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Securely Expose Business Assets and Fuel Innovation

Emily Farmer
Senior Software Engineer,
IBM Competitive Project Office

Cloud

z Systems

IBM

Point-of-View

The challenges of cloud computing

Highlights

Cloud computing is an obvious technology option considered by many C-level executives. However, understanding when and how to use it can make all the difference when it comes to business success or catastrophic failure.

- The cloud is arguably an appropriate platform for many Systems of Engagement applications.
- Systems of Record, with exceptionally high security requirements, are best hosted locally.
- IBM mainframes, the *de facto* Systems of Record for businesses today, require absolutely secure connectivity to off-premises cloud-based Systems of Engagement. IBM Bluemix provides this security.
- When secure connectivity is guaranteed, businesses can begin to explore the greater opportunities that are available when business assets are exposed under the API Economy.

The cloud is undeniably a major force in computing today. It's commonly believed that cloud computing is an easy way to reduce entry costs, simplify infrastructure management, and grow and shrink capacity quickly and easily. Many cloud platforms are available today that promise to make the transition fast, smooth, and straightforward.

However, savvy business leaders are not diving in carelessly. They have a smarter, more nuanced approach:

- They are cautious and understand the risks that are inherent with cloud computing.
- They are also visionary, asking themselves "what's the ongoing and future business value of cloud computing?".
- They understand and see how with the correct approach, the cloud may be a conduit for new previously unknown opportunities for growth and business innovation.

The first challenge is to understand which workloads are suitable for the cloud and which are not. Because the cloud is a highly agile, elastic and automated platform, it is ideal for hosting what are referred to as *Systems of Engagement* applications. Systems of Engagement applications are typically a primary point-of-contact for web and mobile front-end users. For example, a retail business might have a mobile "store front" application for purchasing goods, an airline may have a similar interface for booking and managing reservations, or an insurance company for easy filing of claims. The cloud offers a platform for these front-end applications that can easily be modified as needed as businesses grow and change.

And as much as the cloud is appropriate for many front-end applications, it is arguably not appropriate for the back-end Systems of Record workloads, our most sensitive, mission-critical business applications, and data. There are serious risks associated with cloud computing, including potential exposure of sensitive information, general loss of control, and less guarantee of full service delivery. Many governments have issued regulations against the use of cloud platforms for highly confidential citizen data. And most businesses now recognize that the System of Record must remain locally hosted to ensure the highest levels of security, governance, regulation, trust, management, availability, and truth.

Most enterprise businesses host their Systems of Record on IBM® mainframe computers, the most securable and available platform, designed to handle the loads, complexity and unpredictable nature that today's digital business demands.

Twenty-five of the world's top 25 banks, 10 of the top 10 insurance companies, more than 90% of US retailers, and more than 90% of the world's largest airlines all use IBM mainframes. All of these businesses are also undoubtedly exploring cloud computing options in some form. And all are most certainly looking for new business opportunities.

This situation presents a dilemma. It is a given that the future includes cloud-based Systems of Engagement applications connected to locally hosted mainframe-based Systems of Record. The question is, *how can you ensure that connectivity is highly secure and well managed such that this becomes a truly compelling business model and fuels new business innovations?* Figure 1 illustrates this question.

