

หลักสูตร e-Government Exchange Program Cloud Implementation Plan II

ผศ.ดร.สุคตงวน งามสุริยโรจน์

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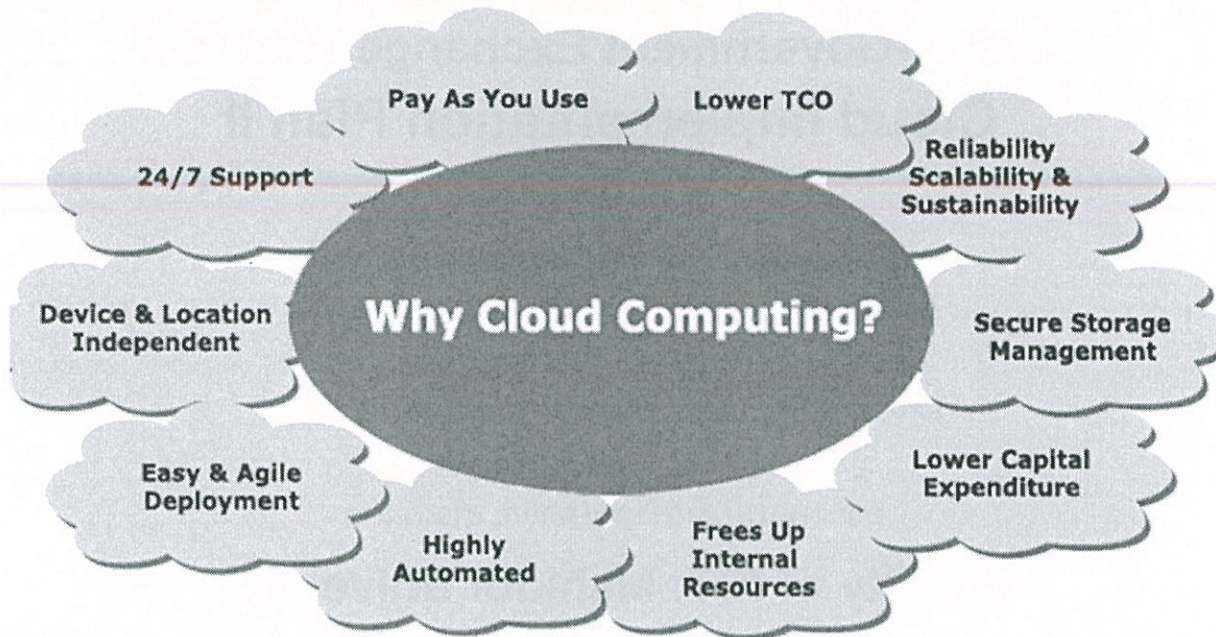
October 3, 2014

Outline

- Cloud Implementation Plan
- Cloud computing readiness
 - Development and Evaluation
- Cloud computing roadmap
- Key IT and Business Transformation
- Change management

Why Cloud Computing?

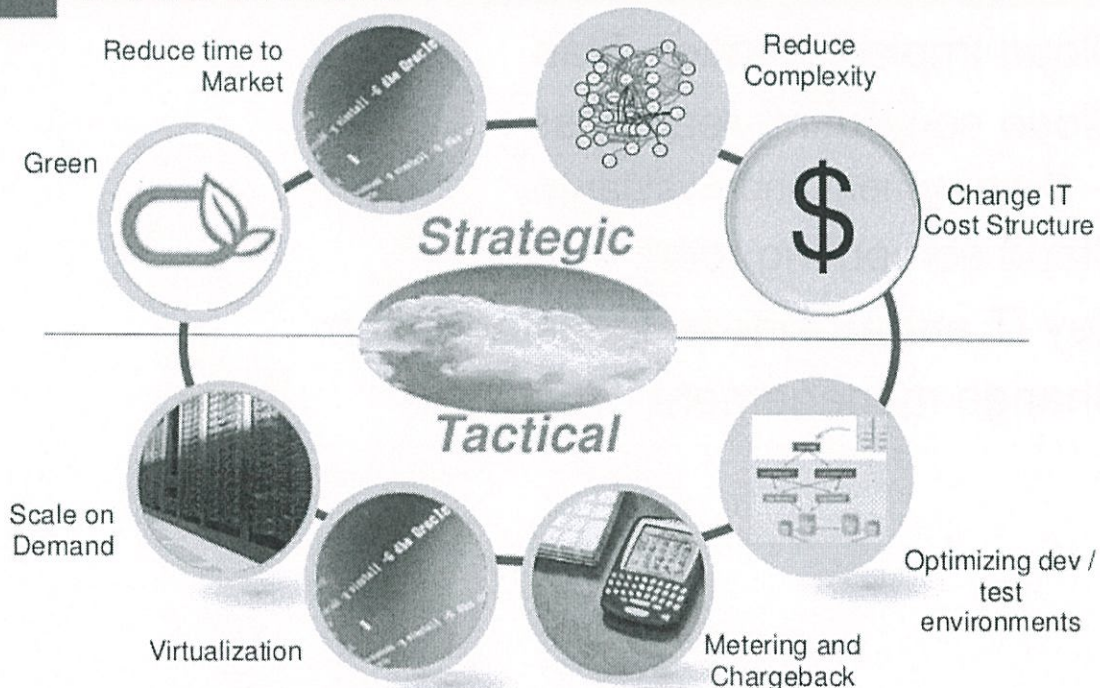
Are you expect all of these?



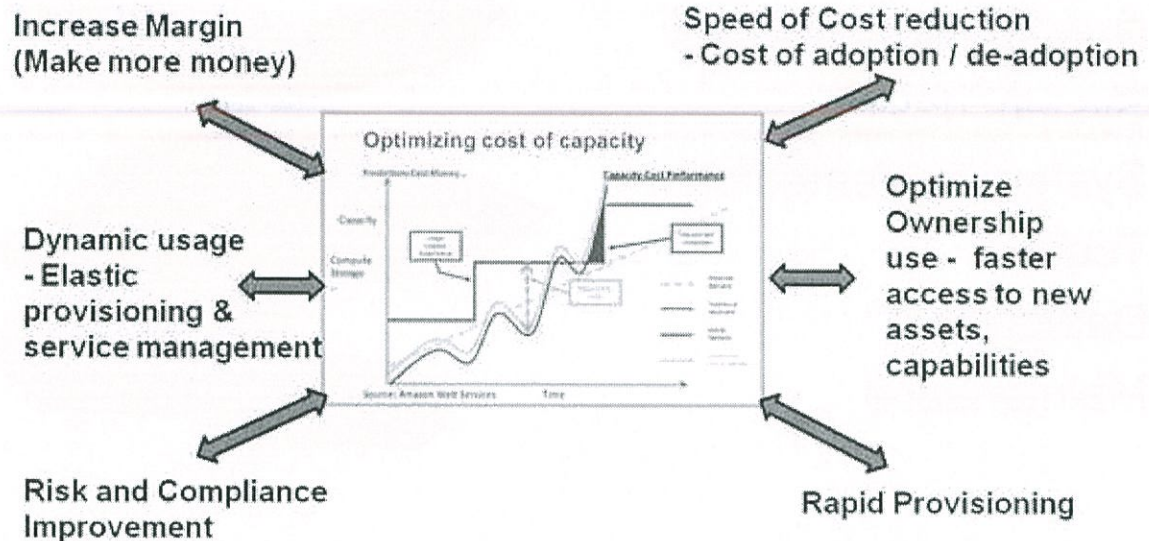
Total cost of ownership (TCO)

Why Cloud Computing?

Cloud Drivers



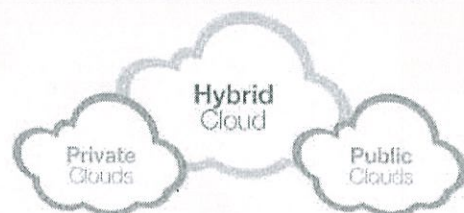
Oracle slides on "Planning a Cloud Implementation"



Cloud Implementation

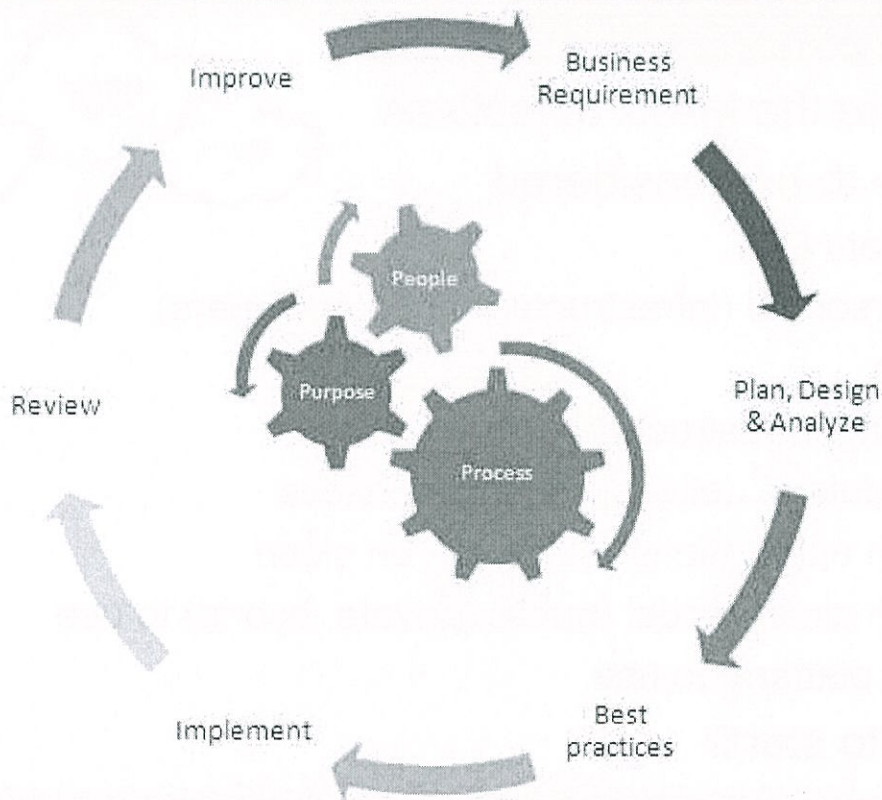
A Big Project

- What are the MAIN objectives
- Factors to be considered
 - Budget / ROI
 - IT personnel (infrastructure and developers)
 - Users
 - Existing infrastructure
 - Schedule to deliver products/services
 - Which applications will be run on cloud
 - Which cloud model (public, private, hybrid) to use
 - What platform to use
- Where to start?



