ACCELERATING GOVERNMENT TRANSFORMATION WITH NETWORK MODERNIZATION

ciena®

RESEARCH BRIEF

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The movement of applications to the cloud and increasing cyber threats mean that government IT departments need to re-evaluate their network infrastructure. These trends are driving the need to scale bandwidth, increase network flexibility and increase network security.

However, these initiatives require funding and unfortunately, government IT budgets are not able to keep up. President Obama's fiscal 2015 budget request to Congress slices $2.4 billion from the government's current IT spending level. State and local governments will also suffer decreases in IT and support services. Contrast that with IT spend¬ing in the private sector, which is predicted to increase to $3.8 trillion as technology companies continue to offer better services and interactions with their customers.

So where do these opposing forces leave government? And how does government compete?

Many government agencies at the state, local and federal levels are turning to **network modernization** to help satisfy the increased needs for more capacity, flexibility and heightened network protection while optimizing network cost efficiency and lowering expenses.

"Network modernization means taking a look at your network architecture and figuring out if it still works for you," said Renee Reinke, a senior adviser on industry marketing at Ciena.

> ***"Network modernization helps you consolidate, migrate or replace technologies and minimize costs, while enhancing your ability to exploit rapidly escalating bandwidth and service demands." – Renee Reinke***

To further understand this issue and how organizations at all levels of government can take advantage of network modernization, GovLoop has partnered with Ciena, a provider of trusted, reliable and secure networking infrastructure to research networks, service providers, enterprise and the U.S. government, to create this research brief. Ciena helps government agencies transform networks into strategic mission assets.

Together, we explore the benefits and challenges of IT modernization and what it means for agencies' mission success.

Specifically, this research brief will:

- Share results from a survey of 180 public sector professionals
- Explain how you can modernize your network to align to mission needs while complying with tight budgets and supporting legacy applications
- Provide a successful case study from Miami-Dade County's network modernization
- Include expert commentary from Renee Reinke, senior adviser on industry marketing at Ciena
- Give you insight on how Ciena can help you adopt modern network solutions

Today, governments must think differently about their network infrastructure and how to modernize it. It is more critical than ever to implement the right infrastructure foundation to support the new application-driven world.

CURRENT NETWORK CHALLENGES AND TRENDS FACING GOVERNMENT

& How Network Modernization Helps

In order to better understand the challenges and needs of the public sector when it comes to network modernization, GovLoop conducted a survey of 180 public sector professionals. The survey audience, a snapshot of the GovLoop community, was 33 percent federal employees, 19 percent state employees, 24 percent local government employees, with the remaining percentage made up of industry, nonprofit employees, federal defense employees and education workers.

In particular, GovLoop's research identified the top technology challenges, trends and network infrastructure challenges our audience is facing.

The survey drove home several concepts. As noted in Figures 1 and 2, it is clear that our audience has a core set of concerns that focus on mobility, cloud computing and virtualization. We can also derive from the survey data that the technology concerns the GovLoop audience is facing overlap with many of the top trends they are working to promote, making them more critical than ever.

Many of the survey respondents seem to understand that network modernization could help them to better align missions. As seen in Figure 3, nearly 52 percent of respondents cited security as something driving network modernization. Improved service delivery was a close second, at nearly 49 percent.

However, our survey respondents made it clear that they face hurdles in effectively deploying network modernization due to a variety of obstacles. Figure 5 shows that 70 percent of the respondents cite budget and resources as their main obstacle. IT constraints are an obstacle for 48 percent of the audience, and lack of skills or proper personnel came in third, with 43.5 percent.

Nevertheless, our survey respondents seem to be trying to work past these obstacles to plan network upgrades. As Figure 6 shows, nearly 35 percent are currently working on a network upgrade; 8 percent plan to do it within six months and 35 percent will do it within the next one to five years. Only 22 percent of respondents said they are not planning a network upgrade.

This intersection of technology challenges and top technology trends that the public sector wants to enable, as revealed in our survey, is where network modernization can help.

Network modernization plays a key part in enabling the success of each of these trends and initiatives and helping the public sector move past hurdles.

CLOUD COMPUTING

"Ensuring network performance in the cloud era requires the ability to scale network resources dynamically based on application needs, segment traffic by priority and ensure that outages or malicious activity on the network are quickly identified and mitigated to ensure an always-available network experience for the application and end user," Reinke said.

