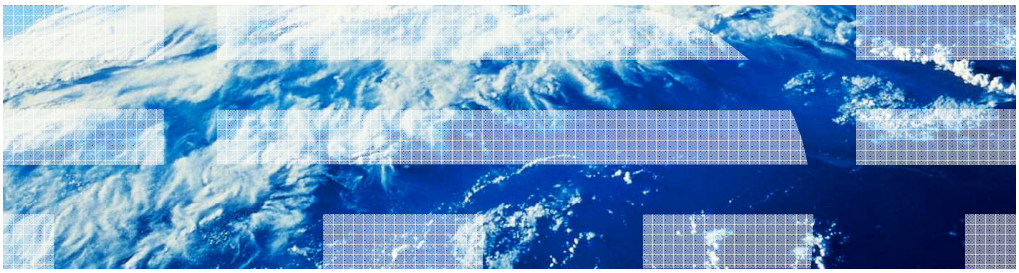
IBM WebSphere DataPower XC10 V2.0

XC10 as a side-cache for the XI50



WebSphere software

This presentation will discuss the WebSphere DataPower XC10 V2.0 and how it can perform as a side cache for the IBM WebSphere DataPower Integration Appliance XI50.

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The presentation will first cover a summary of the XC10 REST Gateway feature followed by a high level discussion of the XC10 integration with the XI50

Overview – Xi50 ESB

- Enterprise Service Bus (ESB)
  - Connects and integrates applications at the messaging layer
  - performs protocol mediation, message transformation, routing, process choreography etc
- WebSphere DataPower Integration Appliance XI50 is an ESB with:
  - highly scalable integration solution
  - capable of off-loading eXtensible Stylesheet Language Transformation (XSLT) processing, XPath routing, XML conversion and other resource intensive tasks

Here is some background on Xi50:

An Enterprise Service Bus (ESB) is a critical component of a Service Oriented Architecture. The ESB connects and integrates applications, services and business process flows at the messaging layer. It performs protocol mediation, message transformation, routing and process choreography. It also provides quality of service (security, reliable message delivery, and transaction management). The WebSphere DataPower Integration Appliance XI50 is a secure easy-to-deploy hardware ESB. The XI50 is a highly scalable integration solution in a purpose-built hardware appliance. It is capable of off-loading eXtensible Stylesheet Language Transformation (XSLT) processing, XPath routing, XML conversion and other resource intensive tasks. Such tasks include message-level or transport-level security processing from servers to reduce latency, improve throughput, and improve server utilization.

XC10 REST Gateway

- Provided in DataPower XC10 release 1.0.0.4
- Provides non-Java based client applications access to simple data grids
  - Uses HTTP-based operations
- Expands the range of clients capable of using the XC10 appliance for elastic caching
  - Client must have HTTP capabilities
  - Includes PHP and .NET clients

The 1.0.0.4 release of the IBM WebSphere DataPower XC10 Appliance firmware introduces a new REST Gateway feature. 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 IBM WebSphere DataPower XI50 Integration Appliance.

