Roadmap for IT Organization Transition to Cloud Based Service Delivery

Introduction

Cloud enablement is the natural progression for today's IT organizations required to support agile businesses while reducing TCO. Most organizations have bought into the cost benefits and service delivery benefits of an; elastic and flexible cloud based service delivery model. CIO's now have to focus on effectively transitioning from vision to strategy and finally execution. This paper details the roadmap to a cloud enabled IT organization.

Before getting into the roadmap, let's understand the characteristics and deployment models of Cloud computing. The widely accepted Industry definition and characteristics for the Cloud is the one that National Institute of Standard (NIST') has come up with that "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 have also clearly articulated the essential characteristics, service and deployment models. The characteristic being:

- **On-demand self-service:** A consumer can provision infrastructure capabilities, such as compute, network and storage, as needed automatically without requiring human interaction from the service's provider.

- **Broad network access:** Capabilities are available over the network and accessed through standard mechanisms

- **Resource pooling:** The provider's infrastructure resources are pooled to serve multiple consumers using a shared multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand anyplace in the network. Examples of resources include storage, processing, memory, network, bandwidth, and virtual machines.

- **Rapid elasticity:** Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased 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,

> *The Cloud has different service models and deployment models to choose from pick the right one for your business*
>
> *Service Models*
> - *Software as a Service(SaaS)*
> - *Platform as a Service(PaaS)*
> - *Infrastructure as Service(IaaS)*
>
> *Deployment Models*
> - *Private Cloud*
> - *Public Cloud*
> - *Hybrid Cloud*
> - *Community Cloud*

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.

Cloud computing combines multiple technologies and capabilities with a new business and operational model to create a new service delivery model. For these reasons, adoption of cloud computing carries architectural, financial, process and organizational impacts. In order to enable features and capabilities that support an on demand self service elastic infrastructure, the architecture of the data center has to be adjusted.

New operational processes, best practices, frameworks and risk management solutions must be developed and implemented to match the flexibility of the infrastructure and to avoid the inefficiencies typical to silo IT organizations. Funding models for cloud based services have to change in order to support the resulting agility and to avoid sprawl of unused resources. Last but not least, organizational changes are required to address the blending of infrastructure related expertise (network, compute, storage) and to drive service focus within the organization. Cloud computing enables IT to become a true service provider that efficiently supports the business needs of the organization.

Roadmap to a Cloud

For IT organizations whose strategy involves implementing a cloud, the cloud adoption process must be preceded by various steps as shown in Figure 1.
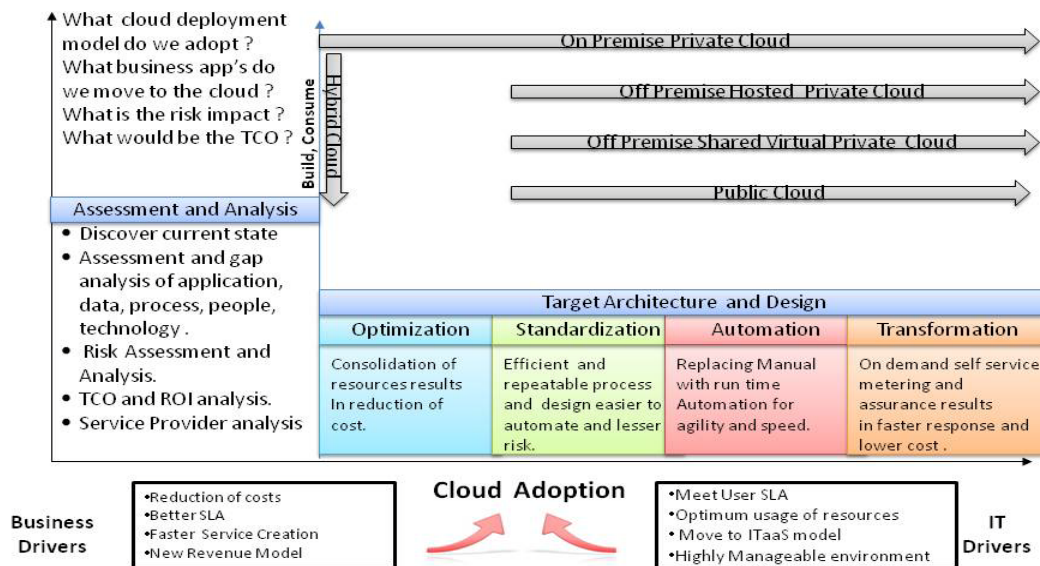

