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Data Center Consolidation Strategies for the Federal CIO

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WHITE PAPER

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Abstract

In response to the current economic downturn, many Federal organizations are consolidating their IT operations—that is, reducing the complexity and number of assets in their infrastructures. This paper reviews the role of CIOs in consolidation and the perspectives they must maintain. Next, it explores the most common challenges facing these CIOs, their organizational goals and the benefits of achieving them. Lastly, the paper explains how complexity reduction and resource consolidation can help CIOs meet their goals and why Quest Software is a smart option for meeting the needs of CIOs in these efforts.

Introduction

The Federal government has seen an IT modernization effort over the last decade, and with it, a move towards data center consolidation. The Federal Data Center Initiative (FDCCI) has been fueling this effort.

Michael Duffy at the Department of Treasury has outlined the operational drivers behind the FDCCI:

- The reported number of Federal data centers grew from 432 in 1998 to more than 1,100 data centers in 2009. [1]
- This growth in redundant infrastructure investments is costly, inefficient, unsustainable and has a significant impact on energy consumption.
- In 2006, federal servers and data centers consumed more than 6 billion kWh of electricity; without a fundamental shift in how the government deploys technology consumption could exceed 12 billion kWh by 2011.[2]
- In addition to the energy impact, there is relatively low utilization rates of current infrastructure and limited reuse of data centers within or across agencies, according to information collected from agencies in 2009.[1]
- The cost of operating a single data center is significant, with ongoing expenses for hardware and software as well as real estate and cooling systems.

Mr. Duffy also explains four key consolidation strategies.

- **Decommissioning**: Turning off servers that aren't used, or that are used infrequently, such as those in dedicated development environments.
- **Centralization/Site Consolidation:** Moving servers and storage devices to a few selected data centers, and combining small data centers with larger ones.
- **Virtualization:** Moving applications and data on several physical servers to a single virtual server
- **Cloud Computing Alternatives:** Move application functions to standardized, vendor-supported enterprise platforms or services such as IT cloud configurations.

There are indications that these consolidation efforts are already paying off for federal agencies, departments and organizations. For example, a number of them are already using virtualization:[3]

- The Marine Corps Systems Command (MCSC) will have virtualized 98% of its infrastructure by 2011; so far, this organization has saved 150 years in staff time on its virtualization efforts.
- U.S. House of Representatives has cut its physical server count from 140 to 18 through virtualization.
- The United States Postal Service used virtualization to reduce the number of servers in its environment from 895 to 104.

[1] Current Data Center count is based on OMB Budget Data Request (BDR) No. 09-41, August 8, 2009
[2] Report to Congress on Server and Data Center Energy Efficiency, Public Law 109-431, U.S. EPA ENERGY STAR Program, August 2, 2007

[3] Input August, 2010 Trends in Federal Government Use of Virtualization presentation

In addition, the Department of Energy's Los Alamos National Laboratory is already seeing some success from its recent launch of a private cloud. According to *Federal Computer Week*,[4] Los Alamos has:

- Decommissioned 100 physical servers
- Deployed 300 virtual machines on 13 physical hosts
- Saved $1.4 million

IT consolidation does have its skeptics, who often write about the impossibility of consolidation or the lack of real savings afterwards. But those skeptics are speaking of failed consolidations—ones that were not carried out with a well-conceived plan.

For CIO's, there's simply no question that a smart consolidation—one that reduces complexity, eases maintenance, and improves security—can be successful.

[4] Los Alamos Labs – *Federal Computer Week* eNewsletter, September 8, 2010

The Role of the CIO in Consolidation

The chief information officer (CIO) holds a critical role in any organization. No matter how big or how complex the organization might be, or what types of products or services are provided, the CIO is responsible for a number of very important pieces of the operation. Many times this is both a direct and an indirect responsibility. In most cases, and especially with technology-driven organizations, the failure of the CIO to track technology trends and implement the most effective IT initiatives can significantly impact the operation as a whole. For smaller organizations without a dedicated CIO, this paper is still relevant to those who have the same responsibilities, but without the title. The responsibilities are often owned by an individual with multiple roles. This individual is frequently tasked with defining IT needs as well as identifying, approving, and funding the appropriate solutions. This person must also ensure management and stakeholder alignment.