Need Project Management

- Feasibility study
- Requirement analysis
- System design
- System implementation
- Testing
- Deployment
- Maintenance

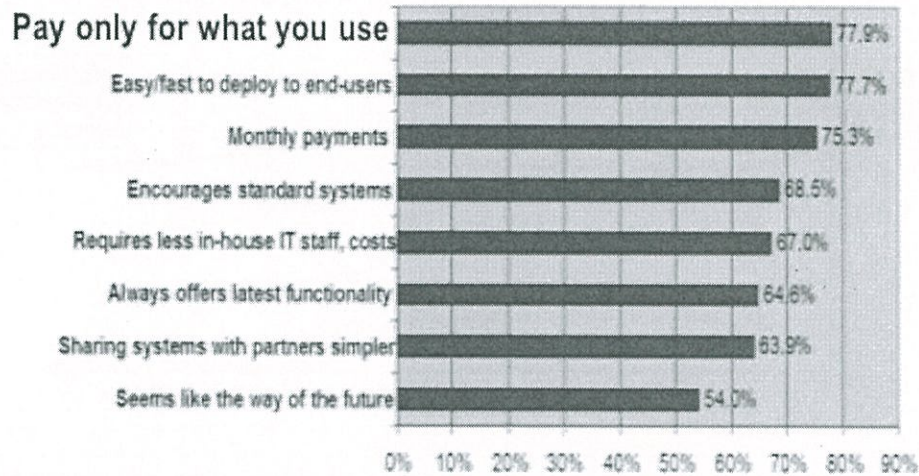


Main Objectives

What specific objectives you are trying to achieve?

- Cost reduction
- Business agility

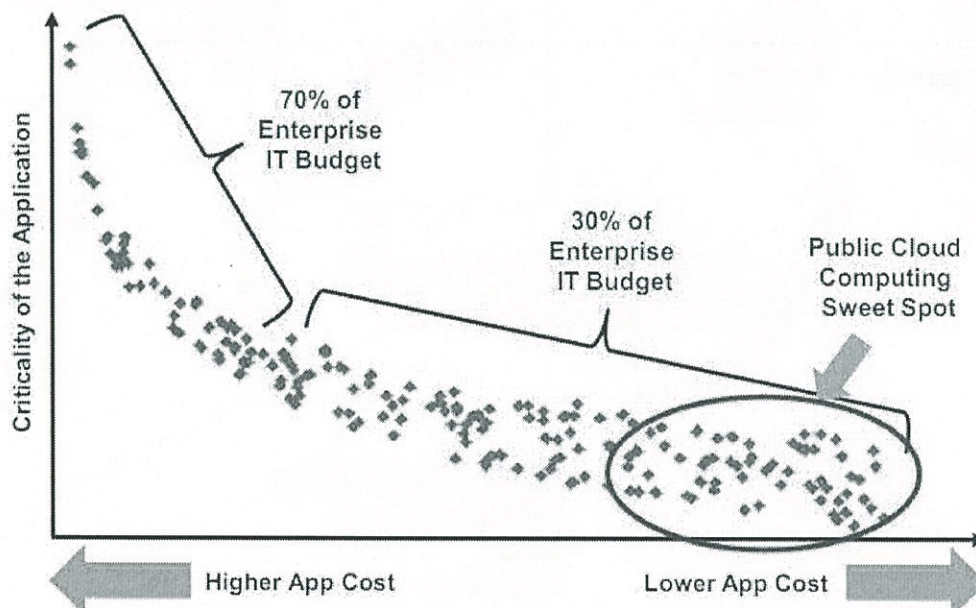
IDC Cloud service survey



Cloud Implementation

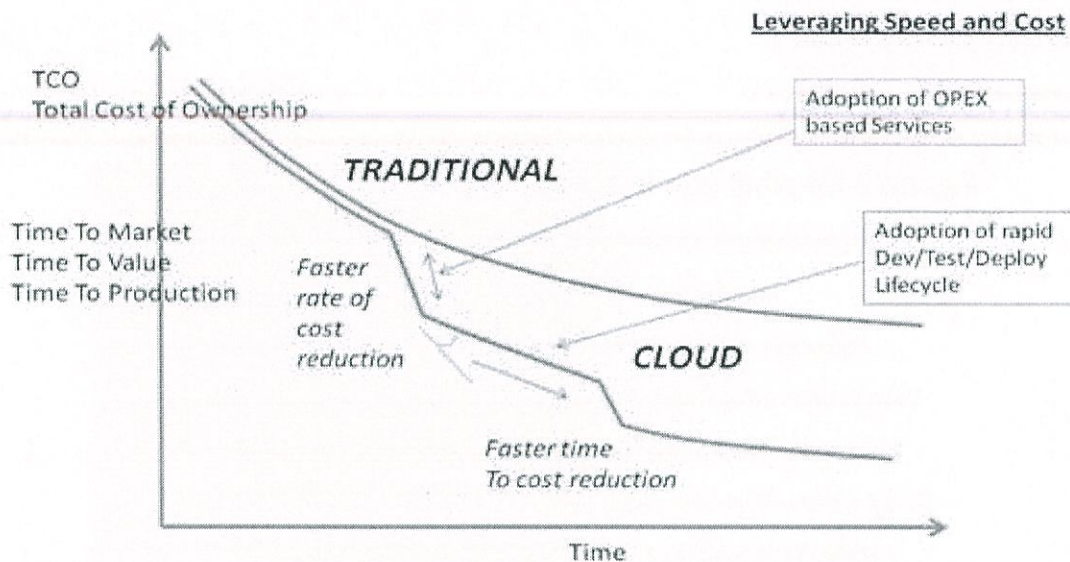
IT Budget

Economics of IT and Cloud Computing



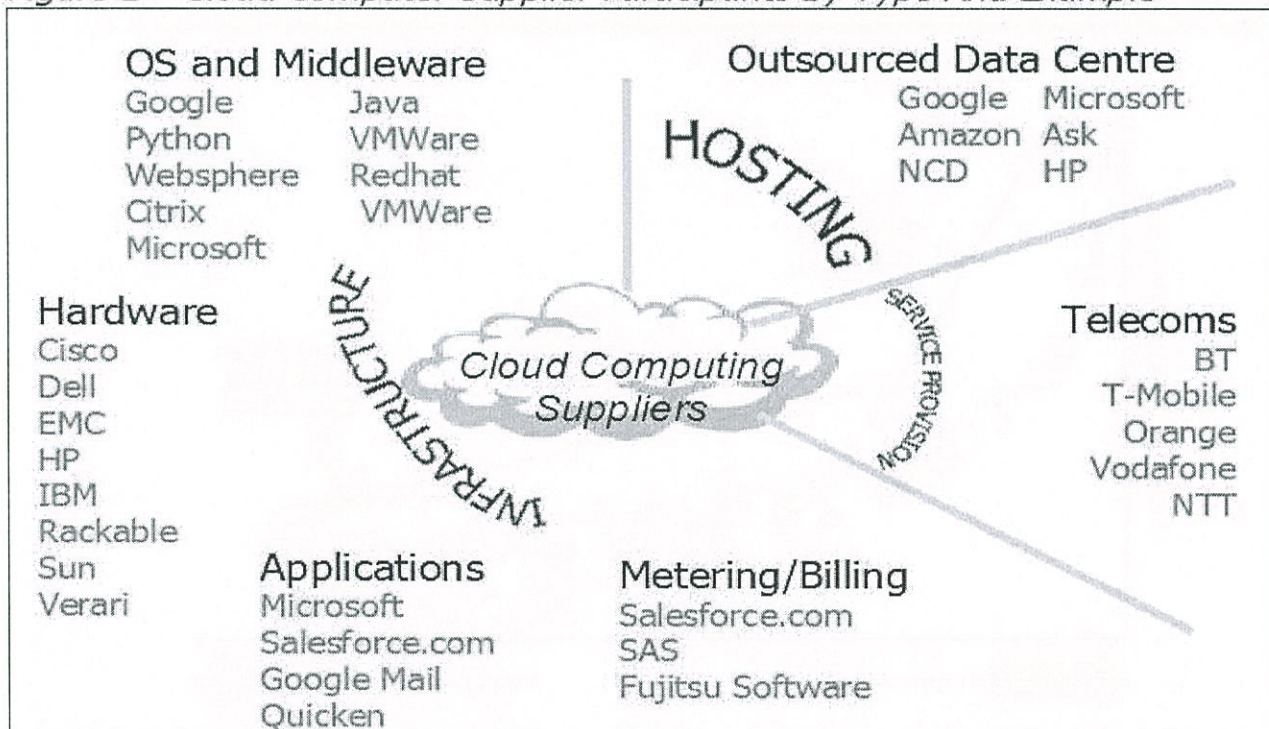
Source: Gartner (October 2012)

Cost Reduction



Cloud Implementation

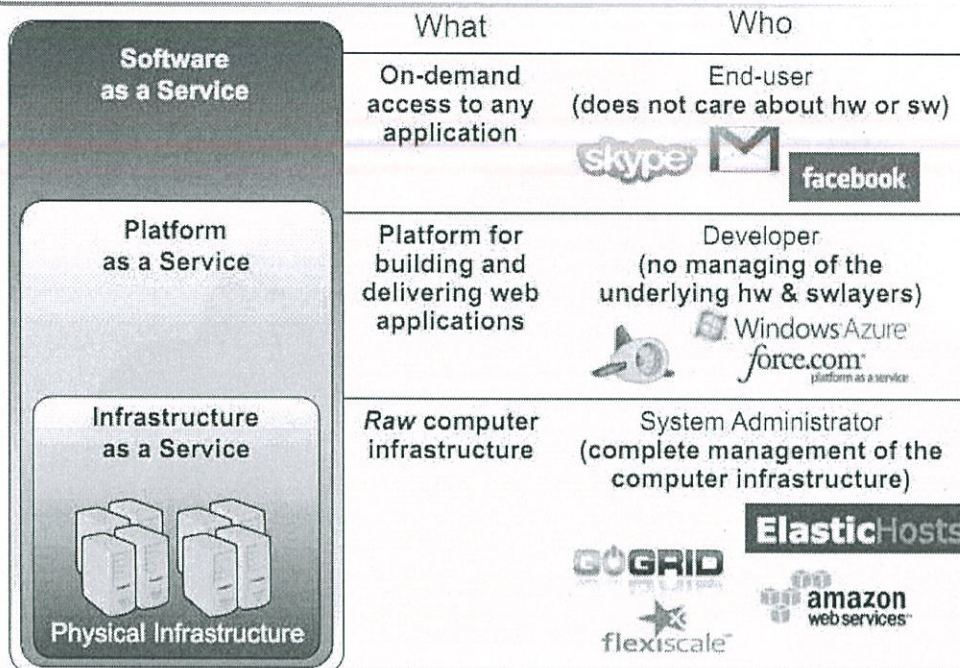
Figure 2 – Cloud Computer Supplier Participants By Type And Example



