IBM

Successfully migrating to Linux:
Business and IT considerations

Contents

Introduction

The past few years have seen a dramatic increase in the acceptance of Linux as a mainstream computing platform, one that is now deemed enterprise-ready by industry analysts and businesses alike. Though many organizations are already running Linux on "edge" servers — e-mail, Web and file servers — an increasing number are considering bringing Linux into the data center and even onto the desktop.

There are several factors adding to the momentum behind the shift from proprietary operating systems to Linux. Cost (including acquisition, licensing and ongoing support) is, of course, a major consideration. But other drivers are also significant, such as the growing availability of vendor applications and software/middleware support for Linux on more architectures, and the forced upgrade caused by the sunset of older operating systems such as Microsoft® Windows NT,® HP 3000 MPE and OS/2.® In addition, Linux offers the ability to avoid the restrictions inherent in proprietary systems; many companies consider the freedom of choice open-source solutions to be one of the most significant factors driving them to Linux.

Regardless of the driving factors behind an organization's move to Linux, it is important to understand the nature of migration. Migration is not simply the rollout of new hardware, software and applications. To make it as safe and cost-effective as possible, considerable preparation is required to properly plan for, design, test, optimize and measure the new system. Organizations must consider business continuity, as well as change management — training where necessary and getting interested parties to "buy in" to the new initiative. Even the decision to migrate in the first place must be properly researched and supported. Few organizations have the in-house expertise necessary to perform all of these tasks. Yet, according to a July 2003 survey of IT executives conducted by Forrester Research,[1] 59 percent of organizations using Linux do not purchase third-party support services for it.

Failure to properly conduct a migration to Linux can, at best, lead to greater costs. At worst, it could put mission-critical computing tasks at risk due to mismanagement and reduce the credibility of an organization's overall Linux initiative. It is therefore a wise investment to engage an experienced service provider to assist in the migration and provide post-migration support. The money spent may be relatively insignificant compared to the ongoing costs of maintaining proprietary systems, and can be offset by the improved performance and lower support costs of a properly optimized Linux system.

Understanding migration drivers

Few organizations have the in-house expertise to perform all the necessary tasks for a successful migration…but there may be compelling business reasons to migrate to Linux.

Before embarking on a migration project, it is important to take a step back and ask why it is being attempted in the first place. Linux has been widely used for several years in non-mission-critical roles, such as for ad-hoc servers on the "edge" of the IT infrastructure. The positive attributes of Linux are well established: security, stability, openness, flexibility, interoperability, portability of code, low acquisition costs and reduced software costs (open-source solutions are far less expensive than proprietary solutions).

While these are all good reasons to use Linux, they may not be enough to displace proprietary operating systems such as Windows® or one of the various flavors of UNIX® at the core of the infrastructure. Organizations that use proprietary operating systems often have already made considerable investments in them; they may not be ready to incur the cost of migration to a new architecture without a compelling business reason to do so. However, there may be compelling business reasons to migrate to Linux, as this paper will highlight.

Cost considerations

The overriding motivator behind Linux migrations is to drive costs out of the system. Over time, the savings can be considerable. According to an extensive total cost of ownership (TCO) study in 2002, the Robert Francis Group[2] found that "Linux was the least expensive platform to deploy and operate. The ability to massively scale the product horizontally without paying additional licensing fees can yield significant cost savings over the long term."

Total cost of ownership study 2002

Operating system (OS) case	Linux	Sun Solaris	Windows
Year 1	$49,931	$421,718	$ 91,724
Year 2	$62,203	$491,619	$141,193
Year 3	$74, 475	$561,520	$190,662

When TCO studies indicate that it may be less expensive to migrate to Linux than to continue to support and update an existing proprietary operating system (OS), the migration is likely to take place – provided, of course, that companies address other considerations such as the availability and support of suitable applications and appropriate tools.

The correct assessment of costs – and the potential savings of migrating to Linux–may be beyond the in-house expertise of some organizations. This is because the factors that support such an IT business decision are complex and varied, with many lying outside the normal area of expertise and respon- sibility of IT departments. Those organizations with these skills often find that their people are so deeply involved in day-to-day operations that they don't have the time for a complete cost assessment.