Migrating development activities and shared applications to a cloud environment makes sense and is mandated in the U.S. federal government by the G-Cloud initiative. The benefits of moving to the cloud are numerous – including cost benefits, greater mobility and operational simplicity. Cloud computing as a trend is obviously important to the GovLoop audience as well – it was No. 3 trend they are looking to implement.

As more applications move to a cloud environment, the local traffic patterns change from mostly in-building or on campus to a user to remote content pattern that significantly drives up both the capacity required at each location and the reliance on the performance of the network from the use to the cloud data center hosting the needed application or content.

The solution? Ensuring network performance in the cloud era requires the ability to scale network resources dynamically based on application needs, segment traffic by priority and ensure that outages or malicious activity on the network are quickly identified and mitigated to guarantee an always-available network experience for the application and end user.

VIRTUALIZATION

Networks as dumb pipes are a thing of the past. Today, software-defined networking (SDN) enables network operators to program networks to align to mission needs. Those static, inflexible connections of the past can now be virtualized resources driven on demand by user or applications based on policies and work groups.

SDN-driven network applications can provide a global view of the network across multiple vendors and multiple network layers to further increase the efficiency of the network in a dynamic environment. Combining this multi-layer view with QOS and security parameters, SDN applications can determine the optimal path to route from point A to point B, factoring in the available resources based on current and predicted needs, costs associated with each network segment, network policies, and topology.

This topic is on our users' minds – software-defined networking and network function virtualization ranked among the top trends and goals of our survey.

"Network function virtualization is poised to revolutionize the cost-efficiency and service delivery of network end-point appliances," said Reinke.

This virtualization of network functions accelerates mission response, reduces dependency on dedicated hardware appliances, and enables an on-demand consumption model – paying only for what is consumed, when it is consumed. NFV enables agencies to break free from end-point vendor lock-in, costly hardware and software maintenance challenges.

MOBILITY

Across all levels of government, agencies are working to understand how to best leverage mobility within the enterprise. For many, mobile presents an unprecedented opportunity to change the way we work, improve efficiencies and reach more employees. And it was ranked the No. 1 top trend on which our audience is looking to capitalize in our GovLoop survey, with nearly 57 percent of respondents ranking it their top tech trend.

But in order to do capitalize on mobility in the public sector, there are many challenges facing government, such as mandates for improved security, protection of identifiable information, expanded telework, data-center consolidation and cloud-first, among other initiatives.

Many mobile operators have deployed a traditional IP over dense wavelength-division multiplexing architecture, which was sufficient when network traffic was dominated by voice and some data services. However, to meet the demand for exploding content services, mobile operators need to plan for bigger bandwidth and consider a network architecture that can deploy a lower-cost, high-performance, packet-optical network. Through the process of network modernization, agencies can extract value from mobile technologies while also reducing security risks and total costs.

FIGURE 1.

TOP 5 NETWORK CHALLENGES

1. *Cybersecurity*
2. *Mobility*
3. *Bandwidth*
4. *Network Consolidation*
5. *Cloud Application Performances*

FIGURE 2.

TOP 5 TECHNOLOGY TRENDS

*Ranked level of importance to your organization's ability to effectively deliver government services

1. *Mobility*
2. *Advanced analytics and big data*
3. *Cloud computing*
4. *Network function virtualization*
5. *Internet of Things*

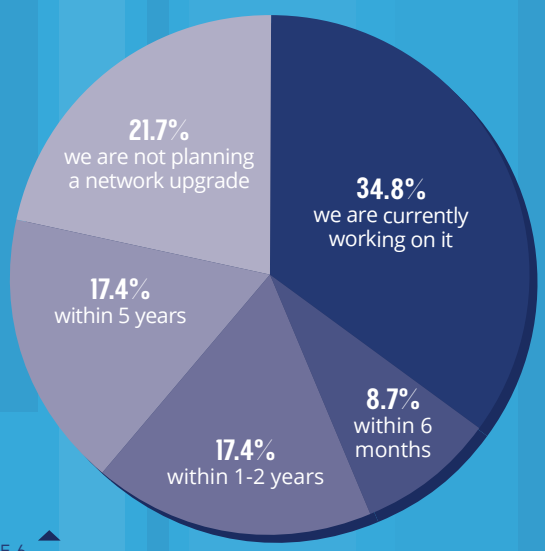

FIGURE 6

WHEN WILL YOU BEGIN PLANNING FOR A NETWORK UPGRADE?