Figure 1: Roadmap to the Cloud

The steps are as follows and we will get into details of each step as we proceed further into the paper:

- ***Assessment and Analysis***: Assess the business needs, assets (application, data), process, technology and risk associated and analyze the gaps. This enables the Enterprise-IT creates a nice matrix of applications that can move to a cloud along with the right choice of cloud

delivery Private (on premise, hosted externally) vs Public (Virtual Private Cloud) vs Hybrid based on Risk/Security.
- _**Architecture and Design**_: Create a architecture and a roadmap based on ROI/TCO calculation based on the analyzed data . This will drive the design for the Enterprise to transform as IT as a Service (ITaaS) provider.
- _**Optimization**_**:** Find ways to optimize the infrastructure and the corresponding process. Things like Virtualization, DC Consolidation etc are part of this step.
- _**Standardization**_**:** This goes hand in hand with the optimization phase. Standardization of software, hardware, tools and process across the board to enable a standardized service offering which lends itself to automation.
- _**Automation and Transformation**_: This is the last step where an IT transform to an ITaaS providers. The key element here is the Service Management Orchestration tools which will enable the on demand self service and expected elasticity of the optimized infrastructure to create the cloud.

For the promises of Cloud to materialize and avoid the pitfalls leading to unsustainable solutions, IT leaders need to take a comprehensive approach towards transitioning the organization to a true service provider operational model. A comprehensive and effective strategy will simultaneously address the technology, process and people aspects of Cloud adoption.

Assessment and Analysis

Full assessment of infrastructure and services including Service Level Agreement (SLA), full profiling of assets (applications, data and dependencies), security risk assessment, regulatory compliance, and complete evaluation of ITSM operational readiness of the organization are the essential first step in benchmarking the environment. The assessment information facilitates mapping the optimal IT services delivery model and the optimal infrastructure to the needs of the business. This mapping is the basis for the successful cloud strategy, identifying the target architecture and defining the roadmap for it.

The analysis step allows the Enterprise IT create a matrix of applications which can migrate to the cloud . Risk analysis provides the right choice of cloud deployment (Private Cloud, Virtual Private Cloud, Public Cloud or Hybrid Cloud). In case of where the Enterprise looks at Public or Hybrid Cloud model a detailed analysis of the Service Provider has to be done and the right partnership signed . In each of the solution a complete ROI/TCO analysis done in each step.

- _Evaluate the risk (business, process, security, & compliance) associated with IT assets._
- _Enabler to evaluate the target service offerings for ITaaS_
- _Evaluate the service providers SLA along with support for regulatory compliance_

Architecture and Design

The assessment and analysis allows the Enterprise to pick the right cloud solution whether they build it in house or consume it from an external provider. Now the architecture team can start creating a reference architecture and design for the implementation which takes into account people, process and technology. The architecture and design will differ based on the cloud solution. The implementation design for an on premise hosted Private Cloud has to cover all the way from Optimization, Standardization, Automation to Transformation while for a Virtual Private Cloud it has to be Standardization and then Transformation.

- *Infrastructure design have to be standardized and repeatable to allow for ease of automation*
- *Process Standardization involves IT Service Management Standards, Frameworks, and Best Practice Convergence*

Optimization

The starting point of any cloud implementation is the infrastructure optimization process. Without this first step, the benefits of cloud will be localized and incomplete. This is particularly evident for a cloud strategy that has a private cloud component.

