estimate

estimate • analyze • plan • control

Cloud Total Ownership Costing: Considering the Technologies, Costs and Benefits

Daniel D. Galorath, CEO Galorath Inc.
Steven Woodward, CEO, Cloud Perspectives

Cloud Perspectives

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Key Points

Cloud Computing Is Becoming Pervasive

Cloud full of challenges and opportunities

Cloud Is not necessarily less expensive from a total cost of ownership viewpoint

GAO Reported Cloud Challenges

1. Meeting Federal Security Requirement
2. Obtaining guidance,
3. Acquiring knowledge and expertise,
4. Certifying and accrediting vendors,
5. Ensuring data portability and interoperability,
6. Overcoming cultural barriers, and
7. Procuring services on a consumption (on-demand) basis.

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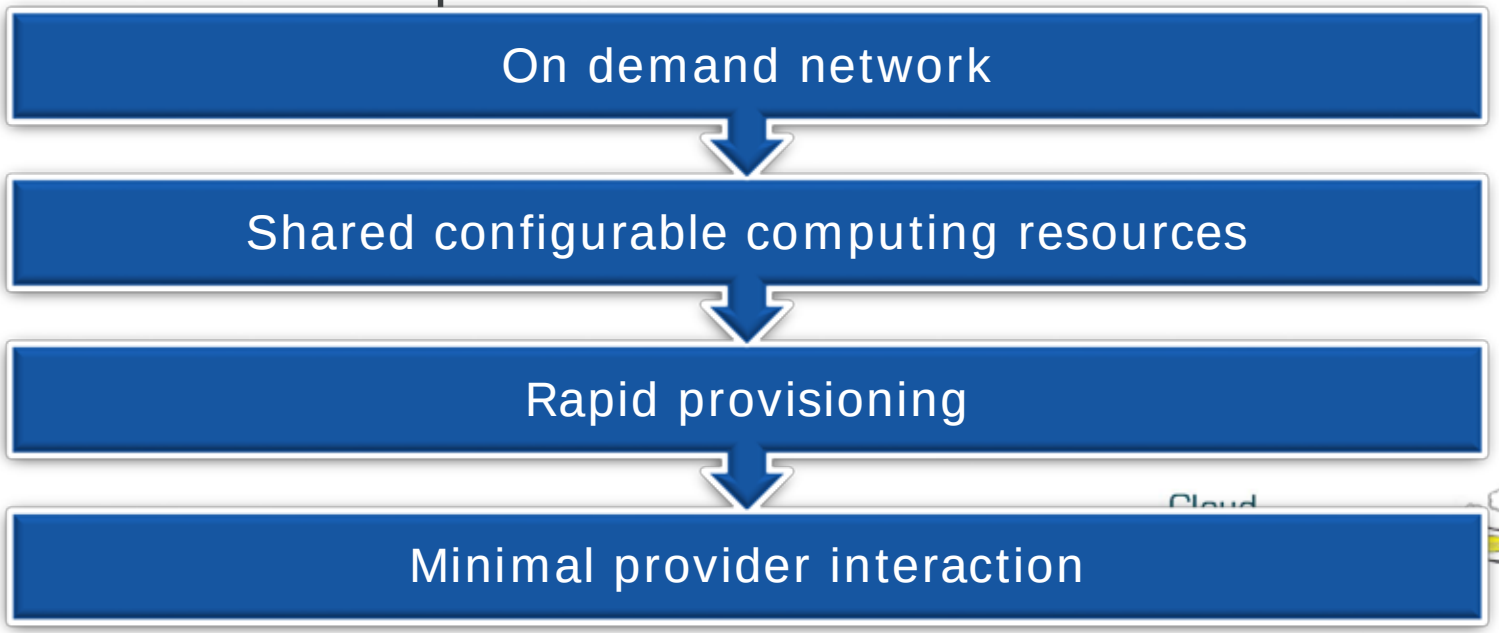
NIST Definition – Cloud Essentials

- National Institute of Standards and Technology (www.nist.gov)
- Model for enabling convenient, **on-demand, network** access to a **shared** pool of **configurable computing resource**s (networks, servers, storage, applications, services) that can be **rapidly provisioned** and released with minimal management effort or service provider interaction.



