

THE NEXT GENERATION OF GOVERNMENT'S IT INFRASTRUCTURE

Research Brief

THUNDERCAT
TECHNOLOGY 

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EXECUTIVE SUMMARY

Government agencies increasingly rely on a complex information technology (IT) infrastructure to serve citizens and meet mission goals. They require storage to house the trillions of data points that internal systems, external sensors and citizens themselves generate. They require computing power to fuel applications for public servants to do their jobs. And they require networking to connect all the applications and workloads that keep government running.

Although agencies have created these IT infrastructures to move forward in the digital world, it's unclear if this complex web of systems is really helping government achieve mission success. To gain more insights into whether today's IT infrastructures are meeting agency needs, we asked 165 government employees to describe the current state of their technology systems, and what they expect from the next generation of IT architectures.

To help synthesize the results of our survey, GovLoop spoke with Kurt Steege, Chief Technology Officer at ThunderCat, and Dale Degen, Director of Product and Solutions Marketing at NetApp. Together, ThunderCat and NetApp deliver an integration-ready, next-generation hyperconverged infrastructure (HCI) solution.

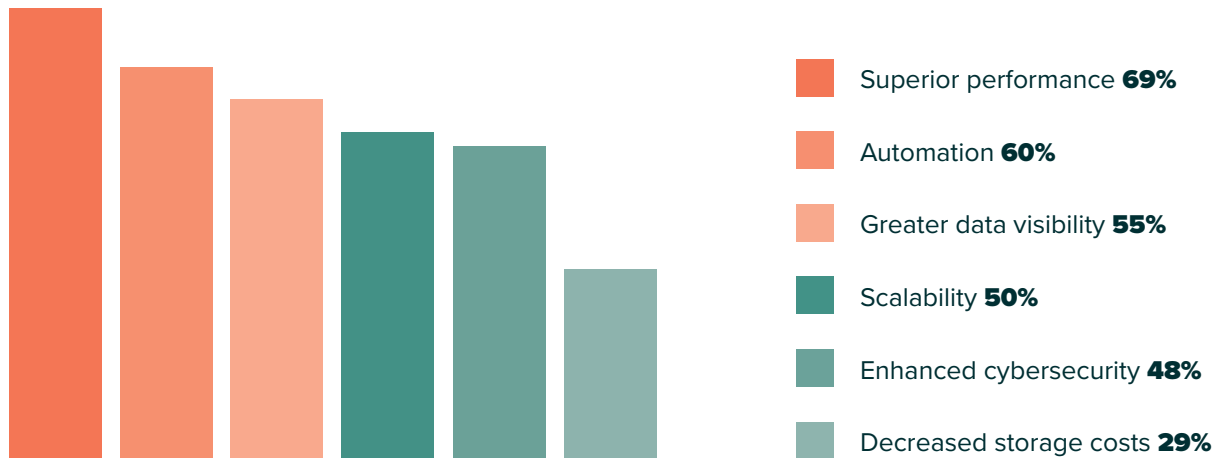
Degen and Steege explained how hyperconvergence — the software-centric integration of compute, networking and storage into a single commodity hardware — can address many of the challenges that agencies face with their current IT infrastructures. They also shared what the next generation of HCI looks like, and what it can achieve.

In this research brief, we'll dive into the results of our survey to examine the current state of government IT and how next-generation HCI can empower agencies to better meet their missions.

GOVERNMENT'S IT NEEDS

FIGURE 1

What capabilities do you expect from a next-generation IT infrastructure? (check all that apply)



Government increasingly relies on technology to meet mission goals. Citizens expect to use intuitive, high-performing and effective digital services to complete their government transactions, while public servants require a host of applications to create those services and complete other mission-critical tasks.

These IT functions require a robust infrastructure of connected technologies, systems and tools. What does that infrastructure look like? We asked government employees what their agencies need in the next generation of IT infrastructures. According to respondents (Figure 1), government IT must be:

High-performing. Neither employees nor citizens want slow systems that experience significant downtime under heavy workloads. To power the ever-growing number of applications and systems in government, agencies need superior computing performance from their infrastructures.

Automated. With government budgets and workforce dwindling, agencies can't afford to dedicate resources to time- or labor-intensive manual tasks. This is especially true in scenarios where automation could expedite and better secure those manual processes.

