

**Taking a strategic approach to IT optimization**

**White paper**

October 2007



**IT optimization as a source of  
sustainable competitive advantage.**

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**Is technology investment approaching the point of diminishing returns?**

Over the last ten years enterprises worldwide have transformed the way they do business by investing trillions of dollars in IT. They've expanded their marketplace reach while working more closely with customers and suppliers. The most innovative of these companies have created a substantial competitive advantage in the marketplace.

Paradoxically, while IT investment has been repaid many times over in accelerated times to market, improved customer relationships and faster supply chains, it has precipitated an exponential growth in IT assets that threatens future gains. The proliferation of assets has increased the complexity of the IT environment, raising operational and administrative costs and reducing infrastructure productivity.

These three trends are seriously constraining the ability of CIOs to deliver new applications, support business expansion and align IT with overall business strategy. There is increasing concern that IT investment is approaching the point of diminishing marginal returns.

This concern is justified. Rising operational expenses threaten to completely overtake IT budgets. In just eight short years, operational labor expense has risen from less than 40 percent of IT labor budgets to nearly 70 percent.<sup>1</sup> With application development labor being squeezed out, CIOs are under increasing pressure to justify their budgets.

The question confronted by those companies that have leveraged IT to secure a competitive advantage is how to make their competitive advantage sustainable.

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**Highlights**

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***Infrastructure complexity is increasing as the need for servers and storage continues to grow, posing considerable management challenges to IT staff.***

This white paper highlights the costs of IT asset proliferation and the advantages of the IBM view of IT optimization as a strategic, ongoing process. It describes the holistic and practical IBM approach and shows how it is helping organizations realize greater initial savings and higher returns going forward.

**The high cost of IT asset proliferation**

Driving the consternation among CFOs and CIOs is the growth in the number of servers and amount of storage. As IT assets increase, so does IT infrastructure complexity, creating significant management problems for an already overburdened IT administrative staff. In addition, data center energy consumption is skyrocketing at the same time that energy prices are on the rise.

**Increasing operational overhead**

IBM estimates that between now and 2010 the installed base of servers is forecast to continue growing at approximately 14 percent annually. External storage will explode at an even faster rate, with unprecedented growth expected between 2008 and 2010.<sup>2</sup>

The addition of each new server or storage device requires thinly stretched staff to spend time ensuring that the operating systems are current, security patches are administered on time and unauthorized changes are eliminated. In the interconnected data center of today, where one change can affect every other system and resource, these management challenges can increase exponentially. It's therefore not surprising that employment of network analysts and system administrators has grown by 14 percent and 8 percent, respectively, as more and more people are needed to simply administer a typical company's IT environment (see figure 1).<sup>3</sup>

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**Highlights**

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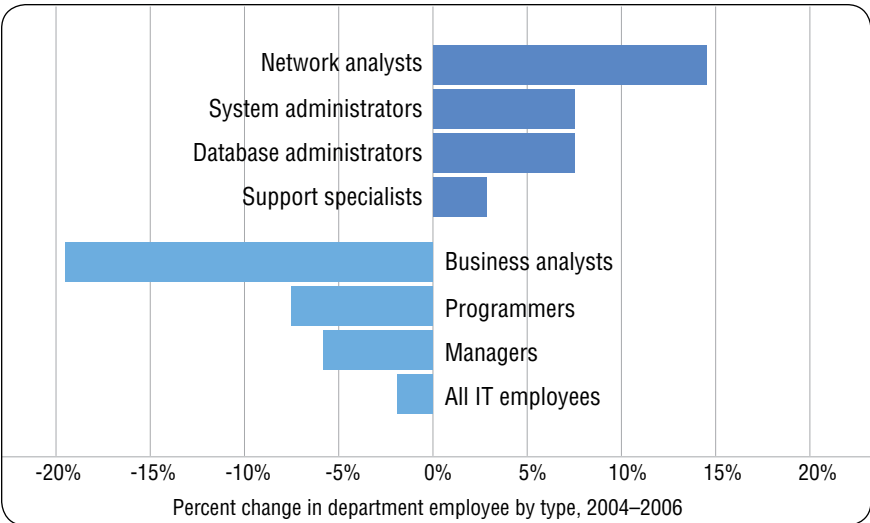


Figure 1: A 2007 report from the U.S. Department of Labor shows that between 2004 and 2006 there have been significant shifts in the percentage of development to operational employees as more people are needed to administer increasingly complex IT environments.