NIST Terms

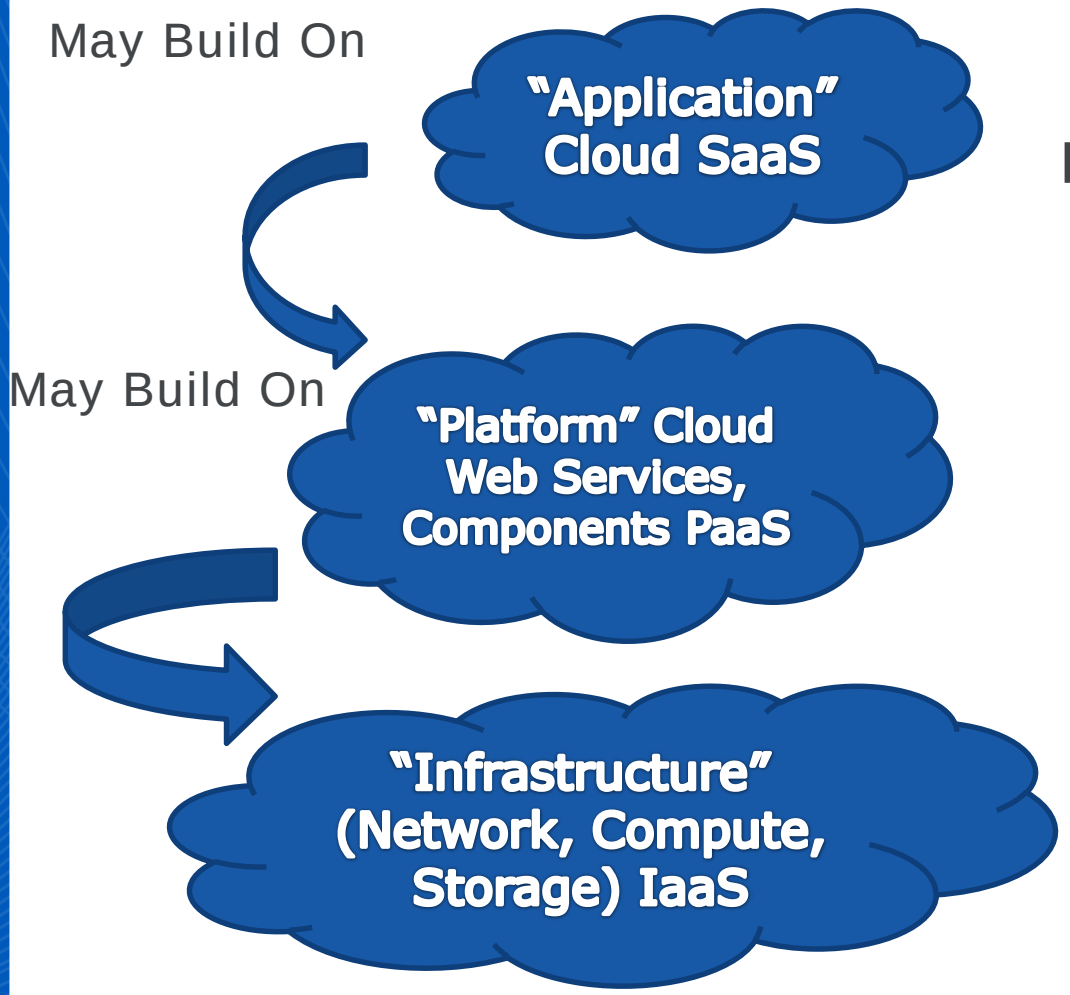
Hosting: External or Internal

Three Service Models
-Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)

Four Deployment Models
-Private cloud
-Community cloud
-Public cloud
-Hybrid cloud

Five Essential Characteristics
-On demand self-service
-Broad network access
-Resource pooling
-Rapid elasticity
-Measured service

NIST - Cloud Service Models



Others: Business Process as a Service, Communications as a Service, Data Base as a Service, Anything as a Service

