Three Building Blocks to Enable the Cloud

A Government Roadmap to Integrity-Driven Cloud Computing

White Paper

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There are many options, models, opinions, and approaches when it comes to cloud computing, so it is no surprise that the market has become extremely crowded and confused. Government, in particular, has much to consider. With shrinking budgets, competing mandates, and the demand to meet citizen needs, where does cloud computing fit into the equation? How can cloud services help, and what can government do to begin transitioning to a cloud-computing model?

This white paper provides a practical roadmap that government agencies can use to move toward a cloud-services approach. The paper gives special focus to some of the challenges that senior IT managers and CIOs face as they consider the benefits of cloud computing. By transitioning to a cloud-based IT strategy, governments will fundamentally change the way IT services are delivered and how they are consumed, while at the same time realizing tangible operational and financial benefits.

Why Government Is Considering Cloud Computing

Agencies that transition to a cloud-based model will experience benefits in three essential areas: cost reduction, organizational agility, and government transformation.

Cost reduction can be achieved in multiple ways by consolidating and sharing resources across multiple agencies, making minimal upfront capital investments to deploy new applications, and decreasing operational and maintenance costs.

Government agencies can improve their organizational agility with cloud computing by shortening the time it takes to procure and provision new services, collaborating across different agencies through seamless systems, and fostering advanced skills in the workforce.

The need for transformation is another essential reason why government is considering cloud computing. Governments want to take advantage of innovative technology approaches to provide additional services, serving, protecting, and educating citizens across vast geographies, and improving access to dynamic services through mobility.

What Challenges Do Governments Face in Cloud Computing?

Agencies constantly struggle with the balance between providing additional citizen services and operating IT more efficiently. With the increase of storage capacity and Internet connectivity, citizens have embraced online services and social networks as a necessary and easy way to communicate and do business. Citizens now expect the same from their government agencies. This means a growing demand for online services that are transparent, accessible, and secure.

Although transitioning to cloud-based computing seems like a solution to meet the needs of both government agencies and citizens, several major concerns slow or even prohibit the transition to a cloud-based model. These concerns include finding a sustainable strategy, meeting ROI goals, and having vendor confidence.

- Is the organization’s cloud-computing strategy sustainable? What kinds of risks are involved? What about up-skilling technical staff in new technologies? Is a single kind of IT service delivery the best option? Government agencies need assurance of a sustainable cloud-computing strategy before they can commit to change.

- There are major government mandates. Will this help meet budget goals? What kind of short and long-term commitments will need to be made with a restrictive budget? With IT costs spiraling and government budgets decreasing, any investment must show measurable ROI.

- Will this vendor be here long-term? Do they have the experience in migrating and integrating cloud-based resources? Who has reliable security experience for cloud computing? Cloud services, mobility, and client devices are inseparable; who can help align the organization’s way of working with these technologies? Governments need
confidence that vendors have the technology, industry expertise, and strategic partnerships to support their transition to cloud computing and help them navigate necessary compliance and regulatory issues.

The concerns about these questions are valid. Government agencies need answers, solutions, and partnerships that will give them a sense of assurance in moving forward with the transition to cloud-based computing.

The Need for Integrity

Whether you are building, deploying, or expanding your cloud-computing environment, make certain that the fabric that connects all clouds and cloud elements—the network—is used fully and built with integrity.

The network is the foundation for any cloud-computing environment and should meet the following criteria:

Secure
A secure network encompasses more than endpoint or perimeter security. Security must be built into the architecture and implementation, so that the network enforces and integrates security policies to enable mobility, voice, collaboration services, and more.

Reliable
The network must be available to provide applications for workers and citizens. It should also provide a robust and scalable level of responsiveness, with the right self-healing safeguards.

Dynamic
Cloud-computing environments have modular components across shared resources. Dynamic provisioning of resources allows services to scale up or down as demands change.

Seamless
The network must be open to any type of cloud-computing approach. This requires interoperable systems that enable connections across organizations and agencies.

An integrity-driven foundation that is secure, reliable, dynamic, and seamless gives governments the confidence to speed-up adoption of cloud-based services.

First Steps to Maximizing the Benefits of Cloud Computing

With an integrity-driven cloud-computing environment, you can maximize the benefits of cost reduction, operational efficiency, and government transformation. While the benefits of the cloud services model can be very attractive, it is important to align cloud-computing initiatives with organizational goals and understand the benefits and limitations of this approach. Making the transition to a cloud-based strategy represents a good opportunity to clearly identify the organizational needs and goals to be achieved. At the same time, it’s important to do proper planning to ensure that funding and resources are used efficiently.

Some basic steps include:

1. Document existing IT processes and identify any changes to IT operations such as delivery, security, and compliance.
2. Perform a risk analysis and identify any potential issues for the project.
3. Understand the transition plan in order to minimize impact on operational continuity for your organization.
4. Make sure the project will have a positive impact and will provide value to the agency.
A Government Roadmap to Integrity-Driven Cloud Computing

Plan for your transition to cloud-based computing across three main technology areas: infrastructure, applications, and services (Figure 1). Using a roadmap enables you to look at your journey comprehensively and provides your organization with a modular approach. When you know where you’re headed, you can make the transition in a controlled manner while mitigating risk.