***For the last five years, the cost of operating a data center in the United States has increased by 15 percent per year.***

**Higher energy costs**

Besides consuming administrative resources, asset proliferation consumes energy. In the United States, IT power and cooling costs for a typical company have been going up 15 percent per year over the last five years. Each dollar of new servers costs US\$0.52 to power and cool, and this expense is forecast to increase to US\$0.71 in the next four years.<sup>4</sup>

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**Highlights**

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***While operational costs are increasing, application development and business expansion expenses are being dramatically reduced. As a result, many organizations are taking a strategic approach to optimizing their IT infrastructures.***

**Decreasing investment in development**

Organizations have had to decrease investment in application development and business expansion to maintain and support an increasingly complicated environment. United States Department of Labor statistics show, for example, that spiraling operational costs have led to reductions of nearly 20 percent in business analysts—the very employees who ensure that IT investments align with business needs. In addition, there has been a decrease of some 8 percent in the ranks of programmers—the employees actually developing business applications.<sup>5</sup>

CIOs who are unable to align with business needs? CIOs who have to cut back on application development? Recognizing the danger, most organizations have already embarked on initiatives to optimize their IT infrastructures. Those achieving success are taking a strategic approach—consolidating resources, strengthening and streamlining management practices, and deploying proven conservation techniques.

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**Case study: reduced cost structure aligned with business value**

To realize its vision of a tightly interconnected health system, the University of Pittsburgh Medical Center (UPMC) needed a supporting IT infrastructure that was better integrated and more flexible, robust and secure. The center contracted with IBM to help ensure availability of patient information across the UPMC network. As part of this agreement, UPMC is reengineering its infrastructure to eliminate underutilized assets. It expects to reduce the number of operating systems from 9 to 4, servers from 931 to 319, and storage arrays from 40 to just 2—while increasing functional capacity. Virtualization technologies will further improve system capacity, utilization and performance. And, to manage the infrastructure more efficiently, UPMC will employ a common tool set across platforms. At project completion, the center expects an overall IT cost savings of up to 20 percent.

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**Highlights**

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***Successful IT optimization is a continuing process that can deliver lower asset costs and reduced operational expenses. In addition, it can help organizations achieve a sustainable competitive advantage by investing the resultant savings.***

**Building sustainable advantage through strategic IT optimization**

For IBM, IT optimization isn't just about IT cost savings. IBM views IT optimization as the process of creating a highly efficient and dynamic infrastructure to derive maximum business value from IT investments. The key word is *process*. Effective IT optimization continually mines the infrastructure for opportunities to improve responsiveness and return on investment. It is an ongoing process that can result in lower asset costs and reduced operational expenses.

In this sense, IT optimization is a vast shifting and acceleration of economies of scale, allowing companies to reduce costs now and continue to decrease marginal costs going forward. Companies are able to sustain a competitive advantage by investing in differentiated products and go-to-market strategies while funding the necessary IT investment from the optimization savings.

From a business perspective, successful IT optimization should position organizations to:

- *Better manage cost and risk*
- *Support business innovation*
- *Comply with current regulations and best practices*
- *Satisfy customer expectations*
- *Meet service levels*
- *Scale more effectively*
- *Remain competitive.*

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**Highlights**

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***IBM takes a client-focused approach to IT optimization that can be adapted to each organization's goals to create a dynamic, responsive and scalable IT environment.***

From a technology perspective, successful IT optimization should make it easier for CIOs to:

- *Anticipate and manage change*
- *Reduce architectural complexity*
- *Adopt, integrate, standardize and automate IT processes*
- *Expand on the value of existing investments in virtualization and server consolidation*
- *Increase the value of revenue-generating services.*

Overall, by reducing the cost and complexity of IT service delivery, IT optimization can help organizations create a dynamic and responsive IT environment that encourages innovation.

**The holistic IBM approach to IT optimization**

The IBM approach to IT optimization is holistic and client centered. IBM adapts its approach to meet each organization's optimization goals, whether they are cost reduction, improved energy efficiency, enhanced response to customers, improved responsiveness to business needs or a combination of these and others. And IBM can scale as large – or as small – as needed.