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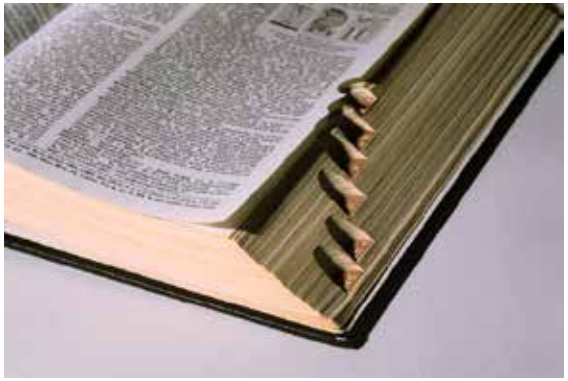
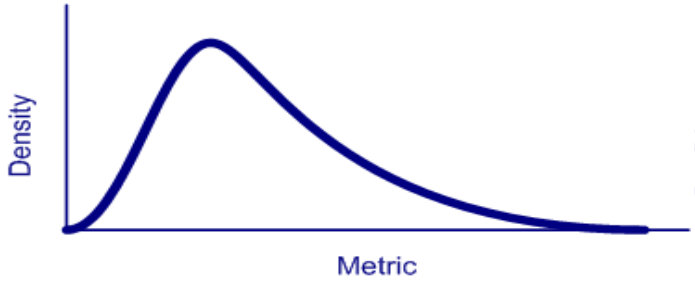
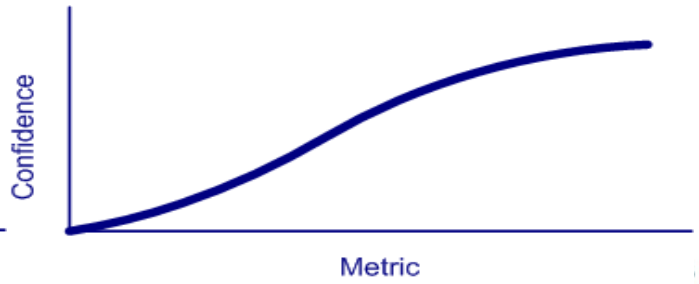
Bad Estimates Are A Root Cause of Project Failure

- An ***estimate*** is the most knowledgeable statement you can make ***at a particular point in time*** regarding:
  - Effort / Cost
  - Schedule
  - Staffing
  - Risk
  - Reliability



- Estimates more precise with progress
- *A WELL FORMED ESTIMATE IS A DISTRIBUTION*





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Example: Clean our House With Power washer: To Buy or Rent?

- Rent for a weekend: $85
- Buy: $309
  - (plus maintenance)
- Hire service: $225

- Analogous to PaaS
- If we hire someone to do the work (SaaS)
- If we used our own hose (IaaS)

Image: Sears.com

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Rent Vs Buy Tradeoffs: Power washers and cloud Analogy

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Buy

"I could lend it to my neighbors."

"I'll use it more."

"Long term, I'll save money."

"Where am I going to put it?"

"I'll have to maintain it."

"More junk."

Rent

The one they rent is really powerful.

It's not that big an expense.

"It's really heavy to carry back and forth."

"They might go out of business"

"They might not be well maintained"

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On Premises Often Cheaper (IaaS Example)

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In-house(Buy)

Replacement Server: Dell PowerEdge T430 - **$3,943**
Back-up Software License and agents (2 options)

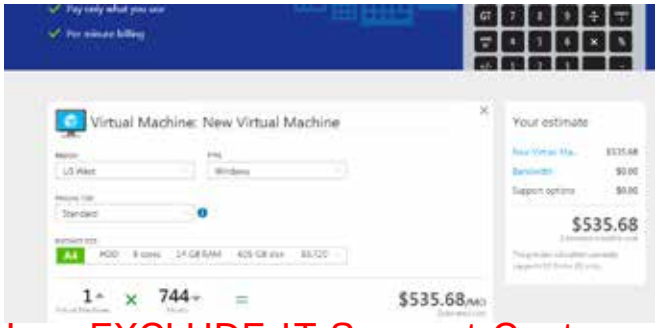
1. Symantec Back-up Exec: **$2,822** (includes 2014 vr and 4 agents)
2. Dell NetVault - **$2,108** (includes 1 TB capacity)

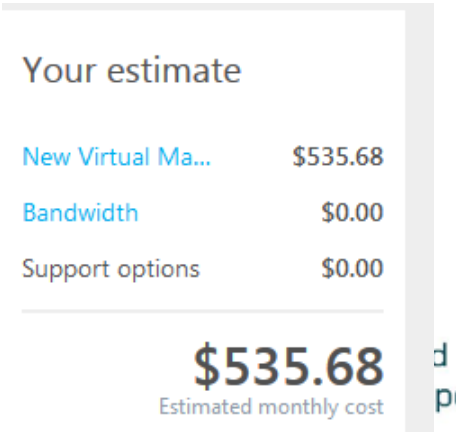
Note: Costs Here EXCLUDE IT Support Costs

$8,873

Cloud (Rent)