Figure 1. Three Building Blocks to Enable Cloud Computing

Infrastructure

Optimize Data Center Consolidation
The delivery of network, compute, and storage services at government agencies has evolved over time. This has resulted in several pain points for customers, including deploying services based on a temporary need, duplicating resources, and limited collaboration between agencies. Data center resources often were deployed with extra capacity, creating an environment that was underutilized and expensive to maintain.

Define a consolidation strategy and outline your goals to identify areas that are underutilized in the data center. Be sure to develop a financial model to justify the project and form a team that includes technical and business stakeholders.

Enhance Network Performance
The ability to provide applications in a timely and reliable manner, in addition to reducing costs, has become a priority for government agencies. A single network is easier to deploy and operate and can provide higher service availability.

When enhancing network performance, develop a secure and reliable network architecture to support cloud services, plan for infrastructure changes and resources, and document application latency and application traffic requirements. Ensure that the implementation team has proper security and virtualization experience.

Connect Anyone Anywhere, Seamlessly
In addition, a robust network platform capable of delivering real-time collaboration to any device is critical, particularly in a cloud environment where resources and applications can reside outside the traditional business perimeter. Plus, the network should provide a secure, seamless user experience across different services.

Coordinate across groups and agencies to ensure implementation of network features and services and assess the state of network security and availability. Ease these changes into the organization’s culture and determine the impact on the way teams work.

Implement Preconfigured Solutions
An effective way to deliver all the capabilities just described while reducing implementation time is to use a preconfigured and validated infrastructure. This promotes the reuse and interoperability of cloud-computing services, facilitating a common platform to integrate all cloud elements. When considering a preconfigured solution, define an implementation plan that is compatible with the current environment.
Applications

Identify Applications for Rapid Deployment

Cloud-computing environments provide applications to support the needs of government agencies and their citizens. The cloud model allows for a rapid provisioning of applications with an underlying infrastructure that can scale up (and down) as demand requirements change. Some applications are better suited to being served from the cloud. Transitioning applications in a phased approach allows agencies to evaluate the benefits of the cloud model before deploying new applications.

To successfully move applications to the cloud, identify the most common applications and define security policies to support the transition. Follow up with metrics to track application latency and traffic requirements and address these accordingly. Justify the applications that will be transitioned by specifying who, what, when, where, why, and how in your deployment plan. After sharing the plan, regularly communicate and get buy-in or feedback from multiple levels across the organization to keep everyone aware of progress and changes.

Utilize Automation and Orchestration Features

The network is the ideal platform for automation since it can monitor every aspect of the infrastructure. It can also respond to changes and ensure security and compliance. A cloud service requires automation tools that offer provisioning, metering, and capacity management, as well as a self-service interface for users.

When considering automation and orchestration features, establish cloud-computing management processes, define configuration best practices, and document all hardware and software components to be managed. Avoid common pitfalls that often include lack of proper processes and planning to manage and monitor resources. Visibility into the network, compute, and storage infrastructure is essential; use automation and orchestration to enhance this effort.

Services

Determine the Right Implementation Model

Implementing cloud computing requires planning and expertise in several areas, from the network infrastructure to the data center and collaboration tools. Take a comprehensive, architectural approach that considers people, processes, and technologies across the network, computing, and storage resources.

Try to identify resources that can service multiple government priorities and define the agency’s role in developing cloud services. Often, a migration plan with detailed implementation steps helps teams understand and see the organizational goals in action. It may help to couple the migration plan with an analysis of the risks involved; before implementing cloud applications, have a mitigation plan in place. Understand the major risks and engage with a risk management advisor to help navigate upcoming challenges.

Create a Phased Cloud Migration Plan

Defining the right strategy and long-term goals for cloud deployment becomes critical before transitioning to cloud computing. Deploying cloud services is typically done through a phased approach, with low-impact applications being the first to move to the cloud. This phased approach reduces risk and allows agencies to evaluate ROI at each step.

Make ROI analysis a requirement before allowing additional deployments. To do this, grow IT governance within the organization to provide a continual stream of direction and advice throughout the transition to cloud-computing and any future technologies.
Conclusion

Cloud computing offers significant benefits for government. Although there are many challenges in making the transition to a cloud-based environment, deploying cloud services on an integrity-driven network makes the transition much easier and reduces risk.

Begin your transition to cloud computing by considering the actions outlined in this paper. Regardless of where you are in your deployment, ensure that your vendors are “cloud-agnostic” and put your business needs before their business model.
Appendix

Cisco is the common denominator for cloud computing. What makes us unique is our open approach to cloud-computing environments that can support whatever deployment model customers choose to solve their business challenges. Hybrid, community, private or public—Cisco and our extensive ecosystem of partners can support it. For more information on Cisco’s cloud computing offering for government agencies, visit www.cisco.com/go/govcloud.

How-To Resources

This section includes Cisco® solutions that can help in each of the phases of the roadmap: infrastructure, applications, and services.

