

IBM System z9: Enterprise Service Bulldozer

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It was not so long ago that IBM employees avoided the word “mainframe”. Yet, for all the talk of “collaborative processing” at the recent System z9 launch event, the hot news was Big Blue’s positioning of Big Iron at the heart of its Service-Oriented Architecture strategy (SOA). The latest System z9 announcements show that IBM intends to employ its ever more capable mainframe platform to retake the moral and technical high ground.

IBM’s argument is classic one-two punch. First it repositions core “mainframe values” as strengths, contending that if such infrastructure attributes are needed then a mainframe is the natural platform to attain and sustain them. Secondly, IBM argues further that the key characteristics of enterprise Service Oriented Architecture (SOA) are scale, security, flexibility, manageability and resilience. SOA and mainframe values are thus entwined. If we accept this worldview, mainframes make an ideal strategic hub for SOA.

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Framing the Frame

SOA is currently one of the IT industry’s hottest buzzwords so let’s start by establishing some fundamentals: it’s best to focus on what a SOA should accomplish from a functional perspective rather than attempt a precise definition of which technical widgets comprise it, because the associated terminology is still evolving.

Unlike monolithic development approaches, an SOA should enable asset and service reuse, by enabling the management and orchestration of loosely-coupled services described using standardized interface definitions. SOA applications are also sometimes referred to as “composite applications” since they are comprised of underlying composite services, tied together using a message-oriented middleware approach. SOA is closely associated with the XML Web Services Stack defined by the OASIS standards body. It is important however to avoid reductionism: SOA is a broad concept and set of design patterns. It might include Electronic Data Interchange (EDI) integration, for example, using existing vertical industry standards.

While derided as monolithic by those lacking a genuine grasp of the architecture, mainframes have always been somewhat service-oriented. Whereas the concept of shared enterprise resources may be alien to many client server bigots, it’s long been core to IBM mainframe design. The mainframe basically regards *all* its resources as services that must be used and protected from unauthorized or inappropriate access. This isn’t to suggest that manipulating mainframe code is a snap—but we’ll return to this notion shortly.

First it’s time to introduce another SOA-related buzzword: the Enterprise Service Bus (ESB). Loosely defined, ESB is a SOA backplane, which allows applications, services and other resources to be plugged in, integrated and managed. IBM’s WebSphere ESB Advanced Edition is squarely targeted to perform this job.

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Mainframe quality of service is such that perhaps we ought to call the System z9 platform an Enterprise Service Bulldozer. One can't, after all, expect to drive through obstacles on a bus, yet SOA is all about knocking down business silos and technical walls. Bulldozers offer raw power although they aren't ideal for every construction job. The mainframe isn't appropriate for all SOA tasks but for auditability, reliability and sheer power, it is unsurpassed. As a hub to which SOA spokes on other platforms can be attached it makes sense.

A Traction Engine

The z9 offers significant improvements in terms of performance, scalability, availability, security and virtualisation over earlier e-server zSeries systems. IBM's billion transactions a day claims (effectively doubling the capacity of its high-end predecessor, the z990) thus made headlines.

But only in the broader context of the IBM software story do the “-ilities” above really come into play. That is, if the mainframe were a purely proprietary, closed-end platform, its raw computing power would be of scant consequence. But given that it can now run the same code that runs on other open systems and distributed platforms, it's possible to apply the mainframe to a much wider variety of tasks, enhancing its overall value.

IBM WebSphere Application Server for z/OS Version 6 was launched just a few months before System z9. It shares the underlying code base, as well as leveraging the look, feel and functionality of WebSphere for Unix or Windows. Commonality is not limited to the base application server, but applies to the entire WebSphere stack, including, for example WebSphere Business Integration and WebSphere Portal.

IBM DB2 for zOS Version 8, is a major launch of the IBM relational database platform. Code is finally portable between the mainframe and non-mainframe versions of DB2, which had hitherto been effectively different architectures, with different code bases and associated skill sets. Portability improvements represent a significant step forward in positioning the mainframe as an enterprise data hub for SOA.

IBM Tivoli Composite Application Manager for SOA, based on code IBM acquired with Candle Software, is designed to track application performance across multiple tiers and platforms, critical in an environment where new applications are created based on existing services. The toolset includes a component called Web Services Navigator, designed to help application developers identify performance problems across complex service interactions. By allowing performance problems to be identified, tracked and fixed across both mainframe and distributed platforms it should prove particularly useful.