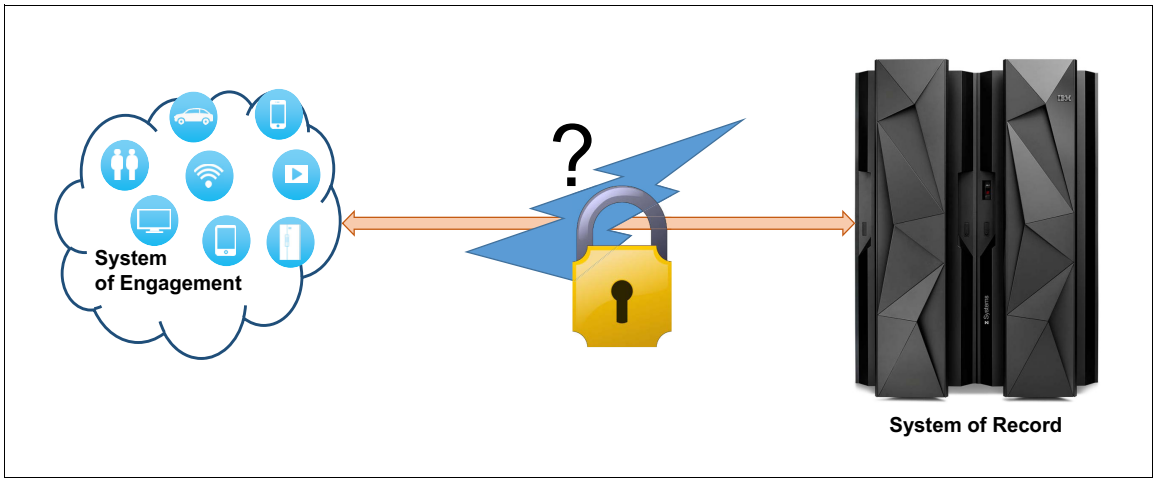

Figure 1 How to ensure connectivity is secure and managed between environments

This IBM Redbooks® Point-of-View publication helps answer this question, by first reinforcing the superior capabilities of the mainframe as a System of Record. We then introduce IBM Bluemix™, a cloud-based development platform with its secure connectivity options. Finally, we challenge you to look to the future and consider how the API Economy can further enrich your business.

The secure and open mainframe

The mainframe has been around for over 50 years. A *ComputerWeekly.com* article from March 2014 states that "Today, 80% of the world's corporate data is still managed by mainframes."[1] Mainframe applications including IBM Customer Information Control System (CICS®), IBM Information Management System (IMS™), and IBM WebSphere® Application Server drive today's business.

The platform has continuously grown and evolved over the years. The latest release of the mainframe (the IBM z13™) uses the very latest 22nm semiconductor technology, packs up to 141 cores and 10 terabytes (TB) of memory, and can drive up to 111,000 million instructions per second (MIPS). In the business world, mainframe horsepower drives over 1.1 million CICS transactions per second per day. And IMS benchmarks have reached a sustained level of over 100,000 transactions per second, a rate that is not seen in business today, but is likely to be required in the near future. Without a doubt, the mainframe is the only platform capable of driving future business needs.

[1] http://www.computerweekly.com/feature/Can-the-mainframe-remain-relevant-the-cloud-and-mobile-era

The mainframe has also long had a reputation for the highest levels of security, which is another reason why businesses build their Systems of Record on IBM mainframes. The mainframe can satisfy most security requirements with all its capabilities (security features and functions), but they must be properly enabled. (Usually, based on the company's policies or in some cases regulations.) Most companies will not risk security or availability to lower cost.

The mainframe is not only architecturally advanced and exceptionally securable, it has also evolved into a very open platform. The core mainframe systems (CICS, IMS, WebSphere Application Server, and IBM DB2®) offer several open-standards-based options for connectivity, including SOAP, Web Services, REST, and JSON. IBM also offers a brokering service called IBM z/OS® Connect, that provides a single, secure, uniform access point to the back-end resources.

The foundation and the interface is in place for highly secure mainframe interactions with a System of Engagement. Many businesses have implemented locally hosted Systems of Engagement that have been highly secure and have provided huge benefit to their businesses and to their customers. However a cloud-based System of Engagement presents additional challenges, specifically with secure connectivity, that if not addressed run the risk of exposure that can lead to catastrophic business outcomes. Choosing the correct cloud platform is essential.

IBM Bluemix for secure cloud-to-mainframe connectivity

IBM Bluemix, hosted by IBM SoftLayer®, is an agile, easy-to-use, component-based application development platform that also includes an end-to-end security architecture and multiple secure connectivity options. In particular, Bluemix offers several options for securely connecting cloud-based applications to locally hosted mainframe assets:

- IBM DataPower® Gateway: A highly versatile gateway appliance with features that provide high availability, fail-over, load balancing, message security, data conversion, and more. Bluemix applications connect directly to the DataPower Gateway, after which requests are forwarded to the backend systems.
- Secure connectors: Made available as services and created with the Standard (IBM WebSphere Cast Iron®) Connector or by using the DataPower Gateway as a connector. These connectors establish protected communication between cloud-hosted Bluemix applications and on-premises systems.
- IBM Secure Gateway for Bluemix: A secure tunnel created between Bluemix applications in the cloud and backend resources. It is based on web sockets, and features a dashboard that allows developers and administrators to view usage and performance analytics. For architectural simplicity, the Secure Gateway for Bluemix can now also be plugged in as a module of the DataPower Gateway, combining their respective capabilities.

Figure 2 shows how the Bluemix Secure Gateway is used.

