



**Written Testimony of
Nick Combs
“Innovating with Less: Examining Efforts to
Reform Information Technology Spending.”
Before
U.S. Senate Committee on Homeland Security and Governmental Affairs
Subcommittee on Federal Financial Management, Government Information,
Federal Services, and International Security
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Chairman Carper, Ranking Member Brown and other distinguished members of the Subcommittee, my name is Nick Combs and I am the Chief Technology Officer for EMC Corporation’s Federal Division. On behalf of EMC and our 54,000 employees, thank you for inviting me to testify today. I will discuss the many ways information technology can further enable the federal government to do more with less and how IT is being transformed through the adoption of cloud computing infrastructure and services.

Prior to joining EMC, I served for more than 25 years in the federal government. I was appointed as the Deputy Chief for Enterprise IT Solutions at the Defense Intelligence Agency, where I was responsible for the engineering and program management of all activities in the Department of Defense Intelligence Information Systems (DoDIIS) environment. I also served as the IT Director and Chief Information Officer of the National Media Exploitation Center (NMEC) under the Office of the Director of National Intelligence. Over the course of my career in government and the IT industry, I have direct experience resolving many of the IT challenges facing organizations today, particularly as enterprises transition to cloud services, manage unprecedented amounts of “big data” and strive to improve trust and cyber security.

Headquartered in Hopkinton, Massachusetts, EMC is a global leader in enabling organizations to transform their operations and deliver IT as a service. Fundamental to this transformation is cloud computing. Through innovative products and services, EMC

accelerates the journey to cloud computing, helping IT departments store, manage, protect and analyze their most valuable asset – information – in a more agile, trusted and cost-efficient way.

We cooperate, partner and work with various public and private sector organizations that range in all sizes and come from diverse missions and business models. Within the federal government, all cabinet level departments and agencies utilize EMC's innovative and cost-effective solutions to address issues and opportunities associated with transforming IT, transforming the business they conduct, and addressing cyber security challenges. However, we are also a leading provider of technology and services to the private and financial sector, with some of our largest commercial customers headquartered in both Delaware and Massachusetts.

As I have said in other public forums over the past 12 months, enterprise IT users in both government and industry often tell us that their current IT infrastructures are too complex, inefficient, inflexible and costly. Almost three-quarters of IT budgets are spent to “keep the lights on” and maintain existing stove-piped IT systems and applications, with only about 25 percent being spent on innovation to deliver new and improved services efficiently and securely to end users. This scenario is as commonplace in the private sector as it is in the public sector and everyone is committed to doing more with less.

EMC is no different and has worked hard to find greater efficiencies to make our own IT operations leaner. EMC's internal shift to a cloud-based infrastructure has helped the company save millions of dollars and significantly improved IT service delivery, while also improving energy efficiency and sustainability. For example, data center consolidation and cloud computing has enabled EMC to save nearly \$80 Million in data center equipment costs and another \$12 Million in power and space savings to date for an overall 34 percent increase in energy efficiency. This is equivalent to 100 million pounds

of CO₂ reduced. The other benefit of our shift to the cloud has been a 170 percent gain in storage administrator productivity.¹

We believe that lessons learned from EMC's journey to the cloud – as well as that of many of our customers and partners in the private sector and at the state/local level -- are equally relevant to the course being chartered by federal IT stakeholders. Some examples of the benefits of cloud computing and data center consolidation reflecting various segments of the U.S. economy include:

- Oregon-based Columbia Sportswear, a leading innovator in active outdoor apparel, footwear, accessories and equipment has increased the performance of its IT infrastructure using 25 percent less space after implementing a cloud computing model. At 95 percent virtualized, Columbia has reduced its storage total cost of ownership by 40 percent while enabling 50 percent more virtual machines to be supported in the infrastructure.
- Texas-based Lone Star College System, the fastest-growing community college system in Texas has deployed a private cloud to deliver IT-as-a-Service to over 90,000 faculty, staff and students at more than a dozen locations. In moving to a cloud model, Lone Star has saved more than \$600,000 in capital expenditures by utilizing virtualization and consolidating its IT environment. At 90 percent virtualized, Lone Star has reduced its energy consumption by 66 percent while increasing its ability to deliver new IT services in less than a week compared to three to four months before moving to the cloud.
- Independent Bank, a Michigan-based bank, has also achieved many benefits from moving to a cloud environment. At 70 percent virtualized, the bank has eliminated 65 servers and avoided additional server expenditures even as its environment expands. All the while, Independent Bank has reduced the time to deploy servers from at least a day to just 1-2 hours. In addition, the bank has seen server-related power consumption dramatically reduced. When it comes to backup, Independent Bank has also reduced its backup storage capacity requirements while decreasing the time to recover data of critical systems from days to just a few hours and even minutes.

