



CLOUD FIRST: PRIVATE, COMMUNITY, PUBLIC & HYBRID CLOUDS – WHICH WORKS BEST FOR FEDERAL?



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INTRODUCTION

In February 2011, U.S. Chief Information Officer Vivek Kundra set a plan in motion to reform federal IT management, putting “Cloud First” and requiring federal agencies to evaluate their technology sourcing strategies so that cloud computing options are fully considered.

Designed to help the government deliver value to the public by increasing the operational efficiency of federal IT dollars, the Cloud First policy stresses the importance of each federal agency moving three services to the cloud over the course of 18 months.

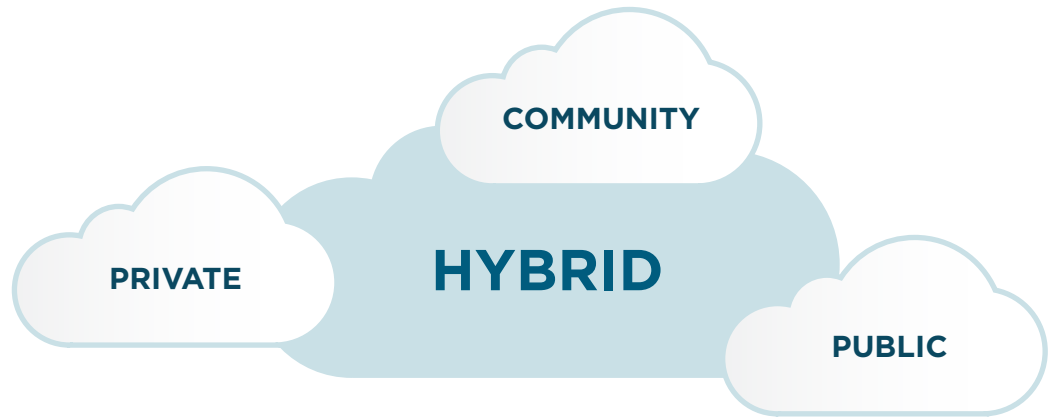
When fully deployed, these cloud services are expected to offer government key benefits, including:

- Vastly improved asset utilization across agencies, functions and regions (with a target of boosting server utilization from 30% to 60%)
- Faster system consolidation
- Near real-time scalability of storage and compute capabilities, so agencies can align their response to changing market or national need (whether scaling up or down)
- Higher productivity from IT staffs, who can now focus on higher skill-level tasks like developing applications instead of configuring servers
- Accelerated development, piloting and launching new applications in a controlled and replicable fashion, while providing a more open platform for sharing innovations across agencies
- A background bridge for IT systems undergoing technology refreshes, reducing potential impacts to users while keeping vital systems available
- A change in IT success metrics, from managing assets to delivering services
- A more balanced culture of risk and entrepreneurship closer to the norms of enterprise
- Better alignment of government’s information infrastructure to its mobile workforce, along with a virtualized workplace no longer bound to a desk, facility or department
- A streamlined way to acquire cloud services on popular federal contracts, using pre-competed pricing from pre-certified vendors
- Improved procurement flexibility to align computing and storage assets with program needs
- Free-market pricing that promises a well-defined and commoditized service
- Reduced environmental impact of the government’s computing needs by operating high efficiency datacenters and infrastructure at high utilization

While the promised benefits of moving to the cloud are compelling, as agencies determine what IT services to move, they also must decide which type of cloud to move to. Under the Cloud First initiative, cloud computing can be implemented using a variety of deployment models – private, community, public or a hybrid combination¹, which all have different advantages. This white paper will take a deep dive into the full spectrum of cloud deployment models and the pros and cons of each.

¹ <http://www.cio.gov/documents/Federal-Cloud-Computing-Strategy.pdf>

Spectrum of Federal Cloud Options



A simple analogy of cloud options is that of the auto industry. Let's assume you are traveling to a new city for a day and need a car. In this case, it's not a good move to purchase or lease a car, as you are not making a long-term commitment. Rather, you could rent a car from Avis by the hour, which would be very convenient because you could pick it up from anywhere in the country, use it as you need and then return it. However, it would be very expensive because you would be paying it by the hour. As the analogy goes, renting a car by the hour is the same as using the public cloud.

