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Veritas: Public Sector Cloud/Hybrid Cloud

With responsibility for protecting and promoting the public good on the line, public sector IT is no place for experimentation, making it no surprise that municipalities, state, and federal government have been deliberately slow to adopt cloud computing.

THE PRAGMATIC REALITY OF CLOUD

Popular advertising exhorting everyone to move “To the Cloud!!” has potentially disserved the public by giving the impression that cloud is a singular resource from which all information and services may be obtained.

There is no one single entity that can be referred to as “the Cloud.” It can be argued that the entire internet is considered to be a cloud because it’s so large and complex that it’s impossible to document, but the reality is that cloud computing consists of many facilities that deliver specific services over the internet. Most people simply call these facilities “data centers.”

Most businesses and public agencies have no driving desire to be in the business of operating their own data centers. Even companies that develop software solutions are no longer running their own data centers. Cloud-based development platforms offer them far more flexibility and agility, and enhanced ability to support team development activities. Many organizations are leaving behind the infrastructure and focusing instead on more effectively managing information.

CLOUDS DEFINED

Early in the development of business data centers, some network managers noted that some of the services they were producing for their own corporation from their own on-premise data center could just as easily be produced in a separate data center. Not only that, but the same service could be produced for a large number of different corporations using the same infrastructure if it were located in an independent data center. This would allow them to deliver a better, more focused service and, owing to the economies of scale created by producing the service for a much larger consumer group, they could actually charge each customer less to deliver better service.

This gave rise to, and is truly the definition of cloud services. Services that can be provided more productively from a professionally managed remote data center and delivered at much lower cost thanks to economies of scale.

When you choose to use a cloud service, you're simply choosing the data center which you feel will provide the best specific service at the most acceptable price to replace a service you're currently producing yourself, probably at higher cost and lower quality.

PUBLIC VS. PRIVATE CLOUDS: TAKING THE HYPE OUT OF HYBRID

Many seem to speak of "hybrid" cloud solutions as if they are spun magic. When we define our terms it becomes very apparent that just about everything is hybrid to some extent, and will continue to be so for the foreseeable future.

Public Cloud services can also be referred to as Software-as-a-Service (SaaS) and if you've ever purchased anything online, played an online game, or used any kind of online service you've been using Public Cloud. It's simply software applications run at a remote "cloud" data center that users can use in a browser across the internet. Most states use public cloud to enable citizens to apply for a driver's license, pay their taxes, or access other governmental services.

Private Cloud is meant for use by one organization to run their internal operations. It may interface to other systems, but access is limited to internal personnel for the most part. The actual data center and infrastructure may be external to the company, or may be located within the company, but there are several operation advantages that distinguish private cloud from simple internal servers. As defined by the [National Institute for Standards and Technology \(NIST\)](#), these are:

On-demand self-service. A consumer can unilaterally provision computing capa-

bilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider.

Broad network access. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, tablets, laptops, and workstations).

Resource pooling. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, and network bandwidth.

Rapid elasticity. Capabilities can be elastically provisioned and released, in some cases automatically, to scale rapidly outward and inward commensurate with demand. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be appropriated in any quantity at any time.

Measured service. Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported, providing

transparency for both the provider and consumer of the utilized service.

A very simple, pragmatic definition of “hybrid cloud solution” combines public cloud services with private cloud services, and often with remaining on-premise solutions. When you stop to think about it, it’s difficult to think of an environment in which this is not the case. Most organizations today are making use of SaaS-delivered services, most have private cloud servers at work, and most still maintain some services on their own premises.

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THE TRICK

The public and private cloud services come from a variety of different data centers. Each data center has its own standards, its own protocols, and its own operating specifications. And they all differ from each other.

The trick, then, is in orchestrating all of these data centers to work well together to deliver highly sustainable, highly reliable consistent quality services.

CLOUD SERVICES ARE PART OF AN IT SOLUTION - NOT A SOLUTION UNTO THEMSELVES

Another important thing to remember is that anyone who is advising you to “move to the cloud” is overstating their case. Very few if any companies or organizations will benefit from the operating disruption that would likely result from such a major transition performed all at once. Most have sound fiduciary reasons that they cannot make such moves without carefully proving them out. It’s simply not a sound strategy.

Better to consider cloud-delivered services as alternatives for the way you are currently doing things. Carefully compare the current on-premises solution to the cloud-service under consideration. Seek ways in which the new approach might provide a higher service level, and ways in which operating costs might be reduced. If you can’t find these readily, you may not want to move to this particular service at this time.

CAN CLOUD BE TRUSTED?

Since the cloud usually requires that data be transported and stored outside the user’s own premises, it was originally thought that the data would be less secure in a cloud solution. That perception has been completely reversed as it became apparent that cloud service providers (CSP) invest far more significantly in security than any individual company or organization could or would.

PUBLIC SECTOR: WHY CLOUD?

Recognizing the importance of making productive use of data, organizations choose to move various functions to “cloud” data centers for a variety of reasons, including:

Agility: Rapid deployment of needed new functionalities.

Time is everyone’s greatest enemy. It’s the one thing we all get the same amount of, and we all want more. The faster we can move from an idea to an operational solution, the faster we can be generating results. Because cloud offers shared resources that can be quickly requested and just as quickly released, many organizations have enjoyed dramatically improved time-to-market with new systems.

Elasticity. With constrained budgets almost the rule, governmental organizations appreciate any environment in which you only pay for what you use, and

you can stop using cloud resources as quickly as you start.