A good example of this is the dilemma presented by Microsoft's suspension of support for Windows NT. Because of the sunset of Windows NT, organizations that use it are now faced with a decision: Stick with Windows and undertake the (costly) move to Windows 2003, or take advantage of the opportunity to move to Linux.

It's important to remember that there are costs associated with all migrations, whether it's moving from one platform to an entirely new one (e.g., Windows to Linux) or updating a proprietary operating system (e.g., Windows NT to Windows 2003). Therefore, it makes good business sense to consider all available options before deciding on a course, even if those options were not part of the initial plan — an organization should not rule out any option without first examining the cost involved.

There are costs associated with all migrations; it makes good business sense to consider available options before deciding on a course.

The correct decision must be informed by a realistic projection of the total cost of both options, which should account for more than just the cost of new hardware and software. Enterprises need to consider intangibles such as business continuity, transparency and future upkeep. For example, most of the many Windows security patches that have been released require rebooting the system; by contrast, Linux servers have been known to run continuously for years and most patches do not require an interruption of service.

Linux servers have been known to run continuously for years.

Also, existing in-house knowledge has very real value. An organization presently using Windows NT already has in-house experience and expertise with Microsoft products. Moving to a new OS will inevitably result in costs associated with becoming familiar with the new environment. However, if the organization already uses UNIX or Linux, these costs are relatively insignificant and are overshadowed by the savings inherent in a Linux solution: A company that already has a UNIX infrastructure can implement a Linux solution less expensively than bringing in a new Windows 2003 solution.[3]

The key question that IT executives must answer is: Does the organization have the expertise necessary to make realistic cost projections for these alternatives? If not (which is likely), it is necessary to bring in outside help, or utilize the proven TCO and return on investment tools and methodologies available from companies such as IBM Global Services.

A full examination of this scenario lies beyond the purview of this paper. Nevertheless, it does serve to illustrate the underlying complexity of supporting the decision about whether or not to migrate to Linux.

An increasingly favorable environment

Though reducing costs is the primary migration driver, several supporting factors are accelerating the adoption of Linux. The release of the 2.6 kernel gives Linux much greater vertical scalability, making it suitable for many enterprise-class workloads — a capability that was not in place a year ago. The ability for 2.6 based Linux to linearly scale to 32 processors also opens the door to running large databases on Linux on Intel,® another option that wasn't as available in 2003.

In November 2002, Bloor Research found that approximately 90 percent of Linux servers ran on Intel machines;[4] however, that percentage is changing as vendors Linux-enable more of their hardware. For example, IBM now offers Linux support throughout the IBM @server® line as well as on all TotalStorage® products.

Software, middleware and enterprise applications are being ported to Linux at an increasing rate.

Software, middleware and enterprise applications are also being ported to Linux at an increasing rate. Comprehensive Tivoli® solutions are available, and ISVs such as SAP, Siebel and PeopleSoft are supporting Linux. Oracle and IBM, the two primary database vendors for Linux, are both solidly committed to Linux and their database offerings are presently fully Linux-enabled. And as the Linux marketshare continues to increase, service providers such as IBM, Red Hat and others are stepping in and devoting more resources to addressing the Linux community's business requirements.

In fact, ongoing heavy involvement by major players is feeding back into the Linux community and driving changes to Linux itself. For example, Oracle has collaborated with Red Hat to enhance the Linux kernel, introducing a number of key features including a cluster file system, asynchronous I/O, I/O driver optimizations, Very Large Memory (VLM) support and more.[5]

Service providers such as IBM and others are devoting more resources to addressing the Linux community's business require-ments — a prime example of the value of open-source software.

