



Research Report

IBM's Migration Factory: Tools, Metrics, Automation, Process Expertise, and Project Management

Introduction

For readers familiar with *Clabby Analytics* reports, you are aware that we believe that the days are numbered for Itanium-based servers — and that we have little faith in Oracle's SPARC roadmap. (If you are not aware of these positions, please visit the following URLs: http://www.clabbyanalytics.com/uploads/Itanium_Fire_CIO_Update.pdf for our Itanium perspective; and <http://www.clabbyanalytics.com/uploads/SPARCfinal.pdf> for our SPARC perspective).

If you agree with our perspectives and you are using one of these server architectures, it may be time to consider migration to other server architectures (to us, this means migration to x86 multi-cores, Power Systems, and/or System z). To get the ball rolling, you'll need to build a business case to justify the move.

If we were building a business case, our first question would be "how will migration help our business?" And, for most Itanium and SPARC-based server users, we believe the answer to this question will be "it will cost significantly less to run our workloads on Power Systems, System z, or x86 multi-cores".

The key word in the preceding paragraph is "workloads". A workload is an application or a group of applications that are used to complete a task. Different types of workloads place differing demands on microprocessors and related systems designs. If you match the right workload to the right processor/system architecture, your organization can save REALLY BIG MONEY. As for proof, consider reading this report on how it is possible to save over \$1,000,000 running a heavy I/O workload on 256 virtual servers within a mainframe as compared with running the same workload at the same service level on x86 multi-cores: http://www.clabbyanalytics.com/uploads/z_VirtualizationFINALRev.pdf.

Once the business justification is in place, the next logical steps are to scope the technical difficulty of migrating to another systems platform; size of the effort (timeframe) and the scope drive the cost of the effort. Some organizations have the ability to undertake platform migrations using internal resources. Others don't have such expertise internally, and will be better suited finding a partner with a lot of experience in migrating applications and databases off of Itanium and SPARC-based servers to other target environments.

For enterprises that are looking for external migration expertise, we suggest looking at IBM's Migration Factory — a professional services organization that has over two decades of migration experience. These service professionals have access to advanced migration tools; they know the comparative and sizing metrics; they have already automated much of the migration process; they have established processes; and they have strong project management skills for migrating from Itanium and SPARC-based processors to other server environments. And, most importantly, they have loads of experience!

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In this *Research Report*, *Clabby Analytics* takes a closer look at IBM's Migration Factory. We start with a general discussion about why we believe that information technology (IT) buyers need to migrate away from Oracle SPARC and Hewlett-Packard (HP) Itanium-based servers. We then describe some of the elements that should be considered in building a migration business case. We follow that with a description of how customers can engage with Migration Factory executives. We briefly describe how the Migration Factory does what it does. And we then wrap with this conclusion:

Although the Migration Factory can perform migrations to x86 multi-cores and System z mainframes, it is particularly well-suited for enterprises that are migrating from:

- *HP/UX, Linux and Solaris to IBM's AIX (Unix);*
- *HP/UX, Linux and Solaris to Linux on IBM Power Systems;*
- *Oracle's database to DB2 or Informix;*
- *Oracle's business application suites on HP/UX or Solaris to the same suites on AIX; and,*
- *SAP on HP/UX, Linux or Solaris to SAP on AIX.*

First: Why Migrate?

To us, the answer to this question is very straightforward. Itanium and SPARC-based processors (and associated systems designs) are not keeping up in terms of performance or features/functions with their competition (which is primarily IBM Power Systems incorporating POWER microprocessors). Both Itanium and SPARC have historically and consistently missed their roadmap deadlines — which means that Itanium/SPARC buyers have needed to wait for months (or sometimes years) for competitive processors/servers to arrive. And, when these processors/servers do arrive, they sometimes drop features and miss the mark in terms of expected performance. For instance, consider the following:

*In December 2010, Oracle announced a SPARC SuperCluster TPC-C benchmark claiming a world record (over 30,000,000 transactions per minute — which it did achieve). By comparison, it would take three IBM Power 780 servers to achieve over 30,000,000 transactions. But a closer look at this record showed that Oracle required 108 processors, **1,728** cores and 13,824 threads to achieve this result. IBM's Power 780 required 24 processors & 192 cores to perform 768 threads to perform 10,366,254 transactions per minute — so multiply by three (to build a Power Systems environment that could exceed 30,000,000 transactions per minute) and you'll see that IBM would require 72 processors, **576** cores, and used only 2,304 threads to get the same amount of work done.*

What's the problem? Just this: if IT buyers take the Oracle result on face value, then Oracle reported an impressive benchmark. But if they read between the lines, prospective buyers might recognize that performance per core is an extremely important consideration — especially when it comes to energy usage, space requirements, software licensing (software licensing is huge because most software vendors price their software on a per core basis), and systems management.