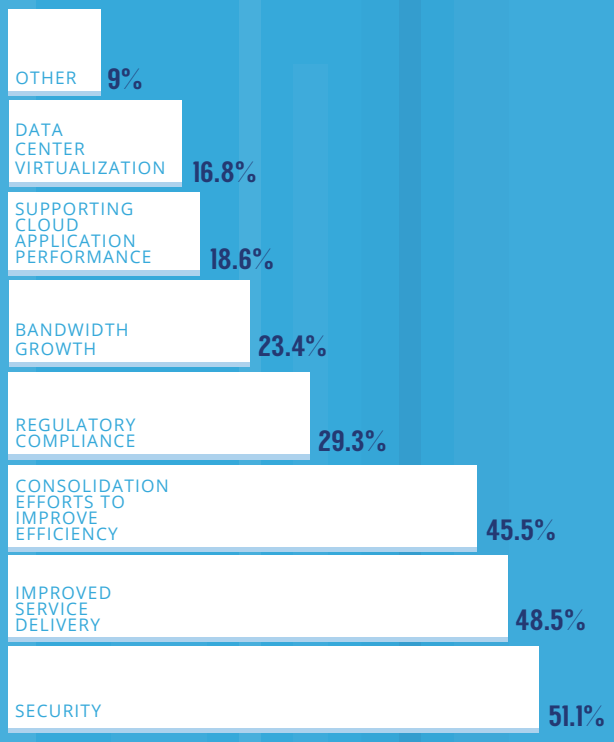

FIGURE 3

WHAT IS DRIVING NETWORK MODERNIZATION IN YOUR ORGANIZATION?

FIGURE 4.

TECHNOLOGIES THAT HAVE BEEN IMPLEMENTED AT YOUR ORGANIZATION

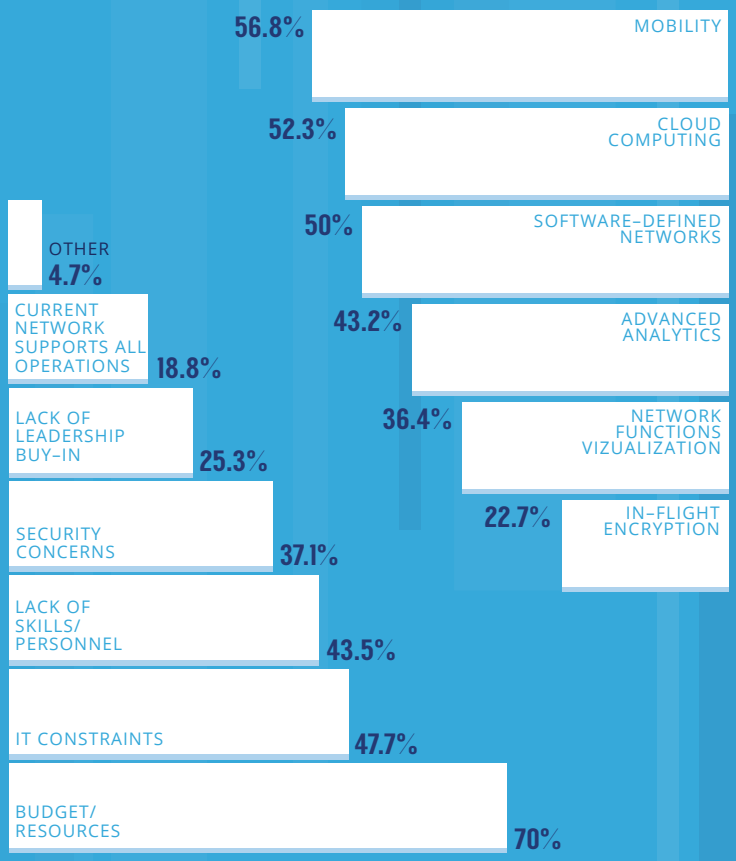

FIGURE 5

OBSTACLES TO EMBRACING NEW TECHNOLOGY

NETWORK MODERNIZATION:

The Key to Public Sector Mission Success

Network modernization maximizes business value through a succession of tactical and strategic steps that transform your infrastructure and operations to be as efficient as possible — for present and future demand.

