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Case study on Service Oriented Cloud Computing Infrastructure

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Abstract: Today's highly dynamic environment of market is leading enterprises to cost reduction in all operations empowered by effective automation. One of these operations is logistic management. Existing methods do not meet the needs of the multi-product enterprise and that there is a need for a new generation of logistic system that are more efficient and cost effective. This presentation focused on the application of facility location optimization techniques to minimize transportation cost and optimize mode of transportation and associated capacity. In particular, our focus is on describing efforts by industries and academic literature. Future scope of design and development of techniques to optimize logistics decisions using different location problem solving procedure also reported.

Keywords: MIS, ERP, MRP, Cloud Technology

INTRODUCTION

"A Cloud is a type of parallel as well as distributed system consisting of a collection of interconnected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level agreements established through negotiation between the service provider and consumer."

Cloud computing provides a platform for the execution of massive tasks on cloud instead of the execution of tasks on users' Personal Computers, Servers etc. It is very beneficial for small organizations that cannot afford huge investment on their IT sector but at the same time expect maximum benefit from this supporting industry in order to industry in order to survive in today complex competitive business world.

Cloud computing can help such organizations by providing massive computing power, unlimited storage capacity, less maintenance cost, availability of useful web-services etc.

The definition clearly implies that there is a Service Level Agreement (SLA) between the provider and the consumer for getting services from cloud on pay per user basis. Actually Cloud computing offers the three layers of abstraction such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS). SaaS provides different types of applications as a Service for the end user. It includes different useful web-services.

PaaS provides a standard platform for better execution of application with proper exploitation of physical resources using Middleware Services. PaaS includes Database services, Middleware Services etc, in this endeavor we intend to throw light on Software as a service (SaaS).

IaaS provides the infrastructure of cloud consisting of physical resources like CPU, Storage, and Network etc.

Again middleware of PaaS consists of Core Middleware and user level middleware. Ore Middleware provides a set of services including "Admission Controller", "Service Request Examiner Monitoring", "Accounting Billing" etc; whereas the user level middleware provides access point of services as delivered by the Core Middleware. The "Service Request Examiner and Admission Controller" accepts the request after ensuring that there is an availability of resources for carrying out the request. For this, the "Service Request Examiner and Admission Controller" interacts continuously with

"Virtual Machine Monitor" mechanism regarding resource availability; while the "Pricing Mechanism" decides the charges for request service.

The final cost of the request service is fixed by the "Accounting Mechanism", based on the actual usage of resources for the requested service. The role of "Virtual Machine Monitor Mechanism" is to keep track of the availability of Virtual Machines (VM). The "Dispatcher Mechanism" executes the tasks on allocated Virtual Machines, where as the "Service Request Monitor" keeps track of the execution of the service request.

The Virtual Machines execute the job on physical machines, which consist of multiple computing servers, data storage etc. It is observed that performance monitoring of any two application in PaaS is always complex, different and challenging. In the absence of precise knowledge about the availability of resources at any point of time and due to the dynamic resource usage scenario, prediction-based analysis is not possible.

Thus, performance analysis in PaaS must be characterized by dynamic data collection (as performance problems must be identified during run-time), data reduction (as the amount of monitoring data is large), low-cost data capturing (as overhead due to instrumentation and profiling may contribute to the application performance), and adaptability to heterogeneous environment. Just like the day to day utility services such as water, gas, electricity etc are essential for the smooth running of our daily lives; the trend of cloud computing is also to provide different IT resources on demand on a pay per user basis.

The IT resources include different computational web services of different nature like tax calculation web service, weather information web service, shipping status web service etc.

The aim of Cloud computing is to be global and to provide such computational web services to the masses, ranging from the end user that hosts its personal documents on the internet to enterprises outsourcing their entire IT infrastructure to external data centers. In fact, Cloud has given a new approach to make IT a real utility which is global and complete for the end users. The agenda of computational web service of SaaS is to offer simple web methods that computational clients can call to perform application specific computation on their own data.