At the other end of the spectrum, there is a new, often independent, role known as the CISO (Chief Information Security Officer) for larger agencies. This role grew out of all the recent regulations, rules and concerns about cybersecurity. In many cases, the CISO reports to the CIO, but has autonomy to drive security-related initiatives. The insight in this document also applies to the CISO since most IT initiatives have some sort of impact on security.

Taking the Strategic View

The CIO has to take a strategic approach to keep IT aligned with organizational requirements for IT services. When possible, the CIO stays ahead of the curve, anticipating needs in the not-too-distant future. This anticipation helps to pave the way for IT to meet those needs just as they become important.

When most CIOs look at their infrastructure, they look at it from a few different perspectives. Here are examples of how the infrastructure is viewed:

- **My infrastructure is an investment over time.** IT infrastructure is not a one-time investment; it is a continuously evolving service platform. Seeing the infrastructure in this light helps to ensure that future needs are planned.

- **My infrastructure is valuable to the organization.** In most cases the IT infrastructure provides services that are not the core functions of a business; rather, they support the business by enabling services and improving efficiency. For example, the CIO of a government agency understands that the department's primary goal is not to provide employees with e-mail or Internet access, but the CIO also knows that without these services, the department might be far less efficient or might even be unable to achieve its primary goals.

- **My infrastructure is highly efficient and always improving.** Just as the infrastructure is a continuous investment, the way it works always has room for a little more efficiency. Typical changes that occur over time include the number of users, as well as the complexity and usefulness of services. For these reasons, and many more that are covered in the next section, the CIO keeps focusing not just on expanding capacity and services, but also on honing the infrastructure already in place.

Every CIO's environment varies in complexity, but most CIOs seem to share these three core views.

Taking a Hard Look at the Challenges

Every organization is different and that means that the challenges of every organization are unique. Changes in political, social, cultural, and technological conditions present unique challenges from several directions.

For example, the CIO of a health care organization has to consider regulations like Health Insurance Portability and Accountability Act (HIPAA) when approving all strategic IT changes. The CIO for a state department of corrections, on the other hand, may need to consider HIPAA for some facilities but not others, but must consider prison-specific regulations.

In federal organizations, the CIO must consider how to consolidate the infrastructure, while maintaining compliance with myriad regulations and standards. In particular, federal CIOs must refer to the CIO Council's Federal Identity, Credential and Access Management (FICAM) roadmap[5] when implementing any sort of access controls for newly installed for modified systems.

The complexity of the considerations can be staggering. And they put the CIO in a difficult situation for a number of reasons. Below are several challenges that typify the Federal CIO's concerns, limitations, and requirements.

These challenges apply to many CIO roles across government agencies, but they are not intended to be comprehensive:

- **Preventing the compromise of sensitive data:** Virtually every public sector CIO is impacted by regulation, whether it comes from the federal or state government, an industry, or somewhere else. One of the principal goals of most regulations is data protection. This is driven by both the critical need in most industries to collect data and the relatively common compromise of that data – sometimes with disastrous consequences. Even when not specifically bound by regulations, the CIO has an implicit obligation to ensure that data is protected. But with today's distributed data storage and access technologies, it can be difficult, and in some cases impossible, to provide adequate protection.

- **Defending against cyber attacks from inside and outside the organization:** The news media report daily on compromised IT systems and the impact of those breaches. The impact of a breach (and subsequent public reports) often goes far beyond the actual breach itself. Successful attacks erode the public confidence, and addressing the public outcry often requires reactive responses which divert already limited IT resources. These attacks increasingly come from inside an organization, further compounding the problem. The CIO must understand the direct and indirect results of these attacks when they do occur, and at the same time take appropriate measures to make sure they never succeed. For this reason, the CIO must work with the CISO to develop and maintain a vigilant response to the threats.

