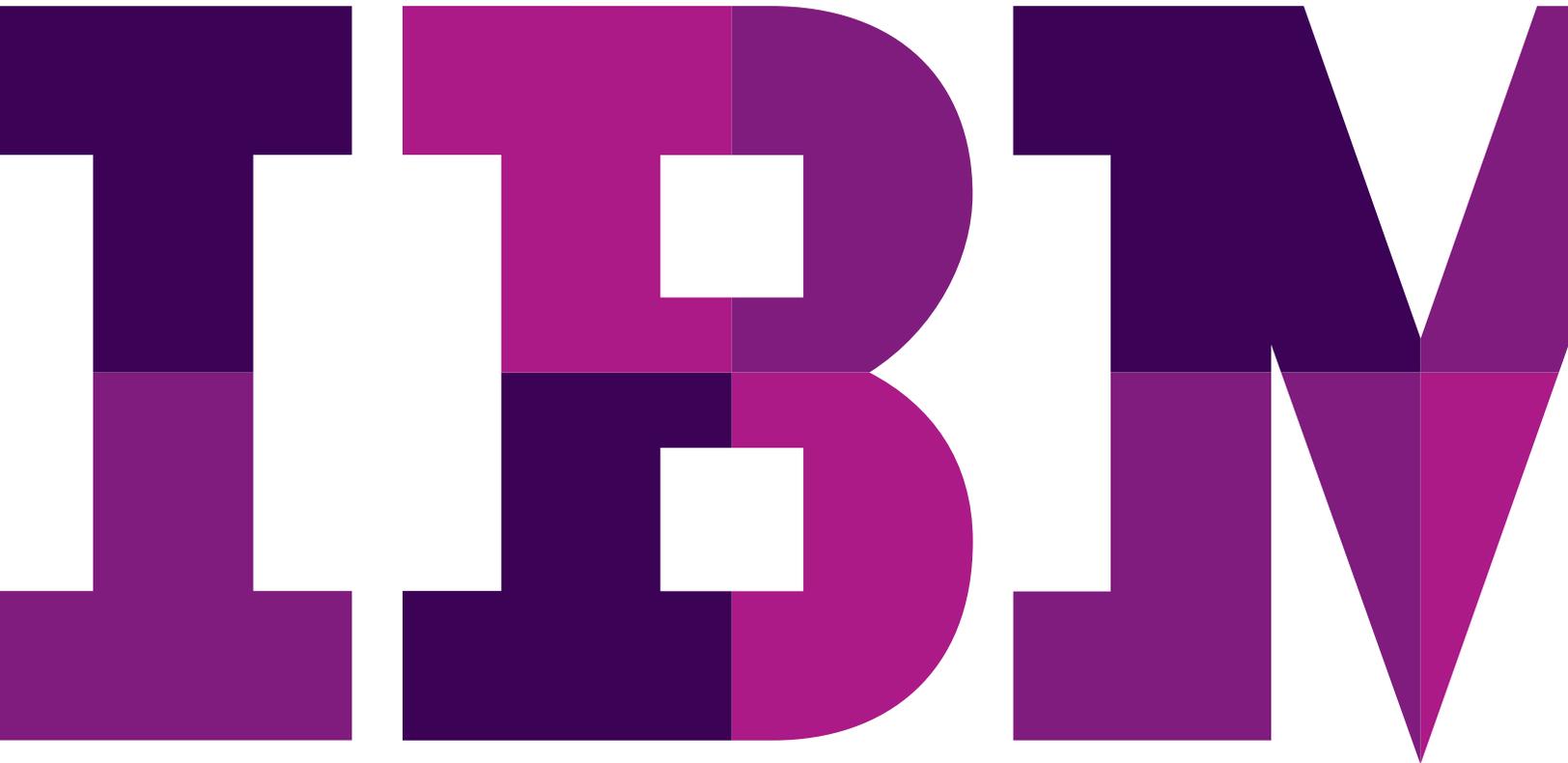


Driving enterprise resiliency with data center consolidation and migration



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Executive summary

Cost reduction. It can mean the difference between sinking or swimming through tough times. And even through the good years, reducing costs is always a smart strategy—as a more operationally efficient data center can position the enterprise for future growth.

Toward that end, many chief information officers (CIOs) and data center managers may be migrating their IT assets to the cloud and consolidating their data centers—while others may view efficient expansion and new data centers as keys to success.

