



Case Study

The Department of the Interior's National Business Center — Using System z as a Strategic Enterprise Cloud Platform

Executive Summary

To be successful, an information technology (IT) shared service provider needs to take advantage of “economies of scale” that enable it to deliver computing services at a lower price than internal IT departments or less nimble competitors. These economies of scale drive: 1) acquisition and operational cost reductions; 2) facilitate cost avoidance; and, 3) enable shared IT investment leverage.

Within the United States Department of the Interior there exists an IT services organization with over \$400 million in annual revenue known as the National Business Center (NBC). It provides shared IT services for offices and bureaus within the Department of the Interior, as well as for federal agencies outside of the department. And this shared services organization competes and wins against other, much larger service providers by operating an extremely efficient data center. It maximizes its return-on-investment (ROI) on servers by using mainframes; it lowers integration and interoperability costs by using a service-oriented architecture (SOA) and Linux; and keeps management costs under control.

- *To lower server acquisition costs* NBC uses IBM System z mainframes that operate at 80-100% utilization (Distributed servers usually operate at 10-20% utilization rates. Mainframes promote economies of scale as the work of hundreds of individual servers can be performed on high-utilization-rate mainframes.
- *To lower integration costs* NBC has standardized on IBM's WebSphere SOA environment (because it offers “very sophisticated middleware”); and NBC has deployed Linux on its mainframes. SOA middleware makes it easier for programs to communicate with each other. And Linux not only helps lower integration costs (because thousand of applications have already been written for the Linux operating environment), it also broadens the application portfolio available to NBC and its customers (allowing NBC new paths of expansion). And,
- *To lower management costs* NBC has also invested in IBM Tivoli management products that help manage mainframe virtualization, provisioning, and workload management. Additionally, NBC uses IBM's usage and accounting manager to help its customers and itself manage the billing process; and IBM's new WebSphere CloudBurst product to help virtualize and provision its x86 environments.

In the future, NBC plans to become a “cloud service provider” by leveraging this standardization within its IT environment such that it can provide infrastructure-as-a-service; platform-as-a-service; and software-as-a-service offerings. The remainder of this report describes how NBC is using System z mainframe technology to create a distinct competitive edge; and it discusses NBC's cloud plan in greater depth.

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Understanding the Mission of the National Business Center

At www.NBC.gov, the National Business Center articulates what it means to be a provider of shared services to the US government:

“For over 30 years the National Business Center has supported the Offices and Bureaus within the Department [of Interior], as well as federal agencies outside the Department, as a Shared Service Center, providing world class business management systems and services. We offer a diverse, yet integrated set of administrative solutions, and are currently the only federal agency designated by both OMB [Office of Management and Budget] and OPM [Office of Personnel Management] as a Center of Excellence in the financial management and human resources lines of business. Our workforce of dedicated professionals with unsurpassed knowledge of federal business practices, along with our ability to leverage government and commercial best practices, allows us to service our customer base of more than 150 government agencies.”

Although NBC provides aviation support, appraisal, facilities management, and other services to the US government, the primary services it provides are information technology/application hosting, human resources management and financial management.

It is very important to understand that NBC is NOT FUNDED BY GOVERNMENT APPROPRIATIONS (budget dollars dedicated to NBC) – NBC clients receive appropriations and award contracts based upon competitive bids. NBC must operate efficiently, and bid carefully in order to survive.

An Interview with Doug Bourgeois — Director of the National Business Center

In order to understand NBC's business model better — and in order to understand why NBC has chosen IBM's System z as its “strategic-enterprise-server- environment-of-the-future”, *Clabby Analytics* traveled to Herndon, Virginia to meet with Mr. Doug Bourgeois, Director of the National Business center (see Mr. Bourgeois' photo — right).

In an interview with Mr. Bourgeois, *Clabby Analytics* learned that:

- NBC would love to change the general perception of government institutions as “laggards” in IT. NBC is aggressively rearchitecting its information infrastructure to provide private cloud services. NBC's cloud strategy positions NBC as a leading-edge government shared services provider.



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- NBC has standardized on IBM’s System z mainframe environment as its enterprise-server-of-choice due to clear advantages in cost-of-acquisition and cost-of-operation. These cost savings are vitally important to NBC because they enable it to keep its costs low and ensure that the organization remains competitive in bidding situations.
- NBC is moving all new enterprise-class applications onto IBM System z on Linux because it believes that mainframes are their most efficient computing platform. The efficiencies delivered by mainframes enable NBC to be extremely competitive when it comes to competitive bidding (especially against distributed computing architectures).
- NBC is using IBM’s advanced virtualization products to create a cloud environment that will enable the organization to expand the kinds of services — and the quality of services — that it can offer to its clients. In addition to running financial and human resource application environments for its existing customer base, NBC will also be able to provide infrastructure-as-a-service (IaaS); platform-as-a-Service (PaaS); and software-as-a-service (SaaS) offerings. All of these types of services will be made available due to IBM’s advanced cloud software combined with the company’s sophisticated billing and metering software. (see Figure 1)