¹Validated in ESG IT Audit , EMC IT – a Blueprint for DataCenter Efficiency, by The Enterprise Strategy Group, April 2009.

- At 90 percent virtualized, the City of Denton, Texas is leveraging virtualization and cloud infrastructure technologies to optimize efficiency, streamline management and transform its IT infrastructure. Since implementing its EMC-based infrastructure, the City of Denton has dramatically increased performance, streamlined administration, and developed a solid business continuity strategy.
- As a result of data center consolidation efforts, the Commonwealth of Massachusetts now uses a single content repository for all eligibility systems. This eliminates maintenance costs of multiple systems, as well as paper and manual processes. This also enabled customer service improvement by enabling content to be searched across all systems; resulting in response time improvement of four days to constituents.

IT transformation within the enterprise can be accelerated by aggressively consolidating data centers, transitioning legacy IT systems to cloud-based infrastructure and services, and building security into the cloud architecture from the beginning. But to do that, organizations have to make targeted investments in enabling technologies such as virtualization, converged IT infrastructure and scalable data storage, data analytics and information security in order to get the maximum amount of cost effectiveness, efficiency and agility over the long haul. While federal agencies are beginning to make these critical investments, budget cuts could stifle the federal IT transformation underway if they are misdirected.

As you know, Congress has placed federal IT spending on a diet due to federal belt tightening measures designed to reduce budget deficits. In my view, diets are only successful if you make smart choices about what you consume, not just focusing on a reduction of food and calories. If you don't invest in the diet, by eating healthy, exercising and having the right balance, then it is likely that you will not succeed in your overall objective. The same approach should be applied to federal IT transformation. While we should buckle down to reduce redundant and unnecessary expenditures, we should invest strategically in the technologies, services and processes that will enable the federal government to do more with less over the long term. To enable our internal shift to the cloud – in order to gain the improvements in productivity, energy efficiency,

transparency and trust – EMC had to *make investments* in technologies and converged IT infrastructure in order to achieve our savings and productivity objectives.

Agency CIOs should have budget flexibility in order to aggressively shift resources towards cloud computing and away from far more limiting and costly legacy systems and services. In a recently released report by MeriTalk, titled “Cloudy with a Chance of Savings,” federal agency savings are already estimated to be at \$5.5 billion in IT costs with current cloud computing efforts, and could go as high as \$12 billion annually.² Based on our own savings from cloud computing and other industry assessments, we believe the federal government is well positioned to save billions if efforts to utilize cloud computing are fully adopted and implemented through effective governance and federal budgets.

Congress, including this Senate Subcommittee, and the Office of Management and Budget (OMB) should be commended for ongoing efforts to meet these challenges head-on. OMB’s improvements to federal IT governance when fully implemented could help federal agencies do more with less while providing better services to federal taxpayers. OMB’s plans including the Cloud-First policy, the Federal Data Center Consolidation Initiative, and the Federal IT Shared Services Strategy are changing the federal IT landscape for the better. However, increased flexibility within the federal budget process is also needed to accelerate IT innovation.

As noted in the Government Accountability Office (GAO) report released this week, Congress and the Executive Branch must identify budget models that will allow increased budget flexibility through working capital funds or other centralized IT operations and maintenance functions.³ Last year, the TechAmerica Foundation Cloud2 Commission also specifically recommended that OMB “establish policies and processes

²MeriTalk report titled “Cloudy with a Chance of Savings”, April 25, 2012 Cloud Computing Brainstorm on Capitol Hill (<http://www.meritalk.com/ccx/chanceofsavings>).

