IBM

Simon Kapadia

Redpaper

Strategic Overview of WebSphere Appliances

IBM® WebSphere® DataPower® Appliances simplify, govern, and optimize the delivery of services and applications and enhance the security of XML and IT services. They extend the capabilities of an infrastructure by providing a multitude of functions.

As IBM has grown its line of WebSphere DataPower Appliances, the capabilities have increased from the core business of service-oriented architecture (SOA) connectivity. WebSphere DataPower Appliances now serve areas of business-to-business (B2B) connectivity and web application proxying. These appliances also support Web 2.0 integration with JSON and REST, advanced application caching, rapid integration with cloud-based systems, and more.

WebSphere DataPower Appliances deliver their functions in a dedicated network device, cutting operational costs, reducing complexity, and improving performance. The latest generation of purpose-built hardware appliances includes increased capacity, flexibility, performance, and serviceability as compared to its predecessors.

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These appliances offer a pragmatic approach to security, integration, and intelligent application delivery as purpose-built, easy-to-consume, and easy-to-use products. WebSphere DataPower Appliances help you take advantage of the value of existing infrastructure investments and help reduce total cost of ownership.

This IBM Redpaper™ publication provides a summary of the WebSphere appliances, including core functions and add-ons. The paper discusses the features of the appliances, use cases, and strategic impact for decision makers and architects.

Service gateway appliance (XG45)

IBM DataPower previously included the following major appliances:

- ► XS40 designed for "edge of network" security
- ► XI50 integration appliance
- ► XB60 for B2B

The XS40 was a capable security device, but clients asked for an entry-level appliance to use as an "SOA gateway." The XG45 is a response to that client request, which is signified in part by the naming of the appliance. With the XG45, the letter is changed from *S* for *Security* to *G* for *Gateway*.

The XG45 fulfills the role of an upgraded XS40 and provides an entry-level variant of the XI50. The XG45 includes the previous security features, such as the IBM Tivoli® Access Manager client, which was an option with the XS40. The XG45 also handles multiple protocols (such as JMS, WebSphere MQ, and FTP) and includes an optional Data Integration Module that enables non-XML processing with PKCS7 cryptography.

The XG45 (Figure 1 on page 8) occupies the DMZ and authorizes traffic to services in the secure zone. The XG45 adds a security enforcement point and provides entry-level SOA functionality.

The XG45 provides benefits in the following use cases:

- ► Providing authorized web services and applying security constraints

- ► Supporting authorized web applications and providing access control

- ► Performing dynamic routing based on almost any part of incoming messages or the accompanying metadata

- ► Transforming non-XML messages (with the optional Data Integration Module) into formats more easily understood by back-end services, providing secure, sanitized, validated, and safe input for those service

- ► Threat protection (denial of service, SQL injection, and so on)

- ► Maintenance of service level agreements (SLAs) using monitors

Integration appliances (XI52, XI50B, and XI50Z)

The DataPower integration appliances (XI52, XI50B, XI50Z) are the core of the WebSphere DataPower Appliances offering. The XI series of appliances are deployed successfully at thousands of client sites worldwide. The appliance processes large numbers of service requests that would not be possible without its capabilities. Integration appliances deliver message transformation, integration, and routing functions in a dedicated network device, cutting operational costs and improving performance.

Integration appliances can do everything that the XG45 can do but in the larger 7199/9005 2U chassis (shown in Figure 2 on page 9). Thus, they have more resources, such as memory, available to help them perform their role. In addition, integration appliances have access to certain protocols, such as SFTP, MQFTE, Tibco EMS, and IBM IMS™. Integration appliances can use Applications Optimization (including self-load balancing).

Integration appliances provide benefits in the following use cases:

- ► Serving as a secure FTP gateway to a private network using SFTP

- ► Providing security, threat protection, and AAA to an MQFTE integration

- ► Bridging solutions that use Tibco EMS and the IBM queuing systems, such as WebSphere MQ

- ► Providing a fast, secure web services gateway to an IMS

B2B appliance (XB62)

Business-to-business (B2B) scenarios require an appliance that can handle the most widely used B2B messaging protocols, partner profiles, transaction state, and non-repudiation of data and documents. This appliance must be able to store large amounts of data to permanent storage (hard disk).

