Cloud Brokering:
An Intuitive Perspective

Background

Government managers are increasingly recognizing that many of their information technology services can be treated as a commodity. Advances in Cloud technologies provide the ability to dynamically increase or decrease capacity to match usage needs that enable the leveraging of shared infrastructure. The result is a compelling business model that realizes significant economies of scale by pooling computing resources. The cloud computing model can significantly help agencies grappling with the need to provide highly reliable, innovative services quickly in spite of the resource constraints they all face.

The private sector has taken advantage of cloud technologies to improve resource utilization, increase service responsiveness, and accrue meaningful benefits in efficiency, agility, and innovation. Cloud service providers are continually expanding their available offerings to include the entire traditional IT stack of hardware and software infrastructure, middleware platforms, application system components, software services, and turnkey applications.

The Federal Government, through programs like GSA's FEDRAMP and Agency led procurements has rapidly provided access to a myriad of cloud computing providers. These advancements now change the question from "What is cloud?" to "When and where will I acquire my cloud?"
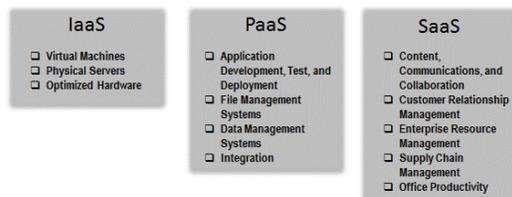
Cloud Service Models

Cloud computing is characterized into three service models that define the roles and responsibilities of the consumer and provider. NIST defines the cloud services models as:

- *Infrastructure as a Service (IaaS)*— The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources.

- *Platform as a Service (PaaS)*—The capability provided to the consumer is the ability to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider.

- *Software as a Service (SaaS)*—The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser.

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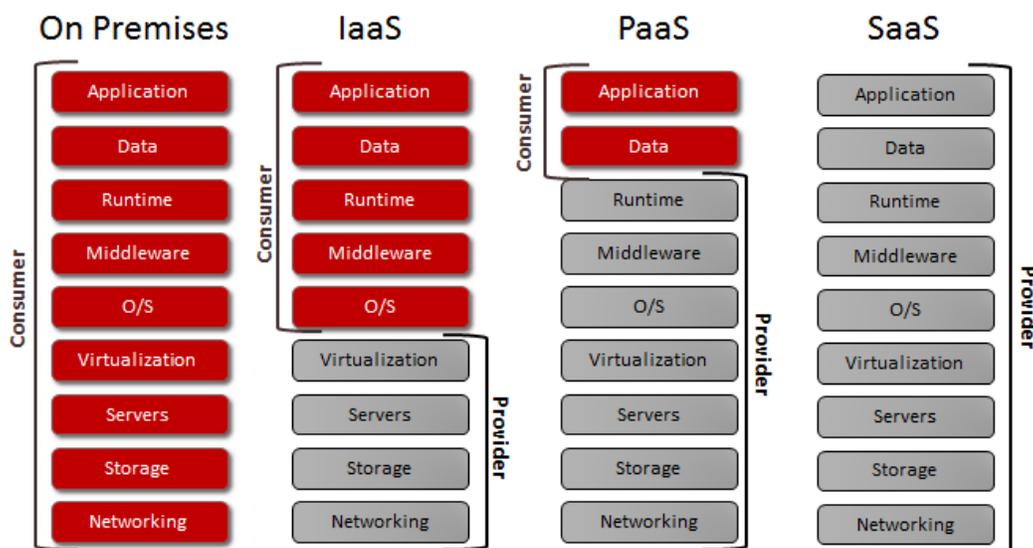
Cloud Offerings

The Cloud Service models provide building blocks to that can be configured to meet the mission needs of the Government. The cloud offerings range from pooled computing resources that are dynamically provisioned on demand to development and test environments or a complete solution offering. Understanding the service models and offerings enable the Government consumer to assess their needs and resources to determine what functions/activities are candidates for outsourcing to a cloud provider.

| IaaS	PaaS	SaaS
❑ Virtual Machines ❑ Physical Servers ❑ Optimized Hardware	❑ Application Development, Test, and Deployment ❑ File Management Systems ❑ Data Management Systems ❑ Integration	❑ Content, Communications, and Collaboration ❑ Customer Relationship Management ❑ Enterprise Resource Management ❑ Supply Chain Management ❑ Office Productivity

Some notable success stories have been the move to SaaS offering of email and office productivity. The advances in webmail and web based applications have commoditized those activities to a degree that they are low risk decisions. As Government consumers mature their understanding on how to best leverage cloud technologies, the exploitation of virtualization technologies offered in the IaaS will enable additional efficiencies and economies of scale.

The PaaS model is where Government consumers will be able to exploit the cloud in direct support of their respective missions. The ability to develop, test and deploy applications with horizontal cloud scalability will be a major paradigm shift.

Provider Considerations

There are a myriad of permutations of cloud offerings with varying degrees of complexity. NIST has developed an initial Cloud Reference Model that can be used as a resource to evaluate cloud providers and their offerings.
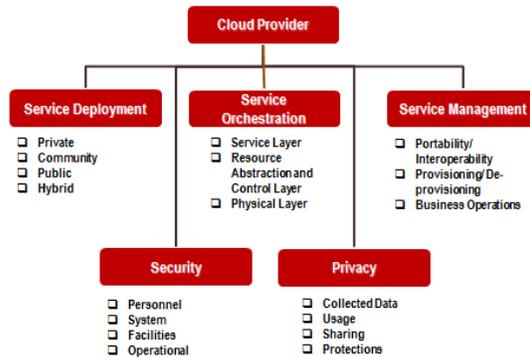
Conclusion

Cloud computing offers the Government a incredible resource to improve resource utilization, increase service responsiveness, and accrue meaningful benefits in efficiency, agility, and innovation. By understanding the service models, roles, offerings and attributes, Government Managers can make informed strategic solutions that will advance their respective Agency's missions.

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