Figure 1 — NBC’s SaaS, PaaS, IaaS Service Delivery Plan

Cloud Service	Description	NBC Launch
SaaS (NBC Apps)	Software applications delivered over the Internet, available on-demand, and typically run from within a web browser.	Q4 2009 (ongoing)
PaaS (NBC Stage)	A fully-fledged software development and hosting environment available as a service over the Internet. Applications are built to run on a specific PaaS platform.	Q2 2010
IaaS (NBC Grid)	Computer infrastructure such as servers, desktops or network equipment, delivered over the Internet. IaaS resources are able to scale easily according to demand.	Q4 2009
Authentication (NBC Auth)	Allows authentication between applications in NBC’s Cloud product suite to occur seamlessly and links back to an agency’s internal directory services infrastructure.	Q4 2009

Source: National Business Center — August, 2009

It should be noted that NBC still runs distributed computing environments for its customers. Mr. Bourgeois explained this happenstance this way: “Sometime our clients can specify the architecture. They don’t necessarily want to hear that there might be a better way to run their applications. Very often we can run distributed computing environments less expensively than our competitors — so we win the bid.” But the resigned manner in which Mr. Bourgeois stated this indicated that he would like to see more of those kinds of clients embrace a more efficient architecture — the mainframe.

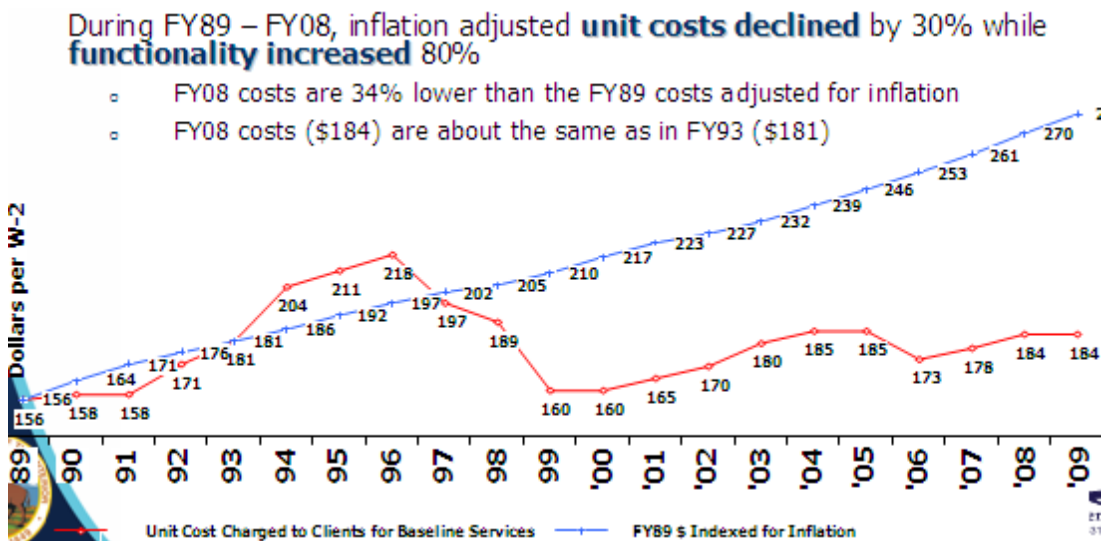
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How NBC Learned Its Linux on the Mainframe Lesson

Three years ago, NBC had two very important enterprise-class applications running on its mainframe — a human resources application suite (that included a very important payroll system), and a series of financial applications. There was a distinct synergy between these applications as they ran on NBC's system z — payroll applications were used heavily during the day, while financial systems (which were largely custom batch applications) ran mostly at night. As a result of this synergy, NBC was able to keep its System z busy all of the time, *running at greater than 80% (usually over 90%) of capacity on a regular and consistent basis*. From a profitability perspective, NBC was maximizing its return-on-investment in its mainframe hardware. And, from a customer perspective, NBC was providing solid, secure service — and adding functionality for less cost at the same time.

In addition to operating an extremely efficient server environment, NBC also kept application costs under control while increasing application functionality. Figure 2 shows the cost to provide fully integrated payroll services for a year (NBC charges on a per W-2 processed basis to determine the number of employees supported). In fiscal year 2008, this chart shows that NBC was charging \$184 for an entire year of payroll service — almost the same amount of money that it was charging in 1993. But, in 2008, NBC was delivering 80% more functionality for almost the same cost! Costs were lowered by increasing the number of users (scale); operating on an efficient computing platform (one that scales efficiently); and by achieving a high utilization rate on the platform.