Visible. As government generates and accrues more data from people and systems, it's imperative that agency leaders have visibility into that entire trove of information to make better, data-driven decisions. Data visibility is also essential for cybersecurity professionals to understand the scope of their IT footprint and the information within it.

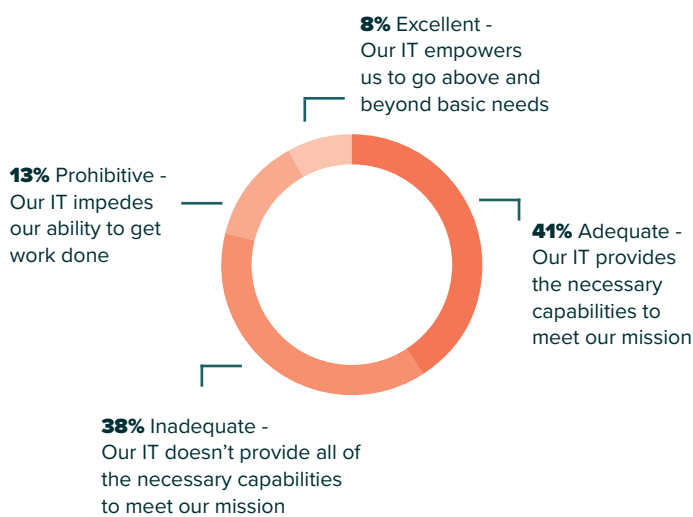
Scalable & Cost Effective. Although most agencies have a shortage of IT professionals, they do not have a shortage of storage or computing demands. And those demands will only increase as data and applications grow. To ensure that performance can be maintained, agencies must invest in infrastructures that can scale easily and quickly without consuming budgets or IT staff time.

Secure. With cyber threats exponentially increasing in both volume and sophistication, it's imperative that IT professionals be able to efficiently secure and monitor existing and new systems.

But how does an agency achieve the performance, automation, visibility, efficiency and security that modern technologies can provide? The key is to understand the obstacles that impede progress and then acquire a common technology that overcomes those roadblocks.

THE CHALLENGES TO GOVERNMENT'S IT INFRASTRUCTURE

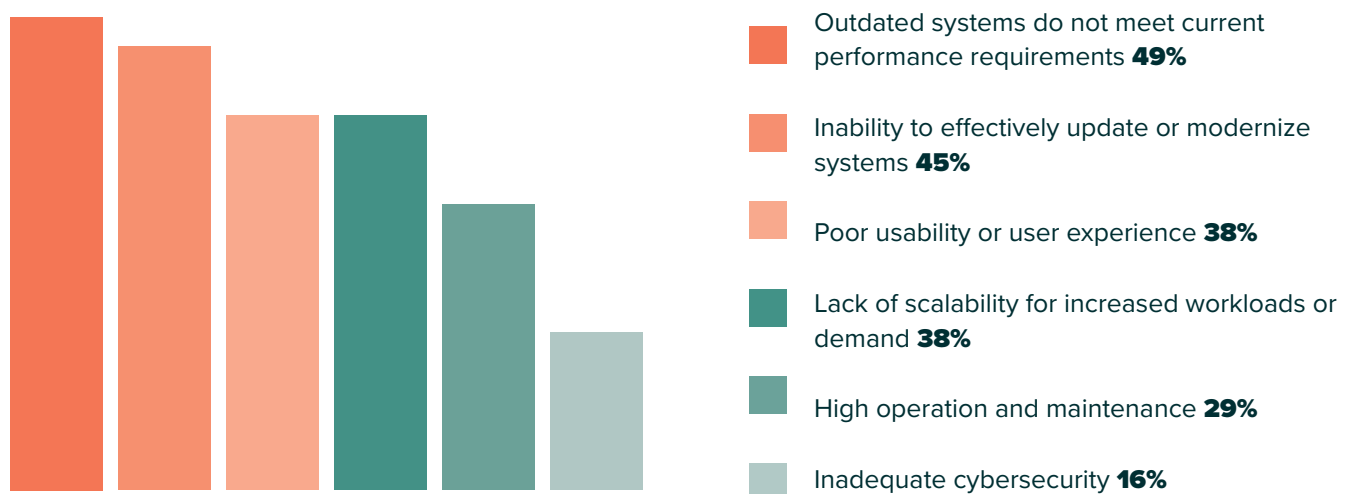
FIGURE 2
How would you describe your current IT systems and tools' ability to help your agency meet its mission objectives?