IBM Enterprise Workload Manager (EWLM) for zOS is currently being redeveloped as a cross-platform product, marking the beginning of the journey towards IBM's end to end virtualisation vision, where all enterprise resources are pooled, and can be shared, where mainframe class workload management spans multiple operating environments.

The ability to virtualise and apply resources to specific services in *ad hoc* fashion is very useful in a SOA. Addressing scaling requirements by provisioning and re-provisioning physical resources, on the other hand, is a highly inefficient and time consuming. With its workload management and virtualization technologies, the mainframe greatly reduces the need for sneakerware. Virtualization decouples physical resources from user and service access models and therefore adds a valuable layer of security to the system.

In terms of the cross platform story it's important to note that IBM continues to deliver Linux capabilities on the mainframe, which provides another dimension of portability; the z9 can run native Linux applications as well as those built on top of IBM middleware.

"The renaissance...
reached a high water
mark with launch of
System z9."

The Confidence Trick

IBM's mainframe platform does not suffer in comparison with other platforms in technical terms. And, for all the FUD, total cost of ownership compares favorably as well. While RedMonk does not carry out formal return on investment case studies, research with mainframe customers over the last ten years shows that best practices IT shops achieve excellent returns as a proportion of total IT expenditure on mainframe systems investments.

There is an important caveat here: many mainframe customers are not fully realizing potential savings, which can amount to tens of millions of dollars in license fees alone. It is essential that any IT organization considering using an IBM mainframe in a SOA infrastructure should audit its assets before proceeding. Customers should identify which mainframe services are to be published and consumed as services, and which services require mainframe quality of service. Another tool, IBM Tivoli License Compliance Manager for z/OS, recently acquired from Isogon Corp, should help customers better understand mainframe software licensing exposures.

Whether or not the datacenter embraces formal asset management disciplines in order to quantify potential new costs and savings, perceptions are still nine tenths of the law when it comes to enterprise workload choices, which explains why IBM is pouring millions of dollars into mainframe marketing.

The IBM mainframe group has not always shown confidence in its ability to influence outside perception. The platform's ongoing renaissance reached a high water mark though with the System z9 unveiling in July: media coverage was largely very positive. Those doubting IBM's commitment to modernizing and extending its flagship platform are disregarding recent investments. Resources poured into the platform include \$1.2 billion and 5,000 developers. There's no chance we'll be seeing the mainframe in mothballs any time soon.

The Law of Unexpected Scale

As any enterprise developer or systems administrator will tell you, it's difficult to predict in advance how any given application can or will be used in future. This factor is even more telling in the context of an SOA, where a range of new end points may be added. CRM applications today, for example, are bent towards

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point-of-sale (POS) applications in ways their original creators wouldn't have anticipated.

A useful service will not only gain additional internal adherents but, potentially, external customers as well. Bank applications, originally intended for use only by employees, gradually began to be shared across contracted call centers, and then evolved into direct access, round the clock applications for all manner of financial clients. Many backend functions running on mainframes will be elements in service flows that will need to scale up to meet unanticipated demands. When applications are composed of a number of orchestrated services, quality of service thus becomes more, rather than less, crucial. SOA makes capacity planning more problematic.

Mainframes are designed to handle mixed workloads, with automated provisioning of resources to allow the same box to handle, for example online transaction processing (OLTP) during the daytime, batch jobs overnight, and decision support when needed. Many mainframes are already running at or near full capacity; with fairly clear expectations about ongoing scale requirements.

With SOA the game changes, and it is critical to establish a software infrastructure to manage calls to mainframe applications which acts as a throttle, preventing the platform from being swamped. Scalability is one thing, but it makes no sense to just throw more mainframe capacity (MIPS) at the problem. In many cases mainframe applications will need to be redesigned in order to make them more compelling in a SOA design, better able to cope with the law of unexpected scale.

Enabling SOA Services

Large scale assembler applications require significant effort to refactor, and/or migrate to more modern programming methods and models. Legacy CICS applications tend to be built for speed, not for comfort; though powerful they weren't written with flexibility in mind. However, an ecosystem of vendors can help enterprises service-enable their CICS applications is in place, including companies such as Attachmate, Hostbridge, Iona, Jacada, and NEON Systems.

IBM itself has made significant progress in Web Service-enabling the mainframe. Thus the CICS Transaction Gateway Version 6.0 is a Java™ 2 Platform, Enterprise Edition (J2EE)-based connector to CICS applications, which turns the mainframe into a J2EE Connector Architecture (JCA) consumer.