IBM has also been involved with the 2.6 kernel; IBM engineers are members of numerous kernel development teams and have earned widespread respect and influence in the Linux community. IBM efforts involving the kernel include:

- Broad scalability and system enhancements
- Memory management
- Non-uniform memory architecture (NUMA)
- An overhauled scheduler
- Device naming I/O optimization
- Dynamic logical partitioning (LPAR) support
- Security and networking enhancements
- Reliability, Availability, Serviceability (RAS)
- Files systems, hyperthreading and innumerable patches and device driver fixes

This involvement by multiple vendors is a prime example of the value of open-source software — enabling industry players to collaborate successfully with one another and with the community at large for the good of all. The result is much faster development than is possible in a proprietary environ-ment. One particularly telling trend is the growing availability of servers that ship with no operating system installed. Not long ago, the only option was to purchase a server with Windows installed, which then had to be uninstalled before Linux could be deployed on that server.

Factors such as these often are enough to tip the balance in favor of Linux for many organizations. Because of the increasing support from ISVs, service providers and hardware and software manufacturers, the market has reached "critical mass" — the point at which it makes economic sense for many organi-zations to seriously consider migration.

Supporting research and market data

Research and market data support this assertion and point to an increasing shift to Linux. According to IDC, from a worldwide perspective, Linux servers generated US$960 million in quarterly revenue for Q4 2003. Overall, Linux servers showed 63.1 percent growth year-over-year, while unit shipments grew 52.5 percent year-over-year.

According to Jean S. Bozman, Research Vice President in IDC's worldwide server group, "Linux server growth continued to accelerate, demonstrating that Linux servers are taking on important roles in IT customers' computing infrastructure. What began with edge and Web-centric workloads is branching out to include HPC and commercial workloads."[6]

Linux's enterprise-readiness is helping to drive the market.

IDC's predictions for 2004[7] indicate that Linux's strong growth will continue, stating that "adoption of Linux as a low-cost, shared R&D operating platform will be in a 'tipping point' phase in 2004, for the first time making up over 10 percent of server sales in the United States, and Linux-plus-UNIX sales will approach 50 percent."

It appears that the perception of Linux's enterprise-readiness is helping to drive the market. According to Forrester Research,[8] "nearly half of the companies that have deployed Linux will run enterprise applications, excluding Microsoft Office, on Linux during 2004."

Although research suggests that IT executives' biggest concern is availability of commercial support, the third-party support picture for Linux is very good.

While growth trends are clear, Linux is not yet poised to dominate the marketplace. While it's certainly possible to run an entire organization top-to-bottom, including desktops, on Linux, few are prepared to make such a significant leap—yet. A March 2003 survey of IT executives, representing 50 US$1 billion-plus companies, reported that 72 percent planned to increase their Linux usage in the next two years.[9]

Research suggests that the biggest concern of IT executives is availability of commercial support. A September 2003 survey of 50 IT executives at US$1 billion-plus companies in North America[10] indicated that 56 percent of them identified lack of commercial support as a significant challenge to the deployment of open source software, which of course includes Linux.

But this concern is not rooted in reality. In fact, the third-party support picture for Linux is very good compared to lower-profile open-source products. Strong commitment from major IT vendors means that the availability of support is high.