³ GAO Report on Information Technology Reform: “Progress Made; More Needs to Be Done to Complete Actions and Measure Results”, April 2012.

for providing fiscal incentives, rewards and support for agencies as they take steps towards implementing cloud deployments”.⁴

Cloud Computing

Simply put, cloud computing is about delivering applications online to users at their desktops, on laptops, tablets or smart phones. This can be done in-house, through an enterprise’s “private” cloud, or through third-party, web-based service providers in the “public” cloud. We expect most large enterprises will prefer a hybrid⁵ approach that allows them to access some applications, like payroll processing, through service providers while retaining control over their most mission-critical applications in their private cloud data centers.

As the TechAmerica Foundation Cloud2 Commission pointed out in its 2011 report,⁶ cloud computing is really based on a simple idea: “By allowing [IT] users to tap into servers and storage systems scattered around the country and around the world – and tied together by the Internet – cloud service providers can give users better, more reliable, more affordable, and more flexible access to the IT infrastructure they need to run their businesses, organize their personal lives, or obtain services ranging from entertainment to education, e-government, and healthcare.”

We agree and this shift brings new efficiencies, cost savings, and helps organizations gain more productivity from their IT systems.

EMC supports the Administration’s Cloud First and Shared Services initiatives along with the ongoing federal data center consolidation efforts. We understand that the transition to cloud computing will not occur overnight; rather it requires a journey to

⁴ Recommendation 12 (Incentives), “Cloud First, Cloud Fast: Recommendations for Innovation, Leadership and Job Creation”, A Report from the Commission on the Leadership Opportunity in U.S. Deployment of the Cloud (CLOUD2), 2011, pp 24-25.

⁵ *Hybrid Cloud*: The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but that are bound together by standardized or proprietary technology that enables data and application portability. *Source*: NIST Cloud Definition.

⁶ “Cloud First, Cloud Fast: Recommendations for Innovation, Leadership and Job Creation”, A Report from the Commission on the Leadership Opportunity in U.S. Deployment of the Cloud (CLOUD2), 2011, pp 5.

realize all the benefits the cloud has to offer. The federal government has many unique environments, but these diverse organizations can benefit greatly from the successes that commercial organizations have already achieved through the adoption of cloud computing. The economies of scale, flexibility, and efficiencies of these cloud infrastructures will not only save significant amounts of capital and maintenance costs, but enable the application and use of information across our enterprises as never before.

One can only imagine all the ways in which information technology could be applied in the government if federal IT professionals were freed from the burdensome task of managing today's complex and sometimes antiquated infrastructures. Former OMB Director Orszag made a similar point two years ago when he highlighted the reality that government organizations are unable to match the productivity and innovation of the private sector because of archaic and complicated computing infrastructure.⁷ Cloud computing provides a mechanism to address this technology gap, enabling the federal government to unleash new innovations and improve productivity.

The adoption of cloud computing will also help improve cyber security over the long-term. While ensuring "trust in the cloud" is critical to spurring cloud adoption, there should be tangible improvements in security that come with the shift to the cloud that is underway.

Trust in the Cloud

Cyber security is clearly one of the biggest concerns of federal CIOs who are considering implementing cloud infrastructure and services. When I speak to customers about their journey to the cloud, they consistently bring up cyber security and data privacy issues as possible barriers to adoption. In the same MeriTalk report cited a moment ago, 85 percent of the respondents indicated that security was the top obstacle to the cloud.⁸ However, as the current Federal CIO, Steven VanRoekel emphasized recently

⁷ Remarks by Peter Orszag, Center for American Progress, June 8, 2010, Washington, DC.

⁸ Culture issues (38 percent of respondents) was the second most identified obstacle in the report.

at a public forum that I attended in Fairfax, Virginia security doesn't have to be a barrier to cloud adoption, but can actually be an enabler.

For example, technologies and effective best practices exist today to deliver private and hybrid clouds inside federal organizations to gain dramatic improvements in IT efficiency, while also providing the security required to protect sensitive information within the government enterprise. Today, organizations struggle to have control and visibility in their physical IT environments. This challenge need not be exacerbated in the cloud. The good news is that virtualization technology creates the right conditions for organizations to improve control and visibility beyond what's available in today's physical environments.

With virtualization and cloud computing, applications have become completely disassociated from the IT infrastructure on which they run. It provides the flexibility to have the same application run in the datacenter next door on one day, in a centralized datacenter hundreds of miles away the following day, and in a service provider datacenter another day. For that reason, improving cyber security cannot solely rely on the controls of the IT infrastructure such as the network perimeter. Security must evolve to become much more centered on the users and on the information they are accessing. For example, emerging technology practices such as adaptive authentication and data loss prevention are both widely used in the commercial world and are increasingly used in federal government agencies.

