

State of Utah Strategy for Cloud Computing

"The future you see is the future you get"

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Cloud Definition

- * Cloud computing is “a model for enabling convenient, on- demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”---NIST

Business Problems

- ✦ What is Cloud Computing and Why Should I Care?
 - ✦ IT Complexity
 - ✦ Extended Time to Benefit
 - ✦ CAPEX
 - ✦ OPEX
 - ✦ Dependencies
 - ✦ Updates

Perspective

- * Cloud environments are best viewed from a user perspective as opposed to more complex internal customer-technology perspectives. A cloud environment has to provide advantages to the owners and users of the resource.

Utah Cloud Characteristics

- * Located off-site in State data centers, or offered through third-party service providers
- * Solution-based and solution-packaged, meaning that all supporting elements for a given cloud solution are bundled and managed by the service provider
- * Accessed via the Internet, with a Web browser as its primary user interface, while offering its main system interfaces via Web services APIs
- * Require minimal user IT skills to order and implement

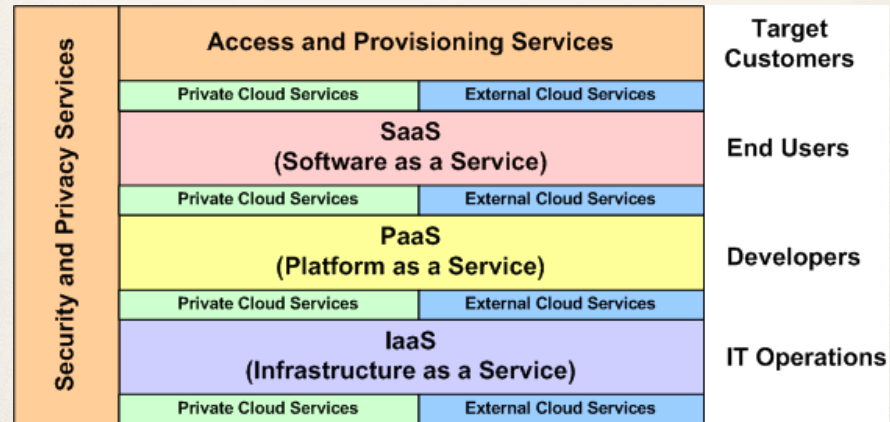
Utah Cloud Characteristics

- * Available in a way that supports self-provisioning and self-service requesting,
- * Provide 24/7 availability for order placement and near real-time deployment
- * Offer dynamic and fine-grained scalability
- * Offer pricing options which also are fine-grained, based on usage
- * Use shared resources and common versions (one-to-many), with any customization (which should be minimal) built around the shared services.

Vision

- ✦ It is the desire of the State to develop a Cloud environment that leverages internally-hosted services with specialized access and security requirements, with public services that add to or replace existing State infrastructure services.
- ✦ The State provides a capability cloud model with service implementations that are transparent to the end user. Services must be easily provisioned, cost effective, and secure.

State Cloud Services Stack



Cloud Services Components

- * **Access and Provisioning Services** provide identity and access services, service provisioning, service level specification, and monitoring and billing services to end user customers.
- * **Security and Privacy Services** are provided at appropriate levels in both private and external cloud environments consistent with risk and legal requirements such as HIPAA.
- * **Software as a Service (SaaS)** is a model of software deployment where DTS, the service provider, provides an application to customers for use as a service on demand. Services may be hosted internally or externally.

Cloud Services Components

- * **Platform as a service (PaaS)** is the delivery of a computing platform and solution stack as a service.
- * **Infrastructure as a Service (IaaS)** is the delivery of computer infrastructure (typically a platform-virtualization environment) as a service.

Provisioning in the Cloud

- * Platforms must support elasticity of demand
- * Leverage a usable Web interface
- * Automate as much as possible
- * Product focus and categorization
- * Keep it simple to meet the needs of a diverse client structure

Timeline and Results

- * January 2009 - Initiated Data Center Consolidation Project
- * April 2009 - Established Cloud Based Tool Standards
- * September 2009 - Developed the Hybrid Cloud Strategy
- * June 2010 - Completed Phase I of the Data Center Consolidation Project with the Majority of Servers Virtualized
- * July 2010 Cloud Storage Provider Standard

Timeline and Results

- * August 2010 - Policy on Using Mobile Devices to Access Secure State Information
- * August 2010 - Tablet Software and Accessory Guidelines
- * 2011 - Cloud Security Strategy Implementation

Financial Benefits

- * Reduction in operating costs of \$4 million
- * Reduction of 1,686 servers to 510 virtualized servers
- * Reduction in energy use of 11,252,284 kWh per year
- * Reduced time and effort to provision infrastructure and platform services
- * Reduced desktop support costs due to real-time provisioning of cloud-based productivity services

Operational Benefits

- * Real-time server provisioning - reduced time required to provision virtual servers for agencies.
- * Improved security
- * Improved data management
- * Improved capability to implement single sign-on
- * More consistent / standard deployment environment
- * Enterprise testing and quality control

Operational Benefits

- * More resources dedicated to innovation and solution delivery vs. counting and supporting widgets
- * 23 data centers have been completely moved, freeing up floor space and resources in these agencies.
- * Improved connectivity to services; the central data center
- * Improved performance - some applications experienced as much as 2000% gain in performance
- * Faster data access

Challenges

- ✦ Reality versus Perfection (“Best can be the Enemy of Good”)
- ✦ Define practical and capable user centric provisioning processes
- ✦ Requests for customized services
- ✦ Focus on what matters most - Avoid “Boiling the Ocean”
- ✦ Redefining the Architecture
- ✦ Communication and End-to-end Provisioning
- ✦ Approvals and authorizations

Good News

- * Cloud Service options continue to grow - the State can leverage economies of scale outside traditional service offerings
- * Cloud Services no longer require the State to host all services
- * Service Level Agreements are becoming more sophisticated and make quality of service easier to measure objectively.
- * Cloud storage options give small organizations economy of scale and lower costs than may have been possible within the organization.

Good News

- * Cloud service offerings are increasingly platform and operating system independent and support mobile devices
- * Security is becoming better defined, and is based on measurable criteria, rather than FUD, hopes, wishes, and perceptions
- * The time to go from an idea to an implementation is compressing dramatically
- * The Cloud tends to keep technical complexity “Behind the Curtain” from an end user customer perspective
- * Cloud services tend to reduce application personnel dependencies

Conclusions and Questions

- * "Start where you are. Use what you have. Do what you can."
-- Arthur Ashe