- **Growing demand for systems and services:** Even as budgets are cut, users demand more IT services. They are challenged to do more with less and get more work accomplished in a day. The enablers of that demand are often new and expanded IT services. And users are becoming more sophisticated every day; they frequently know exactly what services and systems they require for their work—in fact, they ask for them by name. Tasks like data mining, workflow collaboration, and leveraging mass communication channels require a modern and well-equipped IT infrastructure.

- **Federal regulations and statutes:**

    - FISMA describes how data such as personal information, must be tracked. It also stipulates outlines how IT organizations should operate and what oversight the Federal CIO should provide.

    - FIPS 140-2 dictates that any software dealing with encryption must meet standards put out by the National Institute of Standards and Technology, and may require additional testing/examination. "Home-grown" encryption and data security schemes are not acceptable.

    - Section 508 stipulates that, when possible, user interfaces must allow for alternate means of access for those with accessibility challenges. Obviously, this raises costs for both software (in enhancing the existing interfaces) as well as support. And more interfaces could create greater risks of data leaks. Let's say that an interface is designed to read the content to users with visual impairments, exposing more data than what's allowed.

[5] See http://www.idmanagement.gov/documents/FICAM_Roadmap_Implementation_Guidance.pdf

- The FICAM roadmap governs indentify and access management; all federal agencies must follow it or their funding will be withheld for projects.

- HSPD-12: The Homeland Special Presidential Directive 12, put out by the Bush administration, establishes requirements for security badges with a standard format. However, the Department of Defense uses CACs (Common Access Cards) while civilian groups depend on PIV (Personal Identification Verification) cards. PIV cards and CAC are not compatible so someone doing both DOD and civilian work currently needs two or more cards. This should be resolved with the new PIV-I (PIV-Interoperability) initiative but it will take three to four years to re-issue cards to everyone (cards typically have 36 month lifespan).

- **System and service redundancy.** With reorganizations, expansions, IT department isolation and siloed operations, there is no such thing as a stable agency in the world today. From the CIO's perspective, this means that IT resources are constantly coming into and out of the organization. IT integration plans require an analysis of IT assets (primarily systems and services) to enable decisions that promote efficiency and reduce unnecessary redundancy. But in many situations, those integration plans do not or cannot exist because of budget constraints and mandatory timelines.

- **Inefficient use of human and financial resources.** Most CIOs develop both long-term and short-term strategies to drive tactical decisions and tasks. But when long-term strategies are in frequent flux or are impossible to create due to other changes (such as budget changes or service offering changes), there can be significant impact on the efficient use of resources. One example is the loss of volume purchasing benefits. When deployment or migration strategies do not exist, the CIO cannot determine how many computers, software licenses, employee hours and consulting hours should be allocated over time. The CIO can only define what is needed now to complete the immediate project. As a result, each deliverable is bid and implemented separately, rather than as part of a larger and more cost-efficient project. The impact is less efficiency from already scarce resources.

- **Uncertain future funding.** Continuing resolutions (CRs) to provide funding in periods of budgets gaps might make capital expenditures harder to justify**.** When budgets are cut or agencies are operating under a CR, re-justification of IT spending is part of the CIO's normal workload. And when budgets have insufficient transparency, accountability, and oversight, the civic trust is likely in jeopardy. Lack of civic trust usually leads to even more difficulty in budget acquisition. Without confidence in future funding, the CIO has to consider the financial impact when making virtually every decision. This often leads to difficult and unpopular decisions.

The bottom line is that every CIO faces unique challenges that likely include all the ones above as well as and many, many more. Instead of being reactive and simply facing challenges as they come up, the CIO is focused on anticipating and addressing them proactively. So in a sense, the CIO translates these challenges into goals for the IT organization as a whole.

Organizational Goals

There are a number of common goals that arise from of the challenges above. Each goal is strategic in scope as the CIO holds a very strategic role by providing direction, not tactics. Therefore, each goal described below is related to one or more of the challenges described above. The five most common organizational goals of a CIO can be summarized as:

- **Comply with regulatory requirements**. It's essential to ensure that the organization is following both the letter and the spirit of the law.