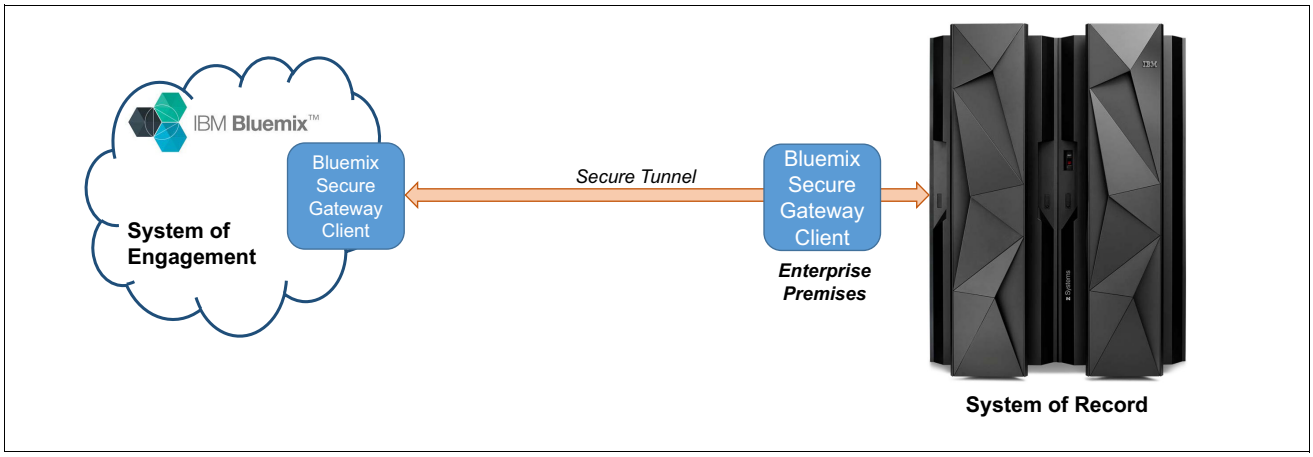

Figure 2 Bluemix Secure Gateway

Because connectivity through a secure tunnel is often not enough, especially for mobile applications, Bluemix also provides additional multi-level security services at the application level including authentication, single sign-on, access control, and authorization. For more information about creating a secure cloud-to-mainframe environment, read the IBM Redbooks publication *Secure Hybrid Cloud Connectivity with IBM Bluemix and z Systems*, REDP-5243[2]. Bluemix also offers a single-tenant option, called the Bluemix Dedicated platform, which is also hosted on SoftLayer and offers limited access to just a single company, bringing even more control, security, and flexibility. The Hybrid Cloud Connect Test Drive includes a *Gateway as a Service* feature from which customers can test secure connectivity to their mainframe systems.

Fueling innovation with the mainframe and the API Economy

Increasingly, IBM is looking to enable exposure of more and more mainframe-based business assets to external cloud-based Systems of Engagement. This approach gives businesses ever-increasing opportunities to engage with customers and partners and explore new business opportunities. IBM is today investing heavily in the API Economy and API Management, especially with respect to the mainframe.

If you are not familiar with the concept, the API Economy[3] is built around the use of Business APIs or productized services. A Business API can be thought of as a public persona for an enterprise, exposing defined assets, data, or services for public consumption. They should be simple to use and easy to invoke. They add business value by extending an enterprise and opening new markets and by publicizing and aggregating a company's assets for broad-based consumption. For instance, a bank can extend its reach beyond customers doing online banking by offering APIs that include Mortgage Calculators, Loan Origination, On-line Payment, and Account Query. It's easy to envision how the use of Business APIs can lead to vast new opportunities and extensions of business.

From a systems perspective, we are talking about enabling the development of business-related APIs that extend the System of Record and enhance System of Engagement applications. Again, there is more to the picture. Exposing business assets must be done through a coordinated gateway that provides security, management, and monitoring.

IBM is heavily invested in both sides of this equation, enhancing the mainframe middleware that supports the System of Record, and enhancing the API management and gateway facility to support the external cloud-based Systems of Engagement applications. IBM API Management provides the management platform and is a fully on-premises, multi-tenant solution for API providers. IBM DataPower provides the API Gateway to enforce API security, control, integration, and optimized access. The API Gateway protects against application-level threats, application acceleration, integration, and traffic management. By deploying a security and integration gateway, enterprises can decouple the enforcement of security and other policies from the underlying application and also provide functional offload of repeatable tasks to allow the backend applications and resources to more efficiently scale to meet the high volume demands that inevitably occur.

Figure 3 on page 5 shows how API Management and the API Gateway connect new business-focused APIs from the mainframe System of Record to cloud-based Systems of Engagement applications in a rich, highly secure, and managed interface, creating a solution that fuels new innovations for your business.