Although government workers know what they need from their IT infrastructure to achieve mission goals, our survey results show that nearly half of agencies' current infrastructures aren't meeting expectations. Fifty-one percent of respondents said their IT was inadequate or even prohibitive to allowing them to meet agency missions (Figure 2).

Respondents also explained how their current technology was failing expectations. Specifically, they cited outdated IT, overly complex architectures, costly procurement and decreased cybersecurity as main obstacles to IT effectiveness (See Figure 3).

FIGURE 3
What are the biggest challenges associated with your current IT infrastructure? (check all that apply)





Legacy IT.

It's no secret that many government IT systems are outdated. That's becoming a major challenge as the financial and performance costs of maintaining those systems rise.

Today nearly 80 percent of federal IT budgets go to operating and maintaining legacy technologies. Unsurprisingly, 29 percent of respondents said high operation and maintenance costs were also a challenge of their current IT (Figure 3).

But despite that investment, 49 percent of our survey respondents said outdated systems don't meet current performance requirements and 38 percent said they provided subpar user experiences (Figure 3).



Increased complexity.

Current systems don't meet agency needs, but when agencies attempt to improve their IT, they run into additional roadblocks.

According to more than a third of respondents, their systems are unable to effectively scale as workloads or performance demands increase (Figure 3). The alternative strategies to scaling — updating or replacing — are also difficult for agencies. Forty-five percent of participants said they were unable to effectively update or modernize agency systems (Figure 3).

These difficulties are largely the result of an overly complex IT infrastructure, built over many years as individual departments deployed ad-hoc systems to meet various needs. That IT sprawl across departmental silos makes it difficult to manage, much less update, systems in a consistent or integrated way.

Survey respondents affirmed this issue. One lamented that too any applications weren't interconnected, while another said there were no interfaces among programs that required the same information to operate.



Decreased security.

This lack of integration across IT systems not only hinders agencies' ability to update systems, it also critically decreases security. A host of sophisticated cybersecurity tools are available to IT and security personnel, but they can't make the most of them when their outdated systems don't support those security capabilities.

Additionally, cybersecurity professionals need visibility across the organization to monitor, detect and address vulnerabilities holistically. Systems that are disconnected — configured differently and residing in various departmental silos — can't provide that visibility to keep agency systems safe.



Costly procurement.

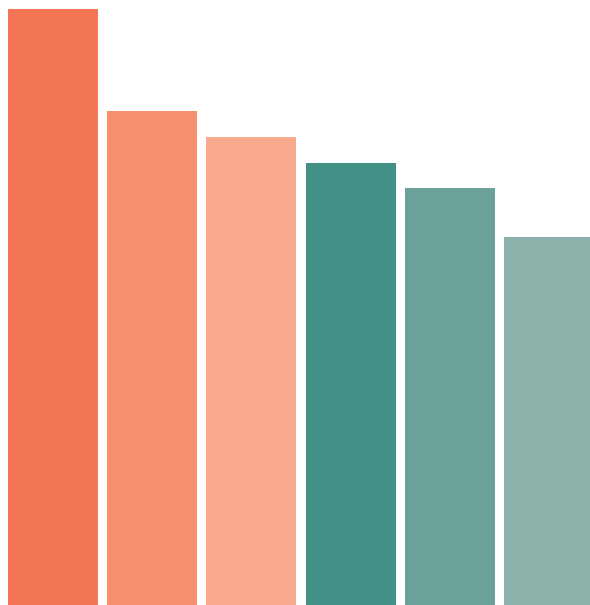
But even if the complexity of legacy architectures decreased, agencies face another hurdle in procurement: Acquisition procedures in government are often lengthy and mired in complicated regulations and requirements. As a result, many organizations have difficulty acquiring new solutions to replace outdated systems in a timely manner.

"Agencies wind up spending so much money and time getting these things together from an IT infrastructure perspective that they don't have enough money or time to build the product or the thing that's really providing the value to the mission," Steege said.

Ultimately, the current configuration of government IT prevents agencies from innovating ways to achieve goals and serve citizens. The public sector requires not just new systems, but an entirely new IT architecture to prepare it for today's demands.