Elastic caching

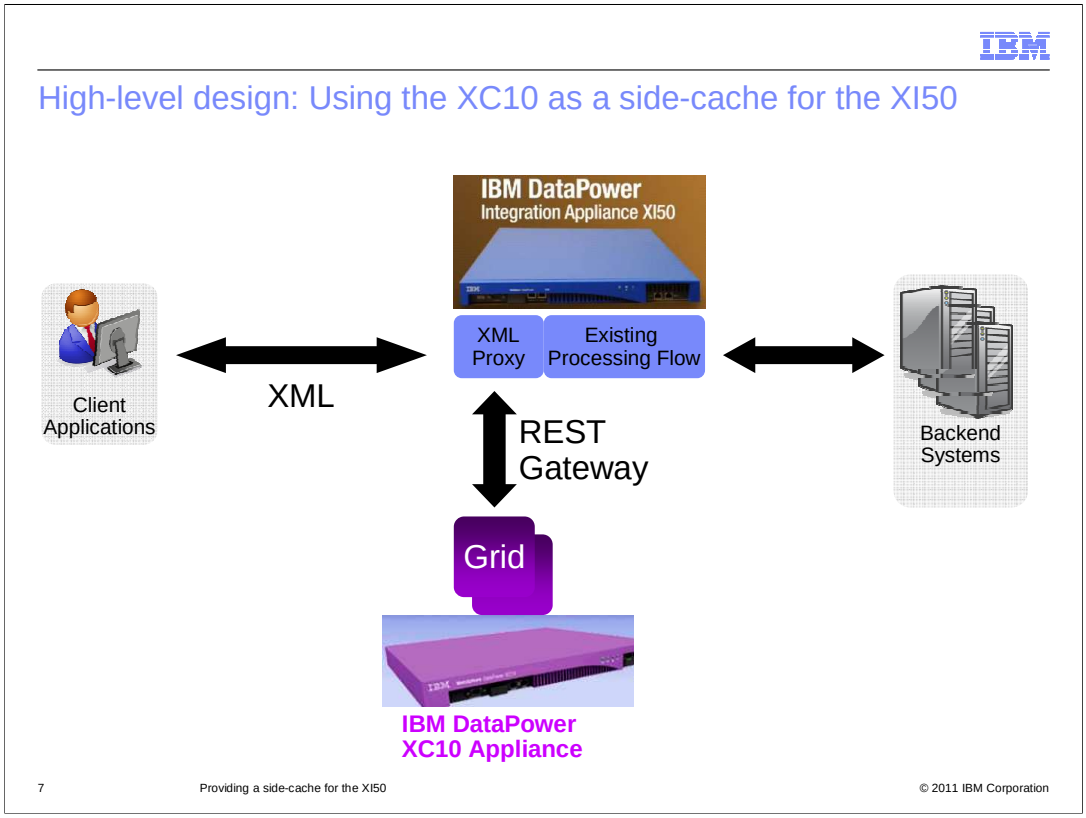
- XC10 REST Gateway feature can now integrate the elastic caching tier with the ESB
- Elastic caching tier now acts as a side cache for the ESB
  - Traditionally elastic caching tier was inserted between the application server tier and the database tier
- A simple data grid hosted on an XC10 functions as a cache for the XI50 hardware ESB
  - Reduces application processing and latency
  - Significant decrease in response time

Using the new XC10 REST Gateway feature, you can now integrate the elastic caching tier with the ESB. Traditionally, the elastic caching tier is inserted between the application server tier and the database tier with the elastic caching tier acting as a side cache for the ESB. A simple data grid hosted on an XC10 functions as a cache for the XI50 hardware ESB. In a traditional setting, all application requests pass through the ESB before they are routed to the application. Therefore, if the result of an application request is retrieved from the elastic caching tier, the application processing and processing latency for that request are eliminated. The result is a significant decrease in response time and reduction of application processing.

