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IBM z13 for Mobile Applications

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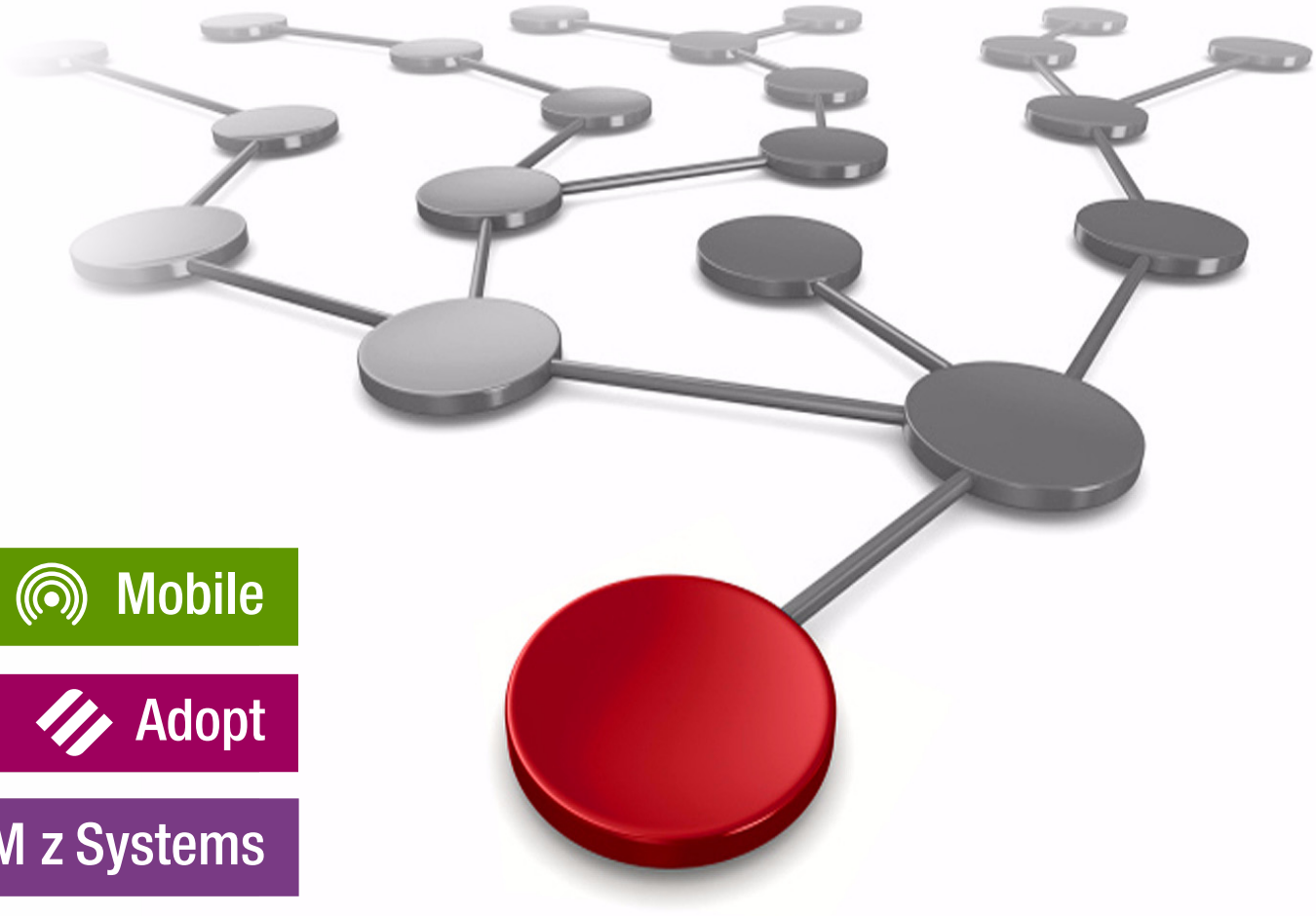