IBM has built intellectual capital through hundreds of client engagements across industries over the past two decades. And it has translated this experience and accumulated capital into:

- *End-to-end solutions supported by a worldwide knowledge network and IBM technology leadership*
- *Solution templates, reference architectures and supporting business plans*
- *A pragmatic and proven approach to IT optimization that incorporates client-specific needs to help optimize benefits while reducing risks*
- *Competitive payment terms and single-contract simplicity through the IBM Global Financing division for increased flexibility in asset acquisition decisions.*

**Highlights**

***IBM developed and proved its successful methods and delivery models not only in hundreds of client engagements, but also through testing and honing its approach to IT optimization at IBM service delivery centers, some of the largest in the world.***

In short, IBM didn't learn IT optimization from a book; IBM is writing the book. Its methods and delivery models were developed and proved not only in client engagements, but also through application within the company itself. Encompassing a cumulative total of 7 million square feet, 1,265 mainframes and over 200,000 midrange servers, the IBM service delivery centers are among the largest in the world. IBM tested and honed its approach to IT optimization at these centers, achieving substantial results, with 54 percent of the savings in operational labor (see figure 2).

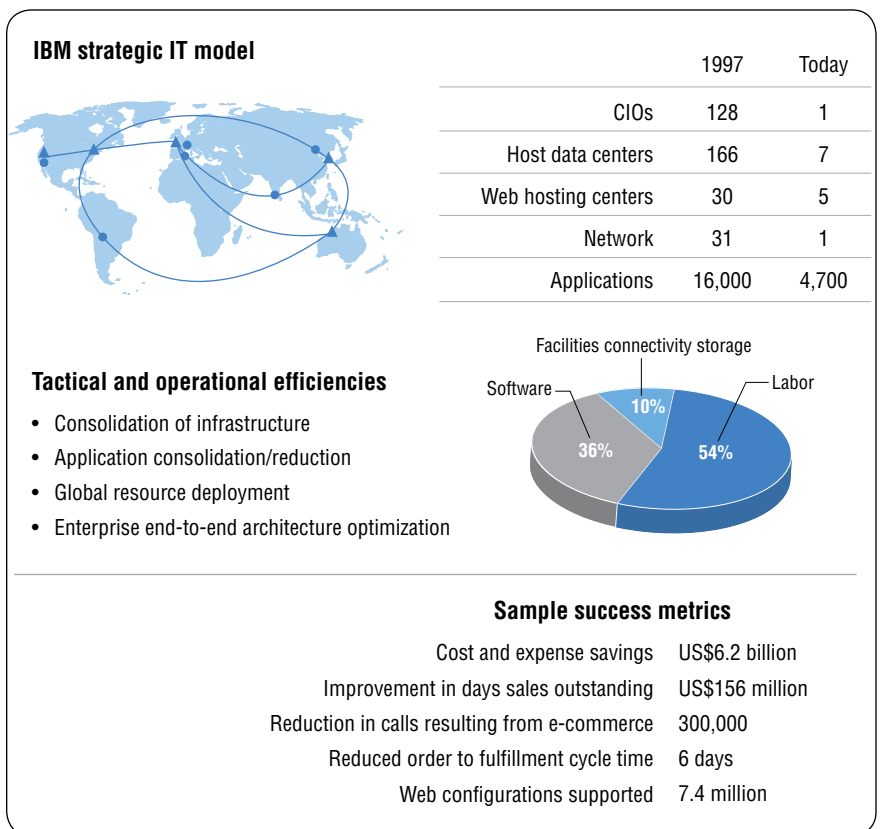


Figure 2: Beginning in 1997, IBM started optimizing its own complex, far-flung environment, reaping substantial benefits in operational cost savings.

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**Highlights**

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***By establishing a clear understanding of an organization's optimization objectives, IBM can help ensure that they are in alignment with the overall business strategy so that subsequent projects can provide real value.***

Distinctive elements of the IBM approach

IBM enables organizations to implement end-to-end IT optimization solutions more quickly at reduced risk with access to:

- *The most experienced people*
- *A proven, holistic and pragmatic process*
- *Marketplace-leading technology*
- *A unique and innovative reference architecture*
- *Single-source financing at competitive rates*

**Start by clearly defining optimization goals**

A clear value of the IBM approach is the focus on broadly converting an organization's needs and pain points into a prioritized set of projects, and then implementing these projects over time in a way that optimizes benefits while reducing risk. The first step in any IT optimization transformation must be to clearly understand the optimization objectives, in concrete and measurable terms, and ensure they are in concert with the overall business strategy, including the strategic intent for the use of IT. It's this understanding that provides the necessary guidance to balance the four seemingly conflicting attributes of value:

- *Enable new business capabilities.*
- *Improve internal efficiencies.*
- *Reduce overall IT cost.*
- *Promote customer satisfaction.*