- **Protect the Infrastructure** - It's critical to provide a high degree of protection for sensitive data, both from threats outside the firewall and from accidental changes or deletions internally.

- **Optimize the infrastructure.** Although infrastructure optimization is an often overused buzzword, there is real value in an IT organization maturing and evolving over time. Most IT personnel understand optimization within a small scope and often implement their own limited approach. For example it is very common for an administrator to create a software tool to automate a repetitive maintenance task, perhaps by creating a script to run each morning. While this provides some short-term gains, it fails to meet the strategic goals of an organization. The CIO understands how a maturing organization becomes more effective over time by gaining intelligence and efficiency. To extend the previous example, the CIO needs to automate more tasks across a range of administrative duties, and to ensure that automation is fully documented and understood so that the organization, not just the individual, improves. The CIO also understands and accepts that the improvement doesn't happen overnight and is a function of focus—the more thought (at all levels of IT) that goes into maturity, the faster and more effective the improvement becomes.

- **Consolidate IT assets.** Every CIO knows that too much of a good thing is bad. Having 10 e-mail servers for a user base of 100 is probably a waste of resources. While some administrators or end users might argue that there is benefit to having multiple systems and that there's no harm in doing this, that's simply untrue. Even if the systems are inherited for free, the CIO understands the real cost of ownership over time. The costs of unconsolidated systems fall in areas such as:
    - Software licenses
    - Hardware monitoring
    - Infrastructure complexity
    - Data center space
    - Power use
    - Cooling capacity consumption

  Each component in an IT infrastructure has a related cost. While this document focuses on the technologies themselves (in software and hardware), the cost per IT headcount is significant in many cases and must also be acknowledged. So consolidating IT assets should be considered in relation to both human and technology assets.

- **Reduce costs.** At the heart of the last two goals above is the idea that a more rational and mature IT organization that has eliminated unnecessary assets and improved its efficiency will, naturally, require less money to operate. Every CIO knows that this is a continuous effort, even when funding is accessible and no pressures exist to reduce costs. In fact, cost reduction without compulsion can be a differentiator between CIOs, making one stand out among the rest. To continue the previous e-mail example, a CIO may be under no direct pressure to reduce the number of e-mail servers in the infrastructure. But proactively analyzing organizational requirements and deciding to reduce the number without pressure may be recognized a taking initiative. That CIO is likely setting a precedent that will be applied to other agencies and the CIO' approach is itself seen as a goal.

Every goal stands on its own. And all goals can be measured independently. But they are all very closely related. Progress toward one goal often leads to advancement toward the others. The job of CIOs is to manage the larger strategic effort and look across all goals for opportunities to improve their organizations by optimizing and consolidating infrastructures, and reducing costs as a result.

Benefits of Achieving Organizational Goals

Making progress against these goals holds tremendous benefit to the CIO and the entire IT organization. To measure progress, it makes sense to look at the progress at the solution level. Each solution should be considered both independently and as part of a larger effort. In other words, the solution itself delivers tangible benefits within its own space, but also improves the organization as a whole.

Whenever a CIO is asked to endorse and support a new solution or major project, such as a consolidation, the following solution-specific goals should be kept in mind. These goals are on the mind of virtually every federal CIO to some degree.

- **Improve security.** An effective solution enhances security by enabling repeatable practices and reducing attack opportunities. This goal is not just for security-oriented solutions; it applies to every solution implemented in a mature organization.

- **Facilitate inter-agency cooperation.** The solution must enable agencies to leverage consolidated systems maintain visibility, transparency, and independence; and increase productivity.

- **Improve decision making.** Does the solution increase the availability of cross-agency information and data for improved IT purchasing and staffing decision-making? Federal CIOs should always consider enhanced decision-making as a valuable byproduct of the project or purchase.

- **Enhance service delivery.** Does the solution result in improvements that meet emerging citizen expectations for seamless, high-quality service? All public sector CIOs must be concerned about both their IT infrastructure and the delivery of the service to the public.