$6,428 annual





Note: Costs Here EXCLUDE IT Support Costs

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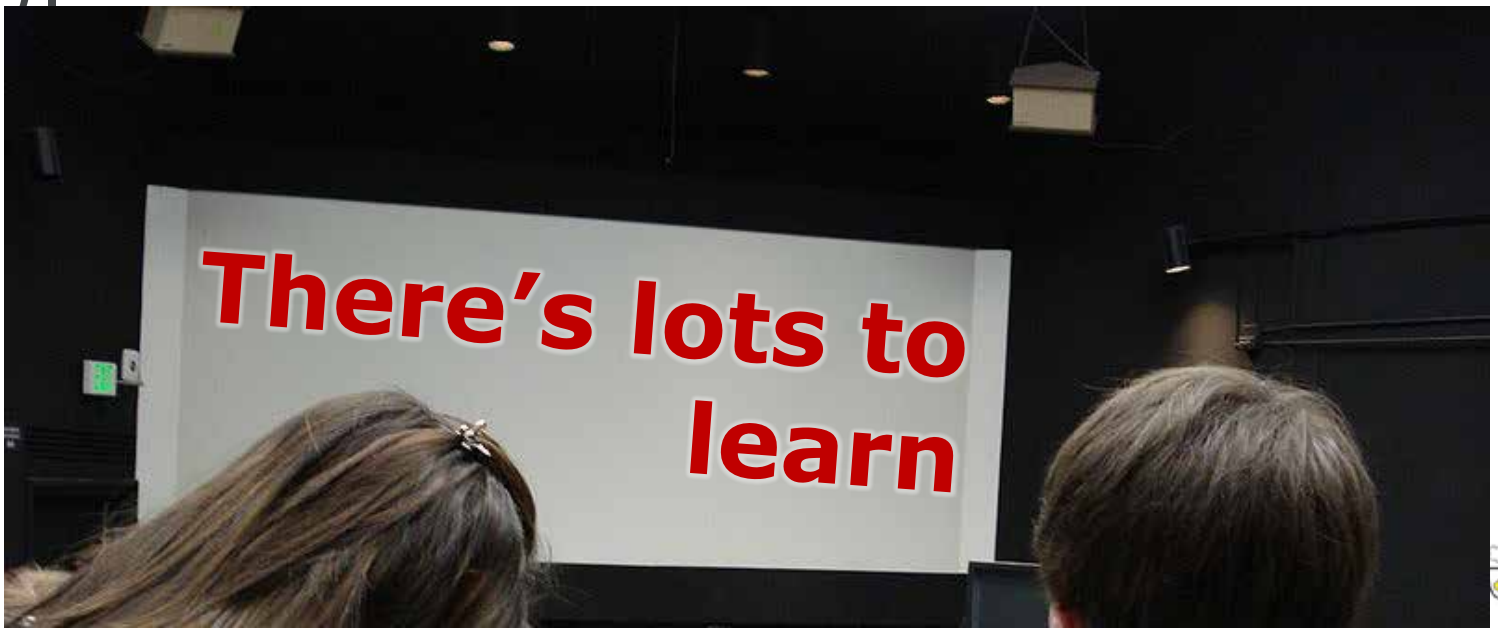
If I just use Cost I will GO On Premises.. But What's Missing

$6428

per year for a cloud solution.

$1775

per year for an in-house solution (5 year life).



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Case In Point… Support is Not Free (IaaS Meltdown)

- Galorath software delivery system cloud based
- Original vendor Claimed 99% uptime and backups
- Suddenly service became unreliable
- Claimed more $ would improve things.. We paid
- Things got worse: Received message “orange server down” Your data is unavailable and cannot be restored
- No Backups: they claimed “you used too much bandwidth so backups were stopped months ago)

Lesson Learned: Don’t rely on cloud vendor backups

INCLUDE COSTS FOR LOCAL BACKUP, MAINTENANCE training, etc.

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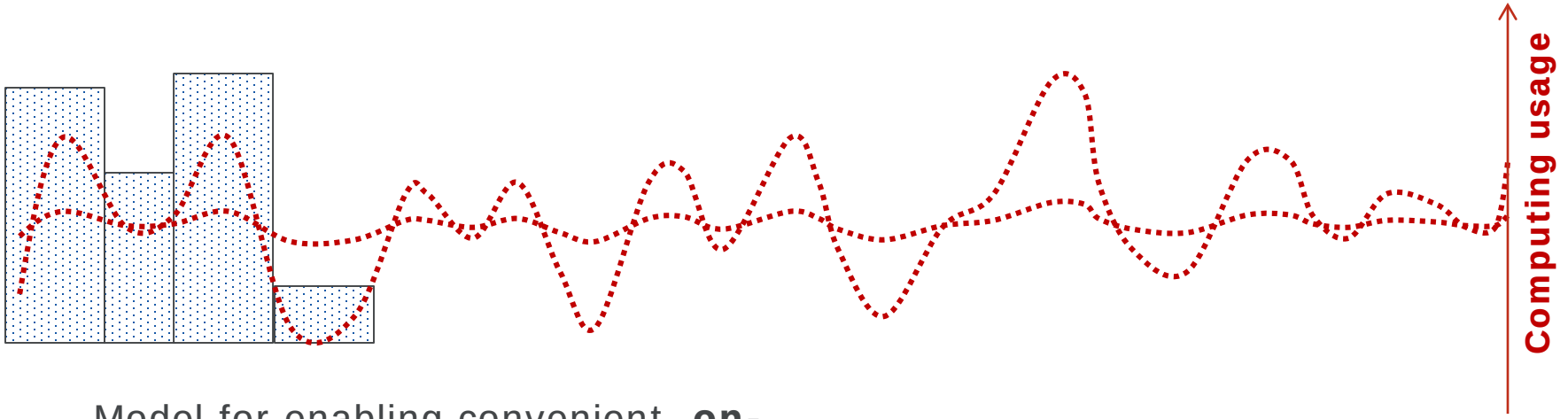
Cloud Optimizes Bursting.. This is one Case For Cloud