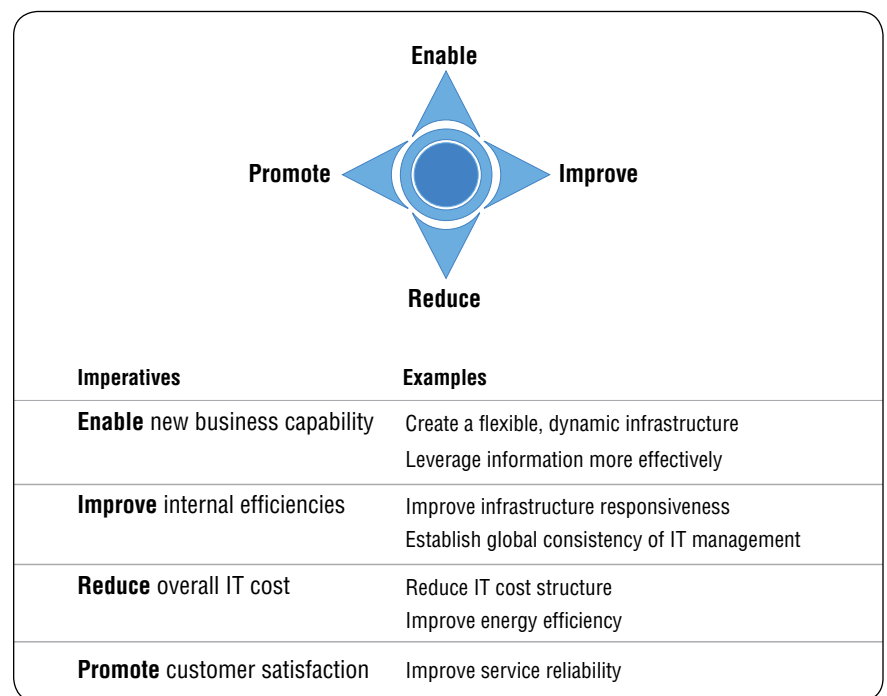
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**Highlights**

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***IBM's approach can enable organizations to realize greater value through new business capabilities, improved efficiency, reduced costs and increased customer satisfaction.***

To better define optimization in a particular environment, the IBM approach helps guide translation of the four elements of IT value into more detailed directives (see figure 3).



*Figure 3: The IBM approach to IT optimization helps organizations translate the four imperatives of IT value into a well-defined action plan.*

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**Highlights**

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***IBM helps organizations look at the key functional areas common to any IT environment to find ways to meet the optimization value imperatives that have been identified.***

**Broadly examine the current environment for opportunities**

Once optimization value imperatives have been identified, the IBM team can help organizations examine seven areas common to any IT environment for opportunities to meet these imperatives and to determine how these areas are interrelated. In complex IT environments, it's almost impossible to make changes in one of these areas without affecting another area:

- *Business strategy*
- *Processes*
- *Organization*
- *Finance*
- *Computing and storage*
- *Applications and data*
- *Networks.*

Tactical approaches to IT optimization often focus on the last three technical domains: computing and storage assets, applications and data, and networks. But in fact, the first four management domains can have an even greater impact on optimization goals. For example, a company's business strategy may favor a decentralized approach to data centers as opposed to a highly centralized system of data centers. Figure 4 illustrates the connection between the value imperatives and the functional areas.

**Highlights**

***By using IBM's optimization methodology to view the value imperatives and the seven areas holistically, organizations can more easily pinpoint potential optimization opportunities.***

	Management domains				Technical domains		
	Business strategy	Processes	Organization	Finance	Computing and storage	Applications and data	Networks
<b>Enable new business capability</b>							
Enable an adaptable IT infrastructure	●	○	○	●	●	●	●
Maintain data more effectively	●	○	○	○	●	●	●
<b>Improve internal efficiencies</b>							
Optimize use of assets	●	●	○	○	●	●	●
Establish global consistency of IT management	●	●	●	○	○	○	○
<b>Reduce overall IT cost</b>							
Reduce total IT spending	●	○	●	●	●	○	●
Streamline technical architecture/ vendors	●	●	●	○	●	●	●
<b>Promote customer satisfaction</b>							
Provide consistent delivery service	●	●	●	○	○	●	●

● Primary focus                      ○ Secondary focus

*Figure 4: The IBM optimization methodology is holistic in nature, aligning value imperatives to all seven key areas of any IT infrastructure either as a primary or secondary focus.*

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**Highlights**

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***Organizations should look across the entire IT environment for opportunities that can help optimize networks, servers, applications, energy consumption and eventually, the data center as a whole.***

The combination of the value imperatives and the domains begins to identify where optimization opportunities may exist. It's important that IT organizations look across the entire environment. When optimization efforts are focused simply on a tactical objective, such as consolidating servers, significant opportunities are missed. While reducing servers, why not also consider ways to optimize storage, decrease labor costs and free skilled resources from repetitive administrative activities to pursue activities with higher business value? By automating process tasks and evaluating power and cooling options, an organization may well uncover opportunities for reducing networks, servers, applications, energy consumption and, ultimately, data centers.