Mobile

Adopt

IBM z Systems

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Solution Guide

IBM z13 for Mobile Applications

IBM Redbooks Solution Guide

In today's mobile era, over 10 billion devices are accessing information. Enterprises are challenged with integrating new mobile services with existing organizational processes, without sacrificing the client's experience. Approximately 70% of all enterprise transactions involve IBM® z Systems™. This IBM Redbooks® Solution Guide describes how the new IBM z13™ with its enhanced data processing capabilities can play an important role by providing the secure and stable base that you need to extend your existing enterprise data and transactions to mobile users. Figure 1 depicts a typical environment where access to applications and interaction with the systems is achieved from mobile devices.

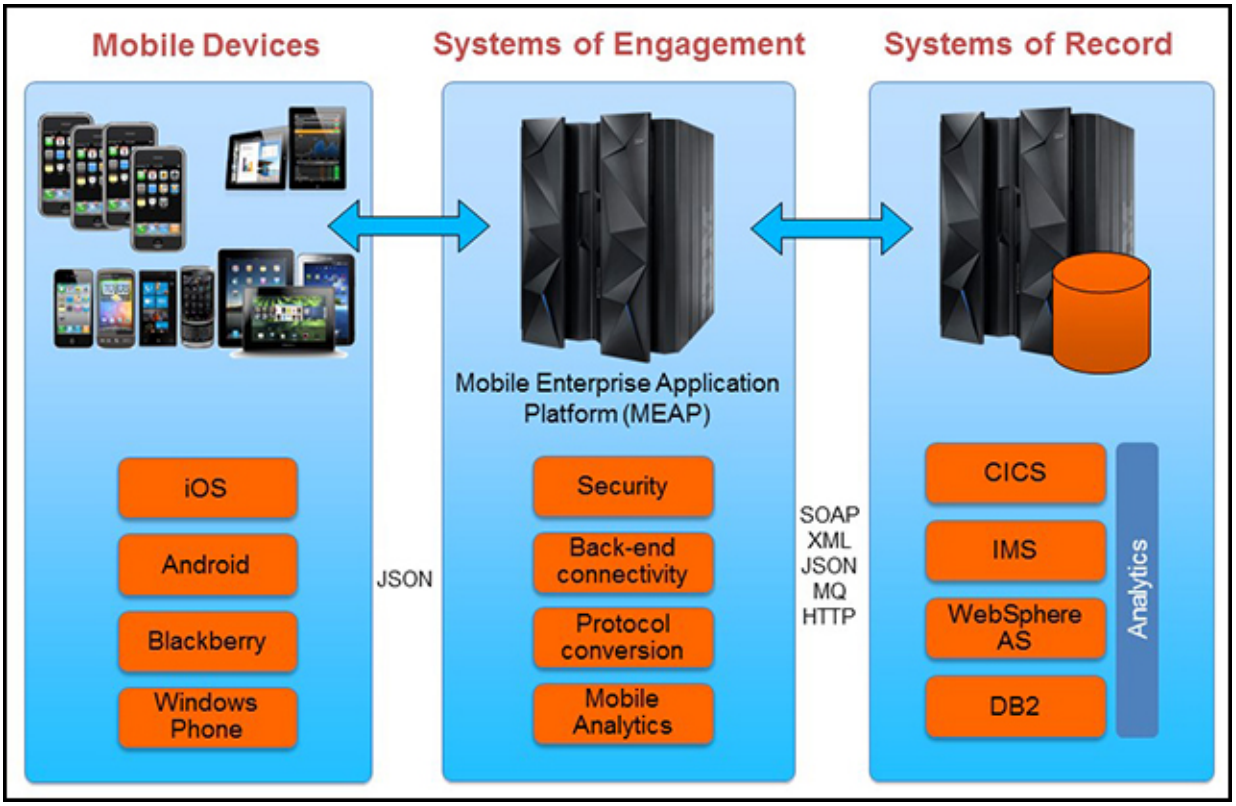

Figure 1 Systems of engagement (SOE) for mobile applications

IBM z Systems provide you with enterprise mobility solutions that can scale to handle the huge number of often unpredictable transaction rates and volumes, deliver proven mobile end-to-end integration with reliability, availability, and security, and ensure that your customer data is protected.