As noted above, most organizations do not choose to purchase support services. Of the remainder, however, the vast majority turn to major vendors such as Red Hat or Novell/SuSe, both of which have significant support agreements in place with leading vendors such as IBM. And Oracle claims that its highest available level of support is available only on Linux.[11]
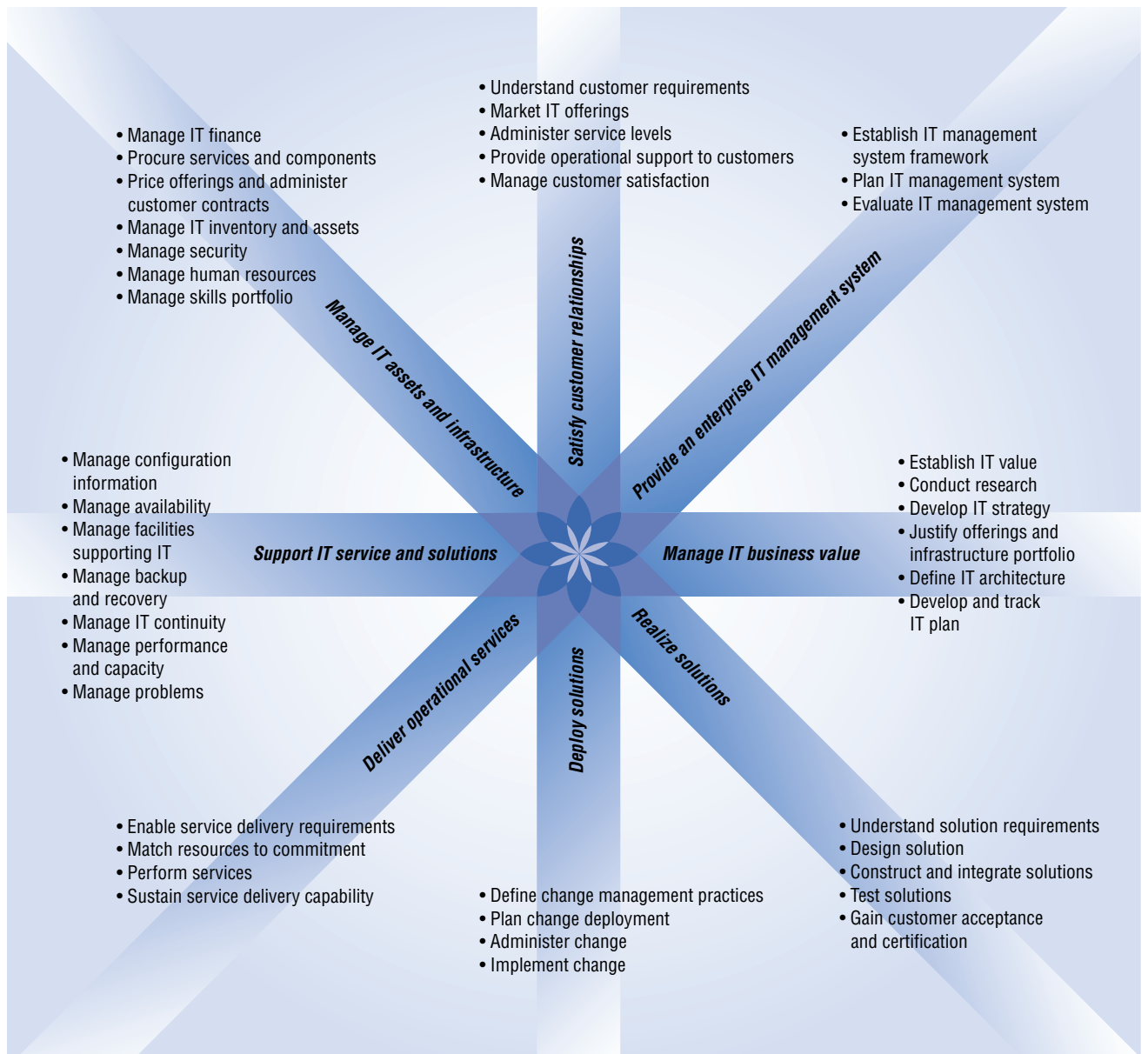
Laying the foundation: The IT Process Model

What underlying migration activities should an organization consider? Given the importance of migrating successfully, it is wise to not only address the small-scale technical issues surrounding the project, but also to consider large-scale, fundamental IT questions — setting the foundation for ongoing success.

IBM has established a model that has proven invaluable in conducting thousands of successful migrations and other IT management projects over the years. It is used within IBM itself and provides a well-established underlying structure for successful IT management.

The IT Process Model is an
essential tool for assessing,
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an organization's IT assets.

Called the IT Process Model, it is an essential tool for assessing, transforming and managing an organization's IT assets. The model is not a detailed technical migration roadmap. Rather, it provides an underlying framework for IT asset management that is dynamic and flexible, and which verifies that all pertinent considerations are considered when embarking on a migration initiative. The foundation for an organization's design, communication, analysis and assessment objectives, the IT Process Model is, in effect, a description of how successful IT implementations operate and the large-scale goals they must accomplish.