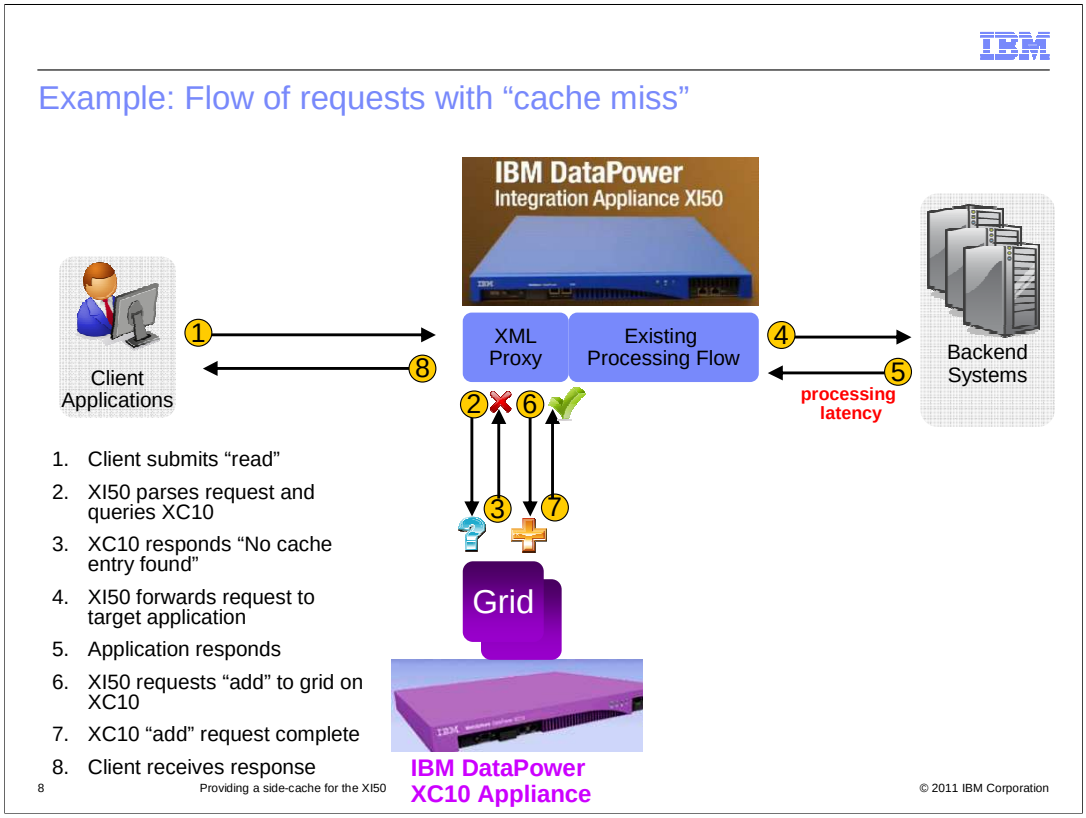
XC10 integration with Xi50

- An eXtensible Markup Language (XML) Proxy defined as the first component in the XI50 processing chain
- Set of “caching policy” rules used to determine if a request needs to cached
  - Caching rules are application specific
  - Caching rules defined using a set of XSLs
- Set of XLS used to generate appropriately formatted REST requests to the XC10 REST gateway

To use the XC10 as a side cache, an XML proxy is defined as the first component in the XI50 processing chain. It will use a set of **caching policy** rules to determine the cacheability of each incoming request. The rules are application specific, but in general, caching policy rules can trigger on the request URI, specific XML contents within the request body, or a combination of both. The rules are defined using XSL which is loaded into the XI50 memory. Additionally, a set of XSLs are used to generate the appropriately formatted REST requests to the XC10 REST gateway to store or retrieve data in the grid.