Suddenly, this world record doesn't look so impressive...

As for Itanium-based servers (or let's be more specific — HP Integrity Itanium-based servers because HP owns 85%+ of the Itanium marketplace), we believe that Itanium is broken from a hardware lifecycle perspective (there are zero/zed HP Integrity Itanium-based servers in the Top500 supercomputer list — and as a result, advanced supercomputer technologies no longer trickle down to HP's Itanium-based enterprise servers). And,

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although this is not HP's fault, it did take Intel three years to get Tukwila (the latest generation Itanium) out the door — delaying performance advancement for HP customers.

The bottom line is this section is this: SPARC and Itanium architectures are not keeping up with the competition from a processor as well as system design perspective. Investing in a machine that does 1/3 to 1/2 as much work as its competitors — and that uses significantly more cores (thus significantly driving up software costs and total cost of ownership) — is not a good business decision. It's time to move on...

Build Your Business Case

Once you've made the mental decision to move off of SPARC and/or Itanium, you need to build your business case. Your business case needs to consider the benefits and migration can bring to your company — and it needs to weigh any risks involved in the migration.

Executives at the Migration Factory claim that the primary benefit that can be achieved through migration is the ability to reduce cost of ownership — as shown in the Oracle example (last section). In that example, we showed how Oracle required three times more cores to do the same amount of work as a Power System.

This means that IT buyers would need to triple the number of software licenses to run the Oracle environment. Cost of software is often more expensive than the cost of hardware. So, choosing the right hardware can have a very high positive impact on your total cost of ownership.

Assessing Risk

A good business case not only identifies the benefits to the business and making a move — it also assesses the risk. When discussing risk, Migration Factory executives separated the risk associated with migration into five categories:

1. Technical;
2. Cost;
3. Schedule;
4. Skills and Culture; and,
5. Operational.

Figure 1 (next page) show a list of key questions that business executives should ask themselves as they build a migration business case.

Notes: according to Migration Factory executives, there is risk in any migration project. To overcome this risk, a combination of processes, methodology, tools, testing and experience is what enables the Migration Factory to minimize risk and control cost in all of its migration projects. These same executives told us that:

- ***Database migrations are relatively low risk projects due to automated scripts that are used to gather the metrics from databases to be migrated.***
- ***In contrast, custom code migrations usually take the most amount of time, carry the most risk, and are the most expensive to complete.***
- ***And finally, these executives observed that most tier 1 independent software vendors have a procedure for installing software and migrating their associated databases to other computer platforms. It is important to remember that the ISV's source code does not need to be migrated (the ISV writes its source to multiple platforms).***

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Figure 1 — Key Questions for Migration Business Case

Risk	Key Questions
Technical	<p>Can it be done?</p> <ul style="list-style-type: none"> • Are required ISV products available on the target platform? • What differences need to be addressed such as application APIs, threading and data formats? • Are there tools available to help minimize the complexity and risk?
Cost	<p>Can it be done within the budget?</p> <ul style="list-style-type: none"> • How will the migration cost be funded? • Does the business case have a positive ROI?
Schedule	<p>Can it be done on time?</p> <ul style="list-style-type: none"> • How much downtime will be required for transition? • When can the business support this change?
Skills and Culture	<p>Are the required resources available?</p> <ul style="list-style-type: none"> • How will the existing systems administration and application development team skills be transitioned? • How will retraining be performed?
Operational	<p>How well will it work?</p> <ul style="list-style-type: none"> • How will the migrated workload be tested? • Will the performance and reliability meet business requirements? • Will it work the same way on the target platform or will changes in customer, supplier or user interfaces be required?

Source: IBM Corporation — June, 2011

Engaging the Migration Factory

If the rewards outweigh the risk when it comes to migrating off of Oracle and HP platforms, then it's time to place a call to IBM's Migration Factory. And we mean “place a call” literally: Migration Factory personnel will engage with interested parties to plan the scope of the migration assessment (and if the migration involves moving to Power Systems this engagement will be on a no-charge basis).

Once the scope of the engagement has been agreed upon, Migration Factory personnel will schedule assessment workshops and discuss building a proof of concept (PoC) for the migration. And, as was the case with the initial prep call, this too is a no-charge engagement if the migration moves to Power Systems.

Following the prep call, the assessment workshops, and PoC discussion, IBM Migration Factory personnel will generate a migration proposal complete with a TCO (total cost of ownership) analysis. This analysis is a three-year financial analysis for the target migration, integrated with application and training plans.

When you reach this proposal/TCO analysis phase, it should become readily obvious that migrating away from slower, more costly Oracle and HP platforms is a good idea from a total cost of ownership perspective. Make sure to look at the software costs to run workloads on IBM platforms as compared to Oracle and HP platforms.

