



For a More Secure SOA at Less Cost, Use System z9 and DataDirect

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Service Oriented Architectures, by their nature (and there have been many of them, over the decades) are renowned for their flexibility and adaptability. All the early mainframes were SOAs, designed for multi-tenancy – though they tended to manage their services one at a time. System z9, IBM's current mainframe, has many levels of partitioning and virtualization, to accomplish many workloads simultaneously, while giving priority to those that are most important to the business – *a service orientation*.

The current incarnation of service architecture, known as SOA, is a software innovation. A few years ago, Grid Computing was a similar hardware imperative. Both aim to reduce waste and make change easier. Modularizing software and making it more declarative allows the software service, often comprising a whole litany of components, to be evolved by swapping out components that are outmoded and swapping in new components. It allows components to be used by more than one process, curbing licensing costs. In the long run, it makes system management more generic and less expensive. It facilitates change, since the policies and points of arbitration can be developed and modeled separately from the process of deployment.

In its full incarnation (for the move to SOA is a gradual process), SOA, as contrasted with simple use of Web Services, allows technology to support the whole of what you want to do in a way where all the hand-offs are arbitrated by an automated process. Thus, SOA can seem seamless and be endlessly extensible – something that is important as companies seek to address new markets and use new business models.

The arbitrated automated hand-off becomes the linchpin. Each handoff within the hub, or between federated SOAs, becomes a point of failure. **With the pervasiveness of networks and the tiers of security vulnerability that the now-near-obligatory use of networks entails, each hand-off across a network becomes a point of vulnerability and security becomes a huge issue.**

If you have a mainframe, the story can be different. **The inherent layered security of z/OS¹ and its native support for orchestration both in the processor and in z/OS, makes it inherently a good environment for SOA.** Orchestration of and management of units of work from a secure location lets you avoid unnecessary risks and put more attention on business optimization and extension.

Use of the mainframe for SOA has also become less expensive. Calculating operational costs of a platform without adding the costs of securing the platform is as inadequate as not including the costs of the energy needed to make it run, or the management needed to make it run well. Using these comprehensive calculations, the Mainframe is cost effective for a very large consolidated environment of many kinds of workloads. The new news, making SOA on z9 less expensive, comes from DataDirect Technologies. DataDirect Technologies is one of those companies that has been around a long time (1987) and whose products are widely used (90% of the Fortune 500, according to the company) and licensed (IBM *WebSphere*, Sun, Oracle, HP, Siemens, et al), but what they do for SOA on z9 is really special. For more details of how their *Shadow version 7* changes the game, read on.

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¹ For more information on Mainframe security, see **The Clipper Group Navigator** entitled *IBM System z Security Covers the Enterprise End to End*, dated April 18, 2007, and available at <http://www.clipper.com/research/TCG2007051.pdf>. Also see, the April 25, 2007, issue of **Clipper Notes** entitled *Multiplexing the Data Center with SOA and Grid*, and available at <http://www.clipper.com/research/TCG2007055.pdf>.

SOA on System z9

Family-style serving is the way to minimize waste and make a food budget go farther. Compare it with the restaurant scenario, where each diner is provisioned with a full plate that is often not fully consumed. System z9 has been built with a share-everything architecture, with the controls to apportion them among multiple workloads safely and securely.

It supports a family-style consumption of assets. Consolidation by open systems' virtualization, by contrast, is like six packs of beer. They are very convenient, but not as efficient a form of consumption, from the provider point of view, as on draft from a keg. There is a collateral of waste.

This is the start of the story about energy efficiency on z9, but there is more. System z9 chip design focuses on overall system performance, not on raw clock speed. The energy cost of System z9's chip is less than that of other processors for comparable accumulations of workloads. The mainframe's general processor consumes power at a rate of one watt per MIPS (million instructions per second). Some of these MIPS are spent on managing multiple workloads – but that is what most businesses want to do to support their increasingly interactive business processes. A filled System z9 BC² draws 18.3 kilowatts per hour. Think about your energy use and whether you are using your cycles for work or merely for idle cycles delivering no business value.

By hosting your SOA hub on System z9 and using specialty engines, you benefit from the mainframe's ability to perform better the more workloads you put on it. Multi-workload stuff is what it was designed to do – and SOA involves many workloads. The more of them you put on the mainframe, the more data center costs you can avoid. Most open systems servers are not naked – they are festooned with adapters and TOE engine line cards and, often, appliance gateways to transform this to that or to accelerate something else. These all have plugs that consume energy. Some of them have to be managed. Most of them can be a source of fault, and must be monitored as such.

