

# Cloud Deployment Models

When it comes to deploying cloud solutions, government organizations have four primary choices:

**Public clouds** – in which the service provider offers a cloud infrastructure for general use on a self-service, on-demand basis. Services vary, although some organizations find public cloud services appealing because they require little to no infrastructure investments while enabling unprecedented levels of scalability. This translates to greater efficiencies and increased agility at a relatively low cost. The downside is that sharing resources across a public infrastructure might raise security and regulatory concerns that might nix this option for many government uses.

**Private clouds** – in which an organization chooses to deliver self-service, on-demand elements in-house. An IT shop can build and maintain a private cloud within its own data center or centers, much as it would any other type of infrastructure. This cloud would be for the exclusive use of the organization's staff or other privileged users.

A private cloud might also run externally at a hosted cloud provider's site. In this case, the

provider maintains and manages the cloud infrastructure, which comprises pooled resources dedicated to that single customer's use.

Due to concerns about compliance, privacy, security and data availability, many government organizations are likely to build private clouds rather than use public services.

### INTRODUCTION

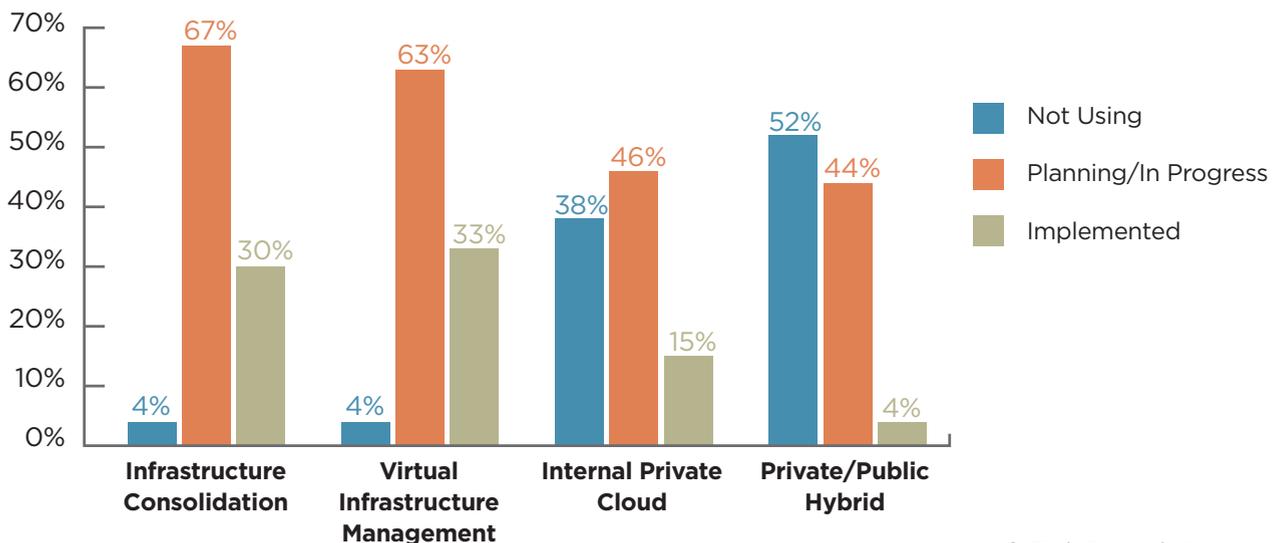
Although cloud computing can help the federal government achieve lower cost, more efficient IT operations, there's still much confusion surrounding these services in public sector environments. Distinguish cloud differences and get the scoop on why clouds will only grow. Also, see why client virtualization is fast becoming a natural complement to cloud services as a way to centralize apps delivered to users anywhere in the world.

**Community clouds** – provide an opportunity for multiple organizations with similar needs or like interests to share infrastructure. The community cloud option doesn't provide the full cost benefits of a public cloud, but it can allow organizations to more readily facilitate requirements for higher levels of privacy, security and compliance. Similar to a private cloud, the community version can reside within an organization's data center or at an external site.

**Hybrid clouds** – mix elements from among the private, public and community options.

In one common scenario, an agency might allow specific applications to run on the public cloud to grab additional resources as needed, while maintaining other mission critical apps on a private cloud service.

## Cloud Adoption in Large Organizations



Source: Info-Tech Research Group Inc.

## Best Practices Advice

Experts say it's best to evaluate specific applications, factor in security and compliance considerations, and then decide which applications or services are best suited for private, public or hybrid cloud computing alternatives. Other key best practices tips include:

- Plan for data integration by using a checklist of integration-related items such as how the cloud service provider's offering will integrate with current and future software as a service applications. Also important is how the provider will guarantee availability and security, along with how it will provide database access.
- Make use of key resources, such as the Information Technology Infrastructure Library framework, which can help agencies document and implement the key processes and disciplines that will make cloud initiatives successful.
- Consider investigating 'client cloud' advances, such as cloud PCs, which deliver desktops as a service. These client-side devices are built so that primary PC software components, including operating systems, applications and data, all reside in a cloud.
- Look for tools to help with cost management to address the capture and management of data that provides information on the agency's total IT costs. Some tools allow mapping against specified service level agreements, which is useful for managing costs.

### 'Paint by Number' Clouds

The entire cloud computing stratosphere, including the markets for private, virtual private and public cloud computing, is expected to reach approximately \$61 billion in revenue by the end of 2012, according to Forrester Research, Cambridge, Mass.