Source: ITCandor, March 2010

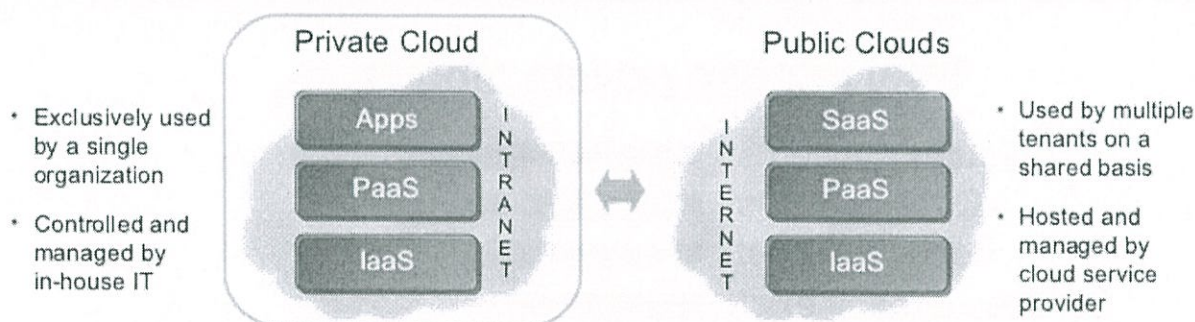
Which cloud platform to use

A Model for Delivering IT Capabilities as a Service



Cloud Implementation

Private vs. Public Cloud



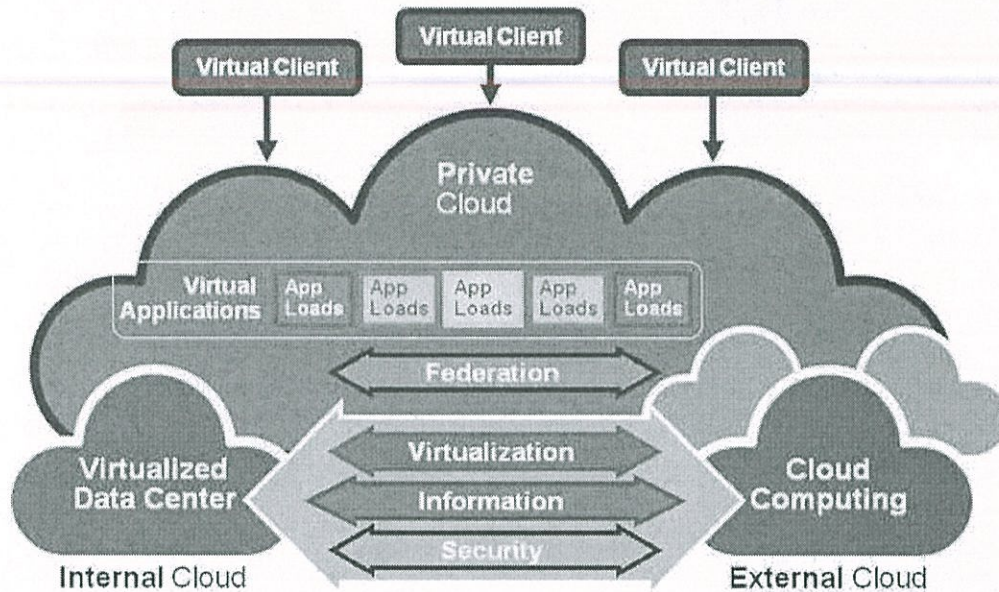
Trade-offs

- | | | |
|------------------------------------------------|---|----------------------------|
| Lower <i>total</i> costs | ↔ | Lower <i>upfront</i> costs |
| Greater control over security, compliance, QoS | ↔ | Outsourced management |
| CapEx & OpEx | ↔ | OpEx |

Enterprises will adopt a mix of private and public clouds

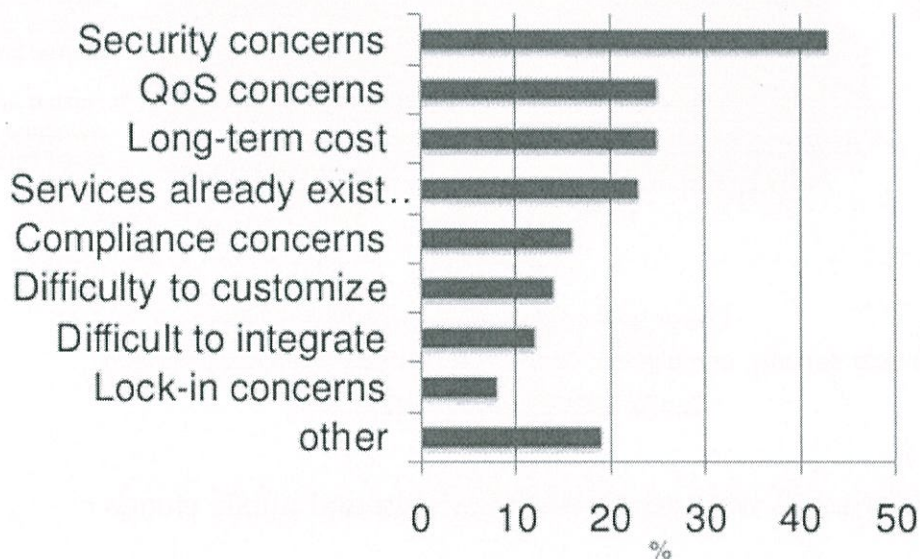
Private Cloud Model

Private Cloud Model



Why choose private cloud?

Why choose private cloud?



Benefits of Private Cloud

Agility	<ul style="list-style-type: none"> • Increase in IT agility to response to business needs/changes
Cost Reduction	<ul style="list-style-type: none"> • Capex Vs Opex
Innovation	<ul style="list-style-type: none"> • Reallocate staff to focus on core and value added services
Self Service	<ul style="list-style-type: none"> • Optimized application LC with service templates and self service portal
Availability	<ul style="list-style-type: none"> • Improve availability and performance with deep application monitoring, diagnosis and remediation
360 Degree View	<ul style="list-style-type: none"> • Centrally integrated cloud management stacks covering Infrastructure and Application layers
Elasticity	<ul style="list-style-type: none"> • Efficient horizontal and vertical scaling as load factors increase









Cloud Implementation

Comparing Different Cloud Models

	Enterprise private cloud	Public cloud	Virtual private cloud sourced by cloud service providers	Hybrid cloud
Demand	Frequent standard test environment needs which run long term	One off or sporadic or diverse test environment needs which run short term	One off or sporadic or diverse test environment needs which run short term	Some of the environment needs run long time, while some are one off and short-term in nature
Infrastructure Availability	Abundant infrastructure availability within organization	Lack of infrastructure availability within organization	Lack of infrastructure availability within organization	Infrastructure availability within organization to meet majority of environment needs
Budgetary Spend	Underutilized infrastructure as per defined threshold, Organization looking to move from CAPEX to OPEX from a environment perspective	Organization looking to move from CAPEX to OPEX from a environment perspective	Organization looking to move from CAPEX to OPEX from a environment perspective	Organization looking to move from CAPEX to OPEX from a environment perspective
Release Calendar	Release calendar of applications accommodating sharing of environments	Release calendar of applications not accommodating sharing of environments	Release calendar of applications not accommodating sharing of environments	Release calendar of some of applications are accommodating for sharing, while some are not

Which applications moved to Cloud

Top services or applications moving to the cloud:*

Small business	Medium business	Large business	Federal govt.
<ol style="list-style-type: none"> Storage (40%) Conferencing & collaboration (37%) Messaging (36%) 	<ol style="list-style-type: none"> Storage (35%) Messaging (33%) Office & productivity suites (32%) 	<ol style="list-style-type: none"> Conferencing & collaboration (40%) Storage/business process apps (35%) Messaging/compute power (34%) 	<ol style="list-style-type: none"> Conferencing & collaboration (39%) Messaging (37%) Business process apps (31%) 
State/local govt.	Healthcare	Higher education	K-12
<ol style="list-style-type: none"> Storage (19%) Conferencing & collaboration (17%) Messaging/business process apps/compute power (15%) 	<ol style="list-style-type: none"> Conferencing & collaboration (29%) Compute power (26%) Office & productivity suites (22%) 	<ol style="list-style-type: none"> Storage (31%) Messaging/conferencing & collaboration (29%) Compute power (25%) 	<ol style="list-style-type: none"> Storage (40%) Conferencing & collaboration (36%) Office & productivity suites (33%) 

*Those who are migrating or have migrated

Which applications moved to Cloud


Sr #	Application Category	Wave / Cluster for Migration	Cloud Adoption Recommendation
1	<ul style="list-style-type: none"> Non-mission critical apps Internal-focused (Apps servicing internal IT or employees) Storage intensive/historical data 	Cluster 1	Migration can begin immediately
2	<ul style="list-style-type: none"> Core business apps Non-revenue generating apps 	Cluster 2	Should begin after Cluster 1
3	<ul style="list-style-type: none"> Decision making apps Revenue generating apps Customer serving 	Cluster 3	This should be the last cluster to move into cloud infrastructure

	Web	Application	Database	Other
Production	5	20	2	
BI	2	2 (20 VMs)	1	
Other		12 (30 VMs)		
Dev/Test	2	2	1	7
Performance Testing (QA)	3	10	2	
Total	12	46 (+50 VMs)	6	7

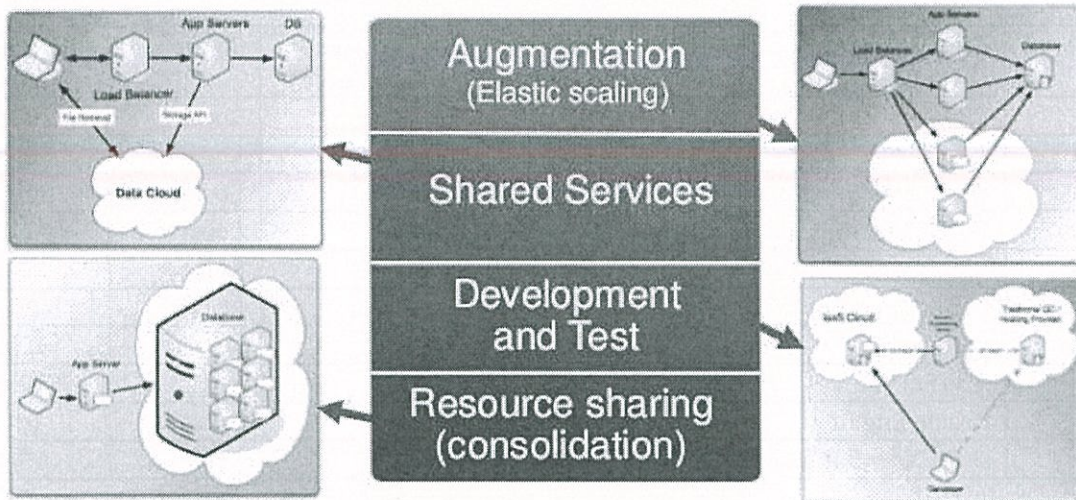
Storage Requirements

Realm	Element	Number of Instances	Storage Size (per instance)	Type	12-month Growth
Dev	Web Server	2	120 GB	Local	0%
Dev	App Server	2	120 GB	Local	0%
Dev	OrderNow Database	1	20 GB	Local	0%
Dev	VSS (operating software)	2	120 GB	Local	0%
Dev	VSS (source files, etc)	Shared	50 GB	SAN	25%
Dev	General (ad hoc)	3	250 GB	Local	0%
QA	Web Server	5	250 GB	Local	10%
QA	App Server	10	120 GB	Local	10%
QA	Oracle Engine	2	120 GB	Local	0%
QA	OrderNow Database	Shared	500 GB	SAN	15%