Did you know?

IBM has the leading platform in systems of record (SOR) with IBM z/OS®. IBM provides easily consumable mobile access to all the data and transactions in subsystems of z Systems software (IBM DB2®, CICS®, IMS™, MQ, and others). Customers can create engaging mobile apps today by using existing transactions on z Systems. IBM z/OS flagship operating system availability and scalability are crucial for mobile workloads.

IBM is also a key player in systems of engagement (SOEs), Linux on z Systems. Based on its availability and scalability, z Systems can handle mobile workloads. In this context, Linux on z Systems provides an excellent environment for mobile infrastructure.

IBM provides the tools to satisfy the lifecycle requirements for mobile application development, including, but not limited to these tools:

- IBM MobileFirst Studio (formerly IBM Worklight® Studio) offers leading tools for mobile app development, helping to maximize code reuse and accelerate development.
- IBM MobileFirst Server (formerly IBM Worklight Server) mobile-optimized middleware serves as a gateway between applications, back-end system,s and cloud-based services.

Business value

Business-critical solutions depend on where the source data resides. IBM z Systems deliver a single workload-optimized platform for operations (systems of record and systems of engagement, including mobile applications) and analytics by integrating and managing real-time, historical, and predictive views of data.

Keeping applications and data as close to each other and as secure as possible is a top priority for outperforming organizations, and this requires tight integration with operational data. When data resides on disparate and distant servers, several problems might be encountered:

- Significant effort is spent for moving data, resulting in veracity and security issues.
- Complicated, bifurcated infrastructure requires multiple skill types.
- No single point of management.
- Business continuity concerns.

Infrastructure matters for mobile applications. The IBM z System platform's scalability, security, and resilience can enhance critical mobile applications. The enterprise security capabilities of z Systems can help you simplify and improve a complex set of operational security processes. IBM z Systems are designed for the highest level of security for commercial grade platforms.

The main benefits of implementing mobile apps with IBM MobileFirst Platform on z Systems are as follows:

- Easy-to-consume APIs from CICS, DB2, and IMS allow you to leverage your investment in z/OS transactions to quickly add a mobile channel.
- z/OS enables massive and simple scalability in a single footprint, to handle the workload of millions of devices and sensors.
- IBM MobileFirst Platform security integrates with z/OS security providing end-to-end security and data privacy for mobile applications.
- z/OS Workload Management ensures your crucial applications remain responsive during sharp spikes in demand.

- Low-latency I/O. Mobile usage patterns favor short, read-only data requests (users check account balances), so fast access to operational data, with low latency, is key. The mainframe offers exceptional I/O with dedicated hardware I/O processors, reducing latency, which increases mobile app response times.
- Business resiliency for critical mobile applications.

In addition, the following features benefit the development and running of mobile applications on z13:

- Simultaneous multithreading (SMT): Integrated Facility for Linux (IFL) processors and zIIPs with software support
- Single-instruction, multiple-data (SIMD): Accelerating computation for analytics
- Large memory: Providing faster response time to Java and DB2 based applications (in general, any applications that can exploit large amount of in-memory data)
- High-performance communications (network and I/O): Shared Memory Communications over RDMA (SMC-R), IBM FICON® Express16S, and so on

Solution overview

A typical mobile application environment deployed on z Systems is shown in Figure 2.