THE HYPERCONVERGED SOLUTION

FIGURE 4
Which capabilities do you believe could be achieved with HCI? (check all that apply)



- Superior performance **70%**
- Automation **58%**
- Enhanced cybersecurity **55%**
- Greater data visibility **52%**
- Scalability **49%**
- Decreased storage costs **43%**

Agencies must rethink the way they architect their IT tools and solutions to decrease complexity while enhancing performance and security. HCI can help them do that.

HCI is a software-centric architecture that tightly integrates multiple resources into a single commodity hardware box supported by a single vendor. “Think of it as the easy button for everything that you want to do,” Steege said. “It’s taking the storage, compute and networking functions, putting them in a single box, and then allowing you to scale that out, piece by piece.”

The obvious benefit of this centralized yet scalable technology is the ability to decrease departmental silos. Agencies can procure a single solution to provide compute and other technical capabilities to their entire enterprise, increasing collaboration while decreasing licensing and training

Hyperconvergence dramatically simplifies agencies’ IT architectures, allowing them to spend fewer resources to implement better technologies, quicker. With HCI, agencies can achieve:



A smaller footprint.

The [Data Center Optimization Initiative](#) requires federal agencies to reduce their data center footprint. But even without the pressure of a federal mandate, agencies must consider ways to make their IT use more efficient. Resource constraints coupled with the potentially high costs of storage and computing technologies mean optimization is a must.

Forty-three percent of respondents believed their agencies could reduce storage costs by implementing hyperconvergence (Figure 4). Steege affirmed that idea. “HCI is all about consolidating inefficient infrastructures and optimizing facilities,” he said.

HCI optimizes technologies by allocating compute, storage or networking functions only to the workloads that need them. That avoids unnecessary spending on unused resources, and it reduces agencies’ overall footprint as they move away from traditional data centers.



Quicker implementation.

With hyperconvergence, departments can avoid long procurement cycles to add additional storage, compute or networking components as new demands arise. “When you need an additional node, a user can say, ‘I’ve already certified this platform. This is just another node. That’s 70 [percent] or 80 percent of the work that’s already done. Now, I can take the money I’ve been allocating to procurement and put it into something that really provides value to the mission,’” Steege said.

Not only can agencies avoid procurement lags, they can also easily expand capacity with HCI’s automation capabilities. Fifty-eight percent of survey respondents said automation was a key benefit of HCI (Figure 4) because it allows agencies to quickly scale and allocate resources as demands change. This avoids lengthy integration cycles and the substantial labor costs associated with hardware implementations.

“HCI also helps these different agencies become familiar with a cloud infrastructure, and helps them build out an as-a-service infrastructure internally, where they don’t worry about the infrastructure as much and they can spend more time and more resources on the things that the agency actually needs to serve the American public.”

- Kurt Steege, Chief Technology Officer at ThunderCat



Increased security.

Even as deployments and infrastructure expansions accelerate, agencies don’t have to worry about risking the security of their IT systems. In fact, more than half of survey respondents said that implementing HCI would dramatically improve their cybersecurity posture and offer greater data visibility to IT professionals (Figure 4).

With HCI the underlying nodes are managed through a software defined overlay that exposes everything to the IT administrators. Therefore they are able to more easily deploy, expand, and secure everything rapidly.” Steege explained.

That’s because any new software platforms or applications, including cybersecurity tools, can be immediately integrated into the overall platform through APIs. From there, cybersecurity professionals can view every underlying node of the infrastructure to ensure that threats are quickly detected and countered. As new nodes are added, that visibility automatically expands to include them.



Better technology.

Ultimately, HCI allows agencies to achieve superior performance with their technology investments, as 70 percent of survey respondents noted (Figure 4). Not only can HCI efficiently allocate resources to the workloads that require performance, it can also prepare government for the next wave of technical capabilities.

As agencies’ IT spend declines with HCI, they can use those funds — and the IT staff whose time has been freed from routine infrastructure maintenance and integration — to explore new technologies. Plus, the integration-ready, software-defined architecture of HCI can help agencies make those transitions. “The people who are finding the most value in HCI are the infrastructure architects who are going to use the platform as a simple tool to build out other needed tools,” Degen said.