We believe in the transformation power of virtualization – so much so that we are focusing our cloud-security strategy and development initiatives on making security and compliance in the cloud: 1) logical and information-centric, 2) built-in and automated, and 3) risk-based and adaptive. For years, EMC, RSA (the Security Division of EMC) and our sister company, VMware, have worked to embed security, management and compliance controls into the virtualization platform.

In addition, RSA and EMC are working with cloud providers to give them the means to demonstrate security and compliance to their customers, removing this barrier to greater cloud adoption. For example, the RSA Cloud Trust Authority gives cloud customers an easy and scalable way to ensure trusted access to multiple cloud providers, while giving the cloud providers themselves a more automated, consistent way to demonstrate compliance with cloud standards for security and confidentiality as they evolve. Over time we expect the Cloud Trust Authority to evolve to offer additional means of security and compliance for digital information and identities.

During the next several years, cloud computing adoption could enable organizations to improve information security by replacing the disparate and legacy IT systems that are so common today. Instead of having our IT and information security organizations protecting stove-piped systems, organizations are able to implement centralized monitoring, management and security solutions.

When implemented correctly, cloud environments can be much more secure than today's IT environments. The level of transparency cloud vendors provide is a critical aspect when choosing a cloud partner. The federal government must take a trust-but-verify approach. Cloud vendors should be required to provide the tools and capabilities to allow customers visibility into their cloud environments to ensure compliance with those service level agreements, or SLAs. SLAs should be clearly defined and monitored by government customers to ensure maximum service value is received for budget dollars spent. For instance, SLAs in areas of performance, availability, backup and recovery, archive, continuance of operation, and disaster recovery must be clearly stated, measured, and monitored by the government agencies. Additionally, government risk and compliance capabilities need to be deployed and dashboards provided to the customer to ensure that our information is protected and our policies are being followed.

Security must be risk-based and driven by flexible policy that is aligned to the business or mission need. The need for a common framework to ensure that security policies are consistently applied across the infrastructure is critical to success. That is

one of the principle reasons that EMC supports updating the Federal Information Security and Management Act (FISMA). Enacting updated FISMA legislation that will enable continuous monitoring is essential to address today's threat environment as well as provide for an effective operational risk management framework for tomorrow's cloud computing infrastructure. By adopting continuous monitoring practices, federal agencies will be able to more effectively address advanced cyber threats as well as save money over the long haul by moving away from costly, paper-work intensive compliance.

Data Center Consolidation

In the recent report, GAO indicated that OMB's efforts to consolidate 800 data centers by 2015 is listed as incomplete because of a lack of agency detailed reports. The good news in our view is that the federal government can save several billion more in taxpayers' dollars once these plans are fully executed.⁹ These savings could also help the government to eliminate duplication and high energy costs. Last year, the Senate Appropriations Committee report accompanying the funding bill for the General Services Administration highlighted the data center migration efforts taking place at the Department of Homeland Security. According to the Committee report, "the Department of Homeland Security has testified to the Committee that it expects to save approximately five billion dollars in taxpayer funds over the next twenty years due to recent data center consolidation efforts. Building on current successes across the Government will allow GSA to better demonstrate and measure the cost-savings potential of such activities and thus encourage other agencies to adopt such best practices."¹⁰

EMC and the Informatics Information Group have helped the Walter Reed Army Medical Center comply with its mandated closure as a result of the Base Realignment and Closure Commission (BRAC) recommendations. This effort resulted in virtualization of 99 percent of servers before migration of data and systems to two other facilities.

⁹ GAO Report on Information Technology Reform: "Progress Made; More Needs to Be Done to Complete Actions and Measure Results", April 2012.

¹⁰ U.S. Senate, Committee on Appropriations. Financial Services and General Government Appropriations Act, 2012 (S. Rpt., 112-79). Washington: Government Printing Office, 2011.

According to Daniel J. Lohrmann, Michigan's Chief Technology Officer and Deputy Director of the Infrastructure Services Administration, "Our constant challenge is doing more with less...We thought that as budgets were slashed, user demand would drop, but the exact opposite happened."¹¹ Efforts to consolidate the number of data centers helped Michigan curtail spending on data center maintenance and energy costs for a savings of \$1.4 million annually.