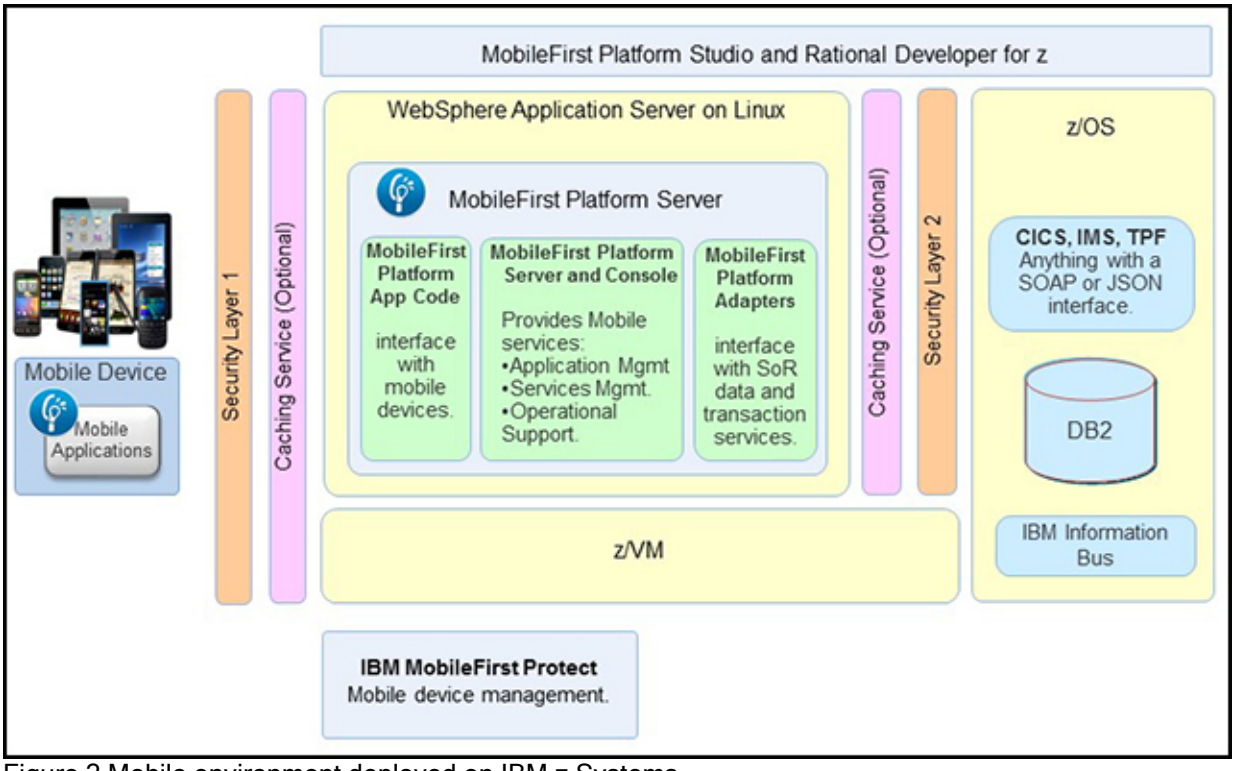

Figure 2 Mobile environment deployed on IBM z Systems

The Mobile Middle Tier adds the following components, which are not present in typical web applications:

- **Mobile Device Access Interfaces :** Mobile devices can interact with the Mobile Middle Tier (runtime servers) using open source protocol standards for mobile devices like Java Script Object Notation (JSON) or MQTT. The interfaces supported by the middle tier server qualify it for universality and flexibility.

- **Mobile Application Management (MAM):** The ability to manage multiple applications with respect to versions, device specifics, and operating systems
- **Mobile Device Management (MDM):** Management of device level security, access, policies.

  MDM is responsible to support multiple mobile devices and deliver an ease-of-use management for new devices and the process to keep existing ones current with the *push* notification
- **Mobile Services Management (MSM):** Various mechanisms to help control and manage mobile apps regardless of their type and OS, as in these examples:
  - Application versions to block faulty or out-of-date versions and seamlessly direct people to the (enterprise) app store
  - Authentication and access control
  - Push Services Management
  - Usage reports and analytics
- **Mobile Operational Support:** Mobile applications behave differently from traditional applications, have a much shorter life cycle management and change behavior, are more dynamic, and must respond very fast to customer requirements.