This design feature requires a device that is persistent with both transaction metadata and multiple copies of the payload. This device is used for non-repudiation of origin and receipt. B2B processing requires heavy persistence to retrieve and store large amounts of data, to be able to send and resend messages, to be able to view data from past transactions, and more.

The DataPower B2B Appliance XB62 (Figure 2 on page 9), the successor to the XB60, provides a high-throughput, secure entry point at the edge for routing data into enterprises. The appliance is a purpose-built hardware B2B-enabled enterprise service bus (ESB). The XB62 provides simplified deployment and hardened security with the ability to transform data between a wide variety of formats, including XML, industry binary file standards, and custom formats. The device provides core B2B functions, including B2B messaging (AS1, AS2, AS3, and ebMS).

Another B2B function provided by the XB62 is partner profile administration, which also includes support for the ebXML Collaboration Protocol Profile Agreement (CPPA) standard. The appliance also provides routing of electronic data interchange (EDI), XML, and binary payloads, auto-archiving and purging of B2B transactions, and B2B transaction viewing capabilities. The ESB functions include routing, bridging, transformation, and event handling.

Typical XB62 use cases are focused around B2B integration, with the ability to rapidly on-board partners and move B2B governance and security to the edge of the network. The application rejects unwanted partner connections before they enter the protected network.

The appliance is Drummond Group certified interoperable for both AS2 and ebMS v2.0. Thus, the XB62 provides assurance that connection to partners who are using other vendor products that are also certified can be accomplished much more efficiently. Most importantly, the appliance can review, correlate, resend B2B transactions, and archive and purge historical data.

Edge appliance (XE82)

The WebSphere DataPower Edge Appliance XE82 provides an integrated, edge-of-network traffic gateway that can consolidate traffic and monitor, manage, and accelerate web application delivery. The DataPower Edge acts as a web application gateway. This appliance is a 2U hardware unit, the same size as the one shown in Figure 2 on page 9.

The XE82 is a *reverse proxy* for web applications that creates a single point of configuration and maintenance. The device acts as an SSL terminator, using its fast on-board cryptographic hardware to accelerate the initial PKI handshakes and caching SSL session keys to minimize handshake repetition.

The XE82 uses DataPower Application Optimization technology. Application Optimization allows the device to perform self-load balancing, with multiple XE82 appliances sharing the IP address. This function eliminates the need for a load balancer and reduces one hop in access to the server.

The XE82 can maintain *session affinity*, keeping calls from a client "stuck" to the same server as long as that server remains working and capable of servicing the requests. The XE82 also includes *intelligent load distribution*, where the appliance performs internal load balancing to back-end servers. The application adjusts weights dynamically, based on response time, processor utilization, and other factors that are monitored on the back-end servers.

The device also matches service targets with the capacities and performance of the back-end servers. Application Optimization works well with IBM application server products, but the XE82 can also intelligently load balance and maintain affinity for non-IBM back-end servers.

Caching appliance (XC10)

The IBM WebSphere DataPower XC10 is a purpose-built, easy-to-use appliance designed for simplified deployment and hardened security at the caching tier of an enterprise application infrastructure. The XC10 V2 incorporates a 240 GB cache into the DataPower line of appliances. The appliance adds elastic caching functions that enable business critical applications to scale cost effectively with consistent performance.

The XC10 allows business applications to process millions of transactions per day with efficiency and near-linear scalability. With the XC10, you can take advantage of the value of existing infrastructure investments and bring higher performance, fault tolerance, and scalability to common distributed caching scenarios.

The XC10 is a 2U hardware unit, the same size as the one shown in Figure 2 on page 9.