Specifically, HCI is a key enabler to helping agencies effectively migrate to cloud computing because it grows elastically, as cloud needs grow. “HCI also helps these different agencies become familiar with a cloud infrastructure, and helps them build out an as-a-service infrastructure internally, where they don’t worry about the infrastructure as much and they can spend more time and more resources on the things that the agency actually needs to serve the American public,” Steege said.

With HCI, agencies can invest in innovation rather than maintaining legacy, underperforming and insecure systems.

THE NEXT GENERATION OF HYPERCONVERGENCE

Hyperconvergence is a clear next step for most government organizations as they pursue new, more efficient IT strategies. But before investing in these solutions, Steege and Degen cautioned IT professionals to consider exactly what type of HCI architecture to deploy. That's because they're not all configured to act the same way or meet the same demands.

First-generation hyperconverged solutions were more focused on consolidation — putting networking, storage and compute functions in one place — than on effective resource allocation among those components. “The original hyperconverged solutions came out as one-size-fits-all,” Steege said. “There were points where you might not have enough of one thing, like storage or compute, while you had too much of another.”

“Additionally, a lot of these first-generation architectures were focused on the smallest footprint,” Degen added. As a result, many HCI solutions were deployed to smaller departments within agencies, perpetuating technology silos and missing opportunities to purchase technology at scale.

First-generation HCIs consolidate disparate IT components but in a uniform, localized manner. In most cases, agencies will need more from their IT architecture. “We're looking at the government agencies that are trying to build their private cloud and scale things out as-a-service,” Degen said. “They really need a much larger scale — what we're calling the enterprise scale — where they can start very, very small and grow almost infinitely from there.”

That's why some solutions providers, such as NetApp, are creating a next generation of hyperconvergence that provides the consolidation benefits of traditional models, but with additional flexibility for larger-scale enterprises. The differentiator in these next-generation architectures is the ability to independently allocate different resources while continuing to leverage a single commodity hardware.

“One of the unique things that our NetApp HCI solution brings to the market is the independent scale of compute and storage,” Degen said. “That's truly a real cost savings aspect as you're growing. If you can independently grow your compute and storage, you're going to optimize your investments.”

Although the platform still pools resources to maximize performance and cost savings just as traditional HCI solutions do, NetApp's HCI platform is built on a per-workload basis. That means minimum, maximum and burst performance levels can be allocated to individual workloads, rather than unnecessarily spread across workloads that don't need those resources.

Not only can agencies avoid allocating unnecessary resources to specific nodes, they can also decrease their licensing costs. In most cases, new applications are licensed according to the number of infrastructure components they will run across. With traditional HCI, that means each node — whether it is compute, networking or storage — is counted in that licensing agreement even if the application will not use that resource.

With a next-generation HCI solution, that's not the case. It allows IT admins to allocate licenses only to the compute nodes that will use the application, thereby reducing overall licensing costs.

“NetApp's platform still gives folks that easy button in terms of being able to put things out node by node, but it also allows the flexibility that makes it much more valuable to customers,” Steege said. That's the promise of next-generation HCI. Platforms such as NetApp's still offer all the benefits of traditional hyperconvergence, but with even greater capacity to help agencies innovate under tight budgets.

LEARNING MORE ABOUT HCI

FIGURE 5

Does your agency currently use HCI?