Big Blue has some work left to do in cleaning up its mainframe integration tool set, however. IBM's Eclipse-based consoles hide some complexity from developers, but DB2 Connect and Host Access Transformation Server (HATS), for example, are derived from different code streams. IBM is committed to integrating this code to create a single integrated base.

Another mainframe development approach that may need to be considered in any refactoring effort are 4GL's such as Natural, which have now reached end-of-life and passed over into maintenance mode. Applications constructed using such languages can in some cases be modernized by simply porting to DB2, CICS or IMS using automated migration tools, from the likes of BluePhoenix.

“The Law of
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and resilience”

RedMonk Red Lights

Mainframe security is widely acknowledged to be extremely solid. This reputation is partially due to the shared resource model established from the ground up, but also because mainframe security is a longstanding discipline underpinned by 40 years of best practice. Yet SOA topologies introduce new security risks due to the opening up of applications in unanticipated ways. SOA, by definition, enables new attack vectors which could quite possibly reveal unexpected vulnerabilities. Anybody advocating a mainframe for a SOA hub initiative will have to invest in federated identity management resources to ensure mainframe services are properly protected. The mainframe has long supported powerful onboard encryption and key management capabilities, but with z9 IBM announced new management tools, for cross-platform, and even cross organizational security management. SOA inherently increases potential attack surfaces which is why organizations will need to be methodical with due diligence; many compliance jurisdictions requires strong internal controls across critical business information. IBM is responding to this need.

One issue which could impact IBM's ability to make the mainframe for SOA story stick is failing to talk the same language as business executives; this would be a critical failing, because many SOA projects are run by lines of business. This terminology issue is an ongoing problem for the mainframe group at IBM, which sometimes has difficulty talking in terms that exponents of other platforms such as Unix, let alone line of business executives, understand. Translating mainframe benefits remains difficult for mainframe customers, and IBM must find new ways to make z9 benefits clearer and more digestible to IT managers indoctrinated in x86, scale out and Wintel principles. IBM tends to use its own, esoteric mainframe lexicon—especially in questions of scale—which is Greek to many IT buyers, albeit well understood by long term zSeries customers.

As outlined above, other vendors can help with transformation and modernization. Having other companies focus on tools for enabling mainframe SOA benefits both IBM and its mainframe customers. As long as mainframe ISVs and service providers compete vigorously, the overall community will thrive on the competition. In order to maintain viability and vitality an IT ecosystem requires a range of healthy players. IBM therefore must ensure it doesn't kill the golden goose by competing so aggressively with ecosystem players that it puts them out of business. For mainframe SOA to succeed, CA and BMC are both competitors and partners. It's a balancing act.

A final note of caution: it is important to stress that the ESB and SOA categories are still shaking out in terms of definitions and function. Users should exhibit caution when hearing the latest marketing claims from vendors in the space and IBM is no exception

RedMonk Take

After a slowdown in mainframe capacity upgrades over the last couple of financial quarters, we can expect the z9 to reverse the trend and to win additional workloads, because enterprises are planning accordingly. The capacity increase should serve as a tonic to the overall mainframe ecosystem, not just IBM.

The Law of Unexpected Scale operates in two dimensions- scale and resilience. Not only must a platform be able to scale up as required, but it must also keep running 24x7x365. Remember that the zSeries has a 40 year mean time to failure...

Ultimately market perception, not capabilities, will define the degree of success enjoyed by the z9 series as an ESB platform. In this regard IBM needs to continue making significant investments—particularly where it comes to skills. The aging population of mainframe operators is an easy target for competitors; partially mediated by IBM's ongoing efforts to identify new graduates who will evangelize the platform.

In summary, while it's increasingly clear that a range of options will be available to support enterprise class SOA, organizations looking for a highly scalable deployment and management platform should certainly be evaluating zSeries as SOA project hub.

IBM is investing anew to ensure z9 has a strong presence in the SOA world. It may well be that IBM has discovered a powerful new role for its mainframes, that of enterprise service bulldozer.

About RedMonk

RedMonk is a research and advisory services firm that assists enterprises, vendors, systems integrators and corporate finance analysts in the decision making process around today's enterprise software stacks. We cover the industry by looking at integrated software stacks, focusing on business and operational context rather than speeds and feeds and feature tick-lists.

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