Model for enabling convenient, **on-demand, network** access to a **shared** pool of **configurable computing resource**s (networks, servers, storage, applications, services) that can be **rapidly provisioned** and released with minimal management effort or service provider interaction

= *capacity*

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Cloud Economics

- Rewriting applications to make them work in the cloud has BIG costs
  - Avoid when possible
- Dave Linthicum, points out that there's a lot more to enterprise IT than simply accessing and running applications.
- "Cloud computing typically is going to be a better, more strategic, more agile architecture, but it's also typically going to be more expensive, at least on the outcome," Can be lots of costly infrastructure changes Dave Linthicum
- Can't guarantee service level (SLA) agreements due to multiple points of failure…
  - Organizations pay for better SLA… and we can't quantify

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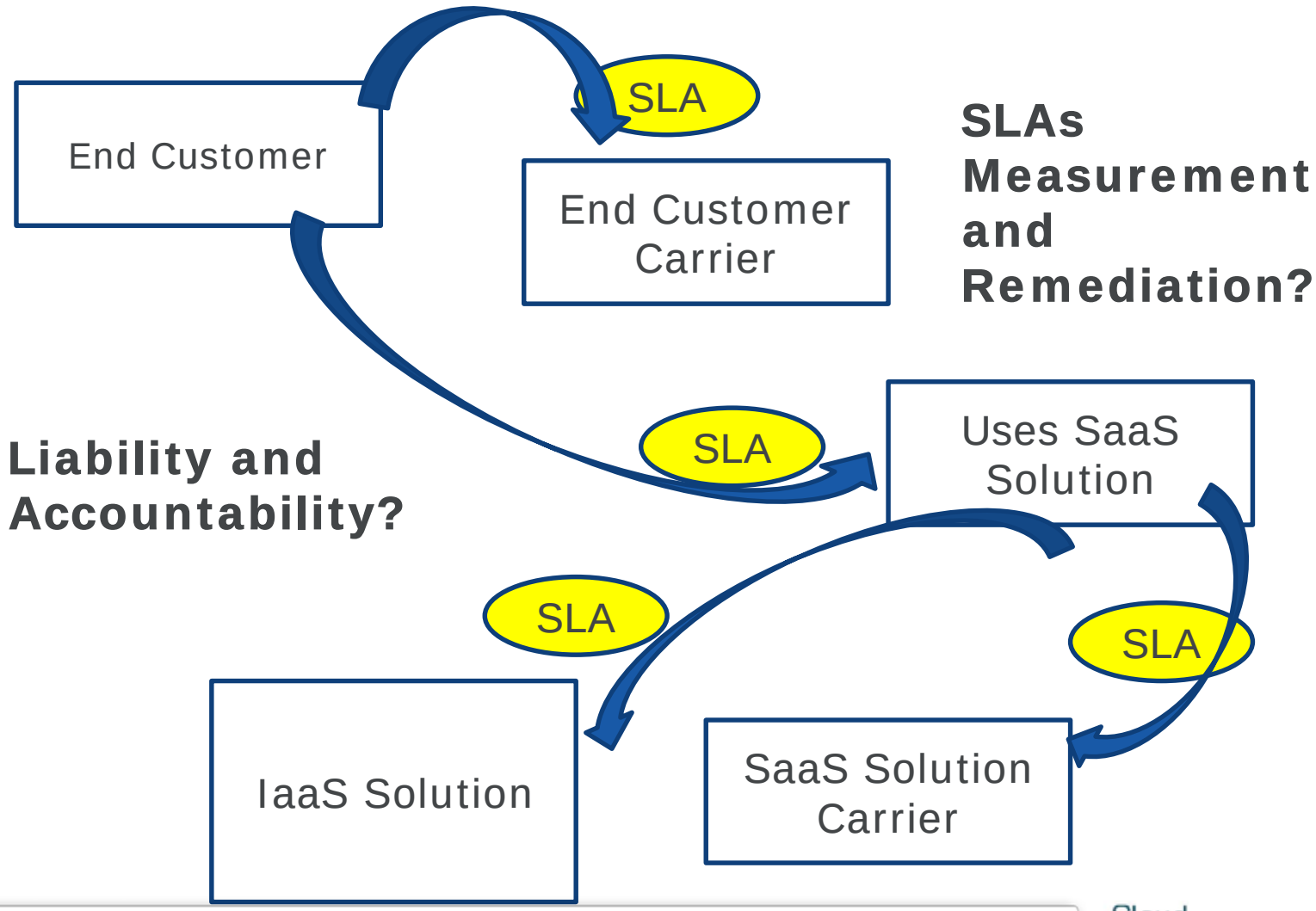
Cascading SLA Make SLA Impossible