By incorporating the principles of the model into Linux migration assessment and planning, organizations can leverage a proven structure that optimizes the effectiveness of its IT infrastructure while reducing its cost. The process model enables an organization to evaluate its current IT processes and determine where they need to make changes during the migration to affirm that the new deployment is managed properly. It also serves to create detailed requirements for the assets and tools needed to manage the new Linux system, which may differ markedly from those being used to manage the organization's legacy systems.

- Understand customer requirements
- Market IT offerings
- Administer service levels
- Provide operational support to customers
- Manage customer satisfaction

- Manage IT finance
- Procure services and components
- Price offerings and administer customer contracts
- Manage IT inventory and assets
- Manage security
- Manage human resources
- Manage skills portfolio

- Establish IT management system framework
- Plan IT management system
- Evaluate IT management system

Satisfy customer relationships

Manage IT assets and infrastructure

Provide an enterprise IT management system

- Manage configuration information
- Manage availability
- Manage facilities supporting IT
- Manage backup and recovery
- Manage IT continuity
- Manage performance and capacity
- Manage problems

Support IT service and solutions

Manage IT business value

- Establish IT value
- Conduct research
- Develop IT strategy
- Justify offerings and infrastructure portfolio
- Define IT architecture
- Develop and track IT plan

Deliver operational services

Deploy solutions

Realize solutions

- Enable service delivery requirements
- Match resources to commitment
- Perform services
- Sustain service delivery capability

- Define change management practices
- Plan change deployment
- Administer change
- Implement change

- Understand solution requirements
- Design solution
- Construct and integrate solutions
- Test solutions
- Gain customer acceptance and certification

The eight elements of the IT Process Model focus on the customer, deliver what the customer values, and support the service over time—all within a management framework.

The IT Process Model consists of eight main elements, defining a total of 41 processes that are closely intertwined and address the various aspects of IT management. These eight elements provide an end-to-end guide for IT activity and how it fits together. They can be thought of as eight "big considerations" for Linux migration.

In brief, the eight elements of the IT Process Model and their significance are the following:

Satisfy customer relationships

The ultimate goal of IT is to make the business function efficiently through the support of business processes, which means ensuring that internal customers' needs are met. It does not matter if a Linux deployment costs less than the alternative if it does not support those needs.

Provide an enterprise IT management system

As noted above, many IT infrastructures were not planned in a rigorous manner; rather, they have evolved in an unstructured way. This is also true of IT management structures within organizations. Ownership, control and responsibility are often scattered, with inconsistent application of standards and inefficient operations. Proper assessment, planning and evaluation of a Linux migration is critical to success, which is possible only if the overall management structure is unified.

Manage IT business value

IT has real business value that can be measured in cost control and productivity improvement. That value must be established in a measurable way and planning must be conducted to optimize it. This is a core consideration in justifying and planning for a Linux migration.

Realize solutions

It is not enough to simply "migrate to Linux." Organizations must identify and set priorities, and create solutions to meet those requirements. This involves understanding needs, designing solutions, and implementing, testing and integrating them.

Deploy solutions

This covers the all-important shift from pilot to production, and includes change management, deployment planning, administration and the all-important timing of the cutover.

Deliver operational services

IT is a dynamic, shifting, evolving activity. Requests come in from internal customers and the IT department must allocate the resources needed to meet those requests. In a migration scenario, this might involve alteration of schedules or even overall project requirements and plans as new technology becomes available or requirements change.

Support IT service and solutions

Linux may be incredibly stable and reliable, but no computing platform is perfect. Day-to-day support tasks such as backup and recovery, the maintenance of configuration information, ongoing maintenance and upgrades must be planned for and performed on a continuing basis.

Manage IT assets and infrastructure

The ongoing activities that surround and support the IT infrastructure, from finance to future planning to skill-set management to interaction with service providers, are all critical parts of the overall IT picture and have a direct and profound impact on the migration.

These eight groups of processes are not executed in any specific order. Rather, they all interact with one another, and no one component can be considered in isolation: All are important.