Best-of-Breed. When all of your services come from your own IT department, you are to some degree being held hostage by your own IT department. When you can pick and choose different services from competing cloud vendors you can assemble solutions that incorporate the best-of-breed in each category. With the right systems in place to effectively orchestrate them, you can create your own ideal solution.

Tiered Storage. It is a common error to think that “storage is storage.” Today there are many choices from simple disk to disk arrays to solid-state “flash” storage and more. Using very expensive fast-access storage to keep seldom-used data makes no financial sense. Nor does storing current transactional data on inexpensive disk drives. Tiered storage puts all the data in the most appropriate places based on cost and criticality. Especially in a cloud environment where data may be stored in several physical locations, careful planning of data backup is critical.

Cost-Effective Disaster Recovery. Take the cost of your entire data center and double it. That is the barrel most organizations used to look down when thinking about how to provide effective disaster recovery for their data and systems. Today cloud gives us the option of creating a complete replica of our data continuously in a virtual storage cloud. Instead of taking days to recover data from backup, failover from the cloud can happen almost instantaneously. This has helped redefine continuity of operations

and recovery from system outages.

Enablement of Mobility. Cloud communications and mobile applications have made it possible for whole workforces to operate without ever visiting a central location. Work has truly become an activity rather than a destination. Today’s smartphone user can convey visual as well as textual information, and communicate effortlessly with almost anyone anywhere.

Reduce Operating Overhead by Sharing Resources. When talking about “data silos” most are thinking about how departments can’t share data, and that is certainly a challenge. Financial managers also see the incredible duplication of physical assets engendered in maintaining multiple data silos. Cloud concentrates all resources into a single shared pool which costs far less to obtain, maintain, and upgrade.

PUBLIC SECTOR: CLOUD VALUE PROPOSITION

Public sector managers feel a strong sense of duty to make the most of their budgets, so if you don’t have to buy something, you don’t buy it.

Cloud Computing has been very successful in the private sector because the value proposition of receiving better services at lower cost is far too compelling to pass up. This is undeniably the case for the public sector as well. Primary concerns include:

Cost Reduction. Because each of the services are produced and managed in a dedicated data center by professionals, the quality of service delivered is higher. Because one infrastructure is used to serve many customers, the spread cost per user is far lower. Higher quality at lower cost. That’s a holy grail.

Accountability. HP co-founder William

Hewlett first told us that, “You cannot manage what you cannot measure.” Each cloud data center is closely monitored. With proper monitoring and management any anomaly or failure can readily be traced back to its source for resolution. Every provider is easily held accountable for their particular operations.

Privacy and Security. When data is always encrypted, whether in transit or at rest in storage, only those possessing the decryption key can use the data. This is why there has never been an actual reported case of data leakage in a multi-tenant cloud server.

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Cloud Service Providers spend far more on data and network security than any single organization ever would. Also, it is still reported that approximately 80% of data exploits come from within an organization. Migrating these data assets to the cloud renders them external to those nefarious internal users who would corrupt or steal them.

Compliance. Keeping their own house in order, public sector organizations must always maintain full compliance with all applicable regulatory acts. Cloud operators are fully familiar with these requirements and prepared to consistently and constantly fulfill them.

Continuity of Operations and other protections from Disaster. Virtual servers and storage in the cloud have

made effective operational continuity and disaster recovery truly affordable for the first time.

FOCUS NOT ON THE INFRASTRUCTURE, BUT ON THE INFORMATION!

Infrastructure is the bottle, and data is the wine. It's all about the data, the information that drives action and results. Those moving most or all IT operations to the cloud recognize that and prefer to focus on the data and how to best derive value from it.

When you look at information management this way, you no longer break it down to individual infrastructure operations. You simply see services. The most effective way to assure consistent operations is to focus on keeping entire services working at peak efficiency.

PUBLIC SECTOR: CLOUD CHALLENGES

No discussion of cloud computing for the public sector would be complete without alerting readers to the key challenges they will want to pay special attention to.

The Core & the Edge of the Network.

It used to be the case that there was just one network core, one data center in which all the servers, storage and other central infrastructure resided. The edge consisted of the internal network that connected all the users.

In the cloud, there are multiple cores at multiple data centers and the entire internet is the edge. That's a lot more to manage.

Orchestration. The key to successfully managing multiple cores and a global edge lies in careful orchestration of all of the selected cloud data centers' services. This is at the heart of the changing nature of systems integration - making diverse clouds work well together.

Visibility. If Hewlett is right, we'll need to be able to measure all the cores and the edge to be able to manage them. Comprehensive, effective network monitoring and management is mandatory.

Data Security. Using encryption to protect data in motion, and at rest in storage must be your primary strategy. If decryption keys are effectively managed and protected, the result will be highly secure data.

Governance. The biggest challenge will always come from the least predictable element, the network segment that exists between the keyboard and the back of the chair – users. Establish comprehen-

sive information governance policies and enforce them constantly and consistently.

CONFIDENT CLOUD COMPUTING FOR THE PUBLIC SECTOR

As with so many things, the key to success in confidently using cloud computing in the public sector lies primarily in the selection process. Choose providers who adhere to standards, are committed to working in concert with other cloud service providers, and who demonstrate sound business sense. Select the right tools to properly orchestrate, manage, and keep a close eye on everything. Inspect what you expect and cloud will help you drive greater results at lower cost for years to come. ■