- **Reduce costs.** Combined procurement processes and elimination of redundant systems and resources leads to economies of scale. Over time this helps both save money and enable reinvestment of saved costs, which makes progress toward funding future capital and operational improvements.

IT Consolidation as a Solution

In many organizations, the consolidation of IT assets makes an impact on all of the goals described above. This one activity is a solution to a surprisingly large percentage of efficiency and maturity problems in the IT community.

What is consolidation? Simply put, it is reducing the complexity and number of assets in the infrastructure, usually through two major types of optimization:

- Resource consolidation
- Complexity reduction

These two are obviously related but each has independent value.

Moving two e-mail server's worth of light-use users onto a single server is a simple example of resource consolidation. The extra server can be repurposed to save the cost of purchasing a new server, or it can be decommissioned to save the operational costs like maintenance, power, and cooling.

Migrating users from an older user database to a new shared database can be an example of both resource consolidation and complexity reduction. The benefits here not only include decommissioning some servers but also realizing the efficiencies of a single system that is optimally managed. The management optimization includes efficiencies like task automation and system expertise as well as the simplification of IT resources. Efficiencies gained as part of this migration result in lower headcount costs; organizations can hire fewer administrators to care for the single system instead of having a set of administrators for each system.

Migration is frequently confused with consolidation because they are interrelated and usually part of the same project. The CIO should understand the fine distinction between these two concepts. Migration is usually a component of consolidation. In the example above, users must first be migrated from one infrastructure to another (effectively consolidating all users on a single infrastructure) before the old, and now unused, infrastructure can be decommissioned. So migration is a part of the consolidation, but it is not the goal and yields no independent benefit.

How Quest Software Meets the Needs of the CIO

Quest provides numerous award-winning solutions, technologies, and techniques that address the key phases of IT data center consolidation. These solutions have proven themselves through years of migration, consolidation, and operational projects.

Our products and services plug into your optimization and consolidation strategy, which maps to the goals and metrics described earlier in the document. Plugging our offerings into your strategy helps save you time and effort, and move your organization along faster than you thought possible. We help you by enabling continuous consolidation across three categories of IT: core infrastructure, business productivity and application platform.

Core Infrastructure

An important efficiency for any IT organization is in the operation of its core infrastructure, which is the heart of IT functionality. The consolidation of core infrastructure is arguably the biggest impact a CIO can make on an organization.

Many IT organizations develop heterogeneous and distributed core infrastructures. These distinct core infrastructures may require expensive and inefficient components to link them, and they often must be managed with completely different sets of tools and even staff. Whenever possible, these infrastructures must be consolidated, and the consolidation must be done as efficiently as possible.

For example, let's assume that you want a thorough and impartial systems analysis before making consolidation decisions. How do you know that the analysis is reliable and unbiased? The use of third-party analysis and reporting tools is one of the most effective methods, because these tools are designed to analyze based on pure data. That kind of analysis allows you and your staff to both make and defend your consolidation decisions.

Once the consolidation analysis and decision-making processes are complete, you want to ensure that you employ tools that can help you implement decisions quickly and easily. In many of today's consolidation scenarios, multiple authentication servers and domains will be consolidated into a single domain. For that process you want to use tools that provide value to the process and improve operational efficiency. Those tools might include functionality like automated user migration from multiple sources, centralized account management user configuration management, and even automated user password management.

One of the most popular ways to consolidate is to take existing systems and virtualize them. Virtualization comes in two flavors; desktop and server. Server virtualization allows an organization to consolidate hardware and move applications into hardware with a smaller footprint. Desktop virtualization gives users a remote view of their desktops which are stored centrally on a server within a data center.

Virtualization has numerous benefits, including:

- Fewer servers to manage due the more efficient use of hardware resources
- Easier deployment and management through consistent, familiar infrastructure versus disparate hardware across numerous sites.
- Less time spent on help desk requests because support staffers can access and rebuild a user's desktop with minimal troubleshooting)
- Reduced energy consumption from lower power demands of fewer servers

The federal CIO should consider software solutions that can easily convert physical servers into virtual machines as part of the overall consolidation strategy.