  The behavior of the Mobile Server must be monitored and (automatic) actions must be taken to avoid unplanned outages.
- **Integration Interfaces:** The interfaces to access and interact with data services and transactional services enable an integration of back-end systems such as transactional environments with CICS and data services from different databases and platforms.

Mobile topology choices can be classified as follows:

- **Browser access**: Applications are the same as mobile websites; they are coded in HTML and all their interaction is driven by an application server or web server.
  - Written in HTML5, JavaScript and CSS3.
  - Quick and cheap to develop,
  - Less powerful;
  - Browser access
- **Hybrid applications**: Combine both web and native application programming types. They contain natively coded features to interact with the mobile device, but may primarily interact with application servers in SOEs.
  - User arguments web code with native language for unique needs
  - Maximizing user experience;
  - Downloadable
- **Native applications**: Are coded in programming languages that run directly on mobile devices. They interact primarily with APIs provided by SORs, but may also run code on application servers in SOEs.
  - Platform-specific
  - Requires unique expertise
  - Costly and long development cycle
  - Can deliver higher user experience
  - Downloadable

Mobile application can be deployed with or without these components:

- An application server (IBM WebSphere Application Server)
- A portal
- IBM MobileFirst Platform
- IBM DataPower

Solution architecture

The architecture of an IBM MobileFirst Server solution on z Systems is shown in Figure 3.