The largest individual cloud computing market continues to be public software as a service, which will reach \$33 billion by the end of 2012, according to Forrester Research.

Meanwhile, Info-Tech Research Group Inc., Toronto, Ontario, Canada, reported in a December survey that 76 percent of nearly 100 IT decision-makers in both public and private sector organizations will focus initially on private cloud services. In the same survey, a total of 33 percent of respondents said they would only implement a private cloud service.

Accountability and control were most important to the survey's respondents in evaluating cloud services. More than 75 percent of respondents called performance monitoring a "must have" in any cloud service. Less crucial to respondents were considerations related to the types of hypervisors used, for example. Nearly 75 percent of respondents said solutions offering 'hypervisor agnosticism' would be nice but weren't a necessity.

### CLOUD-Y FORECAST PREDICTIONS

Top predictions for the coming year include:

- Cloud computing will provide an increasing set of lower-cost alternatives to in-house services. Government organizations working to expand IT services must comply with the Obama administration's cloud-first initiative. Regardless of whether cloud computing makes sense in a particular situation, agencies must keep in mind that cloud services will become the benchmark for how federal oversight organizations will assess the cost and quality of services provided by agency IT organizations.
- Although cost is a primary reason for choosing cloud services, the biggest benefits might instead come from the built-in elasticity and scalability provided, according to Gartner Inc., Stamford, Conn. As more IT functions, such as email, are commoditized, large organizations will see the value of providing such services via a cloud solution. Gartner also predicts that hybrid cloud services will grow in importance, as will organizational requirements that will force providers to strengthen security and governance features.
- Forrester Research predicts public and private sector organizations will see greater flexibility in the licensing of cloud services. "In 2012, we will see ... capital expenditure (capex) and operational expenditure (opex) licensing models, upfront payments, financing, subscriptions, flat-rate- and dynamic-usage-based pricing, and outcome-based pricing for all the different deployment options — on-site and in the cloud," said Holger Kisker, a Forrester Research analyst.

# Fostering Links Between Cloud Services and Client Virtualization

Client virtualization is fast-becoming a natural complement to public sector cloud computing initiatives, due to the potential for agencies to lower costs, and centralize the management of applications and services delivered to users nearly anywhere in the world.

That's why this concept of cloud-based client virtualization is taking hold as an attractive option for government agencies and departments looking to realize the benefits of virtual desktops without taking on the challenge of building customized infrastructures. Customers are starting to deploy client virtualization in preparation of being able to take advantage of cloud-based client services as they emerge into mainstream services. "By investigating such services, early adopters are finding they can avoid large investments in servers and data centers, along with the staff required to run IT operations," said Paul Schaapman, a solutions architect specializing in virtualization for CDW-G.

No matter whether government organizations leverage a private cloud platform inside the firewall, or a public cloud service provided by a third-party supplier, Schaapman maintains they stand to gain enormous benefit from investing in client virtualization as a stepping stone to cloud-based operations.

Recognizing the natural compatibility of cloud computing and client devices, a number of manufacturers are already designing 'Cloud PCs,' and some are even starting to deliver desktops as a service (DaaS). Cloud PC devices are designed and built so that the main software components — operating systems, applications and data — all reside in a cloud. Cloud PCs deliver processing power, graphics capabilities and network connections to access software delivered from a cloud, but they typically don't include hard disks for local storage. At the same time, DaaS providers can

deliver a fully functioning virtual desktop in a cloud-based service. IDC is forecasting the virtual client computing market will top \$3.2 billion by 2014 as more organizations start to adopt this concept of cloud-based client virtualization.

## Challenges and Futures

So far, the software available for users is still somewhat limited compared to the advanced features and capabilities available to users on typical Microsoft Office platforms. And the major suppliers, for the most part, have yet to enter the cloud-based client virtualization area.

In the coming year, it's likely government entities involved in data center consolidation will start to transition from traditional IT infrastructures to cloud-based services. Many will also examine cloud-based delivery of client applications and services. This type of solution would allow government organizations to address growing mobility requirements for employees and other authorized users who want to access government resources from nearly any location, using a wide assortment of handheld and desktop devices.

The combination of clouds and virtualized desktops delivers an entirely new option for government organizations seeking a low-cost way to achieve the overarching goals of client virtualization. These emerging services may help them to effectively 'right-size' all of the resources users need to work efficiently and economically.

CDW-G offers the expertise, tools and services to assist government organizations exploring all available cloud-based client

virtualization alternatives. CDW-G can help agencies through the process, from understanding requirements to picking the right solution to match those requirements, to pilot-testing a solution that will help each organization to meet stringent security requirements, all while managing an increasingly mobile workforce and simultaneously lowering IT costs.

## What Customers Gain

Some of the key benefits that could be derived from cloud-based client virtualization include:

- Integrated, consolidated application delivery and data management for all users accessing government resources.
- Stronger security through centralized control and management of all client resources.
- The ability to dynamically provision IT resources for users no matter where those users are working.
- A reduction in hard-to-predict capital expenses, which are replaced by regularly scheduled service charges that can be readily budgeted for, at predetermined rates.
- The potential to increase productivity and eliminate downtime for end users due to system crashes, viruses or component upgrades.

To learn more about the options available, please visit: [www.cdwg.com/federal](http://www.cdwg.com/federal).