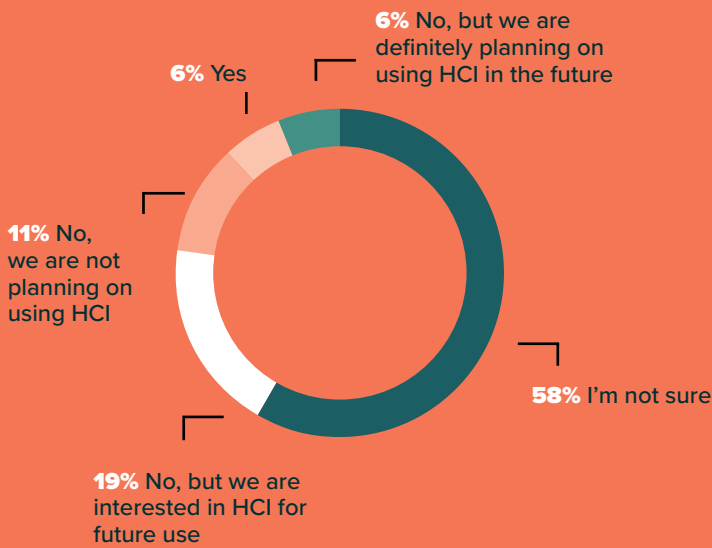
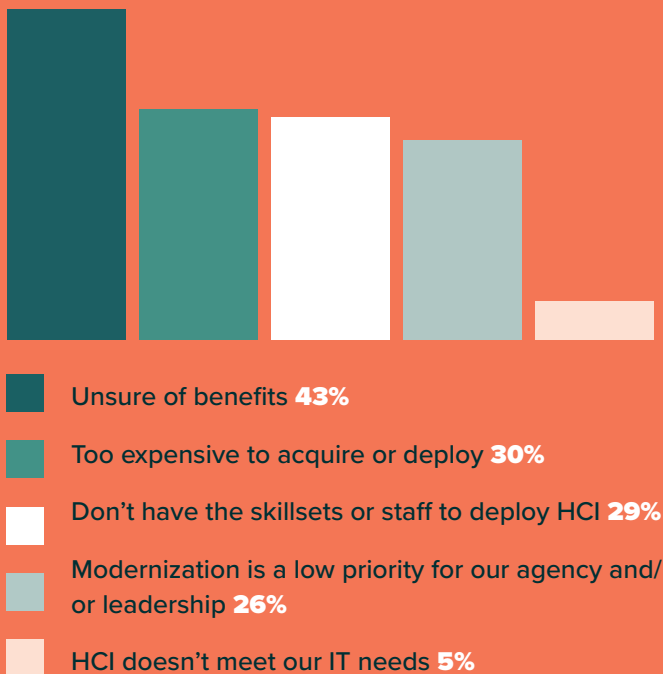


FIGURE 6

If your agency isn't leveraging HCI, what prevents your agency from using HCI today? (check all that apply)



Some public servants are already aware of the benefits of HCI, including how it meets critical agency needs. In fact, 12 percent of respondents said their agency already used or was definitely planning to use HCI in the future. However, more than half of respondents weren't sure if their agencies currently use this architecture (Figure 5).

If HCI holds so much promise for agencies, why aren't government employees working to acquire the solution? The main impediment is awareness, our survey shows. Forty-three percent of respondents were simply unsure of the benefits HCI could deliver. Others have misconceptions about the feasibility of HCI adoption. For example, 29 percent thought they would need specific staff or skill sets to deploy HCI, while 30 percent thought the solution would be too expensive to acquire or deploy (Figure 6).

The reality is that HCI can help move agencies forward as they seek to increase performance and lower IT costs. But for many organizations, the first step toward progress will be education. IT professionals can partner with solutions providers such as NetApp and systems integrators such as ThunderCat to make sure their next infrastructure investment is the right one.

"Really, that's the focus of what we've designed our architecture around — building an HCI product with the guaranteed quality of service and scale that allows agencies to take that next step and build out that enterprise-scale HCI," Degen said.

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- Dale Degen, Director of Product and Solutions Marketing at NetApp

CONCLUSION

Given diminished resources, heightened performance needs and increased pressure to secure IT systems, agencies must find a way to update their outdated systems and create a sustainable IT architecture for government. For many, HCI is the path forward.

HCI — particularly next-generation HCI that is independently scalable — provides the automation, scalability, security and performance that government requires today. And it does so without consuming resources that agencies could better use to spur innovation. Ultimately, HCI lets government focus on meeting its mission, rather than simply maintaining technology.

ABOUT THUNDERCAT

ThunderCat Technology is a service-disabled veteran-owned small business that delivers technology products and services to the federal government and Fortune 500 companies. ThunderCat is a value-added reseller that brings an innovative approach to solving customer problems in and around the data center by providing strategies for data storage, networking, cyber security and applications.

For more information, visit www.thundercattech.com.



ABOUT NETAPP

Government agencies of all levels count on NetApp for software, systems, and services to manage and store their most important asset, their data. With solutions ranging from data protection and recovery to cloud computing, data analytics, and flash solutions, NetApp has become government customers' top choice for key technologies that drive data center transformation. Top counties, cities, and states count on NetApp and value our teamwork, expertise, and passion for helping them succeed now and into the future.

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ABOUT GOVLOOP

GovLoop's mission is to inspire public sector professionals by serving as the knowledge network for government. GovLoop connects more than 270,000 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 the public sector.

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