Profile Applications and Workloads

 <p><i>Suitable for cloud now</i></p> <ul style="list-style-type: none"> Time based Very parallel (i.e. batch) Spiky traffic Capital intensive (especially startup) Proof of Concept Low utilization Less deployment costs High bandwidth costs / high real estate 	<p><i>Not as suitable for cloud</i></p> <ul style="list-style-type: none"> Vertically scaled applications Consistent load levels Latency sensitive applications Insecure applications Hardware device dependent (e.g. fax server, SNA gateway) ISV unsupported Per CPU licensed applications
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Start with Common Use Cases



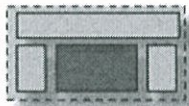
Most enterprises are trying

- Shared development and test environments
- Hardware & Services consolidation

Cloud Implementation

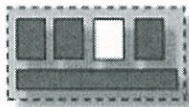
Shared Services – Many Possibilities

Shared Functions



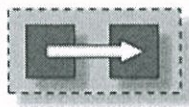
- Sharing Applications across org
- Enabled by SOA, BPM

Java PaaS



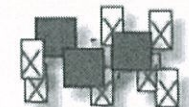
- Build & deploy to common platform
- Enterprise Private Cloud

Shared SOA



- Application services integration

Shared Security



- Centralized authorization for all apps

DBaaS



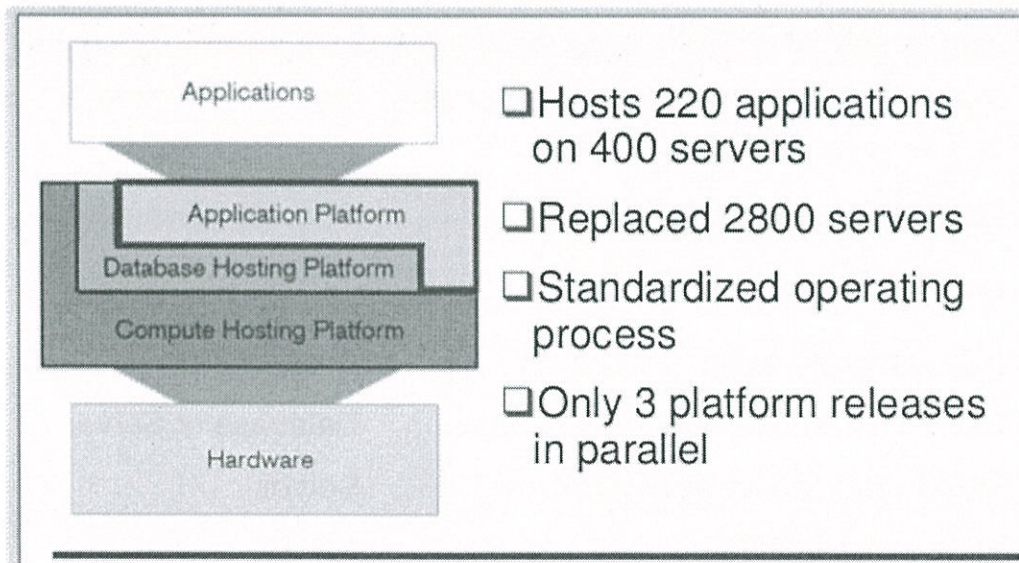
- Rapid access to all enterprise data
- Parallel Processing of Transactions

Sample Business and Consumer Cloud Service Categories

Basic Cloud Apps	Intermediate Cloud Apps	Advanced Cloud Apps
Network Requirements: Download Speed: Up to 750 kbps Upload Speed: Up to 250 kbps Latency: Above 160 ms	Network Requirements: Download Speed: 751-2,500 kbps Upload Speed: 251-1,000 kbps Latency: 159 - 100 ms	Network Requirements: Download Speed: Higher than 2,500 kbps Upload Speed: Higher than 1,000 kbps Latency: Less than 100 ms

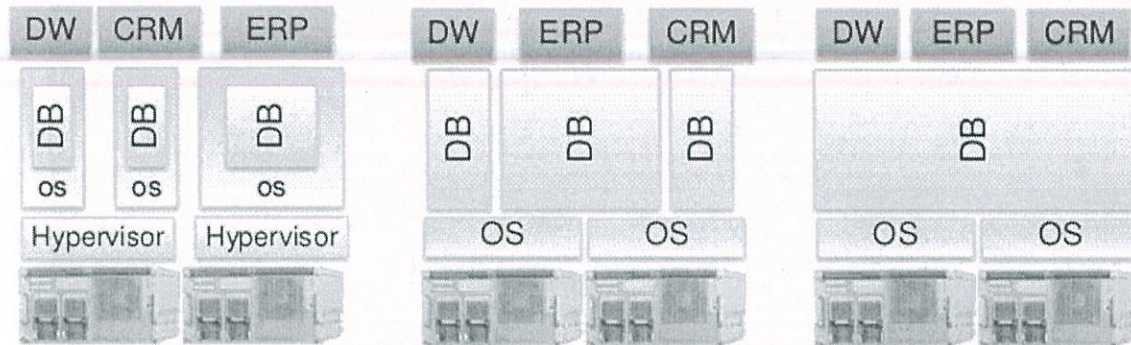
Shared Services – Case study

Credit Suisse



Private Database Cloud

Common Building blocks are shared servers and storage pools

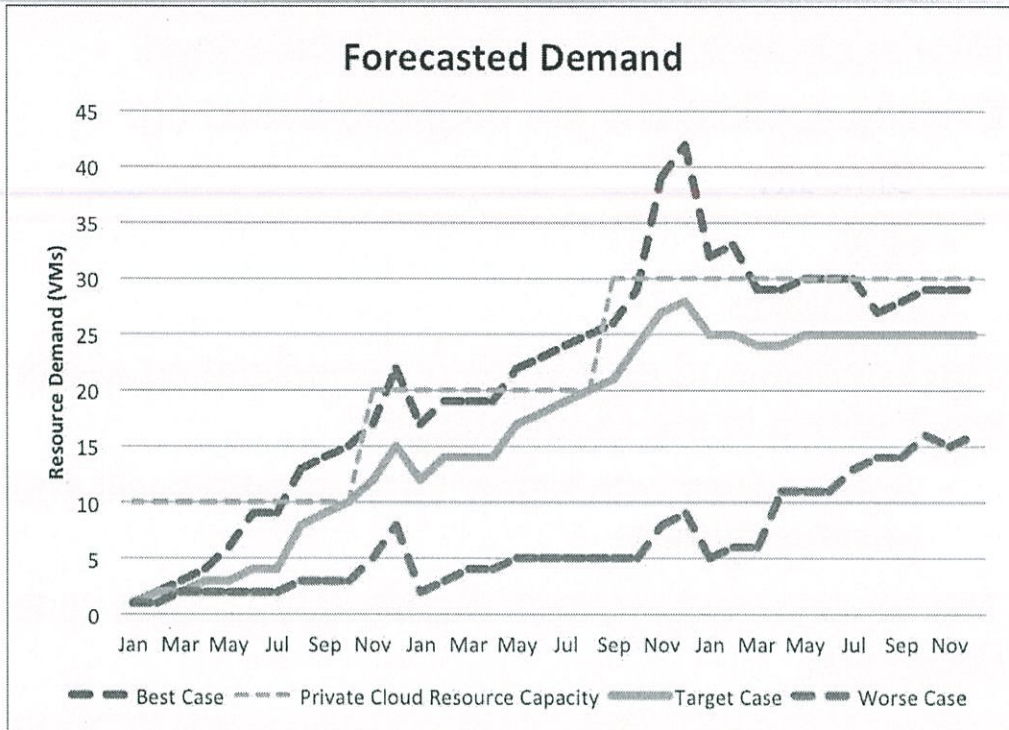


<p>Server</p> <p>Deploy in dedicated VMs</p> <p>Server virtualization</p>	<p>Operating System</p> <p>Share server pool</p> <p>Real Application Clusters</p>	<p>Database</p> <p>Share database instance</p> <p>Real Application Clusters</p>
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Each architecture serves different workloads

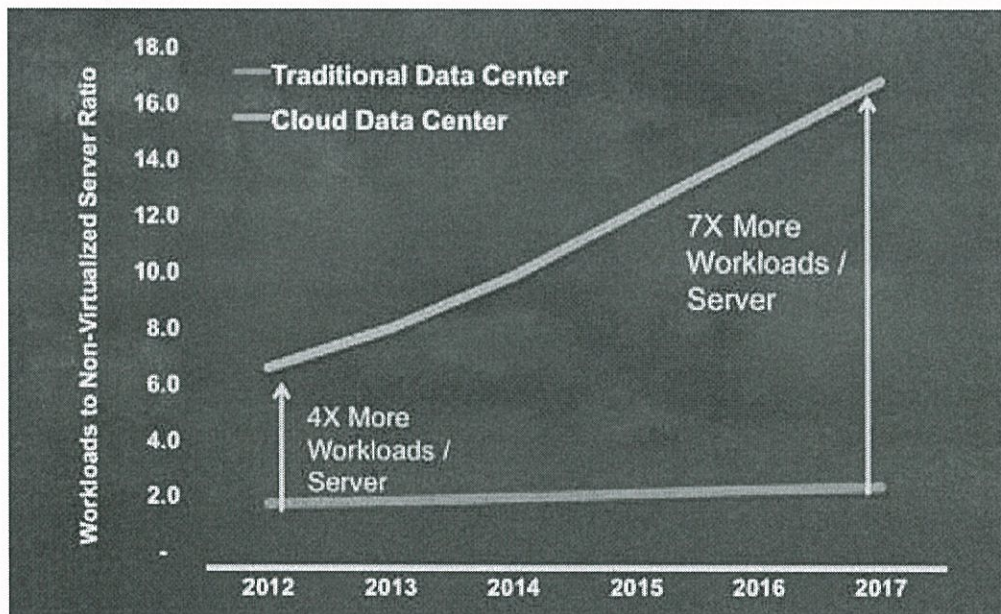
Workload Type	Optimal Cloud Architecture
Mission or Business Critical Deployment	Operating System
Packaged Applications	Operating System
Data Warehouse Applications	Operating System
Standardized environment	Operating System or Database
Internal Applications	Database
Rapid provisioning (i.e. Test and Dev)	Database or Server
Mixed workload consolidation	Server
As-Is consolidation	Server