Business Productivity

End users rely on business productivity products for their daily tasks. Because these software products are so pervasive, they are likely to become redundant over time.

For example, in widespread use today is Microsoft SharePoint, which is a relatively recent collaboration service that many managers find valuable in workgroup efforts. Because of its business value and newness on the market, it has become widely deployed. But many SharePoint deployments are not centrally planned or managed, and therefore SharePoint is one of the services most likely to be identified as redundant during a consolidation process.

Because SharePoint is relatively new, most IT professionals have never deployed it, and very few have ever conducted an enterprise-scale data migration and consolidation effort. The right consolidation tool can supplement the lack of IT expertise by enabling a number of tasks, including:

- Identifying SharePoint sites in the organization
- Cataloging and reporting on data across SharePoint sites
- Migrating data from both SharePoint and other data repository technologies to a SharePoint server
- Enabling data reporting as well as data backup and recovery on SharePoint servers

While individual tools are available to meet unique needs, a suite of tools that work together is more efficient for staff to learn and operate. A tool suite also enables bulk purchasing to help reduce the long-term costs of buying software one license at a time.

Application Platform

Your business applications are key components of organizational efficiency. If a core business process requires the use of an application, that application should be as fast and reliable as possible. Slowdowns and errors impact productivity, which adversely affects most of the goals you've established.

One scenario where application platform consolidation takes on great importance is the performance of customer facing web applications. These applications are more than just a Flash-based web site and a PayPal button; they're complex, multi-tier interfaces that represent the value of the organization. The web applications usually interact with any number of components based on the service or product provided. These components include:

- Customer information databases
- Product information databases
- Knowledge and general information databases
- Customer-provided feedback databases
- Internal resource and availability systems
- Workflow management systems
- Real-time order processing systems
- Inventory management systems

Consolidation of these systems is often identified as a priority due to the disparate nature of the system's creation and maintenance. A very common scenario is to migrate the multiple databases to either a single database engine or several virtual servers combined into one physical server. In this scenario, you're looking for tools that help in the following areas:

- Enumerating performance on database servers to help define a consolidation strategy
- Automating database migration and consolidation
- Measuring performance on servers before, during and after consolidation

As mentioned earlier, a single suite of tools that meets all of these needs is more efficient for staff to learn and operate than a number of disparate tools. A tool suite also enables bulk purchasing to help reduce the long-term costs of buying software one license at a time.

Using an application performance monitoring solution helps your IT staff identify and eliminate the causes of these problems.

Cloud-based Computing

There is a lot of buzz about 'cloud computing' but it's important to make a distinction between public and private clouds. In a public cloud scenario, resources are available on the internet, but service providers can't guarantee that one customer's data won't be co-mingled with another customer's data. Plus, customers don't have any assurance that their data will remain consistently in one data center location, or even within the country. Because of these security risks, a public cloud is not practical for the federal CIO. A private cloud initiative, however, is very appealing as part of consolidation efforts, especially if an agency has already started to virtualize many of its servers.

In a private cloud, a single agency can control all of the servers and the data storage locations where they reside. Plus, a common interface to access systems through a private cloud infrastructure makes it very easy for administrators to allocate and recover virtual resources (servers, applications, etc.).

For example, during periods of peak activity, resources can be temporarily “borrowed” from one application and shifted to a particular computing task to speed up processing This is an especially useful capability at times such as a billing cycle or reporting period. Those same resources can then be recovered and reallocated after the high-demand task is completed.

Another example is the creation of a testing environment to simulate a peak computing load. Once the product or application testing program is complete, the cloud management system could automatically de-provision the virtual machines in the test environment and return them to the available resource pool.

As organizations start to consider creating a private cloud within their infrastructures, they will need a robust management solution for reaping all the efficiency benefits of cloud computing. This solution should support self service for business users and application owners. Empowering them to make infrastructure decisions and schedule requests for both building and releasing services will minimize the burden on the IT team

When organizations implement cloud computing with the automation tools, they will achieve even greater efficiency. The table below shows efficiency gains in 10 different implementations.