Web Services are programmable and reusable. They are available anywhere via the internet. Programs built on the basis of this model will run across multiple websites extracting information from each of them and combining and delivering it in a customized form to any device anywhere in the world. The potential of web services is unlimited. For example, a software company may provide a web service to calculate income tax. Any company that wants to calculate income tax can subscribe to this web service. The company offering the service can dynamically update it to accommodate new taxation rates. The subscribers need not to do anything to get the new updates. In future a collection of such web services may replace packaged software. As web services break down the distinction between the internet, standalone applications and computing devices of every kind, they enable business to collaborate and offer an unprecedented range of integrated and customized solutions that enable their customers to act on information at any time, any place and on any device.

OUTLINE

- SOI
- Cloud Computing
- SOI Model
- Cloud Computing Model
- Bringing SOI and Cloud Computing together
- Conclusion

FOCUS AREA

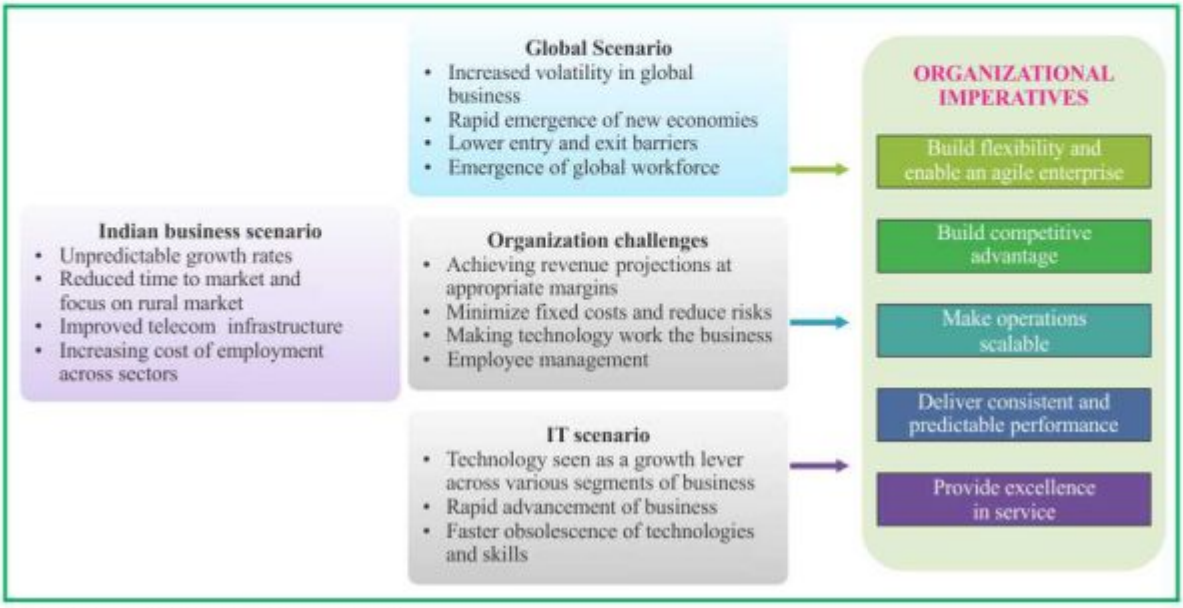
- Security optimization
- "Shared" accreditation
- Validation of customer applications
- Integrating Software as a Service
- Accessing federated and shared services
- Varying interpretations of security guidelines

- Business streamlining

  .Each Service and Agency has unique processes

  .Funding hurdles; Procurement verses Operating
- Enterprise Email
- Host Based Security Solution

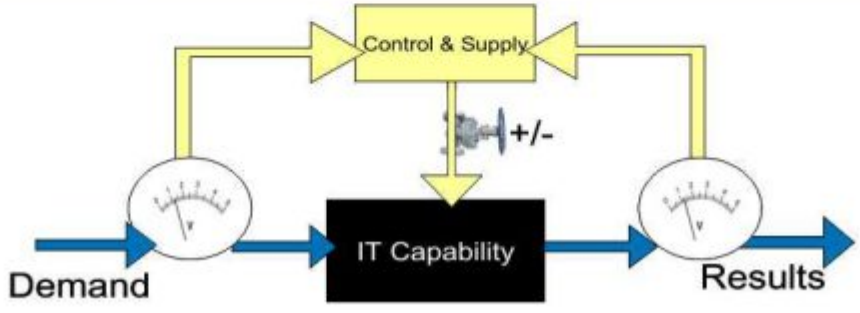
- Back-up & recovery
- Dynamic requirements
- Software acquisition lead time
- Out year capital projection for technology infusion