Regardless of the circumstances, data center consolidation and migration can be far more than a cost-reduction effort. By incorporating IT discovery tools as part of the consolidation and migration process, businesses can better understand their IT infrastructure, reduce costs, improve enterprise-wide resiliency and optimize their infrastructure and workloads. In this way, consolidation and migration can be more than merely a facilities exercise—it can transform the value of IT across the business.

This paper discusses the importance of using IT discovery tools during the migration process and offers practical tips for employing these tools to help decrease costs, manage risks, facilitate a seamless migration and improve resiliency. The paper also highlights the many transformative benefits and challenges of data center consolidation and migration.

Drivers and benefits for data center consolidation and migration

There are numerous drivers and benefits for data center consolidation and migration—ranging from new technologies and cost reduction to mergers and acquisitions and resiliency improvements. These drivers are explained in greater detail below:

- *“Cloud-first” strategies:* The undeniable benefits of the cloud—such as cost reduction, agility, speed and innovation—are driving many enterprises to adopt cloud-first strategies. Gartner predicts that by 2020, a corporate “no-cloud” policy will be as rare as a “no-internet” policy is today.¹ Because a thorough evaluation of IT systems and workloads are required to identify IT assets as cloud candidates, cloud migrations can often spur full-on data center consolidations or migrations.
- *Hybrid cloud and agile data centers:* Hybrid IT has become the new normal, as migrating entirely to the cloud has been difficult for many enterprises, particularly those with complex or legacy infrastructure. Data center consolidation helps enable enterprises to retain mission-critical legacy infrastructure, realize their return on existing IT investments, and optimize data center utilization and costs. In this way, it provides a smarter path toward embracing cloud more fully in the future.
- *Cost reduction:* Data center expenses—such as electricity, cooling, staffing, equipment and maintenance—can put an enormous strain on the IT budget. Consolidating data centers, on the other hand, can free up millions—even billions—of dollars that can be invested back in the business. High-profile initiatives, such as IBM’s own massive consolidation, are evidence of the tremendous savings potential of a consolidation effort.
- *Data center additions and upgrades:* Rapid technological changes, coupled with massive data growth, are forcing many enterprises to either upgrade or build new data centers. In some cases, building or moving to a new facility is more practical and cost effective than renovating a legacy site. These days, organizations are using these opportunities to make their new data centers more “cloud-like,” with rapid on-demand provisioning and de-provisioning capabilities.

These capabilities enable enterprises to more easily support high-density computing technologies, such as big data, Internet of Things, cloud, social and mobile.

- *Mergers and acquisitions:* Mergers, acquisitions and geographic expansions often leave organizations with too many data centers to manage. By eliminating data centers or relocating to more cost-effective site locations, enterprises can reduce high infrastructure, facilities and labor costs.
- *Business continuity improvements:* The expectation for always-on operations makes business continuity and resiliency more important than ever. Many enterprises are migrating their stand-alone facilities to new data centers that provide more robust business continuity and resiliency capabilities.
- *Facility move or end of lease:* Often data center migrations or consolidations are initiated by purely practical events—such as the end of a facility lease. Moreover, the addition or upgrade of another enterprise data center often triggers a move from an existing data center.
- *Carbon footprint reduction:* In the US alone, data center electricity consumption is projected to increase to roughly 140 billion kilowatt-hours annually by 2020.² This is the equivalent annual output of 50 power plants, costing American businesses USD 13 billion annually in electricity bills and emitting nearly 100 million metric tons of carbon pollution per year.³ Reductions in electricity not only reduce costs and pollution, but they also help enterprises better manage compliance. Consolidation can be a means toward achieving all these goals.
- *Operational efficiency:* Consolidation is a strategic initiative that allows IT managers to achieve operational efficiencies while reducing the amount of time they spend supporting the ongoing technology environment. With fewer resources devoted to managing disparate data centers, enterprises can focus on strategic priorities, such as innovation and operational improvements.

The challenges of data center consolidation and migration

All too often, data center migrations are easier said than done. Skyrocketing data growth, burgeoning new technologies and increasing demands for rapid IT services have left many data center inventories in disarray. As equipment is regularly added, removed or modified, IT inventory management falls by the wayside. Enterprises may also lack the IT discovery tools needed to give them this 360-degree view of their data center environments.

In 2014, IDC estimated that, conservatively, 75 percent of enterprise data centers do not have accurate records of location and connectivity for at least 25 percent of their IT assets.⁴ The analyst also noted that in an audit, it isn't uncommon for enterprises to discover they had 30-50 percent more equipment than they had records.⁵ And for that equipment, they would typically find a similar percentage of errors.⁶

In 2014, IDC estimated that 75 percent of enterprise data centers do not have accurate records of location and connectivity for at least 25 percent of their IT assets.⁷

It all boils down to an inability to answer basic questions:

“What’s in my IT environment?”