Cascading relationships make SLAs nearly impossible.. New technologies drop SLA performance before they mature

Functional Sizing For Cloud Process

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Identify Objectives

- Why are we counting / estimating functions

Identify counting boundaries

- Review objectives & goals
- Use other reference architectures and cloud eco-system models to generate discussions
- Business application boundaries
- Middleware boundary approaches
- IaaS and PaaS can be initiated by a “user” or “machine” (even a higher level service SaaS for example)

Identify scope

- what is in and out of scope
- E.g. force.com count features and functions you are developing but not all the features of force

Identify data sets ILF & EIF

- for PaaS & SaaS what DETS are in & out
- e.g. source code library if you are making updates to it
- Interpretation of rules PaaS.. Design specs saved, Test docs ILFs
- IaaS Controlled sets of data such as policy.. E.g. storage cant exceed 5 petabytes.

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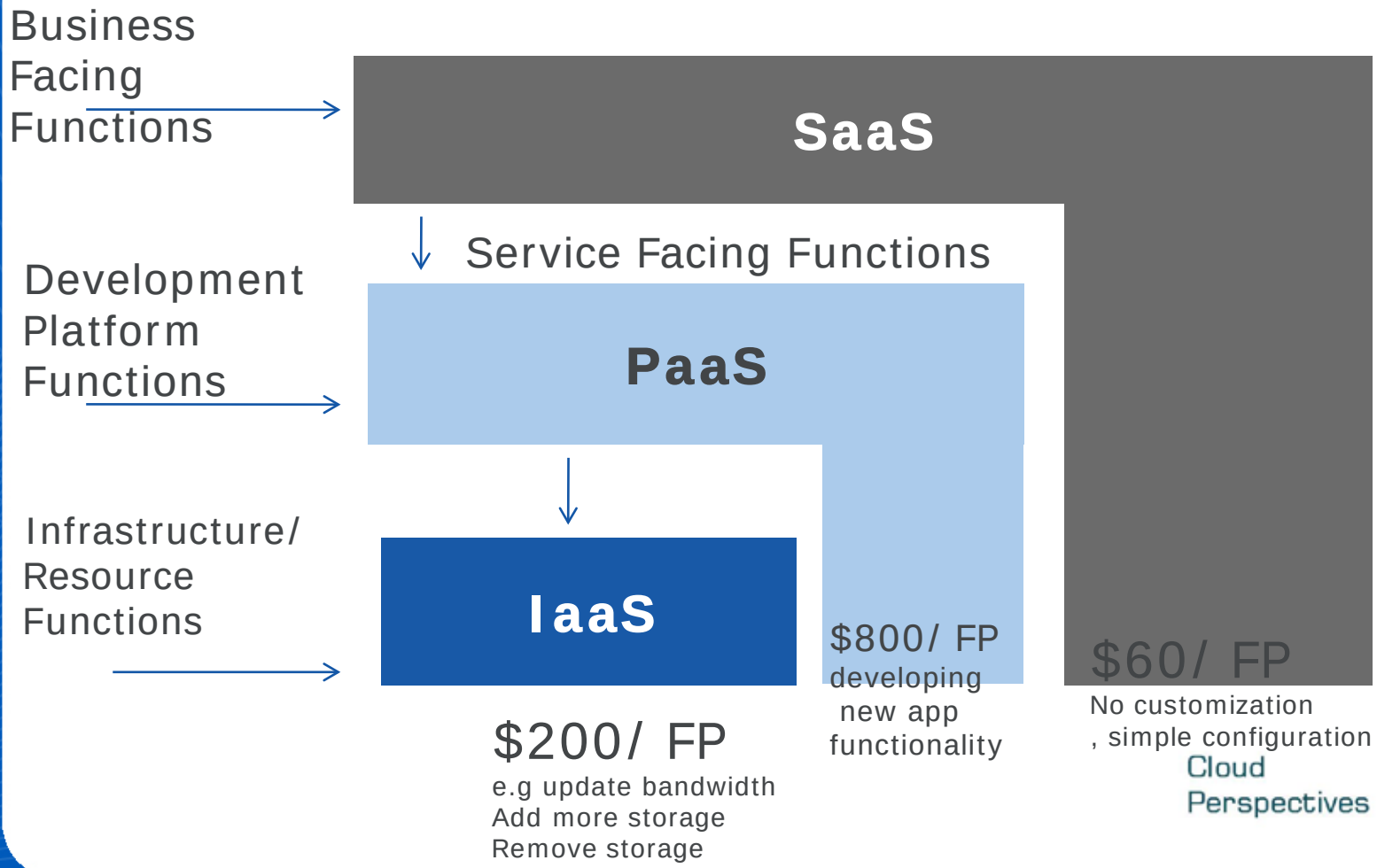
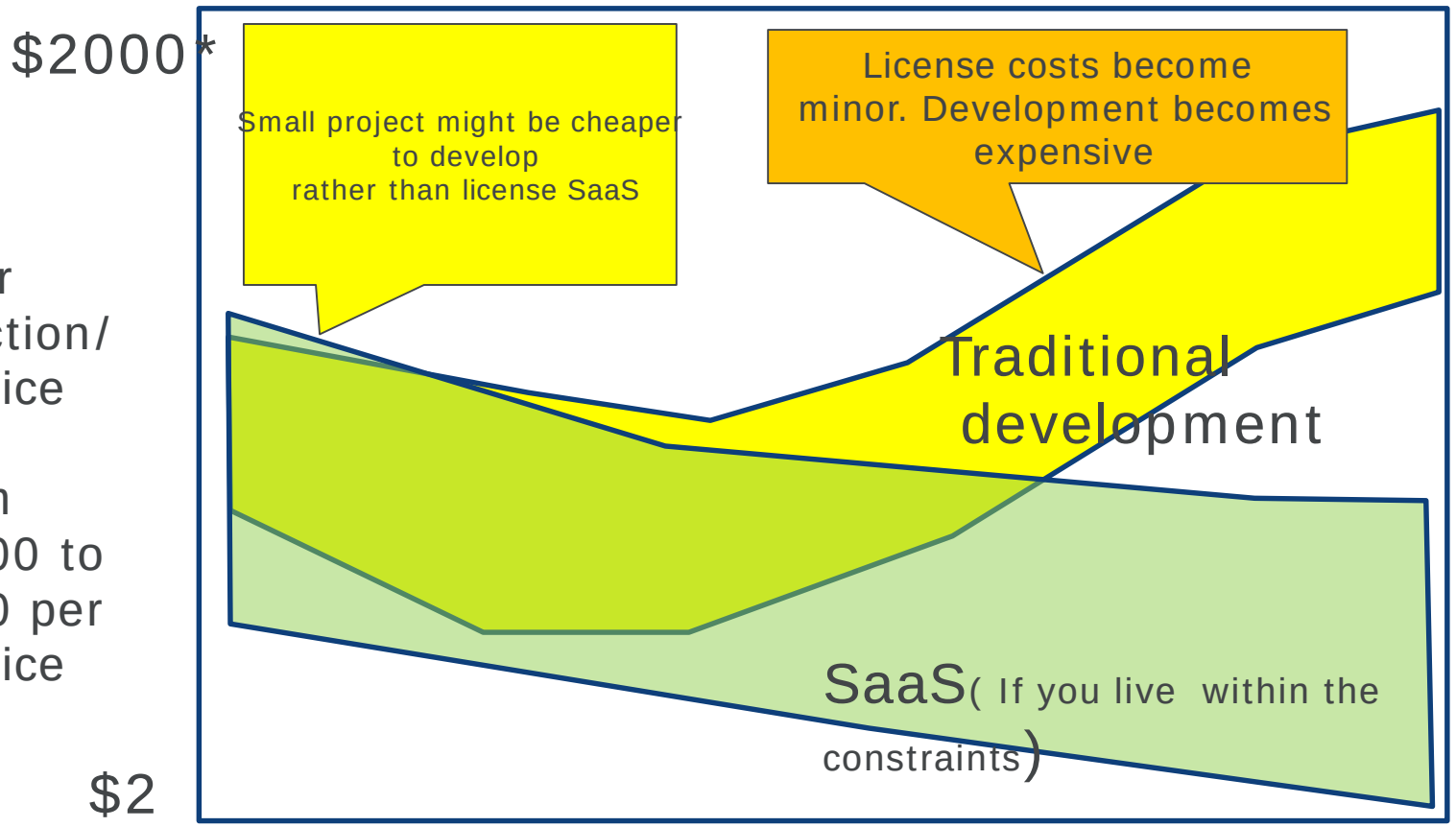
Categorize Software Capabilities Around The 3 Service Models