Premigration: Setting a frame of reference

The IT Process Model described above provides a well-defined framework that helps to guide IT management activities of all kinds. But what about migration-specific concerns?

An organization must ask relevant, specific questions and prove cost savings projections with real data.

Once an organization decides to migrate, the key issue it must address is what exactly is the object of the exercise? What is to be gained by migrating to Linux, and is it worth the cost and effort to do so? If an organization's existing systems are poorly managed or dysfunctional in some way, it's tempting to consider a wholesale shift to a new platform as a way to fix what's broken… and Linux is a prime candidate because it typically is so cost-effective. But it is important to remember that migrating to Linux (or any other new platform) will not solve problems all by itself. If the current environment is poorly managed, the Linux environment will also be poorly managed unless the organization changes its management processes, tools and possibly even its skills and resources. This is where a rational framework such as the IT Process Model can prove invaluable.

To determine whether the migration is actually worth doing, it is not enough to simply follow the lead of a study that says Linux is less expensive than Windows or some other proprietary operating system: The organization must ask relevant, specific questions, and cost savings projections have to be proven with real data.

Therefore, the migrate/don't migrate question must be framed in a measurable way, through thorough assessment of current and projected costs along with assignment of values to service levels and performance. It is not possible to judge whether the migration has achieved its goals without a clearly defined and objective measurement methodology. It is possible, but impractical to work this up from scratch; it makes much more sense to leverage existing industry best practices by teaming with an external service provider that has experience conducting such assessments.

It makes sense to leverage existing industry best practices by teaming with an external service provider experienced in conducting such assessments.

That does not necessarily mean professional services are needed at every level or for every migration project. An important part of the migration process is to accurately assess the level of in-house expertise, as well as the cost of using those resources to perform the migration versus bringing in a third party. At what point does it make sense to hand the task over to dedicated professionals? Simply adding an Apache Web server running on Linux to an existing IT infrastructure does not require teaming with a service provider. But a large-scale migration, one dealing with mission-critical data and processes, is another thing entirely.

Often, an organization may have adequate IT skills in-house, but those resources cannot be taken away from keeping the business running. Or, the organization may lack sufficient planning, assessment and management skills to properly oversee the project. Being careful and conservative is the order of the day: it is essential to realistically assess how the migration will impact the organization on all levels, existing resources and the cost of any additional resources needed to make the migration work.

Following the migration path, step-by-step

It is important to understand at the outset that there is no one clearly defined activity that can be called "migration." Each case is unique, with its own set of background considerations and requirements. This does not mean, however, that the wheel needs to be reinvented with each new migration. Past experience and best practices can be leveraged to help ensure success.

Experienced partners such as IBM Global Services have a long history of successful migrations — bringing intellectual capital to each engagement.

Migration to Linux can, and should, be done in small steps, taking lessons learned along the way and applying the new knowledge to future activity. This is where industry expertise and best practices can prove invaluable. Experienced partners such as IBM Global Services have a long history of successful migrations and bring that intellectual capital to each new engagement. The superior flexibility of Linux allows it to be easily used in mixed environments where existing applications cannot be ported (such as heavy reliance on Microsoft Exchange servers or other proprietary applications).

Emphasis should be placed on transparency and business continuity. A successful migration should be essentially invisible to the users. Lost productivity due to poor planning, change management or failure to meet service level targets is a cost that can easily wipe out any economic gains realized from the migration.

Regardless of the nature or extent of the migration, it is important to start the migration itself with an end-to-end assessment of the IT infrastructure (hardware, software, middleware and applications) and the organization's IT and business processes. The initial assessment should include a thorough documentation of the "as-is" state.

It is important to start the migration with an end-to-end assessment of the IT infrastructure and an organization's IT and business processes.

Consider questions such as:

- Do the existing systems perform adequately?
- Are existing tools, IT processes and skill sets up to the task of managing the system now and for the foreseeable future?
- Does the existing infrastructure have enough capacity, or will implementing something more robust have to be a part of the migration?
- Is it flexible enough to accommodate growth, or should a new architectural design be considered?