The XC10 provides benefits in the following use cases:

► Serving as a simple, high-performance, scalable "drop in" replacement cache for WebSphere functionality, such as HTTP Session data caching and dynacache, requiring little configuration and application code changes

► Serving as a cache for use by application code using the ObjectMap API

► Serving as a "side cache" for other DataPower appliances, using REST calls to access the huge cache size for storing XML objects and reducing calls to the back-end system

IBM Workload Deployer

IBM Workload Deployer is an evolution of the IBM WebSphere CloudBurst® 2.0 appliance. Workload Deployer drives the use of patterns, templates, and automation to simplify and accelerate the definition and deployment of private cloud solutions. This appliance (Figure 2 on page 9) provides more processing power, storage, and network capacity.

Workload Deployer provides Hypervisor Edition Images of WebSphere Portal Server and IBM Lotus® Web Content Management, IBM DB2®, WebSphere Process Server, WebSphere MQ, and WebSphere Message Broker. The appliance also provides images of IBM HTTP Server and WebSphere Application Server. It can distribute custom images, including those created using IBM Image Construction and Composition Tool.

IBM Workload Deployer works with patterns that describe the logical configuration of both physical and virtual hardware, which you can customize according to application requirements. You can use these patterns multiple times, creating multiple environments with the same configuration in a few minutes.

IBM Workload Deployer introduces a feature called *automatic elasticity*. With this feature, the deployment is created with a set of resources so that if the appliance becomes overloaded, IBM Workload Deployer can add resources automatically. For example, WebSphere nodes and cluster members can be added using automatic elasticity. IBM Workload Deployer monitors the load. As the load drops and additional resources are no longer required, Workload Deployer removes the resources automatically.

Cast Iron appliance (XH40)

IBM bought Cast Iron® in 2010 for its ability to integrate quickly and easily with cloud and Software as a Service (SaaS) applications using simple graphical tools. Although not an existing DataPower product, a DataPower Cast Iron appliance has been added to the choice of Cast Iron execution platforms to use a common hardware platform. Also, the appliance can take advantage of the performance benefits and design of this latest technology.

Cast Iron integration solutions are developed using a tool called *WebSphere Cast Iron Studio*. This graphical development environment allows you to create solutions that allow you to integrate applications without needing any programming knowledge. These solutions are then published to a Cast Iron runtime environment, such as a WebSphere DataPower Cast Iron Appliance XH40 (Figure 3 on page 10).

Cast Iron integration solutions allow data migration and synchronization between applications that can be on-premise. Examples of such appliances include databases such as SAP, or cloud-based applications, such as Salesforce.com. Cast Iron includes the following key features:

► Provides speed and simplicity using configuration instead of coding

► Offered as a cloud itself

► Comes with connectors that provide widely-used and on-premises SaaS options

► Provides a library of tailorable pre-created solutions, called *Template Integration Processes* (TIPs)

Cast Iron provides benefit in the following use cases:

► Exposing enterprise resource planning (ERP) information held in an on-premises application for sales agents using Salesforce.com

► Integrating separate on-premises insurance policy systems

- Synchronizing multiple on-premises e-commerce systems and then linking these systems to a SaaS Customer Relationship Management (CRM) application to provide a single view of clients
- Migrating data that is held in an existing on-premise system to a cloud-based SaaS

Appliance hardware

DataPower appliances are either rack-mountable 1U or 2U devices, or Blade servers that mount in an IBM BladeCenter® chassis. The Cast Iron appliance, with its focus on cloud integration, is also available as a virtual appliance for cloud deployment. The appliance is delivered as a VMWare ESX virtual machine image.

7198/9005 1U appliance

Previous generations of DataPower appliances all used a 1U form factor called the *9004*. 1U means a single *rack unit* of about 1.75 inches in height, with a shape resembling an elongated pizza box. The newer 1U appliances, known as the *7198* (Figure 1), are based on the most recent 9005 form factor.

This new slimmer appliance is the same height but is much more capable than the previous 9235/9004 line. This platform features six Ethernet interfaces (two of which are 10 Gb) and two RJ45 serial-over-LAN administrative ports for management. It ships with two 300 GB hard disk drives with 300 GB total storage in a RAID 1configuration.