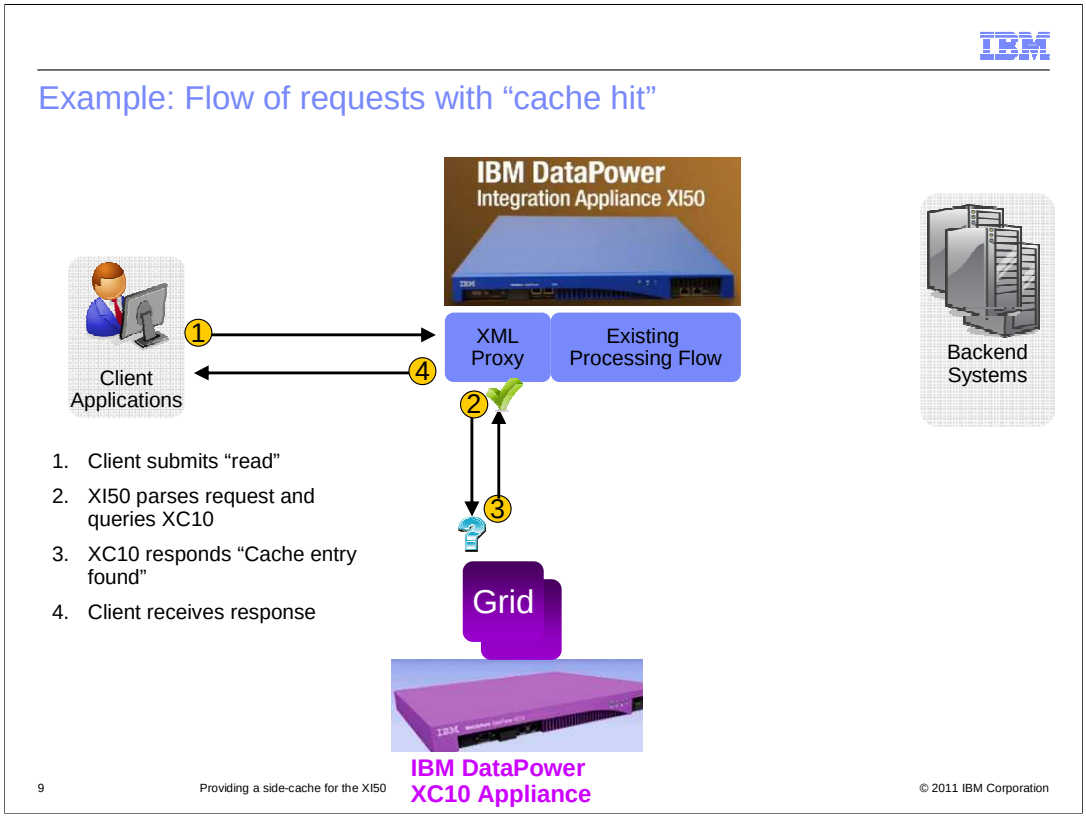


This slide shows the high-level design of the XI50 using the REST APIs to access the XC10 simple data grids as an SOA results side-cache. As incoming client application requests are received, the XML Proxy inspects the URI, the XML body contents – or both. This is to determine if the request meets the criteria for being cached, based on the caching policy rules defined in the XI50. 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, meaning 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 then cache the response as it flows back through the XML Proxy to the client application. The XML Proxy will use the REST-based HTTP POST method to insert the response into the side-cache. If the incoming request was found in the cache, then the result is retrieved from the cache, bypassing the back-end systems, thus removing the latency introduced by the application and data layers.



This example shows what happens when you issue an initial request for information stored on a backend system, for example product information from an on-line catalog.

You submit the request for a Product as indicated by the arrow labeled “1”. The requests is first read by the Front Side Handler. The XML Proxy then runs, which sees that the request matches a rule that you configured for a side-cache request. Arrow “2” shows the XML Proxy issuing a query to the XC10 to retrieve the data from a cache entry in the simple grid. The XC10 responds with “No cache entry found”. The XML Proxy then routes the request to the Back Side Handler which invokes the Sample Catalog Service running on the back-end server as shown by arrow “4”. The XML Proxy requests that the data be added to the simple grid on the XC10 as shown by arrow “6” and the XC10 replies that the add was successful. The arrow labeled “8” shows that the response to the client is successfully delivered. Now that the information for a particular Product has been inserted into the side-cache, subsequent requests for that Product are much faster.



This example shows what happens when you do a Search request for Product information which has already been inserted into the side-cache. The client submits the request for a Product. The request is first read by the Front Side Handler. The XML Proxy then runs, which sees that the request matches a rule that you configured for a side-cache request. The XML Proxy issues a query to the XC10 to retrieve the data from a cache entry in the simple grid. The XC10 returns the data – cache hit, shown by arrow “3”. Then, as depicted by arrow “4”, the proxy routes the response data back to the client application.

Since the data for a particular Product was already cached, requests for that Product are very fast since they are not routed to the backend system at all.

