphere Portal with eXtreme Scale

- Issue
 - HTTP session replication required for high availability
 - HTTP session data creates large memory requirements in the Portal Server (application) tier
 - More servers must be added when memory/session usage grows

- Solution
 - Use WebSphere eXtreme Scale session manager for session persistence and replication of customer portlets
 - Supported versions: WebSphere Portal v7.0 and WebSphere eXtreme Scale v7.1



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Overview

A major performance bottleneck in many Portal-based systems is the necessity to replicate large amounts HTTP session data for high availability.

Additionally, HTTP session data creates large memory requirements in the Portal Server (application) tier which means more servers must be added when memory/session usage grows. The solution to these problems is to use WebSphere eXtreme Scale session manager for session persistence and replication of customer portlets. The supported versions are WebSphere Portal v7.0 and WebSphere eXtreme Scale v7.1. The Key benefits of this integration are reduced hardware resources and improved session quality of service. Additionally, fewer servers and less memory is needed for customers who require session management. Multi-data center session replication enhances disaster recover solution. Finally, storing session data in a separate data tier can reduce the need to expand the application server tier.

SNMP

- Simple Network Management Protocol is a UDP-based network protocol
- With SNMP you can monitor hardware devices on the network for scenarios that require administration
- Common devices managed by SNMP include
 - Computer hosts
 - Routers
 - Switches
 - IP telephones
 - Printers
- WebSphere DataPower XC10 Appliance has an SNMP agent
 - Compatible with SNMPv1 and SNMPv2c specifications
- Clients can poll for information from the WebSphere DataPower XC10 SNMP agent

Simple Network Management Protocol is commonly known as SNMP. SNMP is a UDP-based network protocol that is commonly used to communicate with hardware devices on a computer network. SNMP provides a mechanism for monitoring hardware devices, and altering their configurations by requesting information from a service running on the hardware called an agent, and sending the agent requests to alter the hardware's configuration. Hardware devices that are commonly monitored and managed using SNMP include computer hosts, routers, switches, IP telephones, and network printers. Using an SNMP client to communicate with the hardware's SNMP agent, information about the current state of the hardware can be determined. Based on this information, requests can be sent to the device using SNMP to alter its configuration.

WebSphere DataPower XC10 V2.0 has a configurable SNMP agent. The SNMP agent supports SNMPv1 and SNMPv2c specifications. System administrators can configure a network management system to monitor WebSphere DataPower XC10 using MIB files downloaded from the appliance web console.

WebSphere DataPower XC10's SNMP agent runs on the appliance as a daemon. The port number is configurable, and system administrators that configure a network management system to monitor WebSphere DataPower XC10 can access the MIB files from the appliance console.

Product benefits

This section summarizes the IBM WebSphere DataPower XC10 product benefits.

IBM WebSphere DataPower XC10 benefits

- Accelerated time to value
 - *Reduces the time necessary for installation, setup, and configuration through intelligent defaults, 'drop-in' use for simple side cache scenarios, HTTP Session replication, and WebSphere Application Server dynamic cache service*
- Simplified management and administration
 - *Offers a built-in, simplified administration and monitoring console to enable efficient setup, configuration, and management of the appliance and transaction load within your datacenter*
- Ensures high availability of data for mission-critical applications
- Scales with simplicity
- Delivers high performance and consistent response times

The IBM WebSphere DataPower XC10 delivers an accelerated time to value and lowers the total cost of ownership, as it reduces the time required to install, setup, and configure the appliance to meet your caching needs. The drop-in use to existing architecture is available for the simple side cache, HTTP session replication, and DynaCache scenarios. The DataPower XC10 web console provides simplified management, administration, and monitoring of your data grid. As data or transaction volumes grow, more appliances can be added in a seamless fashion to handle the additional data and workload. The collective of multiple appliances provides high availability and lowers the risk of data loss through automatic replication of data. The IBM WebSphere DataPower XC10 solution delivers high performance and consistent response times to ensure application data is available whenever the client needs it.

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