**Identify domain-specific projects**

The holistic IBM approach to prioritizing IT optimization projects enables organizations to use the near-term savings—from asset consolidation, for example—to fund longer-range goals. Optimization is an ongoing process. Maintaining momentum by implementing a series of projects is key to moving toward longer-term goals.

**Establish an optimization program**

Each of the individual projects should be coordinated through an IT optimization program office. By establishing a program office, individual projects can be combined, synchronized and scheduled in such a way that efforts in one domain are supported, and sometimes magnified, by coordinated actions in other domains.

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**Highlights**

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***IBM helped PG&E significantly reduce the amount of energy its data centers were using, transforming the company into a world leader in energy efficiency.***

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**Case study: creating an energy-efficient and environmentally responsible data center**

When it reduced energy consumption in its own data center facilities—which have more than 40,000 square feet of raised floor—Pacific Gas and Electric Company (PG&E) became a world leader in energy efficiency. Working with IBM, the utility company was able to identify an additional savings of approximately 177 kilowatts. And now PG&E is applying what it's learned and is spearheading nearly US\$1 billion in enhanced energy-efficiency programs for its customers from 2006 to 2008. This investment is projected to eliminate the need for more than 600 megawatts of new generation—or roughly the amount of electricity produced at a large power plant.

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**The IT optimization reference architecture: a practical, end-to-end approach**

Theory is useful, but in practical terms, how do organizations get from where they are to where they need to be for sustainable IT optimization?

Because each organization has different priorities, assets and processes, IBM applies industry best practices to individual organizations' needs using an end-to-end IT optimization reference architecture. Shown in figure 5, this architecture provides the fundamental technical levers used in any optimization program. IBM offers the optimization skill and experience to help organizations determine which levers to use, and to what degree, to provide maximum benefits at the lowest costs possible. In this way, IBM teams guide each organization in developing a personalized blueprint for sustainable IT optimization.