Figure 2 — NBC W-2 Processing 1989-2008



Source: NBC — August, 2008

A Setback — Kind of...

Although Figure 2 shows NBC's human resource payroll application heading in a positive direction — the custom financial applications that NBC operated for its major client was not keeping pace. The mainframe-based financial applications were, instead, becoming more expensive to maintain and operate due to their custom nature.

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As NBC's financial application customers examined this situation, they determined that a more modern software product that would support multiple operating units using one software instance would best suit their needs.

Unfortunately for NBC, this customer decided that not only was it time to move to an off-the-shelf government applications, but it was also time to move to a distributed computing architecture. This particular customer also specified that NBC (if the company wished to be the successful bidder) must move to a Sun-based distributed systems architecture!

Think about this a bit more and you'll realize that NBC's customer actually specified that NBC (or the successful bidder) needed to use a less efficient architecture to run their particular applications. NBC was running at between 80% and 100% of capacity 24 hours a day on its mainframe in a totally synergistic environment. That mainframe cost very little to manage (compared to distributed systems) — and that mainframe offered better reliability, availability and security. But in this case, NBC had to abide by the customer's requirement — and helped move their applications to distributed Sun servers...

At this juncture NBC faced an interesting challenge. Suddenly, 40% of their highly-efficient mainframe would go underutilized. And to recover costs related to this loss of workload on the mainframe, NBC had three choices:

1. Dump the mainframe;
2. Increase their human resource customer's fees by 40% to make up for the shortfall; or,
3. Add more workload to the mainframe.

NBC chose the third option. It chose to run Linux on the mainframe; make the highly efficient mainframe their platform-of-choice; and add new applications and new workloads on the mainframe as a strategic course of action.

Why the Mainframe Is a Good Strategic Choice for NBC

Most of the world's leading financial institutions run mainframes due to their best-in-the-industry reliability, availability, and security characteristics. And these characteristics definitely play a role in NBC's choice of mainframe architecture as its strategic platform-of-choice. But other factors have also strongly influenced NBC's choice. They include:

- Mainframes are positioned as a centrally managed SOA-hub. Running IBM's sophisticated WebSphere environment, NBC has been able to deploy an integrated, standards-based infrastructure that is Web services based and that simplifies program-to-program interaction. By simplifying the way that programs communicate with each other, NBC can very significantly lower its systems/software integration and maintenance costs;
- By taking advantage of the mainframe's best-in-the-industry virtualization capabilities (mainframes are at least a decade ahead of x86-based servers) in terms of virtualization sophistication, in terms of resource provisioning, and in terms of workload balancing based upon prescribed and agreed-to levels of service.
- Highly automated products such as IBM's Tivoli Intelligent Orchestrator and Tivoli Provisioning Manager help drive down management costs on the mainframe by

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reducing the amount of human labor needed to manage system provisioning and workload balancing.

- IBM's sophisticated usage and accounting manager (ITUAM), which is based-on decades of mainframe billing and accounting experience, plays an important role in helping NBC account for its computing costs (as well as a proof point for customers to show how much computing power they actually use).

Considering that NBC is in the service provisioning business — and the fact that the mainframe is the most advanced virtualization, provisioning, and workload balancing commercial system on the market — it is no mystery that NBC has chosen to make the mainframe its strategic-server-of-choice. With all of these mainframe advantages, NBC can realize greater efficiency thanks to greater utilization, better integration, and simplified management than it could realize if using a distributed computing architecture.

Summary Observations

The lesson to be learned at NBC is that mainframes offer greater computing efficiencies than distributed computing architectures. And as a service provider, these efficiencies translate directly into increased efficiency. Private sector distributed computing IT executives should take note: mainframes are modern; they are highly integrated (with the most advanced virtualization and provisioning in the industry coupled with sophisticated middleware and management software); and, if used to capacity, have huge returns on investment.

As a shared service provider, NBC sees clear advantages in redesigning its environment around clouds and mainframes. Yes the company will continue to run other types of computers to meet client requirements — but clouds will enable NBC to extend its market reach and better service its clients, while strategic mainframe servers will efficiently and cost effectively deliver those services.

An example of how NBC plans to provide these types of services can be found on its website at www.cloud.nbc.gov. On this site you will find a customer portal (test environment) that allows users to request services and allocate systems to process their requests. This site is an informational site at present. The goal over time will be to build an environment that will enable customers to easily acquire the computing resources that they need.

Eventually, NBC's implementation will develop into a "federal private cloud" — and the organization will achieve growth by continuing to expand the services it offers and by continuing to expand its cloud. Because mainframes offer advanced virtualization, cloud solutions on mainframes are decades ahead of distributed servers, therefore NBC will be able to deliver cloud solutions well in advance of its competitors. And this, in turn, will create distinct competitive advantage for NBC, and better service for NBC customers.

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