Migration Factory Expertise

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IBM acquired certain suites of migration code as well as migration methodologies from a company called Sector7 in 2003 (this code is now part of what is now the Migration Factory) — and at that time *Clabby Analytics* wrote a report that described the tools, utilities, metrics, automated migration facilities, and expertise that Sector7 was bringing to IBM. But since then, the Migration Factory tools have gotten even stronger, their comparative metrics are even more accurate, and their automation facilities have also improved substantially. Add to this that Migration Factory personnel have also clearly defined processes for migrations — and now uses project management tools to keep migrations on target — and you, too, will likely come to the same conclusion that we have: *there are few (if any) companies in the world that can compete with the Migration Factory from a tools/technology/process/project management perspective.*

Since 2003 the Migration Factory has expanded its focus beyond operating system/-platform/database/custom code migration to include a focus on:

1. Server workload and storage migration consolidation;
2. Automated server/workload discovery and inventory;
3. Analysis; and
4. Consolidation of workload and data.

This server workload and storage migration/consolidation theme is pretty hot in the market right now as IT buyers look to consolidate, virtualized, and provision their sprawling server and storage environments. Migration Factory personnel have skills in CiRBA, VMware, PlateSpin, Softek, Virtuozzo, and much, much more to assist in consolidation and virtualization efforts.

The automated server/workload discovery and inventory service includes collection and monitoring services that can provide enterprises with information on their systems/storage utilization rates.

We rank this service as extremely important to enterprises looking to lower the cost of computing. The name of the game and reducing computing costs is to raise utilization rate of the systems and storage that an enterprise owns. To do this, IT managers need to know what their utilization rates look like at present — and they need to set up a mechanism to track utilization rates in the future.

This automated server/workload discovery and inventory service also helps clients deploy a CCMDB (change and configuration management database) that can help clients update their software and manage capacity (capacity management becomes very important when driving high utilization rates — as will be the case in the cloud architectures of the future).

Migration Factory analysis services can be used to understand server and workload taxonomy (workload characteristics and dependencies). It should be noted that historical data is also gathered as part of the service. This data helps to speed consolidation and virtualization planning and deployment. The state is also important because it feeds total cost of ownership and return on investment models.

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The Migration Factory consolidation of workload and data service considers infrastructure, databases, applications, and storage rationalization — with an eye toward unifying all. Data collection is analyzed and optimized; data center moves (across the existing data center or to outsourced IBM data centers) can be implemented via the service; server refresh takes place at this time; and, storage data migration can also be performed as part of the service.

The traditional Migration Factory offerings as well as a description of the related services are shown in Figure 2 (below).

Figure 2 — Migration Factory Offerings

<p>Server Workload Migration</p> <p>Operating Systems</p> <ul style="list-style-type: none"> ▪ AIX, Sun Solaris, HP HP-UX, HP Tru64 UNIX, Linux (x86, Power & z), SGI Irix, Windows <p>Custom Code Porting/Migration</p> <ul style="list-style-type: none"> ▪ C/C++, COBOL, Java, Scripting Languages (Perl, Shell, etc.) <p>Database Migration, Conversion, Upgrade</p> <ul style="list-style-type: none"> ▪ Oracle, Informix, Sybase, DB2, SQL Server <p>ERP Application Migration</p> <ul style="list-style-type: none"> ▪ SAP, Oracle E-Business Suite, PeopleSoft 	<p>Server Workload & Storage Migration & Consolidation</p> <p>Encompasses Windows, Linux & UNIX workloads and storage Core skills in CiRBA, VMware, PlateSpin, Softek, Virtuozzo etc.</p> <p>Automated Server/Workload Discovery and Inventory</p> <ul style="list-style-type: none"> ▪ Utilization collection and monitoring ▪ Load CCDMB and asset management tools <p>Analysis</p> <ul style="list-style-type: none"> ▪ Server and workload taxonomy ▪ Historical data for rapid development of consolidation planning and TCO and ROI analysis <p>Consolidation of Workload and Data</p> <ul style="list-style-type: none"> ▪ Infrastructure, databases, applications, storage ▪ Like-for-like or cross-platform consolidation ▪ Same application & database migration capabilities ▪ Application rationalization ▪ Detailed data collection, wave technical solution design, implement (migrate, virtualize/consolidate, test & deploy), decommission images/servers ▪ Data Center Move - Migration of server workloads across customer data centers or to IBM data centers ▪ Server Refresh - Image migration and virtualization during the hardware refresh cycle for IBM outsourced accounts ▪ Storage Data Migration - Migration of data across differing storage vendors; e.g. EMC to IBM
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Source: IBM Corporation — June, 2011

Migrating From HP

The preceding section described in general terms some of the activities performed by the Migration Factory. But the Migration Factory has also posted a description of the services that it offers for porting from specific vendors environments to IBM environments. In the case of HP, a list of the typical porting scenarios and migration offerings provided by the Migration Factory can be found here: <http://www-03.ibm.com/systems/migratetoibm/hp/>.