“What am I migrating?”

While not knowing the answers to these questions can stifle any consolidation or migration effort, it can also leave the enterprise vulnerable to increased costs, business disruptions and inefficient operations. For example, under-utilized servers waste power and precious floor space. Unsupported equipment can put your organization at risk of extended downtime if the equipment fails. And bad practices or faulty connectivity or equipment configurations can cause outages that ripple across your data center.

And those outages are expensive. According to the Ponemon Institute, the average cost of a data center outage rose from USD 690,204 in 2013 to USD 740,357 in 2016, a 7 percent increase.⁸

Downtime is an expense no enterprise can afford. Using specialized expertise and tools to plan and implement your data center consolidation can help you:

- Identify and manage risks and facilitate application availability within pre-defined windows of time
- Enable a thorough understanding of your IT environment to facilitate a seamless migration and improve your resiliency posture
- Significantly reduce costs

It's a good time to consolidate – but not by yourself

Working with a service provider can offer the specialized knowledge and tools you need to help ensure a smooth data center migration. More specifically, a service provider helps you:

- Move dependent applications and equipment together
 - Manage critical application availability requirements by using specialized data migration techniques
 - Reduce costs and improve operational efficiencies by helping to centralize your IT environment
 - Limit risks by using highly experienced data center consultants
 - Improve resiliency by rationalizing IT assets and identifying and remediating IT risks
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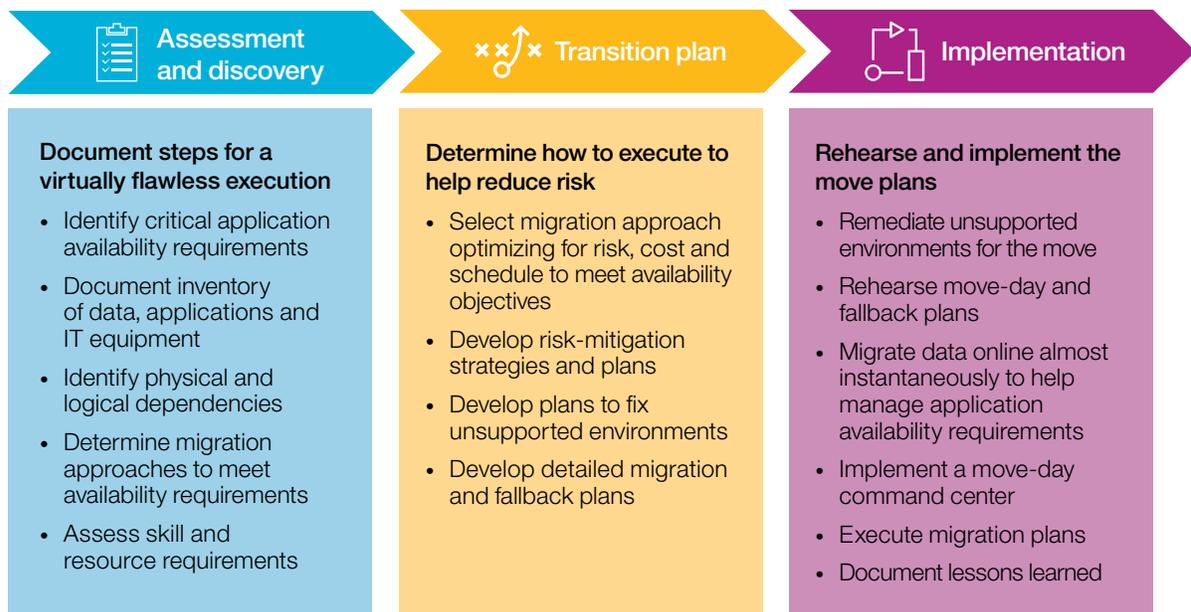


Figure 1. IBM employs a structured, IP-based methodology to help ensure a seamless data center consolidation or migration.

The importance of IT discovery

A seamless data center consolidation should follow a robust approach that ensures successful management of all aspects of the migration. IBM uses the approach pictured above with clients.

Realizing the benefits of resiliency, risk mitigation and cost reduction—not to mention a smooth migration effort—all begin with one critical step: IT discovery. You can't migrate your data center unless you know what exactly you're migrating and how the migration can impact your business. That's why the assessment and discovery phase is the single most important step of a successful migration.