SOI (Service Oriented Infrastructure)

- Demand Driven Infrastructure
- Service Level Framework

Feature	Description
Demand driven infrastructure	*Using service orientation for theinfrastructure provides a way to definedependencies of higher level business services on the lower-level infrastructureservices, down to the actual physicalresources, such as network appliances,storage and servers.*
Service Level Framework	*Service orientation provides a framework todefine service level objectives and measurethe delivery of those objectives.*
Consume as you need	*Risk moves from the consumer to supplier. Supplier needs to ensure that the requisite infrastructure is in place to meet demand.*



Open Group SOI Team

A Service-Oriented Infrastructure forms an appropriate foundation for a service oriented Application Architecture and can be regarded as a natural part of a service-oriented Enterprise Architecture.

Cloud Computing

IT resources and services that are abstracted from the Underlying infrastructure and provided "On-Demand" and "At Scale" in a multi-tenant environment. A style of computing where massively scalable (and elastic) IT-related capabilities are provided "as a service" to external customers using Internet technologies.

- Universal access
- Scalable Services
- New Application Service Models Feature

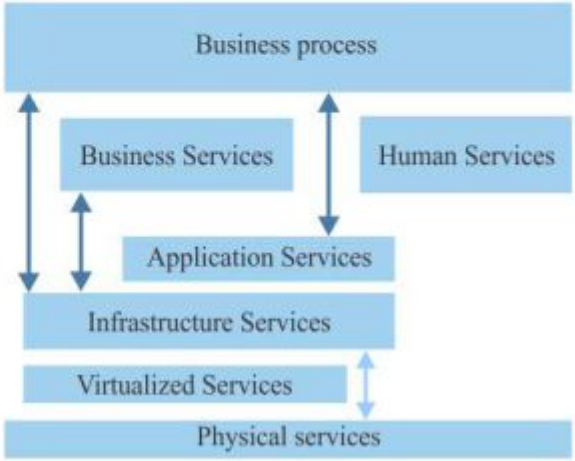
Feature	Description
Universal access	*Cloud Computing's services are ubiquitous – they can beaccessed from workstations and other devices, such as cell phones.*
Scalable Services	*Scale up and scale out. Business Driven Resourcing, Highly scalable, with infrastructure managing the scaling, not applications. Cloud computing allows for elasticity, where capital and operational expenses for resources are only incurred when they are needed.*
New Application ServiceModels	*Supports parallel and persistent services.*

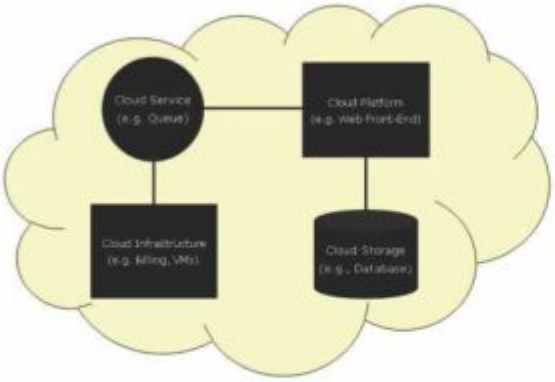
Simple:
Transparent => need to "see" into the cloud Scalable => complexity often limits scalability

Extensible:
New application classes and service classes may require new features Clouds are new => need to extend while retaining useful features

Commodity:
Must leverage extensive catalog of open source software offerings-based New, unstable, and supported infrastructure design is a barrier to uptake, experimentation, and adoption.