Private Cloud Metrics | Average Results from 10 Deployments

Data Center Metric	Virtualized Data Center	Cloud Automation	% Improvement
# VMs/Physical Servers	4,000 VMs on 75 Servers (~64 GB Each)	1,000 VMs on 35 Servers (~64 GB Each)	75%
VMs Provisioned / Day	25	100	300%
Cost Per Provision	$80	$10	87%
Average Reservation Time	30-45 Days	9 Days	70+%
# DC Turns Per Year	10	40	300%
Capacity Utilization	20-35%	75-95%	30-75%
Average Delivery SLA (Days)	20	<1	95%
# FTEs to Manage	8	4	50%
# Reusable Services	35	75	120%
# Supported Users	3,000	3,000	-
RAM & Library Storage	5 TB RAM, 5 TB Library Storage	2 TB RAM, 10 TB Library Storage	60%

Quest Software: Your Expert Partner That Knows the Federal Government

As a leader in an ever-present government organization, you need a business partner that will be around for years to come. Quest Software is a stable, mature company that exhibits industry leadership and brings a long-term commitment to building powerful consolidation and systems management solutions.

Quest has shown steady growth since it was founded in 1987. Nearly 90 percent of Quest's 100,000-plus customers are Fortune 1000 companies. In fact, Quest's customers include the top 10 companies in multiple industries such as healthcare, telecom, pharmaceutical, insurance, banking and retail. That makes Quest an experienced and respected vendor when it comes to highly complex, heterogeneous, distributed IT environments that must meet the needs of highly diverse departments, agencies, and other entities.

Quest's solutions also serve more than 14 million government end users including those in the U.S. Department of Defense, the U.S. State Department, the U.S. Department of Agriculture, the Department of Energy, the Department of Justice, Homeland Security. Regionally, Quest serves public sector customers for the states of California, Colorado, Georgia, Illinois, Kansas, Texas and Vermont, as well as the County of Los Angeles, the City of Chicago, and the City of Houston – to name just a few. Quest also has higher education customers in all 50 U.S. states.

Quest is a multiple-year winner of Microsoft's Global Independent Software Vendor Partner of the Year Award, and a Partner of the Year in Advanced Infrastructure Solutions for Active Directory. In 2009, Forrester named Quest #5 in the IT Management Software Market (behind mega-vendors CA, BMC Software, IBM, and HP), while Gartner named Quest #2 in 2009 North American Application Management and #1 in Database Management Software for North America.

Quest's breadth of experience and depth of expertise allows us to offer powerful tools that precisely target IT problem areas, while our long history and solid commitment allow us to provide superior customer service and a reliable partner for your consolidation projects.

Conclusion

Consolidation is a daunting move for many federal agencies, but it's a necessary one, driven by today's increased public expectations, tighter budgets, and demands for accountability and transparency on the part of government.

Quest solutions accelerate the consolidation process, providing built-in expertise to avoid potential hazards while providing transparency and increased security throughout the process.

After the consolidation is complete, Quest continues to deliver savings through improved IT performance, easier systems management, and enhanced organizational accountability.

With Quest you can control the costs of your consolidation process and improve your overall IT operations from end to end. Quest ensures a smart consolidation, from start to finish.

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About Quest Software, Inc.

Quest Software (Nasdaq: QSFT) simplifies and reduces the cost of managing IT for more than 100,000 customers worldwide. Our innovative solutions make solving the toughest IT management problems easier, enabling customers to save time and money across physical, virtual and cloud environments. For more information about Quest solutions for application management, database management, Windows management, virtualization management, and IT management, go to **www.quest.com**.

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Contacting Quest Support

Quest Support is available to customers who have a trial version of a Quest product or who have purchased a commercial version and have a valid maintenance contract.

Quest Support provides around-the-clock coverage with SupportLink, our Web self-service. Visit SupportLink at **https://support.quest.com**.

SupportLink gives users of Quest Software products the ability to:

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- Download the latest releases, documentation, and patches for Quest products
- Log support cases
- Manage existing support cases

View the Global Support Guide for a detailed explanation of support programs, online services, contact information, and policies and procedures.

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