Infrastructure

Optimize data center consolidation: Cisco provides a robust portfolio of solutions aimed at maximizing and improving the use of data center resources, including:

- **Virtualization.** Being able to virtualize server, storage, and network resources is the foundation for achieving new levels of efficiency and agility in data centers.
- **The Cisco Unified Computing System™** enhances the level of consolidation by uniting computing, storage, and network access into a single system designed to reduce the total cost of ownership.
- Cisco Unified Fabric consolidates network and storage traffic over a converged, highly available infrastructure, reducing the number of adapters, cabling, and power and cooling requirements.

Enhance network performance: Relying on solutions such as Cisco Unified Fabric and the Cisco Unified Computing System, government agencies can provide services rapidly and securely. Cisco products include:

- Cisco Nexus® switches were designed to meet mission-critical data center requirements and offer an end-to-end solution for core, aggregation, and high-density connectivity for end-of-row and top-of-rack deployments. In addition to its high-performance switching architecture, Cisco Nexus switches support Cisco Unified Fabric with Fibre Channel over Ethernet (FCoE) for I/O consolidation.
- The Cisco MDS Multilayer Directors support the deployment of high-performance SANs for virtualized environments and seamlessly integrate Fibre Channel SANs, iSCSI and Fibre Channel over IP in one system.

Connect anyone, anywhere, seamlessly and securely: The network should provide a secure, seamless user experience and support innovations across routing, switching, wireless, and security services. Cisco products include:

- **Cisco TrustSec®,** solution helps secure network and data resources relying on policy-based access control (user and device identity information) and by protecting network traffic.
- **Cisco ScanSafe Cloud Web Security** service prevents zero-day malware attacks and provides real-time threat protection. This software-as-a-service (SaaS) solution is provided from the cloud and requires no hardware or upfront capital investment.
- **Cisco AnyConnect™ Secure Mobility Solution** protects a wide range of desktops and mobile devices, supporting the enforcement of security policies and helping to minimize risk.

Implement preconfigured packages: Our packages utilize best-in-class technology. These packages help minimize risk, as well as the investment required in time, resources, energy, and equipment.

- **Vblock™ Infrastructure Packages,** delivered by the Virtual Computing Environment coalition (Cisco, EMC, and VMware), represent an integrated offering that combines virtualization, networking, computing, storage, security, and management technologies. Rather than assembling individual components, they can be purchased as preintegrated and validated packages.
- **FlexPod** offers validated technologies from VMware, NetApp, and Cisco. Combining computing, storage, networking, and server virtualization, these prevalidated configurations are optimized for a variety of mixed-application workloads, such as virtual desktop, secure multitenancy, or cloud-computing environments.
Applications

Identify applications for rapid deployment: Cisco offers several cloud-computing applications that benefit from a cloud delivery model, including:

- **Cisco WebEx** Meeting Center enables online meetings so customers can present information, share applications, and enhance project collaboration. The software-as-a-service model provides a secure and reliable method to collaborate, eliminating the need for hardware and resources to maintain the infrastructure.

- **Cisco Virtualization Experience Infrastructure (VXI)** integrates virtualized data centers and user workspaces with desktop virtualization services such as interactive multimedia, security, and performance accelerations. End-user desktops are hosted from a central location and are accessible through different end-user devices and locations.

- **Cisco Hosted Collaboration Solution** provides rich communications and collaboration capabilities by integrating voice and messaging services. Hosted services offer a shorter deployment time and provide a consistent set of collaboration tools.

Utilize automation and orchestration features: In addition to partnerships with cloud computing solution vendors (such as BMC Software), Cisco offers orchestration and provisioning solutions across compute, network, and storage resources.

- **Cisco Tidal Enterprise Orchestrator** helps to improve service quality by automating the end-to-end service delivery process. It integrates event and alert management data with best practices for operational support processes.

- **Cisco newScale** provides a self-service portal, as well as service catalog and lifecycle management software for storefronts to deliver and manage cloud-based services.

Services

Determine the right implementation model: In addition to a strong ecosystem of partners able to provide cloud services, Cisco offers a comprehensive architectural services approach that considers people, processes, and technologies across the network, computing, and storage resources. Also available is the option of self-service where customers can use Cisco design guides to deploy cloud-services environments themselves.

Cisco Cloud Enablement services help government agencies:

- Define and justify the strategy to transition to a cloud architecture
- Plan and design a cost-effective infrastructure
- Reduce implementation risk
- Implement and operate a secure cloud service

Cisco offers a range of services to make the transformation to a cloud environment, including:

- **Cloud Strategy Service**: An in-depth analysis to help justify the cloud strategy and determine the most flexible architecture to cost-effectively realize the benefits of cloud computing.
- **Cloud Planning and Design Service**: Detailed, customized designs with the appropriate technology, security, and management orchestration services.
- **Cloud Implementation Service**: Helps you make a seamless migration to a cloud architecture with the support of Cisco experts.

Create a phased cloud migration plan: Agencies can rely on their own IT professionals or Cisco partners to simplify cloud migration projects. Cisco also provides documented best practices and design services to help with application migration, provisioning, and service orchestration.