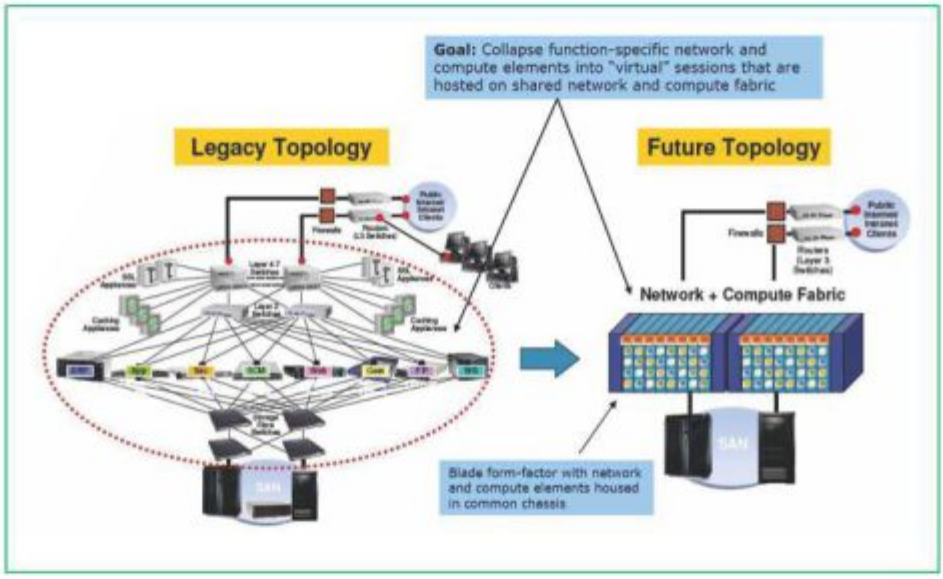
State of SOI Model

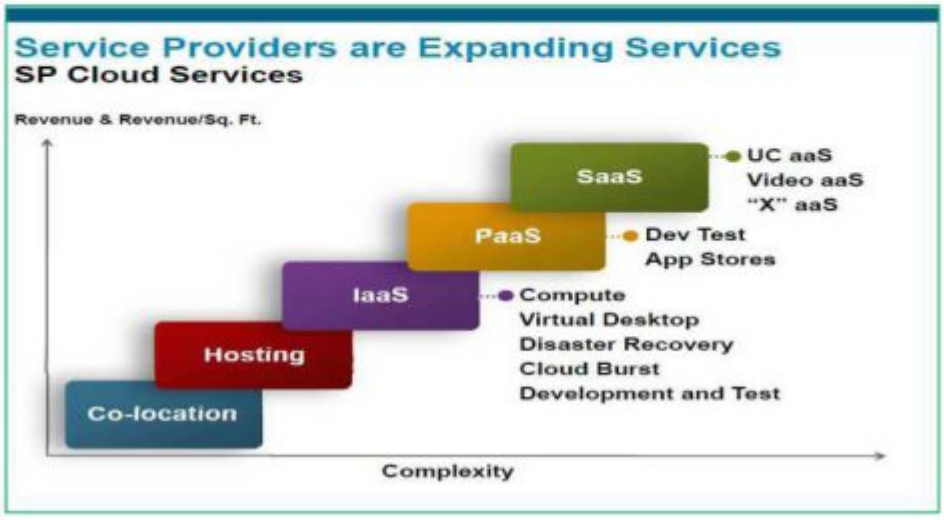


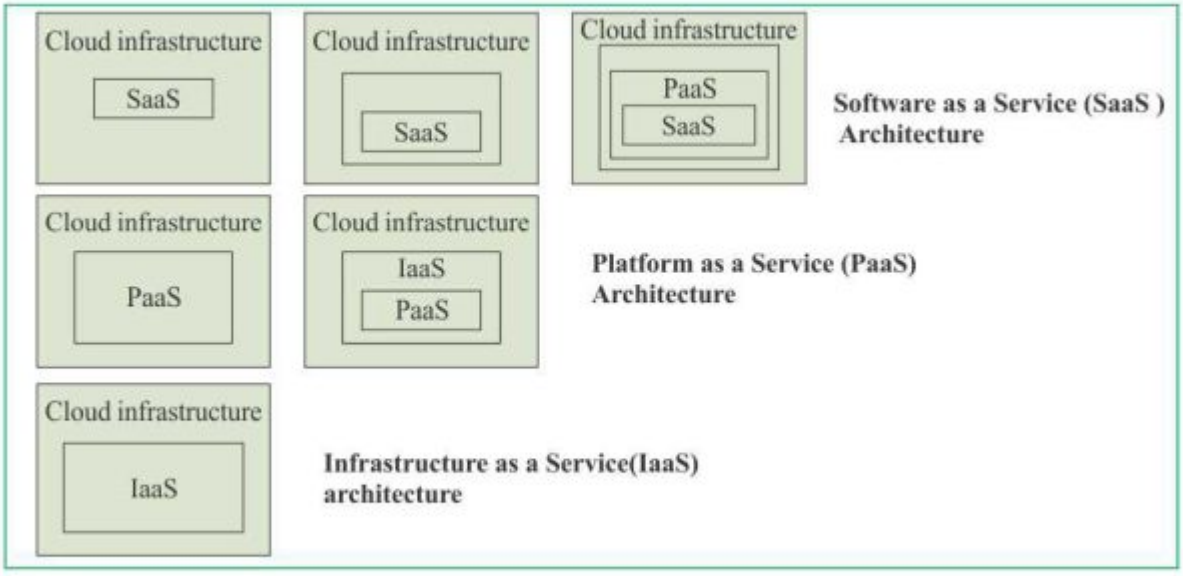


Business Challenges

- Deliver products, solutions & services to organizations to build secure Clouds.
- Enable Service Providers to deliver secure Cloud solutions & services to their customers.
- Advance the market for Cloud by driving technology innovation, open standards and ecosystem development.







Case Study - Cloud Computing in SAP-SCM Mobile Infrastructure (RFID) for Wal-Mart

Problem Statement

- Raising requests for hardware resources
- Delays in Provisioning Hardware
- Ineffective Utilization of Operations Staff
- Central Management of Infrastructure
- Loss of Data / Artifacts
- Tracking of Assets

Analysis Done

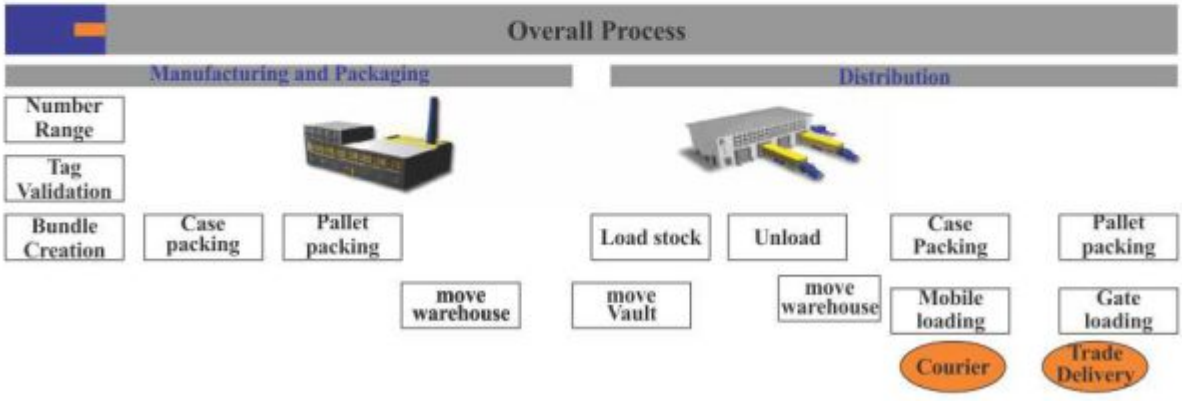
- 80% of h/w resources were for generic compute/storage capacity
- 80% of the support requests were to install / reinstall /update the servers for project with standard software
- Addressing user requests in the event of loss or retrieval of project data

Implementation

- Implemented virtual cloud infrastructure with high-end servers, storage & virtual tape library in 3 locations
- Identification & Implementation of changes in processes for procurement, operations & support
- Preparation of architecture blueprint to address network, security and migration issues
- Roadmap to enhance the services for future needs like High Availability, Dynamic Scalability

Key Outcomes

- Reduced the server provisioning time to a few hours
- Procurement of physical servers reduced by 30%
- Substantial savings expected in Energy consumption
- Ability to support 90 virtual servers hosting both production & development environments.