According to the Data Center Consolidation and Cloud-Computing (DC4) Coalition, for every \$1 customers invest in data center consolidation, they can expect a \$3 reduction in their operating costs within three years. That is exactly what happened in Michigan and is a good barometer for federal IT officials to examine further.

In order to fully implement IT transformation, data center consolidation should be aggressively adopted across the federal government. I am encouraged by Mr. VanRoekel's efforts to include data centers of less than 800 square feet in his plans as many of these data centers are poorly designed and use more energy than necessary. The Federal CIO's efforts to shutdown these data centers will push the total number to be consolidated up to 1000 by 2015 and should result in greater efficiency and overall cost savings for the federal government.

Updating Federal Budget and Procurement Processes

As mentioned earlier in my statement, budget flexibility is a critical ingredient that could help federal agencies to procure and implement IT transformation solutions to consolidate data centers and transition to the cloud. The TechAmerica Foundation Cloud2 Commission emphasized budget flexibility in one of its principal recommendations aimed at federal IT transformation. Specifically, the Commission recommended that "...Agencies should demonstrate flexibility in adapting procurement models to acquire cloud services and solutions. Congress and OMB should demonstrate

¹¹ State of Michigan Case Study, EMC Corporation (<http://www.emc.com/collateral/customer-profiles/h7277-state-of-michigan-cp.pdf>)

flexibility in changing budget models to help agencies acquire cloud services and solutions.”¹²

A plan for upfront costs associated with IT solutions is an important issue for Congress to consider in reforming how agencies leverage and invest in cost cutting technologies. As an example, The President’s FY 2013 budget request reduces overall federal IT spending by \$586 million when comparing FY 2013 enacted levels to the request level of \$78.8 billion. 2.7 percent of this decrease is from the Department of Defense’s closure of 100 data centers.¹³ The President’s budget acknowledges that the proposed plans to consolidate these 100 data centers fails to take into account all upfront investment costs.

As the GAO noted in its recent report, progress has been made but more remains to be done. Tackling upfront costs associated with data center consolidation and cloud computing probably sticks out as the most significant hurdle that agencies must clear. Federal agencies must speed development of a funding plan to implement data center consolidation and its shift of Federal services to the cloud. The Administration’s launch of PortfolioStat coupled with the IT investment reviews contained within the proposed Information Technology Investment Management Act, should help the Office of Management and Budget to surpass previous efforts to track IT spending and hopefully can help agencies to speed delivery of spend plans for data center consolidation and cloud deployments. PortfolioStat and other transparency systems will support Congress and the Executive Branch aims to eliminate duplication and spot anomalies to prevent waste, fraud, and abuse.

Unless agencies can rely on realistic detailed plans to acquire technologies to help them do more with less, data center consolidation and cloud computing goals may not fully gain traction and federal savings could remain lower than anticipated.

¹² Recommendation 11 (Federal Acquisition and Budgeting), “Cloud First, Cloud Fast: Recommendations for Innovation, Leadership and Job Creation”, A Report from the Commission on the Leadership Opportunity in U.S. Deployment of the Cloud (CLOUD2), 2011, pp 23-24.

¹³Data source: *Agency FY 2013 IT budgets, reported February 2012.*

Conclusion

In conclusion, there is a wealth of knowledge within the private sector that can help government agencies identify, update, and support “best practices” based on lessons learned from both public and private sector implementation of data center consolidation and cloud initiatives.

I believe that now is the time to redouble IT investments efforts to incentivize cloud transition initiatives that improve the security and delivery of government services at significantly reduced operational costs benefitting the American people.

As EMC Chairman and CEO Joe Tucci stated in his 2012 Letter to Shareholders, cloud computing is transforming the way information technology is architected, deployed and consumed. We believe market adoption of cloud computing represents a fundamental shift in industry dynamics that will be as far-reaching and impactful over time as the adoption of personal computers was a generation ago.

EMC and I look forward to continued work with this Subcommittee to accomplish the objectives discussed within my written statement. We are committed to helping the federal government to do more with less.

Mr. Chairman and Members of the Subcommittee thank you for your attention to these important issues and I would be happy to answer any questions you may have at this time.