Workload Forecasted



Cisco Global Cloud Index: Forecast 2012–2017

Workload increasing

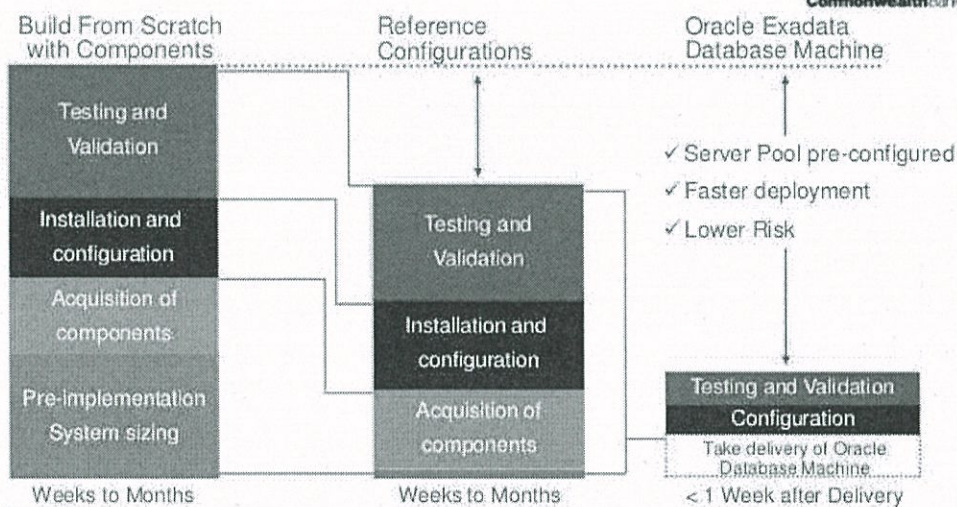


Identification of Application to migrate

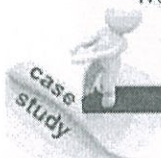
- New applications are deployed to the Cloud
- Existing applications are migrated based on:
 - Difficulty
 - ROI
 - Suitability
- The benefits and difficulties of consolidating existing applications in the Cloud will vary
 - Applications with highly varying peaks will show greatest benefit
- The “lowest hanging fruit” should be migrated to the Cloud first

Cloud Implementation

Build from Scratch vs. Exadata Commonwealth Bank of Australia

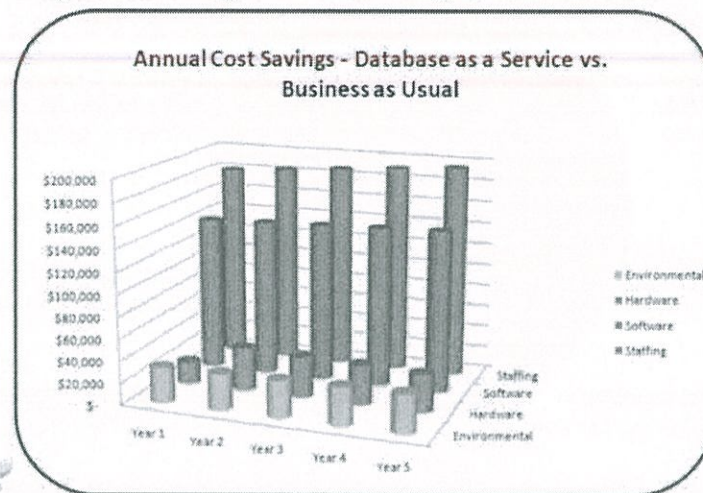


DB deployment time reduced from 3 months to < 1 week



Cloud computing effectiveness

ROI Example – U.S. State Government Major Savings in Staffing & Software



ORACLE

Planning a Cloud Implementation

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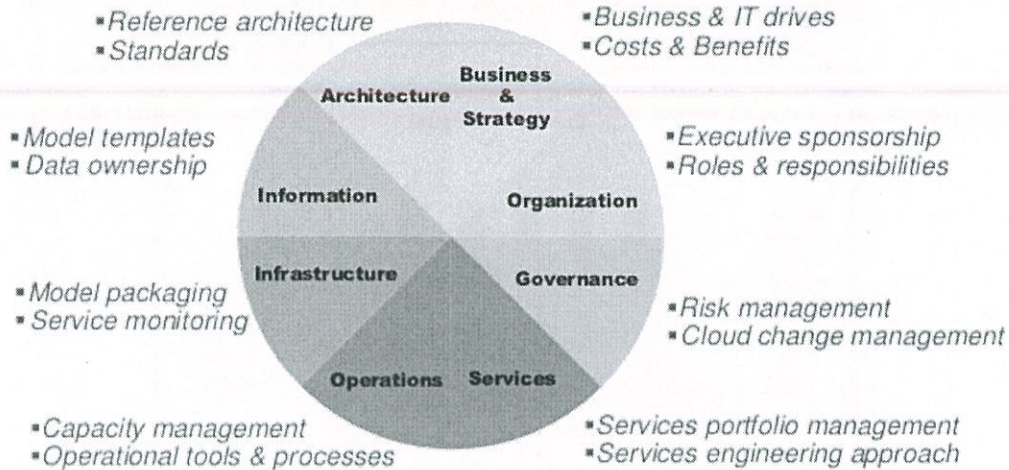
Cloud Computing Readiness

May require diverse business changes

- Consider, for example, IT governance & risk management, information modeling & ownership, operations & service management.
- How are these areas managed today?
 - identified responsibilities, documented processes, etc.
- Do you have a mechanism for assessing capabilities in each area?
- How will you identify needs for changes or improvements to support cloud computing?

Cloud capabilities by Domain

Areas Important to Cloud Readiness



- To succeed at Cloud services adoption, an organization must adequately progress in all the appropriate domains.

Cloud Computing Readiness

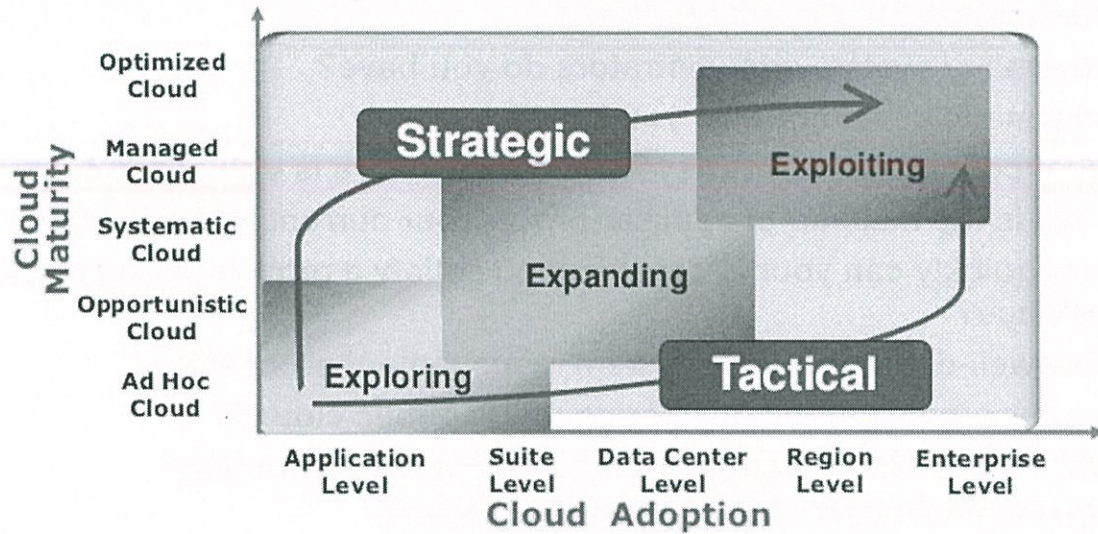
How to introduce your cloud?

Cloud computing efforts range from small 'experiment' projects to major strategic initiatives.

Most companies have multiple projects underway or anticipated.

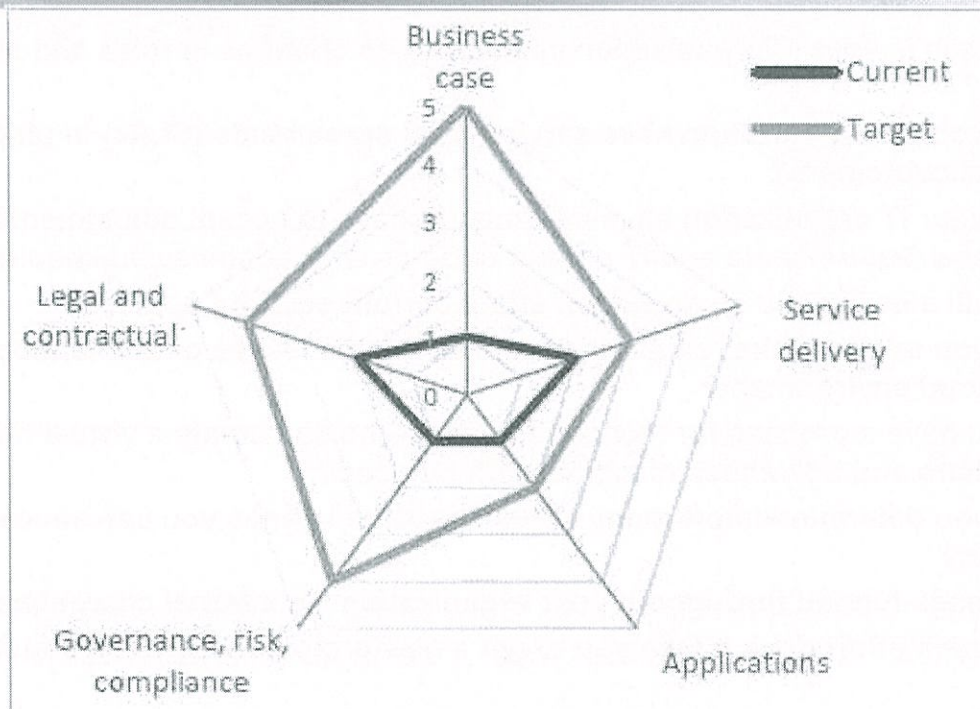
- Separate from the new architecture, is there a plan for how the new model will be rolled out?
 - E.g., by application, by business unit, by geography...
- Is cloud viewed as a limited tactical deployment, major strategic initiative, or both?

Focused Implementation vs. Wide Diffusion



- **Strategic** – Complete migration for a given architecture/application, often focusing on revenue enhancement
- **Tactical** – Wide deployment of a limited technology (e.g. virtualization), often focusing on cost reduction

Example of Readiness Mapping



RedHat Cloud Readiness Evaluation - Questionnaire

1. How many systems do you have?
2. How many system administrators do you have?
3. How many developers do you have?
4. What percentage of your system infrastructure is virtualized?
5. What is the makeup of applications in your current infrastructure?
6. How quickly can your IT organization satisfy a request for a compute instance?
7. How well-defined is your system management process?
8. Is your organization considering using public clouds?
9. What reason is driving your interest in cloud computing?
10. What is your current system infrastructure?
11. How integrated is your IT organization (consider all departments, including networking, database, security, administration, and application teams)?