Inventory turns = Cost of goods sold / average aggregate value of inventory

Average aggregate value of inventory =
(average inventory for an item i) * (unit value item I)

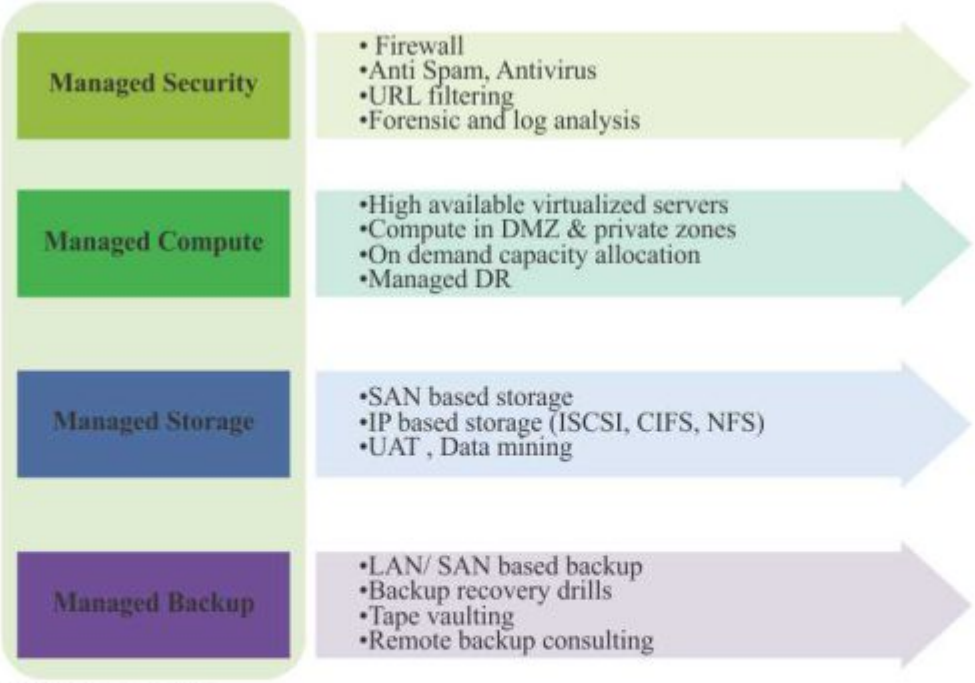
Days of supply =
Average aggregate value of inventory / costs of goods sold/ 365 days

Costs of goods sold=$ 425 million
Production materials and parts = $ 4626000
Work- in – Process = $ 17465000
Finished goods = $ 12322000
Total aggregate value of the inventory (2+3+4) = $ 34416000

Inventory turns =
$ 425000000 / 34416000 = 12.3

Days of supply =
$34416000 / $425000000/365 = 29.5

Infrastructure as a Service – offerings



THE FUTURE WORLD

- SAP-XaaS
- Next-generation Scaling
- Operational Transparency
- Governance and cost control

Synergies	Description
XaaS	Software as a service requires an understanding of the service objectives and the accounting of service use and quality. The underlying reference model for SOI provides the service-oriented framework from which objectives, use and quality can be determined.
Next-generation scaling	Scale up and scale out
Operational Transparency	Cloud computing guarantees certain levels of service to the cloud's customers. When that service degrades, it is necessary to understand therelationship of infrastructure activity to these services so that the situationcan be remediated. SOI provides a framework to determine theserelationships.
Governance and cost control	Pay for use models … Rules based governance

CONCLUSION

• The SOI model enables the provision of infrastructure services that enable the seamless execution of business processes through applications in an integrated fashion within a data center.

• Cloud computing enables the extension of this concept across data centers while leveraging the compute resources to better accommodate the flexible demand in consumption based model.

• At a high level, the SOI model does not change with the advent of Cloud Computing. However, the model can be executed in a more efficient manner realizing significant financial benefits by leveraging the compute resources made available across the extended enterprise by the Cloud Computing paradigm.

A simple idea

User:

- Built a web application
- Using a standard platform
- Using a Standard database
- Upload this application to a cloud provider
- Only pays for what s/he uses when s/he needs it
- Everything else is an implementation detail

- Cloud provider automatically
- Provisions the services
- Scales the application and the database together

Clear Tenets

Application flexibility:

•Standardization
•Increasing " click to run " services
•Live in remote internet data centers
•Scalable to millions

Procurement:

- Efficient
- Rapid
- Commoditized
- "Pay by the slip"

Security:

- Simplified
- Streamlined

Multi faced enablement

Infrastructure
- Consolidation
- Global information grid
- Capacity services
- Virtualization
- Rapid provisioning
- Facility Analysis

Software
- Network centric services
- SaaS
- Forge.mil

Processes
- ITIL
- Security (C&A)
- Computing Service Provider (CSP)

It's A Journey

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