[2] *Secure Hybrid Cloud Connectivity with IBM Bluemix and z Systems*, REDP-5243, http://www.redbooks.ibm.com/abstracts/redp5243.html?Open

[3] *Stepping Forward into the API Economy*, REDP-5164, http://www.redbooks.ibm.com/abstracts/redp5164.html?Open

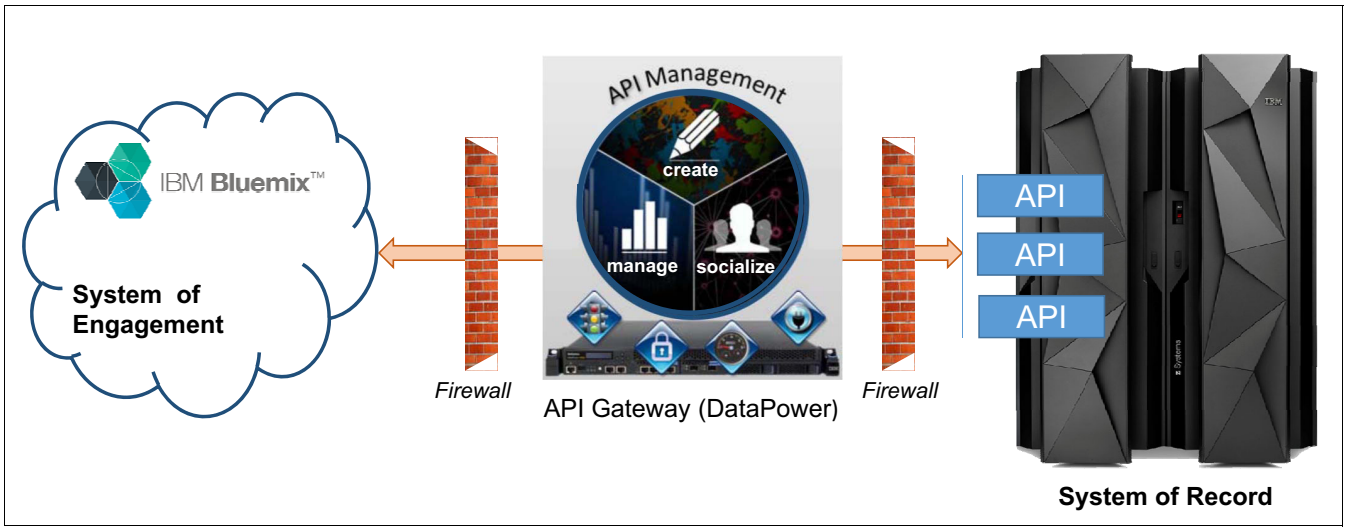

Figure 3 Connect new business-focused APIs from Systems of Record to the cloud

What's next: How IBM can help

IBM provides several options with its IBM Bluemix development platform that can ensure secure connectivity from your off-premises cloud-based System of Engagement applications to your locally hosted System of Record business assets. The IBM Bluemix connectivity options include the IBM DataPower Gateway, the Secure Connectors, and the IBM Secure Gateway. You can rest assured that the mission-critical mainframe assets are exposed in the most secure and controlled manner possible. With Bluemix, it's easy to create applications by reusing predefined components and services, and IBM offers detailed documentation and optional consulting services to help you make it happen.

In addition, IBM has fully embraced the API Economy, providing a complete set of API Management and API Gateway solutions that provide secure, controlled, integrated, and optimized exposure of new business APIs, generating new opportunities and business models.

To learn more about cloud connectivity, the next step is to read the following IBM Redbooks publication:

Secure Hybrid Cloud Connectivity with IBM Bluemix and z Systems, REDP-5243

http://www.redbooks.ibm.com/abstracts/redp5243.html?Open

Resources for more information

For more information about the concepts highlighted in the paper, see the following resources:

- IBM Bluemix Create, Deploy, Manage

  http://www.ibm.com/cloud-computing/bluemix
- IBM Bluemix The Digital Innovation Platform

  https://console.ng.bluemix.net
- IBM Bluemix Solutions

  https://console.ng.bluemix.net/solutions/dedicated
- *Getting Started with IBM Bluemix: Web Application Hosting Scenario on Java Liberty*, TIPS1280

  http://www.redbooks.ibm.com/abstracts/tips1280.html?Open

- IBM API Management

  http://www.ibm.com/software/products/en/api-management
- /api Dev (IBM developerWorks®)

  https://developer.ibm.com/apimanagement/
- *The Power of the API Economy: Stimulate Innovation, Increase Productivity, Develop New Channels, and Reach New Markets*, REDP-5096

  http://www.redbooks.ibm.com/abstracts/redp5096.html?Open
- API for Dummies (download book from this web address)

  http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=WSM14025USEN&appname=skmwww

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