In the government IT sector today, it's no longer enough to just expand and overlay legacy networks. These increasingly complex and sub-optimal networks:

- Increase energy and space costs
- Hamper service delivery times
- Consume a disproportionate amount of budget & resource

There is a solution, however. Network modernization, when planned strategically, allows you to achieve agency missions while maximizing your budgets and resources.

"We all know that digital government is important because it enables greater transparency as well as the flexibility to quickly determine and respond to citizen needs," said Reinke. Only when networks are modernized can governments properly live up to this new digital government standard of agility and flexibility, Reinke said.

"The adoption of cloud services has changed how we use the network. Thus how we architect the network to provide highly scalable, secure and reliable application performance needs to change as well," said Reinke. "Today's network architectures are not sustainable from a cost-to-scale or security perspective."

Modernization of government networks requires a strategic approach of supporting both critical legacy applications and newer cloud applications' performance requirements. The public sector also needs the ability to scale the network cost-effectively; the ability to create virtualized network-connection resources that can be application-responsive and the need to improve IT's ability to deliver mission-critical services with agile and timely responses.

Today, government agencies require the flexibility to quickly deliver solutions to meet rapidly changing mission needs. There are three key strategic network capabilities that ensure mission success for government, said Reinke:

- **On-Demand Network Scalability:** Integrating packet and optical network functionality into a single, converged, programmable platform enables a massively scalable, cost-effective network infrastructure foundation. Software-defined networking (SDN) enables the orchestration of programmable network infrastructure to create a virtualized pool of the network resources enabling end-user or application driven on demand network services
- **End Point Appliance Virtualization:** Network function virtualization (NFV) is poised to revolutionize the cost-efficiency and speed of service delivery of network appliances.
- **Multi-layer security:** Consolidation of multiple networks into a converged architecture reduces the threat surface. Wire-speed encryption at the transport layer ensures latency-free, bulk encryption of traffic end to end across the network.

"A network modernization strategy that converges existing networks onto a single multi-protocol, SDN controllable packet-optical transport architecture enables agencies to address key initiatives, without forklift network upgrades. Network modernization enables the following," Reinke explained:

- Cost-effective path for bandwidth growth now and into the future
- Improved service delivery times and quicker mission response
- Improved cybersecurity
- Simplification and cost-reduction of network operations

"At the end of the day, we are all consumers in the digital age; we have become accustom to instant gratification of our data needs," said Reinke. "We rely on our smartphones and web sites to provide instant responses and enable self-service functionality."

Government is responding to consumer demands and moving more and more in this direction, Reinke said.

"Agencies across the board are enabling digital government. But the criticality of the network in delivering a great digital experience is often overlooked," she said. "If the network performance is sub-par, if it's not secure, then it doesn't matter how great your website or cloud based application might be. Mission success is reliant on the performance of the network and complex legacy networks are not up to the task."

HOW NETWORK MODERNIZATION IMPACTS CYBERSECURITY

Cybersecurity is one trend that is pervasive within all public sector organizations. In fact, in GovLoop's survey, respondents ranked data security as their top concern and network security close behind. Security was also the No. 1 reason public sector organizations in our survey said they are looking to network modernization.

"As more data moves to the cloud, the security of both at-rest data – data residing inside the data center – and in-flight data – data transported between data centers and between uses and data centers – becomes a growing concern," Reinke said. "Protecting the network requires a holistic, multi-layer approach to information security and network resiliency."

CASE STUDY:

Upgrading the Network in Miami-Dade County

With more than 25,000 employees and a population of 2.5 million people spread over roughly 2,000 square miles, Florida's Miami-Dade County faces myriad public sector challenges – including network modernization. In 2012, the IT department was facing growing service demand from a wide set of applications, including video feeds for traffic and law enforcement, data center virtualization and backup supporting property tax and court records and plain old voice service for county agencies.

With this huge set of services, the county faced an overwhelming challenge in upgrading its communications infrastructure while supporting existing services within tight budget constraints. The county needed to serve the interests of a variety of services – libraries, public-safety agencies, courts, health care facilities and every type of county-level citizen service agency. Each had its own unique set of emerging applications and legacy service requirements.