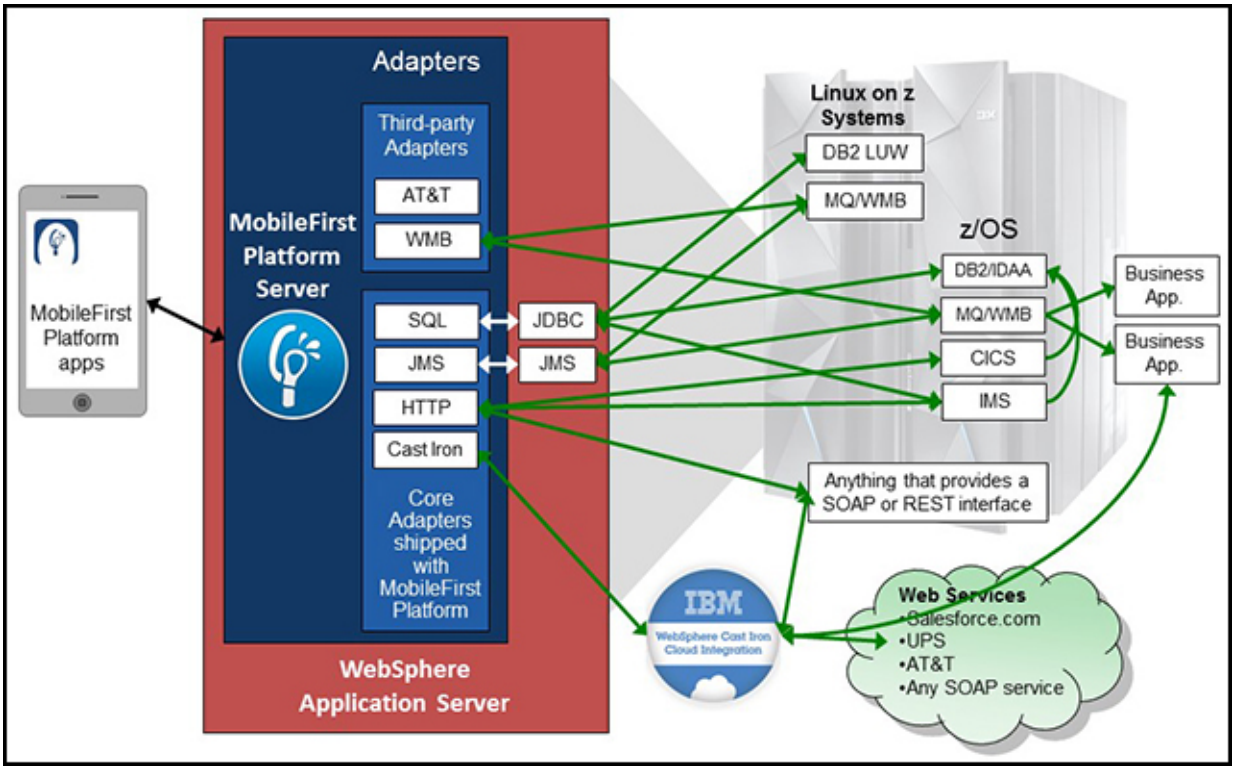

Figure 3 IBM MobileFirst Platform Server deployed on a z System

The application on the mobile device contains functions for authentication, a secured container for locally stored data, and a small component to securely connect to the IBM MobileFirst Server. When a mobile request reaches MobileFirst Server, further fine-grained security decisions can be incorporated into the application logic. After the correct access is granted, the application logic in MobileFirst Server then interacts with back-end services and data by using the MobileFirst adapters in securely configured z Systems connections. For high performance requirements, MobileFirst can run protocol switching between the requester and back-end service.

The flexibility of MobileFirst integration functions enables existing web services on z/OS to be integrated into mobile applications. A Mobile Feature Pack in CICS enables the communication by using the lightweight JSON protocol.

For highly scalable and reliable mobile solutions, z Systems can deliver the best platform to host these environments, and with the MobileFirst Application Center, you can build an enterprise app store for mobile apps.

IBM MobileFirst Platform can create native, web, or hybrid applications. The MobileFirst Platform HTTP adapter is used to invoke web services (SOAP over HTTP) or RESTful services (JSON over HTTP). For more information about MobileFirst adapters, see the IBM Knowledge Center: http://ibm.co/1FMqEDS

WebSphere Message Broker users can use “patterns” in the WebSphere Message Broker graphical interface to create MobileFirst Platform adapters to send messages to SAP, CICS, and IMS, DB2, Siebel, PeopleSoft (and other business applications). The patterns are deployed to the WebSphere Message Broker, and the adapters are imported into MobileFirst Platform to be used by mobile applications. WebSphere Message Broker adapter uses HTTP/JSON to communicate to the WebSphere Message Broker on z Systems.

Note: To access DB2 on z/OS, you still need a DB2 Connect license. That is installed in WebSphere Application Server with the JDBC driver.

Usage scenarios

IBM MobileFirst solutions on z Systems expand into a broad range of industries and organizations. Use cases apply to financial institutions, healthcare, education, computer services, retail, and more.

Assuming that you need your mobile service to be highly reliable, you must be sure to protect against hardware failure, loss of a network, issues with the operating system, and the application server that provides the mobile service. To provide this service, you typically duplicate each of these components and have multiple environments to acquire, operate, and replace after a time. Depending on how important your app is, you might duplicate all of these components again throughout another region. This redundancy is built into the z Systems platform.

An example of an architecture using IBM MobileFirst Platform Server for production is shown in Figure 4.