In general terms, infrastructure optimization means footprint reduction and technology efficiencies and it consists of several components.

- *Choose the right server virtualization solution based on SLA and cost.*
- *Make sure Application SLA are being met in a virtualized environment.*
- *Watch for storage costs when transitioning to a virtualized environment.*
- *Ask the question of Application licensing in a Virtual environment*

- Optimization can involve consolidation of data centers into a smaller number (Inter-site consolidation) of data centers.

- Reduction in the number of servers at a given location (Intra-site) through selecting better suited platforms, decommissioning underutilized platforms.

- Server virtualization technology to reduce the compute footprint.

- Optimize applications by migrating from legacy applications to next generation applications and development platform which can take advantage of the server virtualization and underling elastic characteristics of the cloud.

- Storage optimization using mechanisms like data-de-duplication, thin provisioning, efficient caching and a well defined tiering system.

- Network optimization using IO Consolidation and migration to 10G fabric.

Optimization is performed based on the guidelines generated by the application and service profiling and must be executed within the framework defined by the target architecture.

Standardization

While identified distinctly because it requires dedicated processes and focus, standardization is typically executed in parallel with optimization. The target architecture identified platforms and designs standards for applications, middleware, operating systems, network, compute and storage that will meet the needs of the services. These standards must be enforced throughout the environment in order to end up with an optimal, yet uniform and repeatable, thus easy to manage infrastructure. All acquisition and deployment processes must be changed to ensure consistency in observing the new standards and eliminating the variance developed over years of organic growth.

The front end standardization of the infrastructure must be matched with the back end standardization of the operational processes within the ITIL framework. These processes include everything from service and resources planning, to entitlement and change management, to support and resource utilization reporting. In multi-tenant (internal business units or groups), one of the most challenging processes to be redefined and implemented is the charging model. The successful transition to a cloud enabled IT as a Services (ITaaS) model often times depends more on the new process standards than on enabling technologies. These standards are also the most difficult to define and implement.

Automation and Transformation to ITaaS

With a fine tuned, uniform infrastructure, applications and services clearly mapped to the right resources and supported by set of standardized operational processes, IT leaders are ready to transition their environment to a cloud based delivery model. The last step in this process is the implementation of the tooling that enables the cloud automation. While a technology focused exercise, this step is not trivial in the case of a private cloud.

There are currently no complete, single product or single manufacturer solutions for automating a private cloud. Architects and designers have to select the best mix of tools that will best fit the needs of their private cloud, will integrate with each other in an easy and scalable manner and in the end will be cost effective. The challenges posed by the tools selection, their integration and ongoing support as well as the overall costs of implementation and operation represent one of the biggest challenges to effectively enabling and capturing the value of a private cloud.

Conclusion

Executing this roadmap requires effective project management of a complex, multidimensional effort. It also requires an experienced cross-functional team that combines expertise across all layers of the infrastructure stack: network, compute, storage,

applications. Last but not least the transition to cloud computing will not be either successful or sustainable without combining the technical expertise with extensive process reengineering expertise. Cloud based delivery models hold tremendous promise in terms of delivering more cost effective IT services in predictable and repeatable manner. Without the proper approach however, a cloud implementation effort can become costly, inefficient and lose the financial and operational benefits.

About Nephos6, Inc.

Nephos6 is technology consulting firm that helps businesses find value in disruptive technologies. The company's comprehensive service portfolio covers the spectrum of critical business issues facing enterprises and services providers as they transition to IPv6 and migrate to cloud computing architectures simultaneously. Founded by well known IPv6 domain and cloud computing experts, Nephos6 is headquartered in Raleigh, NC, with presences in Washington DC, and Seattle, WA. For more information, please visit us at www.nephos6.com.

Nephos6, Inc.
P.O. Box 6454
Raleigh, NC 27628
Tel: +1 919.647.4773
Email: contact@nephos6.com