A quick summary of HP specific migration services include several services designed to migrate Windows-based servers running SQL Server and/or SAP from HP x86 platforms to IBM x86 platforms (System x). There are also services available for migrating from HP Itanium-based HP/UX and Linux servers to IBM System x environments — or more likely, to IBM Power Systems running AIX. Additionally, there are migration services for moving from HP's HP/UX or Linux environments to Linux on the mainframe.

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As we said at the outset of this report, it is very important to consider characteristics of the workload. Some workloads run better on x86 architecture; others on RISC architecture (Power Systems is a RISC architecture); and still others run best on a mainframe. The good news here is that the Migration Factory has offerings for moving to all three environments.

We also found numerous services for moving HP customers off of XP, EVA, HP P2000/MSA and P4000/LeftHand systems, HP Storage Work Ultrium / Storage Work MSL storage systems to various IBM storage subsystems.

Moving From Oracle

The Migration Factory also offers several services for moving off of SPARC-based servers and Oracle storage. A list of these services can be found at:

<http://www-03.ibm.com/systems/migratetoibm/oracle/>

A quick summary of Migration Factory Oracle migration offerings shows services for migrating off of UltraSPARCI, UltraSPARC II or IV, M-Series to IBM Power Systems or System z (and in some cases to System x).

From a storage perspective, the Migration Factory offers Oracle customers with EMC storage a migration path to IBM storage subsystems. And for Oracle customers with Sun (now part of Oracle) storage, IBM offers services for migrating off of 9985V or 9990V, Sun Storage 7xxx Array with limited NAS, Sun 2xxx or 3xxx subsystems — and off of VSM or 9310 Powderhorn tape libraries. Further, Oracle customers with Sun StorageTek 6xxx storage arrays can also be migrated to IBM system storage.

But, for even more fun, IBM also offers several incentives for dumping Oracle cores and moving to IBM Power Systems or System z Mainframes (IBM calls these incentives the "Oracle SUN-SET Special — and these specials encourage IT buyers to migrate from Oracle servers to IBM and earn up to 8,000 Power and zRewards points per core. Those points can be redeemed for selected services and software products from IBM and its partners).

Summary Observations

It's been eight years since we wrote our original report on Sector7 (now known as the Migration Factory). In that time, the organization has grown from about 50 people to over 300. And since that time there have been over 5000 competitive displacements from Sun (Oracle) and Hewlett-Packard. And this number is accelerating as Itanium and SPARC architectures continue to fail.

What we believe is happening is that IBM's AIX on Power Systems is in the process of becoming the de facto standard for commercial Unix in the computing marketplace. Migration Factory executives told us that over 90% of the migrations they are now doing are from HP/UX and Solaris to AIX. This is why we said at the outset of this report that the Migration Factory is particularly well-suited to serve enterprises migrating away from HP/UX and Solaris. But note, it is also well-suited for Unix (HP/UX or Solaris) to Linux on POWER migrations too.

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We are now in the initial stages of research that is examining whether HP/UX and Solaris customers may be considering moving from HP/UX Itanium and Solaris/SPARC-based servers to x86 multi-cores running Linux. An initial discussion with Red Hat confirms this trend, but we will need to do a lot more research before verify that the market is moving in this direction. The good news here is that the migration factory can also deliver Unix to Linux on x86 services — as well as Unix to Linux on System z (mainframe) migration services.

We should also note that several of IBM's Migration Factory customers have provided commentary on their migration experience — and that there are several mini-case studies available for further research. These can be found at: <http://www-03.ibm.com/systems/migratetoibm/casestudies/>.

The final point worth noting is that the Migration Factory has become expert at migrating Oracle database users to IBM DB2 and Informix databases. DB2 has several distinctive advantages over Oracle's database — especially in the area of data compression. IT executives who are considering migrating from Hewlett-Packard Itanium-based servers or Oracle SPARC-based servers might also want to take a closer look at IBM's DB2 (because, in the interest of cost, buying DB2 could help drive down hardware and software acquisition costs if the customer chooses to sign a volume purchase agreement with IBM).

In summary, there are significant cost advantages that enterprises can realize on by moving from Oracle SPARC and Hewlett-Packard Itanium-based servers (the major advantage being that IBM servers offer better per core performance — resulting in significantly lower software acquisition costs). There are also competitive advantages to be had by moving from Oracle and HP — IT buyers will no longer need to wait as long to get competitively performing systems. To get the ball rolling, write a business case that weighs the benefits and the risks of migration. Upon completing this exercise, we believe that most enterprises will find that moving from SPARC and Itanium is a very good idea.

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