In short, the county had to implement a converged solution that would continue to dependably deliver existing services, support new applications and scale for the future at a reasonable cost.

That's where Ciena came in.

Ciena helped Miami-Dade design a network upgrade that allowed simple transport of embedded TDM services while adding existing and emerging video and data services from various county agencies.

Its solution allowed the county to assign each service a quality level based on application priority needs. Future applications, expected to be largely packet-based, could be added to the network via the Ciena's carrier Ethernet service-delivery switches at strategic service points in the network and through utilization of excess capacity in the Ciena's layer 2 aggregation switches.

This new network allows Miami-Dade to better support its public constituents in every aspect of government, from residents checking on recycling pickup or finding their voting location, to attorneys searching public records, to the transportation department monitoring live traffic conditions to better manage incident response. All of these applications are powered through networking technology that allows the public to be better engaged in government operations, at a lower cost than ever thought possible.

For more details on how Miami-Dade County made this upgrade work, head here.

WHY CIENA?

Governments at all levels are looking to transform their networks for the new, application-centric, cloud-based world.

Ciena helps the public sector by unlocking network value through a unique engagement model focused on understanding mission goals, solution alternatives and risk assessment. It provides solutions that increase network-capacity scale without exploding costs, by converging networking platforms and layers to help you create simpler, more programmable and more responsive networks.

Ciena believes that a holistic business view must drive judicious network modernization to increase capacity and capability at lower operating costs. Ciena has a portfolio of network-modernization services, in support of every step of this process. In an initial engagement, Ciena works closely with stakeholders across all levels and arms of the business to understand specific business and technology challenges. This critical stage of the process ensures the consultancy team can map out a modernization and migration roadmap that addresses individual needs. Through in-depth consultancy and network discovery, Ciena can help optimize the use of existing network assets. Ciena can also suggest new, next-generation technologies to improve efficiency and performance in key areas of the infrastructure.

"Ciena can support agency missions with leading-edge transport solutions, software defined networking (SDN) tools and network function virtualization (NFV) applications that create the network fabric allowing for high-speed, reliable and secure communications when and where needed," Reinke said. "We are the network specialist."

CONCLUSION

Network expansion or supplementation is no longer sufficient. It is time for network modernization.

This research report shows that to meet the complex demands of public sector missions, organizations must explore modernization of their networks. This will allow them to be more efficient and effective in public sector service delivery.

Digital transformation through network modernization is imperative for agencies to not only meet their missions, but to transform the business of government.

IT modernization is inevitable as new technology, skills and expectations continue to rise. Today's agency networks are strategic mission assets and IT modernization must balance cost- and performance-optimization and cyber-resiliency. As the network specialist, Ciena has worked with government agencies, global enterprises and carriers to architect underlying infrastructure to converge network layers, simplify network management, support the migration of legacy TDM/SONET applications and create a programmable, mission-responsive platform for strategic-mission networks.

ABOUT CIENA

Today's government networks are strategic mission assets that provide citizen services, ensure national security, and enable emergency response. The security, reliability, and resiliency of the network is critical to mission success.

Ciena helps governments modernize and unlock the value of the network through an engagement model focused on understanding mission goals, solution alternatives, and risk assessment. We provide converged, multiservice, network infrastructure solutions that enable cost-effective scale while simplifying operational support. Our intelligent software solutions enable multilayer control and Software-Defined Networking for more programmable mission-responsive networks.

ABOUT GOVLOOP

GovLoop's mission is to "connect government to improve government." We aim to inspire public-sector professionals by serving as the knowledge network for government. GovLoop connects more than 200,000 members, fostering cross-government collaboration, solving common problems and advancing government careers. GovLoop is headquartered in Washington, D.C., with a team of dedicated professionals who share a commitment to connect and improve government.

For more information about this report, please reach out to info@govloop.com.

GovLoop
1152 15th street, NW, Suite 800
Washington, DC, 20001

Phone: (202) 407-7421 | Fax: (202) 407-7501

www.govloop.com
@GovLoop

PHOTO CREDIT:
Daniel Piraino

1152 15th street, NW, Suite 800
Washington, DC 20001

Phone: (202) 407-7421 | Fax: (202) 407-7501

www.govloop.com
Twitter: @GovLoop