Few IT infrastructures are neatly defined and managed throughout the organization. Most evolved in an organic way, with ad hoc hardware being installed to meet spot needs and a diverse mix of software, middleware and applications. The reality is that heterogeneous, sometimes chaotic environments are the norm. This must be considered during a migration. This initial assessment alone can go a long way toward making the overall infrastructure more efficient by uncovering bottlenecks and inefficiencies in existing systems, which can be corrected as part of the migration itself.

Next, the "to be" state should be clearly defined. What will the system look like after the migration is complete? This covers not just the IT infrastructure itself, but the applications and business processes that it supports. IT does not and cannot exist in a vacuum.

With both ends of the process clearly defined, the challenge is to get from the "as is" state to the "to be" state in the most cost-effective, efficient and above all safe manner possible. Timetables for prototyping, development and rollout of new systems, and graceful retirement of old systems need to be established. A dynamic methodology that is flexible enough to adapt to lessons learned should be followed.

As part of the overall assessment, it is also necessary to examine in detail the software tools available for Linux and how they differ from those currently being used. In many cases, there is parity between Linux tools and existing tools; for example, if the organization is running Oracle and uses Oracle Enterprise Manager for management and performance monitoring, there is no difference whatsoever when moving to Linux.[12] But in other cases, a directly comparable tool might not be available and IT processes need to be changed to accommodate this fact.

The same goes for the application suite. Is the required functionality available for Linux at all levels? If not, can applications be developed to provide the functionality, or can the organization's processes be altered to accommodate the available functionality?

Organizations must also consider the tools and processes that are to be used in the actual migration. For some tasks, moving from existing systems to Linux is simple…for example, migrating database information is often a simple export/import operation. But in other cases dedicated tools may be needed. This is another instance in which increasing ISV support for Linux is paying off: Oracle, for instance, has a platform migration utility that the company claims can "allow you to migrate your e-business suite applications tier to Linux in less than one day." [13] Lack of such off-the-shelf utilities means that custom migration tools may need to be developed.

A key advantage of open-source software over proprietary systems is that the information needed to resolve support issues is freely available and plentiful.

It is critical to have full knowledge of these issues before attempting any migration project. The lack of a critical tool or late discovery of a software shortcoming can bring the entire project to a halt and drive up costs dramatically, especially if the organization has not opted to engage a third-party support partner. A key advantage of open-source software over proprietary systems is that the information needed to resolve support issues is freely available and plentiful to anyone who looks for it, but that can also be a problem. It can be difficult to find correct answers quickly using limited in-house skills and resources. Therefore, it is better to ask — and answer — those questions before they turn into crises.

This comprehensive analysis of the IT environment pays dividends long after migration is complete. Where problems occur, it helps isolate the actual source or sources and enables the organization to apply more comprehensive, effective solutions rather than engaging in "fire fighting," in which the symptoms of a problem are addressed without ever determining the underlying cause. [14]

Prototyping and application porting

The first physical step in a typical migration usually involves starting up a pilot, or prototype, system running a subset of the overall application suite in use in the production system. The pilot system is set up in a security-enhanced, isolated environment to help eliminate any possible impact on the production systems. Naturally, sufficient resources must be allocated to the implementation, tuning and testing of this system.

Sufficient resources must be allocated to the implementation, tuning and testing of a pilot system.

The pilot system also should be used to test new IT and business processes before they're tried in a production environment. In many cases, the entire architectural model will change with the move to Linux, which implies new approaches to high availability, backup/recovery, disaster recovery, storage management and workflows. Problems can occur where new processes touch existing processes, and where existing processes must be adapted to accommodate a new architecture. It's far less expensive to work the kinks out before going live.

This initial stage is where several major software issues are addressed. Migration tools need to be deployed and tested. Many migration projects involve proprietary applications that must be rewritten to work with Linux. In such a case, the best point of entry into the migration process is to identify a suitable (i.e., stable) application and port it to Linux in an isolated, security-enhanced test environment. It can then be run in parallel with the live application, tuned and measured to see if real improvements match those projected.