By creating a consolidation or migration plan that identifies your IT assets and clarifies how they're being used, you can:

- Optimize resource usage
- Make effective decisions about aging and unsupported equipment and middleware
- Position your data center to support new technologies well into the future

Ideally, you should aim to identify as close to 100 percent of your IT assets as possible. This includes servers (and their workloads), storage, applications and data. Using automated discovery tools is one of the best ways to identify the components and moving parts of a data center. But the quality of the tools you choose can make all the difference to your success—as they can literally dictate the accuracy of the data you use to plan and implement your migration.

Our experience has shown that client inventories are generally 70–90 percent accurate.⁹ But planning a major migration requires airtight inventory management. An industry-leading discovery toolset should be able to provide the following information:

- Server and middleware visualization with dependencies across the entire data center
- Middleware and its relationships or dependencies on servers
- Overlooked “orphan servers” that have previously unknown connections to other servers, which can pose potential dependency risks
- Robust resource utilization trending, which can identify potential servers for optimization, virtualization, consolidation and retirement; utilization trending should show central processing unit (CPU), memory, network and disk usage

IT discovery tools can equip your organization with the robust understanding of your IT environment needed to seamlessly execute a migration that can reduce costs, manage risks and significantly improve your resiliency posture. These benefits are described in greater detail below.

Discover up to 100 percent of your IT assets with IBM Application and IT discovery tools

IBM® Analytics for Logical Dependency Mapping is a patented IBM Research tool consisting of server-side scripts that automate the identification of servers and network connectivity for clients.



Identify up to 100 percent of the server, storage and middleware assets that need to migrate with reduced performance impact on the IT infrastructure¹⁰



Run a simple and transparent shell/VBScript on the servers without requiring IBM-specific skills or IBM access to systems or systems credentials



Create a data file for each server, which is then combined with other server data files for one common data set describing the IT infrastructure



Execute analytics against the combined data files and identify logical dependencies between servers and middleware components



Optimize the accuracy of IT inventory collection while helping to reduce costs and complexity

Reducing costs with IT discovery tools

Whether you're moving your IT assets to a new data center or migrating to the cloud, IT discovery tools can be employed not only to identify your IT systems but also to reveal numerous opportunities for cost reduction. For example, by using the proprietary IT discovery technology, IBM realized that up to 30 percent of consolidation clients' data center server and storage platforms were fully depreciated or were no longer supported by the equipment vendor.¹¹ In such cases, it's often less expensive to replace that equipment before a migration than to pay to move equipment that will soon need to be replaced.

IT discovery tools can also help you identify and make decisions about under-utilized servers that can potentially be virtualized, optimized or eliminated. With most data center servers operating significantly below their capacity, this effort alone can decrease the cost of power, cooling and equipment throughout the data center.

Additionally, IT discovery tools can pinpoint redundant or expensive maintenance and warranty contracts covering equipment in disparate environments. Such contracts are easy targets for cost-cutting measures, such as contract consolidation or third-party maintenance.

IBM has found that between 10–15 percent operational savings are possible for each data center consolidated.¹²

And of course, IT discovery is just one way to achieve cost savings during the consolidation or migration process. In working with some of the largest enterprises in the world, IBM has found that between 10–15 percent operational savings are possible for each data center consolidated.¹³

Mitigating migration risks

Let's face it—data center migration is risky business, and downtime is expensive.

That's why it's not enough to identify just your IT assets. To reduce outages and operational risks, it's imperative to discover the logical dependencies between your applications and equipment. Doing so can help you understand which assets need to move in unison to maintain the operational integrity of the IT environment—and thus reduce the chance of unplanned downtime. For example, it wouldn't be wise to move an application server without also moving its dependent web, database or middleware server. Employing the right IT discovery tools during the consolidation or migration process can expose these important dependencies.

Additionally, IT discovery tools can identify unsupported environments, such as equipment lacking maintenance contracts or outdated middleware instances. Issues that arise in any such equipment can cause outages that can't be resolved without maintenance and support. By identifying these environments and developing plans to either fully support them or migrate them to a supported environment, you can effectively manage these risks.

However, while the right IT discovery tools can avert numerous risks prior to migration, important considerations, such as outage windows, need to be carefully managed during the actual migration.