Alternatively, if you needed a car long-term, renting from Avis is not a cost-effective way to gain the use of a car. If you intended to keep the car for 3-5 years, leasing would be a better bet. With a lease, the dealer still owns the car. You keep the car for about as long as the depreciation cycle, and your servicing is likely included in the lease, which means you get a great price for this timeframe. This is like using a private hosted cloud or some types of hybrid clouds that combine the benefits of managed hosting and cloud together. You're not paying per hour anymore; you're now paying for a virtual machine over a term. The fact that you're committing to a term means you get better prices from your provider, and you also get more things included in the price.

The final option, which is similar to a true on-premise private cloud, is to actually buy the car. In this case, you spend your own money to buy your car from a dealer. You're responsible for all maintenance and garaging of the car.

Now, let's take a closer look into all of the cloud options available for the federal government.

Private Cloud

Quite possibly the largest concern shared by federal IT managers when it comes to migrating to the cloud is assuring the security of systems and data, identified by 77% of respondents in a 2011 *InformationWeek* survey.² To address this concern, many are opting to deploy private cloud solutions, which offer tighter controls over the geographic location of data storage and other aspects of security.

With a private cloud solution, the cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.

With a private cloud solution, the cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise. According to Shawn P. McCarthy, research director for IDC Government Insights, about 80% of cloud migrations across the government will be to private clouds -- both in-sourced and outsourced.³

The piece of mind that comes with private cloud, however, comes at a price. Like the car analogy, private cloud is not the best choice in every circumstance. Because much of the cost savings associated with cloud are made possible by a wide user base and cheap resources, it's harder to leverage the scale of the cloud model when deploying a private cloud environment. A smart way to do it is to use private cloud for the predictable portion of a government workload and public cloud for burst.

PROS	CONS
<ul style="list-style-type: none"> • Highly secure • Very good performance • Very reliable • Agency has a high level of control 	<ul style="list-style-type: none"> • Scalability limited based on infrastructure • Higher cost due to the need for more resources and management professionals

Community Cloud

Federal agencies looking to take advantage of most of the benefits of private cloud while still paying slightly less will likely look into a community cloud solution.

In a community cloud, infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g. mission, security requirements, policy or compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.

In this deployment model, the costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realized. Essentially, a community cloud is a public cloud with fewer organizations in it.

² <http://www.informationweek.com/government/cloud-saas/cloud-computings-tipping-point/229401691>

³ <http://searchsecurity.techtarget.com/news/1280089683/Breach-fears-push-federal-cloud-computing-initiative-to-private-cloud>

For example, the Department of Defense and some intelligence agencies have launched data center improvement initiatives using a community cloud. This enables them to easily share data with other agencies in the community cloud, while still keeping it secure and controlled.

Another industry taking advantage of community clouds is the healthcare industry. There is a lot of movement around HIPAA-compliant clouds, where everyone in the community is supporting patients and exchanging data in a controlled way.

While the concept of community clouds is not new, adoption by the federal government has been slow on this model to date.

PROS	CONS
<ul style="list-style-type: none"> • Ability to easily share and collaborate • Lower cost 	<ul style="list-style-type: none"> • Not the right choice for every organization • Slow adoption to date

Public Cloud

Possibly the least utilized cloud option within the federal government currently is the public cloud. With a public cloud solution, the cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services. The fear that drives federal agency IT managers away of course, is security.

In fact, participants in a January 2012 survey by the 1105 Government Information Group⁴ of almost 300 government officials rated public clouds as less secure than any other cloud computing model. With opinions driven by major public security breaches, including an attack on Google’s password system in 2010 and a major security breach involving about 60 million email addresses from marketing service firm Epsilon in 2011, perceptions of public cloud are not highest in the government.

One great benefit of using a public cloud solution is that cost savings associated with it are great. When multiple organizations share the same cloud, the cost is divided among them.

However, while many agencies have concerns about the security available in a public cloud environment, the reality is that with a trusted cloud vendor like Carpathia, the public cloud is really no less secure than the private cloud. There are just more people using it.

One great benefit of using a public cloud solution is that cost savings associated with it are great. When multiple organizations share the same cloud, the cost is divided among them. In addition, the cost of upgrading or patching applications is split over those multiple tenants, to the benefit of all.