Most of the time, "problem" applications will have been written in nonstandard languages and/or languages that do not include Portable Operating System Interface Standard (POSIX)-compliant APIs will have to be rewritten.[15]

The porting of applications is a major part of any migration project. Even though porting involves changing only those elements that must be changed in order for the application to work in the new environment, the amount of time and attention to detail required can be significant. If actual redesign is required, the resource demands can be even greater. Porting and redesign involves an assessment phase (similar to the overall migration assessment), design, code and unit testing and integration testing. Inevitably, the project will encounter challenges that require manual intervention, which adds to the time it takes to complete the port. IBM's methodology, based on extensive experience with such projects, calls for anywhere from six months to approximately 18 months, depending on the attributes of the applications involved.

This is where teaming with an outside provider can make or break the project. IBM's approach is to use a proven application porting process that functions like an assembly line, leveraging IBM skills and capabilities across geographic and brand lines, and involving IBM Business Partners where appropriate.

Moving to production

Once the prototype system is ready, it can be scaled up and moved to production status. This is where extensive, careful planning and preparation pay. Ideally, there will be no problems…but if there are, this is another area in which migration experience can prove critical.

The move from prototype to production is actually an iterative process, in which lessons learned are fed back into the development loop to make subsequent pilot projects more efficient and cost-effective.

*A key part of a successful
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Testing, measurement and oversight

In keeping with the initial step of comprehensive cost and savings
assessments and measurable goals, a key part of a successful migration
methodology is to follow a well-defined and conservative path of proto-
typing, testing, measurement and tuning before taking any given application
into production. This allows the organization to isolate the application in a
security-enhanced environment during development, thereby supporting
business continuity and transparency once it is brought into production.
Issues can be identified and addressed before they have an impact on the
business as a whole. This methodology applies not only to the initial proto-
type system, but also to all subsequent migrations.

During planning for the migration, this activity must be put into the timeline,
with clearly defined checkpoints and targets for timing, performance and cost,
feeding any information uncovered back into the planning process to make
the next part of the migration run more smoothly. With more business-critical
solutions being deployed on Linux, the response time and scalability of the
solution under high workloads becomes more critical to the user's acceptance.
A successful rollout will also build credibility for the next Linux implementa-
tion and shorten the due diligence phase of the decision-making process.

Testing and measurement should not end with application rollout. Real-world monitoring and checking is needed to determine whether or not the system is continuing to function as expected especially as the number of users and the workload increases.

Overall management and ongoing project assessment should be built into the migration plan from the outset.

Physical IT considerations aside, overall management and ongoing assessment of the project itself should be built into the migration plan from the outset. This allows the organization to properly track costs and resource use.

These activities are important for two reasons. First, they help ensure acceptable functionality, reliability, availability and response times in the production systems: the performance goals defined during the premigration assessment. Second, ongoing testing, measurement and oversight make it possible to properly assess the success of the migration from a business standpoint.

Here, again, it makes logical sense to leverage existing expertise. IBM Global Services can offer insight and best practices from thousands of migrations performed for a wide range of clients over the years.

Summary

This discussion of migration considerations cannot, of course, cover all possible scenarios or all the detailed technical considerations involved in Linux migration. It is the purpose of this white paper to illustrate the complexity and multifaceted nature of a successful migration. Organizations considering migrating to Linux are encouraged to realistically assess their own ability to engage in such a project in a manner that fosters success and reduces cost without partnering with a qualified third-party migration services provider.

The shift to Linux involves a migration from existing systems to the new platform. This migration is not necessarily a simple task, and few organizations are equipped to perform a high-quality migration without outside help from an experienced service provider like IBM Global Services. This white paper has described some of the scenarios that organizations should consider when planning a Linux migration.

Find out more

For more information about IBM Linux solutions, or to learn more about how the people of IBM Global Services can help your company gain and sustain a competitive advantage in the on demand business marketplace, contact your IBM sales representative or visit:

ibm.com/linux

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