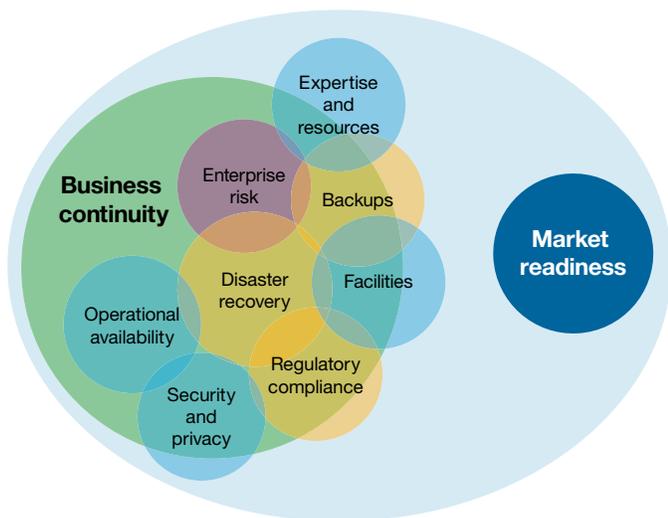
Given the expectation for always-on operations, many applications have outage windows of less than a few minutes. In these cases, there simply isn't enough time to uninstall equipment, transport it and then re-install it. A more practical approach is to install new or repurposed server and storage equipment in your new data center, install the applications on that infrastructure, and then migrate the data from the old infrastructure to the new infrastructure using one of many industry-standard toolsets.

Moreover, network design, implementation and performance issues are common causes of unplanned application outages. Data centers that have been consolidated from long distances or have poor connectivity are often at the highest risk due to network latency issues. Application and network latency profiling services are a good way to identify possible risks.

As an added precautionary measure, fallback plans should always be part of the migration or consolidation effort. Ideally, these plans should define steps for dealing with unanticipated events or outages during the migration process. Defining and rehearsing these plans in advance can ensure that applications with very minimal outage windows are successfully migrated.

What is business resiliency?

Business resiliency is the ability of an enterprise to rapidly adapt and respond to risks and opportunities, in order to maintain continuous business operations, be a more trusted partner and enable growth. The components of resiliency are pictured in the chart below.



Transforming enterprise resiliency

Either your business is resilient or you risk going out of business. Thoroughly understanding your data center environment empowers you with the knowledge you need to develop the right resiliency plans and implement the security and resiliency technologies needed to manage risks and maintain always-on operations. Because data center consolidation and migration necessitates this in-depth understanding, it's essentially one of the best ways to improve your resiliency posture.

Many steps undertaken throughout the migration process help achieve the end goal of better resiliency. For example, by eliminating aging software and replacing it prior to a migration, you can reduce costs while also positioning the data center to better support new technology and run more efficiently.

Moreover, identifying the maintenance status of all your IT hardware during a migration can ensure that you have a rapid source of support in place in the event of a business disruption.

Similarly, locating orphan servers and dependencies among systems, data, applications and workloads helps you avoid moving bad practices from one data center to the next.

Retiring under-utilized equipment, centralizing IT and consolidating maintenance contracts can free up funds needed to make your data centers more resilient, dynamic and agile to support your innovation initiatives.

And with a truly resilient IT environment, you can avoid the penalties of noncompliance.

Why IBM?

For more than 30 years, IBM has been migrating applications and equipment for clients and for the IBM Corporation. IBM has moved hundreds of thousands of enterprise server, storage, network devices and applications. And because IBM plans and performs data center projects regularly, we can stay ahead of the learning curve. Moreover, IBM uses industry-leading processes and proprietary tools like IT discovery to help you achieve a seamless migration, understand your IT environment, improve resiliency and reduce costs. And with access to more than 3,300¹⁴ skilled consultants in IBM server, storage, network and data center practices—IBM can provide the coverage you need for virtually any data center consolidation, migration or relocation effort.

For more information

To learn more about IBM data center and consolidation services migration, contact your IBM sales representative or visit ibm.com/services/us/en/it-services/business-continuity/site-and-facilities/index.html.

ATB Financial transforms its business resiliency using IBM data center consolidation and migration services

Company: ATB Financial is a multibillion-dollar Canadian financial institution formed in 1938. It provides personal, business and agricultural financial services to more than 710,000 customers in Alberta, Canada.

Problem: Rapid growth and demand for always-on operations necessitated a move to a highly resilient data center.

Solution: IBM migrated the firm's storage, networking and backup environments; increased its virtualization ratio from 60 percent to 98 percent; and transformed the company's production environment by optimizing its resiliency.

[View case study](#)

Watch **webinar** to learn about new approaches to IT discovery with the comprehensive understanding of your IT environment needed to seamlessly execute a migration that can help reduce your costs, mitigate risks and significantly improve your resiliency posture.

[Watch Webinar](#)

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IBM Resiliency Services
3039 Cornwallis Rd., Bldg 201
Research Triangle Park, NC 27709

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