Requirements

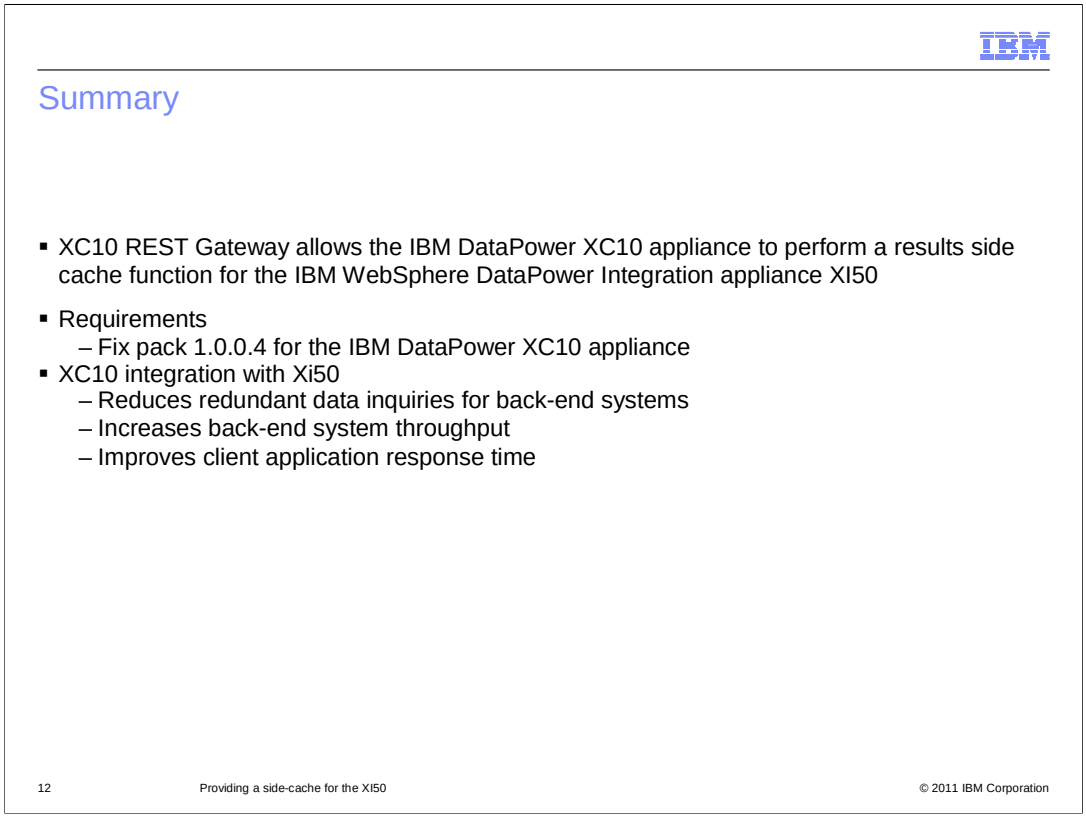
- XC10
  - WebSphere DataPower XC10 firmware release 1.0.0.4 or higher
- XI50
  - No specific firmware requirements
  - XML Proxy
- WebSphere Application Server
  - Most levels that support web services

Using the DataPower XC10 as a results side-cache for the XI50 requires the minimum level of 1.0.0.4 for DataPower XC10 which is the first level with the REST Gateway. For the IBM DataPower Integration Appliance XI50, there is no required level, other than a supported software release. The XI50 should be customized with an XML Proxy. For WebSphere Application server, any level that supports web services should work.

Section

Summary

This section will summarize this presentation.



The IBM DataPower XC10 REST Gateway feature allows the appliance to perform a results side cache function for the IBM WebSphere DataPower Integration Appliance XI50. The REST Gateway feature is available starting with IBM DataPower XC10 version 1.0.0.4, also called fix pack 4. For the back-end system, the XC10 integration with Xi50 increases system throughput by reducing redundant data inquiries, while the client sees a drastic improvement in response time.
In summary, you have seen howXC10 appliance can be integrated with a WebSphere DataPower XI50 Integration Appliance as a side cache to reduce response time to the clients, and improve total system throughput.

References

- Using the WebSphere DataPower XC10 Appliance as a side cache for the WebSphere DataPower XI50 Integration Appliance

https://www.ibm.com/developerworks/wikis/display/extremescale/Using+the+WebSphere+DataPower+XC10+Appliance+as+a+side+cache+for+the+WebSphere+DataPower+XI50+Integration+Appliance

- Information Center for IBM WebSphere DataPower Integration Appliance XI50
  - http://publib.boulder.ibm.com/infocenter/wsdatap/v3r8m1/index.jsp?topic=/xi50/welcome.htm
- Information Center for IBM WebSphere DataPower XC10 Appliance
  - http://publib.boulder.ibm.com/infocenter/wdpxc/v1r0/index.jsp?topic=/com.ibm.websphere.datapower.xc.doc/welcome/ic-homepage.html

Here are some references about the IBM DataPower XC10 appliance and the IBM WebSphere DataPower Integration Appliance XI50. The first link provides detailed configuration steps for a sample application. The Information Centers provide more generalized configuration information.

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