RedHat Cloud Readiness Evaluation - Questionnaire

12. How agile is your IT organization in adapting to changes in roles and skill needs?
13. Does your IT organization have service-level agreements (SLAs) in place for internal customers?
14. Does your IT organization have a formal process to accept adjustments in business requirements and IT project updates with business stakeholders?
15. How will a new cloud environment affect current security policies?
16. Have you explored the regulatory and compliance issues or implications for a new cloud environment?
17. Do you have a process for identifying users who can create a virtual machine and where and how those machines can be used?
18. Have you determined how many virtual machine images you can successfully support?
19. Is IT usage funded throughout your organization via internal chargebacks?
20. How much effort does it take you to get a new project ready for production?

Red Hat Cloud-Readiness Self-Assessment Result

Technology readiness:

Your IT infrastructure has good potential to gain organizational flexibility and agility by using cloud technology.

Your cloud-readiness score

Organizational readiness	High			
	Medium			■
	Low		●	
		Low	High	
		Technology readiness		

● = Your score ■ = Average score

Organizational readiness:

It looks like you have some significant organizational challenges, and while you're starting to understand there are impacts in moving to the cloud, you could use some guidance formulating your overall strategy.

Cloud Readiness Index Calculation

Cloud Readiness Index (CRI) Calculations (Cloud Importance Divided By Cloud Capabilities)

Cloud Importance

Survey question:

To what degree will the shift to cloud computing influence your company's IT strategy over the next three years?

Response options:

From (1) very little influence to (7) very significant influence.

Cloud Capabilities

Survey question:

Given your company's plans for cloud computing, how would you rate the cloud computing capabilities of <VENDOR> compared to where it needs to be?

Response options:

From (1) far behind where it needs to be to (5) far ahead of where it needs to be

Calculating the Cloud Readiness Index (CRI)

Cloud Importance:
Percentage of 6s and 7s
minus the percentage
of 1s, 2s, and 3s.



Cloud Capabilities:
Percentage of 4s and 5s
minus the percentage
of 1s and 2s.

Key Business/ IT Transformations

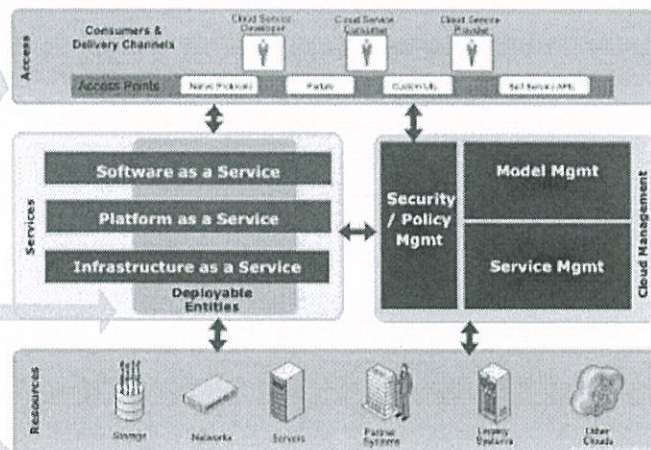
Current Approach	Cloud Approach
IT Architecture designed up front (early binding)	Build out infrastructure up-front, expand later
IT operations developed and performed by the IT department	IT will move to building up-front operational functions for a self-service model.
Systems and application management was specific to select systems and applications	The cloud 'control plane' has to be architected as a general service

Key Considerations – Clouds need new “models”

- **Separation of roles** (e.g., Cloud Provider vs Service Developer)

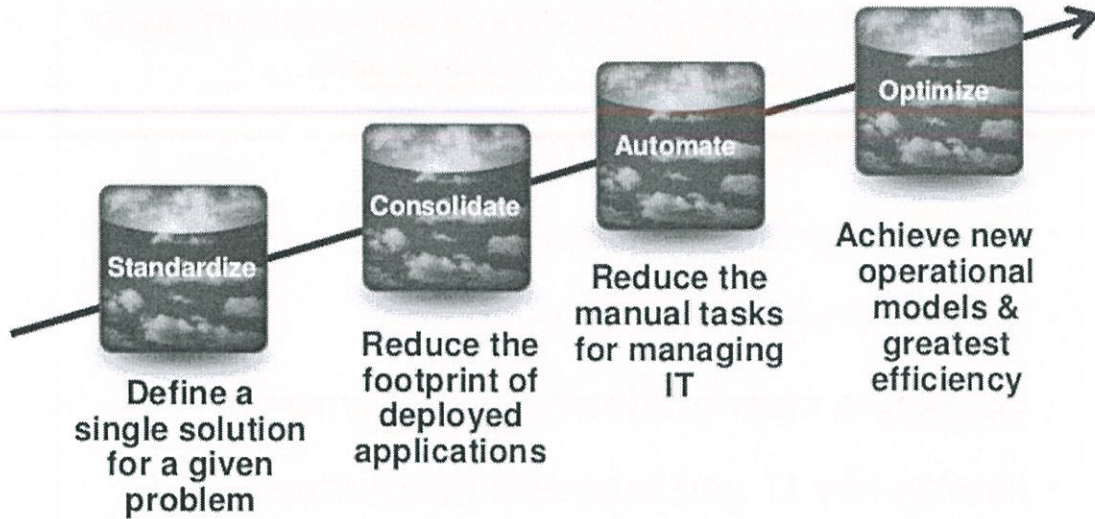
- **Deployable Entities** (aka VDCs) include Service Templates and Service Context (e.g. – OVAB 'Assemblies')

- **Logical resource 'pools'** abstraction of physical resources



Roadmap to Cloud

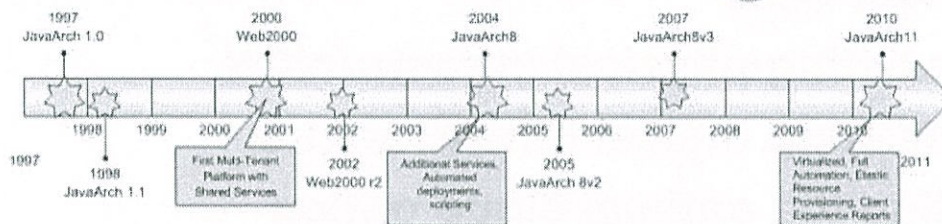
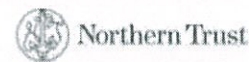
Multi-Dimensional Journey



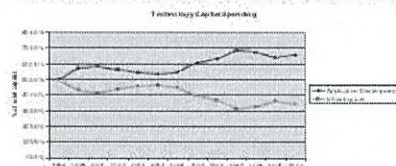
Individual enterprises or applications may join the roadmap at different points

Roadmap to Cloud

Cloud is a Multi-Year Journey Northern Trust PaaS Example



- Each release of an architecture platform evolves into what the industry now calls PaaS
 - JavaArch1.x – Web SSO Security
 - Web2000 – Co-Hosting applications, enterprise logging, templated environment, scripted builds
 - JavaArch8 – Messaging API's, scripted deployments, app metrics, monitoring
 - JavaArch11 – Virtualized, automated creation, on-demand resources, end-to-end experience



PaaS has allowed the business to invest in developing new capabilities rather than Infrastructure



Planning your cloud

- Decide what kind of cloud is under consideration
 - Infrastructure, Platform... , Private, Hybrid....
- Identify measurable benefits
- Use appropriate ROI models
- Evaluate organizational readiness
- Develop a clear roadmap for deployment
- Identify key IT and business transformations

There is no one-size-fits-all approach to adopting cloud computing

Cloud Computing Roadmap

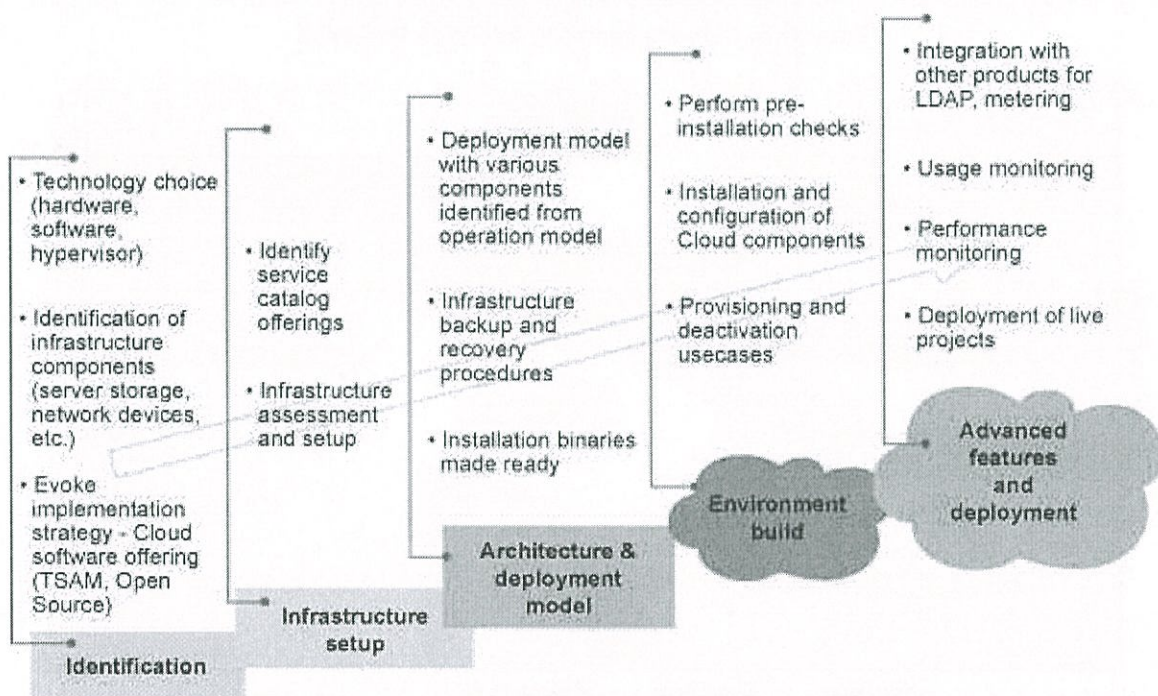
Key Points

- **Your business model and goals**
- **Your user base**
- **Your existing physical infrastructure**
- **Your existing logical infrastructure**
- **Selecting the optimal cloud option**