Figure 1   7198/9005 1U appliance

The following products use this 1U form factor at time of writing:

- WebSphere DataPower Service Gateway XG45
- WebSphere DataPower Cast Iron Appliance XH40

7199/9005 2U appliance

The remaining DataPower appliances are based on a double height (2U) chassis. These appliances are taller than the prior appliances to enable them to deliver considerably more horsepower and capacity, internally and externally. Chief among these features is the enhanced networking capacity, with eight 1 Gb Ethernet ports, two 10 Gb ports, and a pair of RJ45 serial-over-LAN administrative ports.

The 2U appliances feature an LCD panel on the front. The network bays, hard disk drives, fans, and power supply are all replaceable units. The hard disk drives feature four 600 GB hard disk drives in a RAID 10 configuration. Six hundred GB are available to the user and 600 GB are reserved for system use. The appliance also includes a new RAID controller with write caching and battery backup. In addition, the flash size and memory are larger.

The 9005 7199 2U chassis (Figure 2) is currently used for the following DataPower models:

► WebSphere DataPower Integration Appliance XI52
► WebSphere DataPower B2B Appliance XB62
► WebSphere DataPower Edge Appliance XE82
► WebSphere DataPower XC10 V2 Appliance
► IBM Workload Deployer

Figure 2   7199/9005 2U appliance

4195 XI50B blade

The blade form factor is unique to the XI50B (Figure 3). It is designed to fit into a standard BladeCenter chassis and to work closely with other server blades. Putting the XI50 (predecessor to the XI52) into a blade is a good solution for reducing power and cooling requirements. These requirements make up an estimated half of all IT deployment costs.

Figure 3   DataPower blade

The IBM BladeCenter allows high-density deployments of Blade servers using stripped-down servers with a modular design. These servers provide the same function as full-fledged servers but minimize the use of physical space and energy. You can deploy the DataPower XI50B with a number of other servers into a single BladeCenter chassis, allowing for a single enclosed box solution to provide a full environment.

The XI50B blade ships with two 1 Gb Ethernet ports and two 10 Gb ports. The blade can use chassis storage, giving it access to large amount of high speed disk when required (for example, for logging). The blade can also integrate with the BladeCenter Trusted Platform Module (TPM) for encryption of the DataPower flash drive. The blade can also integrate with the BladeCenter management module for hardware management and monitoring functions.

2642 XI50Z blade for zEnterprise

The XI50Z is also a blade, using the same form factor as the 4195 but designed for the IBM zEnterprise™ BladeCenter Extension. Thus, you can use and manage this blade within the mainframe, taking advantage of advanced features. These features include the Sysplex Distributor and mainframe security services, and extension of mainframe quality of service to the DataPower platform.

Cast Iron XH40

Cast Iron is a special case in terms of DataPower appliances because it has a number of deployment options. These options include a physical appliance, a virtual appliance, and cloud deployments.

The cloud option, WebSphere Cast Iron Live, is a comprehensive multi-tenant cloud service that allows deployment of integration solutions in a cloud infrastructure. Although Cast Iron includes industry-leading cloud integration features, IBM also provides an appliance solution.

The appliance solution is available in the following configurations:

- ► As a physical appliance
- ► As a virtual appliance

These two configurations are functionally equivalent but have significant non-functional differences. The physical appliance comes with its own dedicated hardware platform. Thus, the appliance is likely to perform better than a virtual appliance deployed on a shared infrastructure. The physical appliance uses 7198/9005 1U hardware.

The virtual appliance ships in the form of a VMWare image designed for deployment on VMWare ESX Server. When deployed, it is configured and used in the same way as the physical appliance.

The team who wrote this paper

This paper was produced by a team of specialists from around the world working at the International Technical Support Organization, Raleigh Center.

Simon Kapadia is the Appliances Lead for IBM Software Services for WebSphere in EMEA (Europe, Middle East, Africa). He works on designing and implementing large distributed computer systems for IBM clients. Simon holds a bachelor's degree in English and Drama and a master's in Computer Science. Before joining IBM, Simon developed software for digital exchanges at Bell Laboratories, where he managed networks and web applications at a Polish ISP. He also supported and consulted on DCE, DFS, and Encina for Transarc Corporation.

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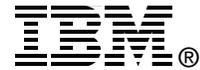
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