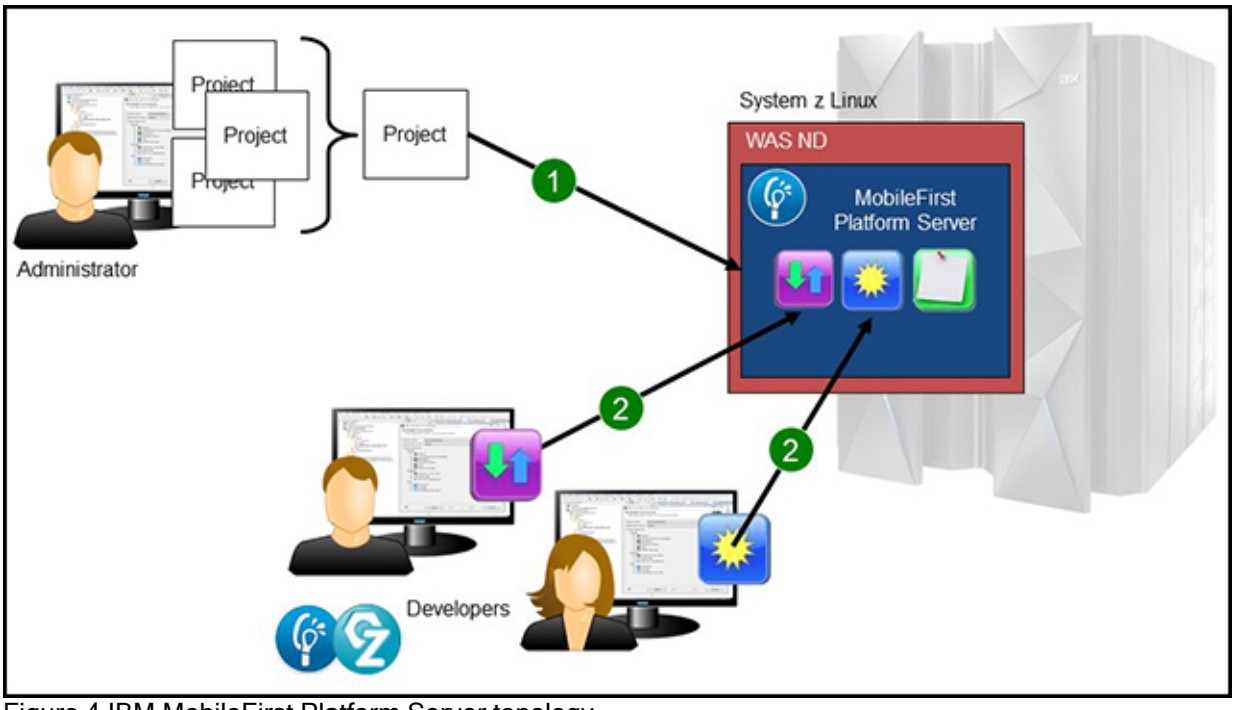

Figure 4 IBM MobileFirst Platform Server topology

In production, MobileFirst Platform web archive (WAR) files (projects) are merged to reduce the proliferation of MobileFirst Platform consoles. Each MobileFirst Platform server (project) has its own console. Administrators merge the security and other configurations in the projects into a single WAR file, which becomes a single MobileFirst Platform server. (This is done primarily because each MobileFirst Platform server has its own console, and administrators want to have the fewest number of MobileFirst Platform consoles.) Applications can then be deployed to that MobileFirst Platform server. Those apps originated as the separate WAR files the administrator merged.

Note: A MobileFirst Platform Project (in development) = a WAR = a MobileFirst Platform server.

The implementation of a mobile solution on z Systems can provide substantial advantages if you consider an implementation designed for high availability. This capability is because of the share-everything concepts in the design of the z Systems technology, which allows the sharing of processors and network channels, and in case of a failover, the switch to a second logical partition, without doubling the resources or machine capacity.

Figure 5 shows the implementation of a highly available mobile environment on the z Systems platform with an IBM DataPower® secure gateway (which is positioned in front of the mobile environment), shared capacity, and access to a transactional z/OS environment by using the z System internal network capability.