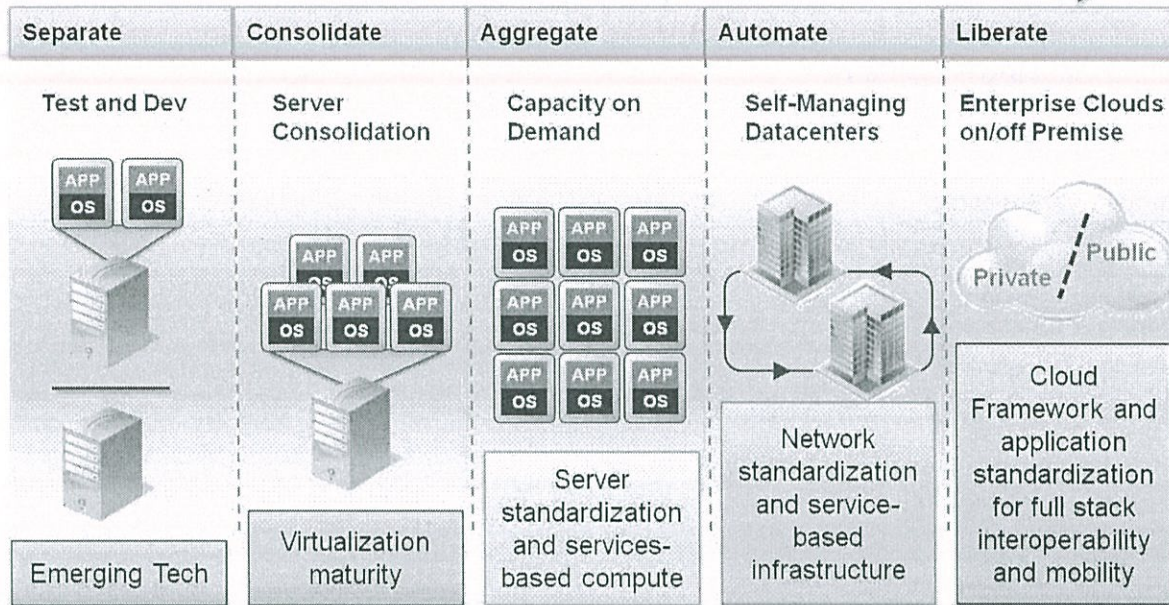
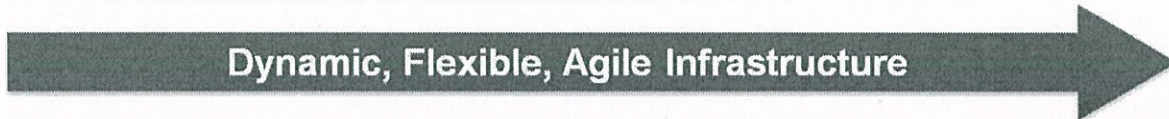
IT Roadmap

Jan 2015	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PHASE 1 High level design & benefits planning			PHASE 2 Detailed analysis and design			PHASE 3 Developing, testing and training			PHASE 4 Implementation, tracking and improving		
Governance & Management											
Establish programmes. Approve programmes.			Establish projects. Approve PIDs.			Manage development. Prepare for change.			Manage transition and realisation of benefits.		
Strategy & Benefits											
Plan benefits realisation for programmes.			Plan benefits realisation for Projects.			Baseline and validate benefits.			Realise, measure and review benefits.		
People, Process and Technology Change											
Design and agree options for Programme -level future states			Design and specify changes to processes, people, tech and estate.			Develop and test all changes, and train staff into new workflows.			Implement, support and sustain change.		
Stakeholder Engagement and Communication											
Gain programme-level commitment to transformational change.			Gain commitment to measurable benefit targets.			Prepare stakeholders for implementing change.			Communicate and sustain achievements.		

Cloud Roadmap to Adoption

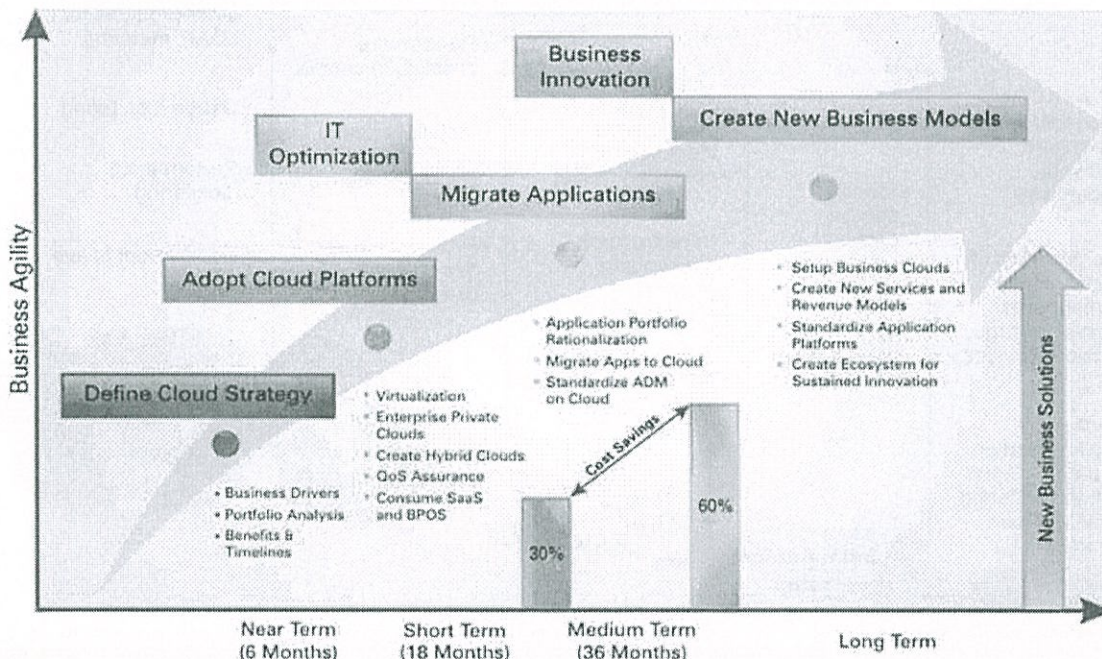


Cloud Roadmap to Adoption



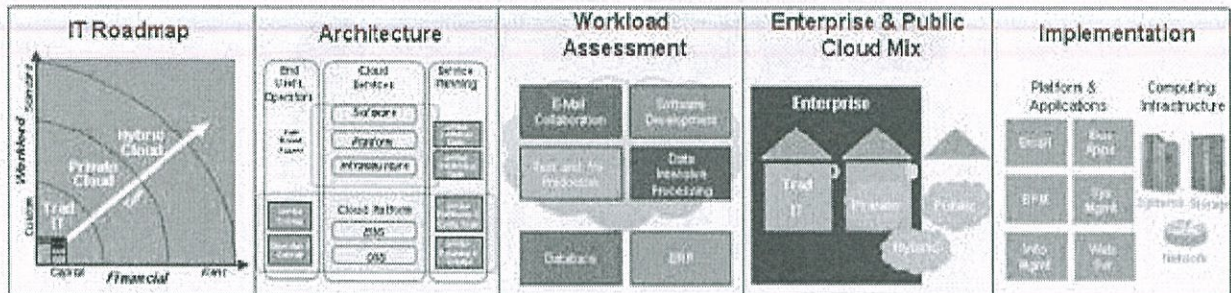
Cloud Roadmap to Adoption

Enterprise Cloud Computing Adoption Roadmap



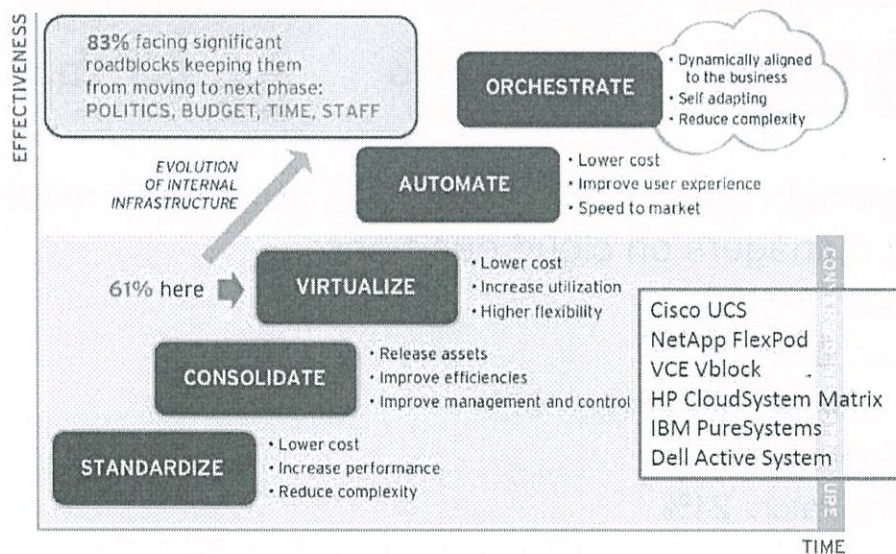
Cloud Roadmap to Adoption

Five-Step Program to Cloud Adoption



Cloud Roadmap to Adoption

Deciphering the Cloud Journey: An Agile, Automated, Adaptable Infrastructure

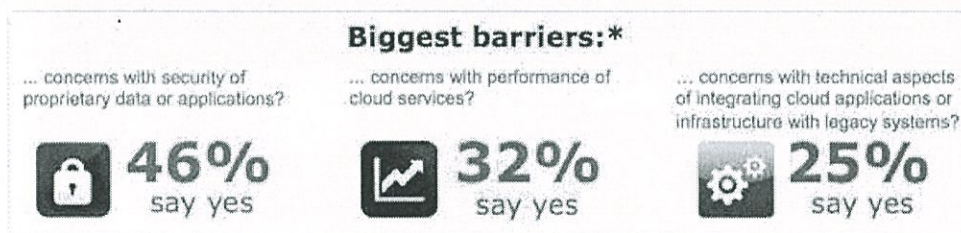


Cloud Migration Path



Cloud Computing Roadmap

What would be Barriers?



- IT professionals rank non-IT executives among the most influential managers on cloud decisions:
 - IT Director: 61%
 - CIO/CTO: 55%
 - Non-IT C-level Executives: 37%**
 - IT Manager: 32%
 - IT Administrator: 24%

C-level is high-ranking executive titles within an organization

Top 10 barriers to cloud adoption

- How should we use different cloud service providers?
 - Consider all options and ensure the risk is evaluated
- How do we integrate all of our cloud service providers, ensuring continuity of service?
 - Create a map of contracts that identifies where the gaps and connections are between services
- How do we ensure moving to the cloud makes commercial sense?
 - Comparing the costs and benefits of a cloud service against a traditional service can be difficult because the two cost models are fundamentally different
- Will we face a lack of cloud engineering and commercial skills?
 - Focus on your core architecture team first, and develop it through recruitment or training to embrace and adopt cloud

Top 10 barriers to cloud adoption

- How do we avoid being locked in to a particular supplier / vendor?
 - Ensure you have an exit strategy defined prior to signing on the dotted line. Also ensure that the contractual arrangements cater for novation, whether early or not
- How do we engage and manage suppliers?
 - The responsibility for managing the cloud estate falls to the service management function
- Will our business information be secure in the cloud?
 - The key is knowing what data you are allowing into the cloud and which type of cloud is suitable for that data
- Where will our data be stored and what risk does that pose?
 - Select a cloud partner able to provision data from identifiable and given locations

Top 10 barriers to cloud adoption

- Will cloud be reliable and fast enough for live business systems?
 - Take steps to ensure you select a cloud service provider that delivers both the response times and the continuous availability that business users need
- Our people don't have the time or knowledge to move us to cloud. Who will set up our cloud? And can we trust them?
 - There are four areas to consider here:

i) In today's tough and challenging economic times, some service providers will simply not survive.

ii) In many instances, organisations simply don't have the skillset to competently make the move to cloud-based services on their own.

iii) How will we manage all the individual cloud services and providers? And how will our cloud be managed?

iv) A provider may simply fail to deliver the required service.