⁴ <http://fcw.com/microsites/2012/download-cloud-computing/02-public-clouds-less-popular-cloud-computing-type.aspx>

For government entities interested in a public cloud solution, the key is to find a reputable cloud provider that can ensure security.

PROS	CONS
<ul style="list-style-type: none"> • High scalability • Low cost and pay-as-you-go pricing model 	<ul style="list-style-type: none"> • Moderate level of security, depending on service provider • Medium level of performance and reliability • Less control than other cloud models

Hybrid Cloud

Agencies looking to take advantage of the benefits of multiple cloud deployment models should take a closer look at a hybrid cloud solution. A hybrid cloud solution is a composition of two or more clouds (private, community or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g. cloud bursting for load-balancing between clouds).

With a hybrid cloud solution, sensitive information can be placed in a private area of the cloud, and less sensitive data can take advantage of the cost benefits of the public cloud.

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In addition, organizations can blend managed services on top of the whole solution to be able to cost-effectively scale an infrastructure to meet the peaks and troughs of customers usage. By blending dedicated managed hosting and cloud computing, customers obtain a lower unit price and retain the traditional benefits of managed hosting. A hybrid model provides the security, availability and reliability of a traditionally hosted environment, paired with instant access to cloud computing and storage.

Because hybrid cloud solutions also often come with some management complexity, management solutions such as RightScale have become available to offer a single view into an organization’s entire cloud infrastructure. With these solutions, IT managers can conveniently access private cloud and public cloud resource pools from one dashboard. Here, they can provision entire server deployments in minutes and then automate and govern them over their lifetimes. Everything is visible, organized and controlled, and it works across all public and private clouds. With solutions like RightScale, managing 10 or 1,000 servers can be equally simple.

Comparing Clouds

Each different cloud model has its own unique pros and cons, but as shown in the matrix below, electing a hybrid cloud model will enable agencies to take advantage of the best of all worlds.

	PRIVATE	COMMUNITY	PUBLIC	HYBRID
SCALABILITY	Limited	Limited	Very High	Very High
SECURITY	Most Secure Option Available	Very Secure	Moderately Secure; Depends Greatly on Service Provider	Very Secure
PERFORMANCE	Very Good	Very Good	Low to Medium	Good
RELIABILITY	Very High	Very High	Medium	Medium to High
COST	\$\$\$; Requires More Resources (i.e. Data Center Space, Electricity, Cooling)	\$\$	\$. Pay-as-you-go Model	\$\$

Partnering for Migration Success

Regardless of the deployment model chosen, it's important to partner with an established, expert and proven services provider that can not only advise on the best plan of action but can also ensure cloud migration, implementation and operations and maintenance fulfill their promises.

As a winner of two GSA IaaS awards, Carpathia Hosting offers an impressive track record and extensive experience and expertise in public sector cloud deployments. Carpathia's Federally Compliant Application Platform (FCAP) -- developed with over 10 years of experience with federal compliance mandates -- means that the rigorous security, certification and accreditation requirements of federal agencies are integrated into every offering.

In addition, Carpathia's new 64,000 sq. ft., 7.3-megawatt IBX Vault data center in Dulles, VA is designed to deliver cloud and managed hosting solutions for federal, state and local agencies with strict compliance requirements including FISMA, DIACAP and FedRAMP.

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Carpathia Hosting is a leading provider of managed hosting services, providing secure, reliable and compliant IT infrastructure and management for some of the world's most demanding enterprises and federal agencies. Founded in 2003, Carpathia is a growing, profitable business run by a seasoned management team with deep experience in delivering enterprise hosting solutions including colocation, managed services and cloud computing. Carpathia's suite of services is designed for organizations seeking scalable, secure, robust and enterprise-grade hosting solutions that can be quickly provisioned or tailored to meet unique requirements. Backed by its E3 Promise, Carpathia consistently delivers an experience that exceeds customers' expectations. Carpathia was named to the Inc. Magazine 500/5000 list in 2011 as one of America's fastest-growing companies. Contact Carpathia at 1.888.200.9494, or visit www.carpathia.com for more information.

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Equinix IBX data centers serve as a reliable and secure destination for the world's largest financial companies, network operators, government agencies, and global enterprises. Equinix was founded in 1998 and is headquartered in Redwood City, CA. Our Federal Sales office is located in Ashburn, VA. Equinix is a public company trading under the ticker symbol EQIX.