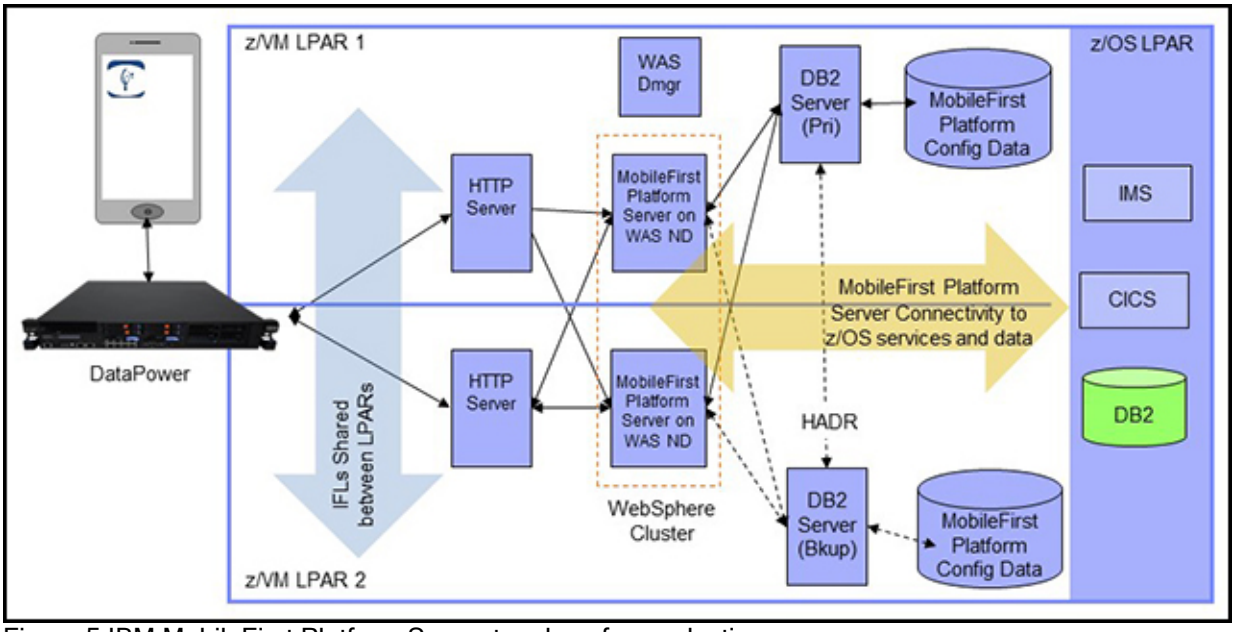

Figure 5 IBM MobileFirst Platform Server topology for production

Integration

The solution integrates well with IBM technologies and transactional and information services by using IBM MobileFirst adapters for the following items:

- HTTP
- JSON
- IBM WebSphere MQ
- MQTT
- SOA
- DB2

- IMS
- CICS through HTTP, JSON, and WebSphere MQ
- SAP

IBM MobileFirst products:

- IBM MobileFirst Studio is for mobile app development.
- IBM MobileFirst Server is mobile-optimized middleware that serves as a gateway between applications, back-end systems and cloud-based services.
- IBM MobileFirst Device Runtime Components offer runtime client application program interfaces (API) designed to enhance security, governance and usability.
- IBM MobileFirst Application Center enables you to set up an enterprise app store that manages the distribution of production-ready mobile apps.
- IBM MobileFirst Console is an administrative graphical interface, providing real-time operational analytics for the server, adapters, and applications and push services to help you manage, monitor, and instrument mobile apps.
- IBM WebSphere Application Server for Linux on z Systems.
- IBM CICS, DB2.

For details, see the following web page:
http://www.ibm.com/software/os/systemz/mobility/

Ordering information

This solution guide introduced a conceptual approach to building a MobileFirst deployment strategy with IBM z System at the core of the solution. This solution encompasses too many products and solutions to be listed here for ordering. To find individual product solution details, see the general IBM Offering Information page (announcement letters and sales manuals) at the following website:
http://www.ibm.com/common/ssi/index.wss?request_locale=en

You may also contact your IBM representative for ordering information.

Related information

For more information, see the following documents:

- *System z in a Mobile World*, REDP-5088:
  http://www.redbooks.ibm.com/abstracts/redp5088.html?Open
- IBM Offering Information page (announcement letters and sales manuals):
  http://www.ibm.com/common/ssi/index.wss?request_locale=en

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