Cloud Implementation Plan

5 Change Management Challenges

- **Workloads for cloud computing**
 - classify workloads for the cloud based on both business criticality and importance
- **Apprehension on data ownership and security**
 - Design and communicate legally compliant and flexible control processes/measures and the role alignment on data ownership
- **Potential change in IT organization and new process and job security fear**
 - Design an acceptable IT governance structure in consultation with key stakeholders and communicate new set of expectations from IT and its long-term employment strategy
 - Support people via training and communications to adapt to new roles, processes and skills

5 Change Management Challenges

- **Integrating IT SM processes**
 - Create business policies and higher maturity processes for SM integration, identify and measure related critical to quality metrics (CTQ)
- **How to measure cloud computing value**
 - Design a tool with cloud computing outcomes and enablers to assist with ROI and value assessments.
- The key challenge of any change is **user adoption**

Cloud Implementation Plan

Identify the need for Change



Need can be categorized into:

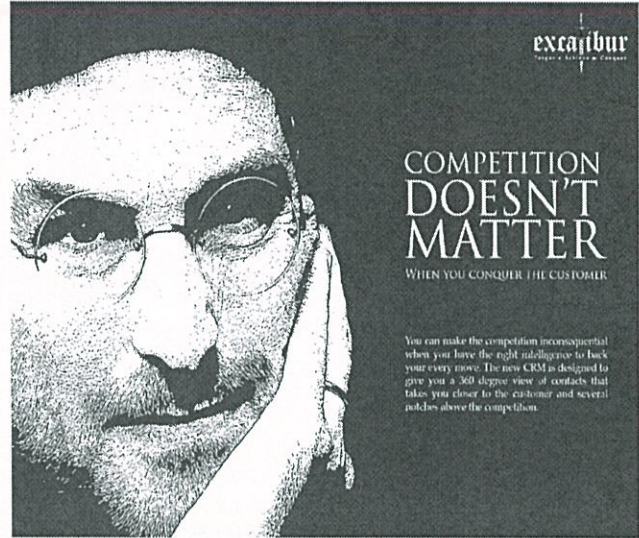
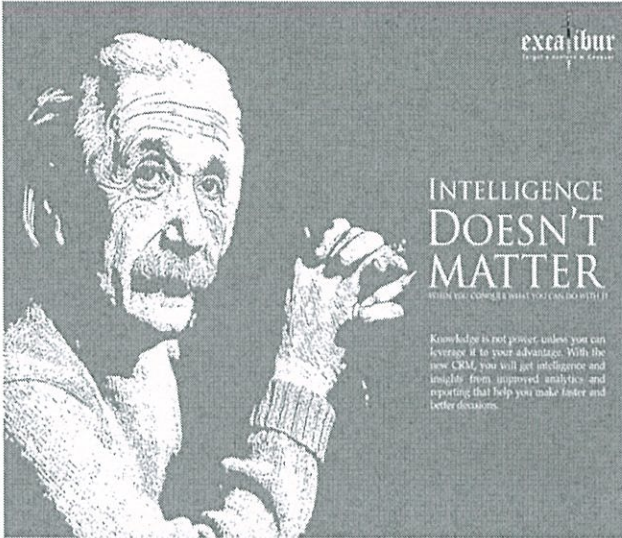
- Process
- People
- Technology

Cloud Implementation Plan

Change Management Framework

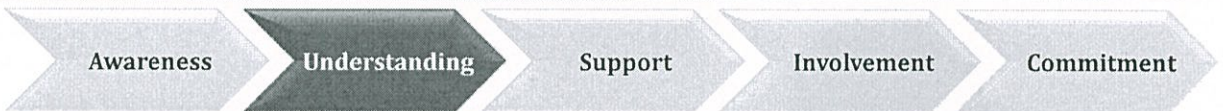


Awareness: Align Leadership to Change

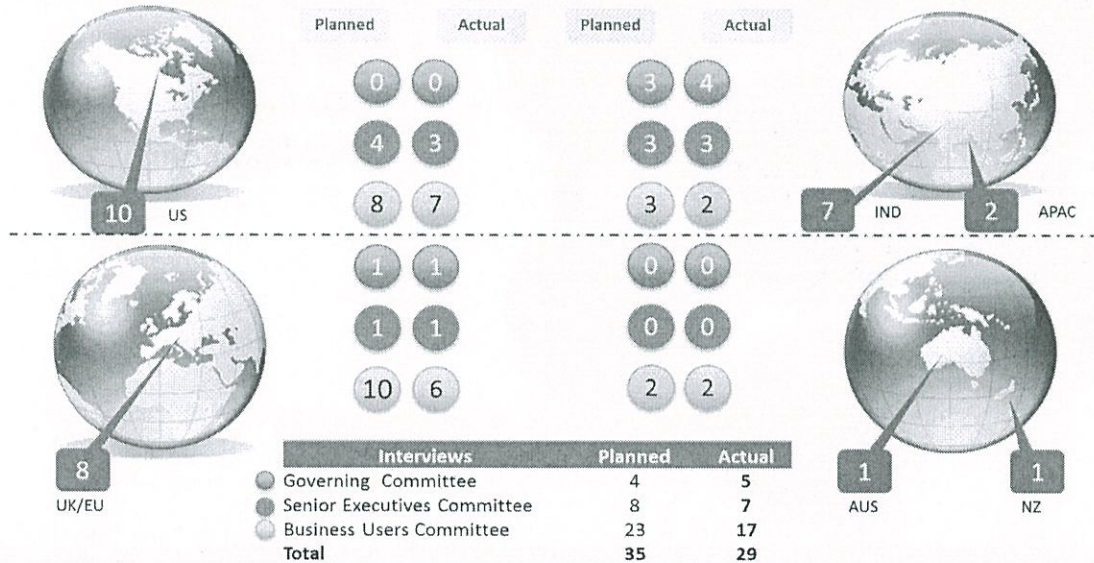


Cloud Implementation Plan

Change Management Framework

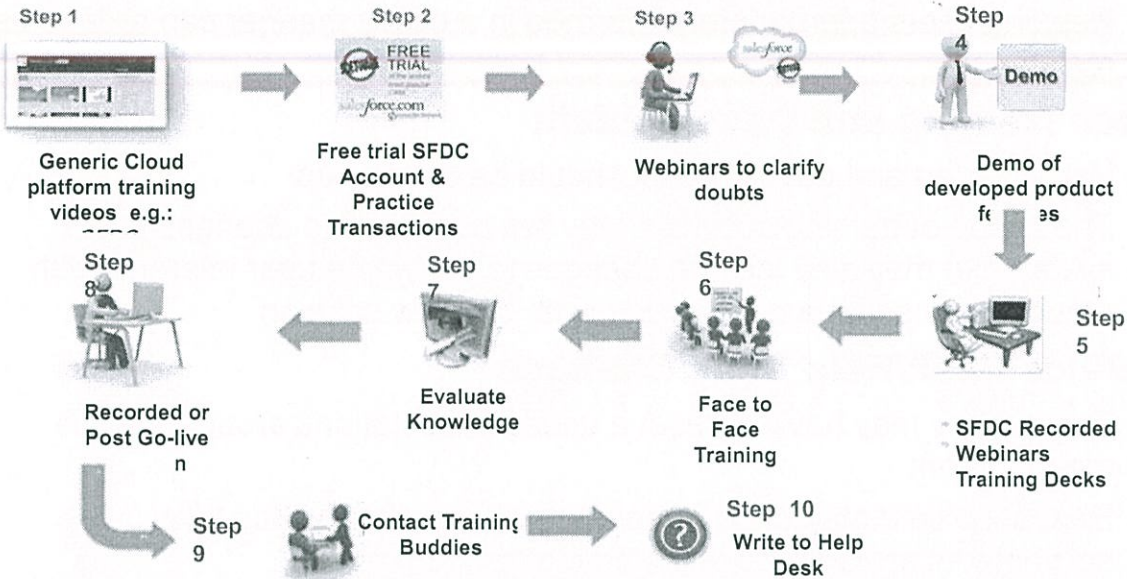
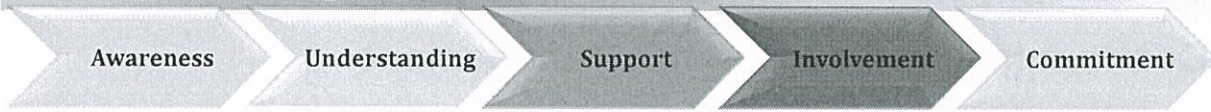


involve users across geo to understand the needs



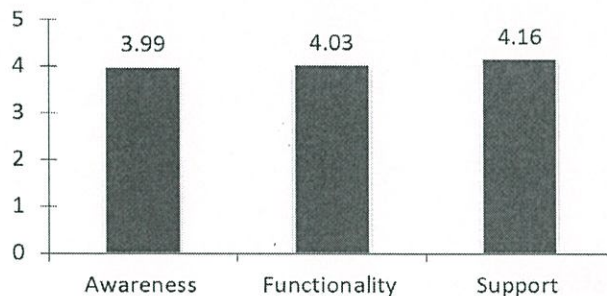
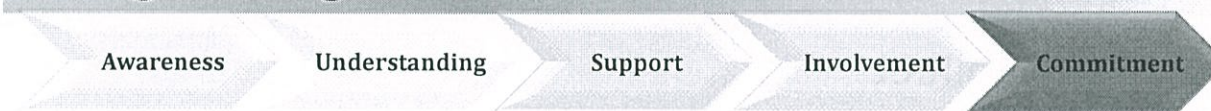
Cloud Implementation Plan

Change Management Framework



Cloud Implementation Plan

Change Management Framework



Parameter	Score
Awareness	3.99
Functionality	4.03
Support	4.16
Overall Score	4.06

- Strengths
- Medium Concern
- High Concern

- Conduct user Adoption analysis for high adoption
- Important to analyze the feedback & take appropriate actions

Impact on Users

- **Communication and Change Management**
 - A pivotal component of any migration
 - Keeping users appropriately informed in a timely manner can reduce user resistance
- **User Training and Development**
 - User training and development should be developed
 - The scope of training activities may not be limited to changes to the system but may also include changes to the way a user interacts with other systems that are integrated with the new solution
- **Service Desk/Help Desk Changes**
 - The agency may have to reset a user's expectations around service management
 - Response time may differ depending on how the service level agreements are created at the time of procurement

Top 10 Cloud Jobs

- Cloud Architect
- Cloud Software Engineer
- Cloud Sales
- Cloud Engineer
- Cloud Services Developer
- Cloud Systems Administrator
- Cloud Consultant
- Cloud Systems Engineer
- Cloud Network Engineer
- Cloud Product Manager