**IT optimization as a source of sustainable competitive advantage.**

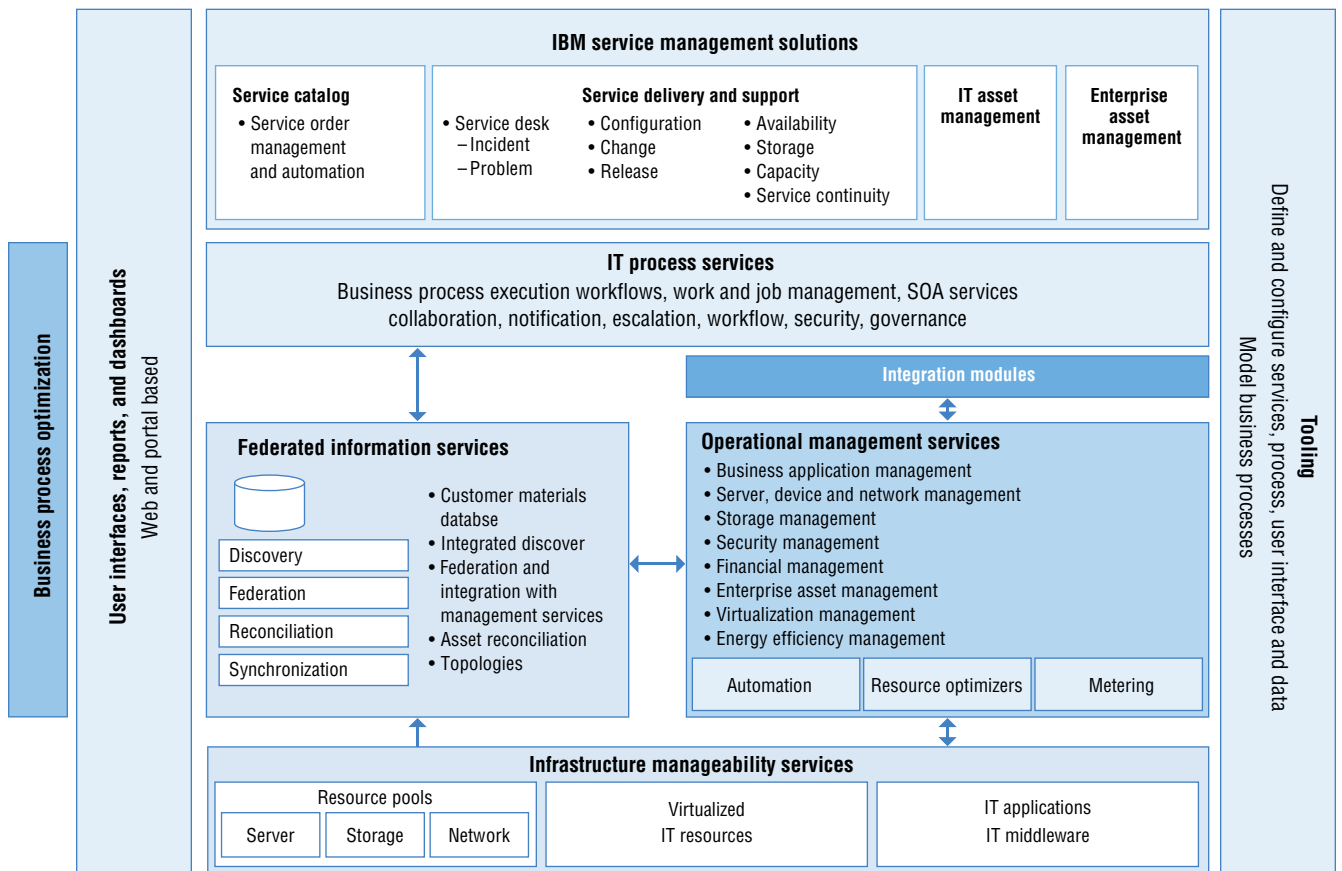


Figure 5: IBM applies industry best practices to individual organizations' needs using an end-to-end IT optimization reference architecture.





This iterative application development process involved a large number of people, assets, and handoffs among siloed teams. Many activities were manual, increasing cycle times and often resulting in errors that further slowed time to market.

Specifically, within the test phase of the process, workers had to manually locate and then procure available test assets. Then they manually provisioned all components, including servers, operating system images, storage, networks and applications. Finally they had to deprovision these assets and return all components to the original state. The iterative nature of the process compounded errors, inefficiencies and dissatisfaction. Quality assurance teams spent more than 26 percent of their time configuring machines to make them ready for testing.

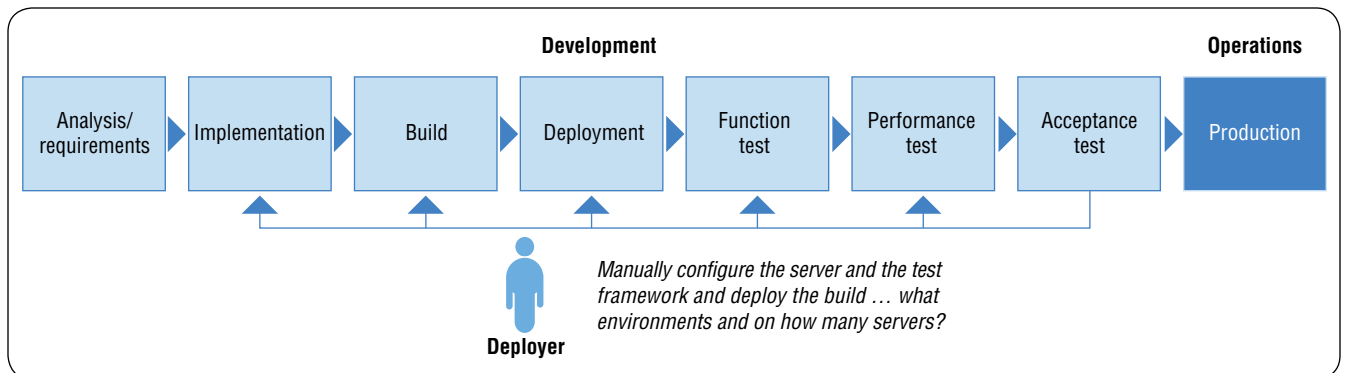


Figure 6: Manually configuring the server and test framework and deploying the build is severely complicated by the number of applications, environments and servers involved.