With consolidation on a mainframe, these costs are avoided. The management to tune a distributed physical architecture to respond to SOA orchestration at the application level is built-in from the instructions set up, and has been enhanced over

² See [The Clipper Group Navigator](#) dated May 23, 2006, entitled *System z9 BC - A Mainframe for the Not-So-Large Enterprise*, and available at <http://www.clipper.com/research/TCG2006040.pdf>.

decades. This is where cost-avoidance starts to tip the true cost of ownership over time calculation in favor of the mainframe.

Leveraging Mainframe Economics

With the release of DataDirect *Shadow Version 7* for System z9, customers get software that can shunt data traffic (including SOA messaging) to System z9's zIIP processor,³ and application traffic (including SOA orchestration) to a z9 zAAP processor.⁴ This is good for the enterprise in many ways.

- z9 specialty engines are less expensive to buy than System z's general-purpose engines, so using z9 specialty engines brings mainframe acquisition costs more in line with Intel/AMD servers for similar workloads.
- Unlike z9 general purpose engines, whose processing power is governed according to the capacity license that the customer has chosen to buy, specialty engines are not governed (i.e., they run at full speed).
- Usage charges on specialty engines are not based on the MIPS of the underlying processor, but by the number of engines deployed for that purpose. Thus, as engines continue to grow in processing power, the average cost (say, per transaction) continues to decline. Said another way, when you upgrade to larger engines in a new mainframe, you don't have to pay any more for the special-purpose software (for Java, DB2, or Linux) on the larger engine. Where else can you get such a deal?

By offloading work to specialty engines, the work gets done faster and is charged according to a less escalative pricing model. Over the years, IBM has made use of specialty engines significantly less expensive, doubling their capacity while not raising their price. The use of specialty engines allows the same hyper-efficient use of resources (sometimes

³ zIIP is for information serving and transformation. For more information about the zIIP processor and how it works, see [The Clipper Group Navigator](#) entitled *System z9 Adds zIIP to Ally With DB2 on z/OS to Better Serve the Onslaught of Business Data*, dated January 20, 2006, and available at <http://www.clipper.com/research/TCG2006006.pdf>.

⁴ zAAP is optimized for offloading Java workloads. For more information about the zAAP processor and how it works, see [The Clipper Group Navigator](#) entitled *zSeries Zips through Java with zAAP*, dated April 7, 2004, and available at <http://www.clipper.com/research/TCG2004030.pdf>.

known as *over-subscribing*⁵) that System z9 also uses in its memory systems. There is a consolidated, multi-workload computing pattern here. System z9 has been perfecting it for decades. In open systems, a full set of basic features is becoming more complete – but these are features that, on System z9, are supported by hardware, operating systems, applications and, now, DataDirect's *Shadow* middleware, all working together in tight harmony.

Data Direct Shadow 7

Now there is *Shadow 7*. DataDirect has been facilitating Web Services on the mainframe since 2001. With Shadow Version 7, three significant capabilities have been added.

- Virtually all of Shadow version 7's functions can now be run on specialty engines. Engineering this capability required a different, more advanced approach to multi-threading, which makes the offload not only possible but also deft in the use of threads.
- With Version 7, DataDirect adds an industry-standard BPEL2 engine and application server (Tomcat) to exploit the zAAP processor for SOA orchestration (which, like other middleware, is an application).
- DataDirect enhanced the product's SQL capabilities meeting ANSI 92 SQL standards and added *DataDirectConnect* driver technology, which gives superior SQL performance to relational and non-relational files on the mainframe.

Both the BPEL designer and Shadow's *Data Mapping* are integrated into *Shadow Studio*, DataDirect's Eclipse-based IDE⁶. Any BPEL-2-compliant IDE can also be used. Shadow itself runs under z/OS to get full benefits of z/OS's superior security and workload and application.

This whole scenario allows more z9 general purpose engine MIPS to be repurposed for other work. For the System z9 installed base, this is very good news. For the non-installed base with aggressive and large-scale SOA ambitions, this is another reason to consider adding – as a kind of *utility infielder* – a small mainframe, the z9 BC. Remember, a mainframe can let you do great things and can let you *not do* tedious things (like routine management). It can simplify your security challenge considerably.

⁵ Where each application thinks that it has all of the system resources that it requires, even though the sum of what appears to have been allocated (across all applications running simultaneously) exceeds 100% of the actual resources. This is virtualization, *to the max*.

⁶ Integrated Development Environment.

The scenario is also great for System z9. Its combination of open source and high-performance, high-security proprietary elements gets the benefits out of each approach, applying them all to the challenges that businesses face. Its hybrid vigor should be evident to all who consider it.

Conclusion

It is time to be declarative – not about what comprises your infrastructure, but about what you want to do with it – then let form follow function. If you want a cost and energy efficient service oriented environment, this thought process might just lead you to the mainframe. For all IT shops who want to make the most of their assets – and whole assets include a mainframe – this DataDirect scenario should be of great interest. If they are in the process of rolling out a high-performance SOA, the DataDirect strategy will be of immediate use.



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