One Product Can Cross Services



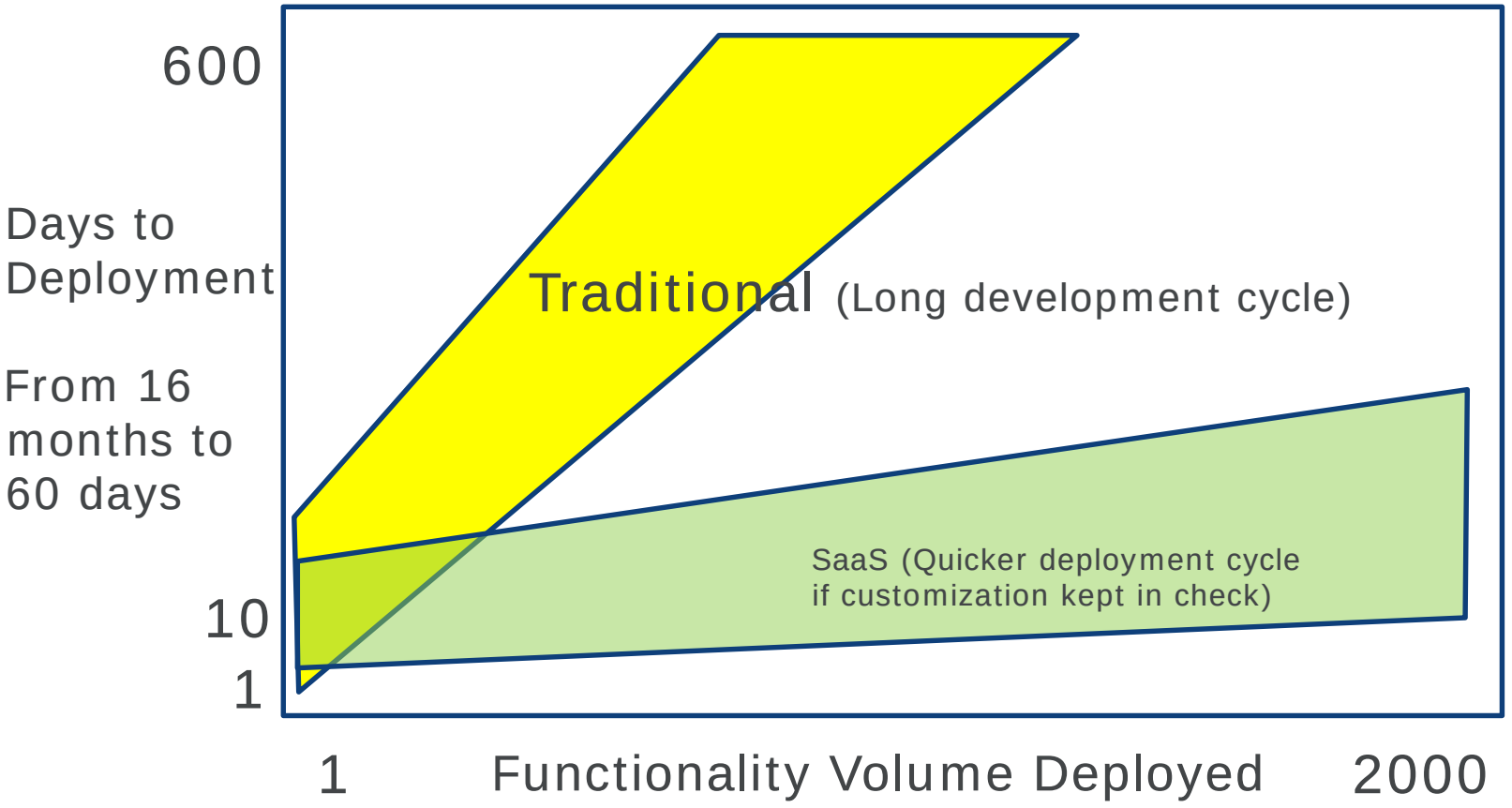
Cost vs Functionality New Deployment (Enterprise App)



* Canadian $ 2012

Private cloud or COTS about same as on- premise

Cloud BIGGEST BENEFIT TIME TO MARKET When Good Fit (Enterprise App)



SaaS acts much like COTS..
Good fit: deploy fast

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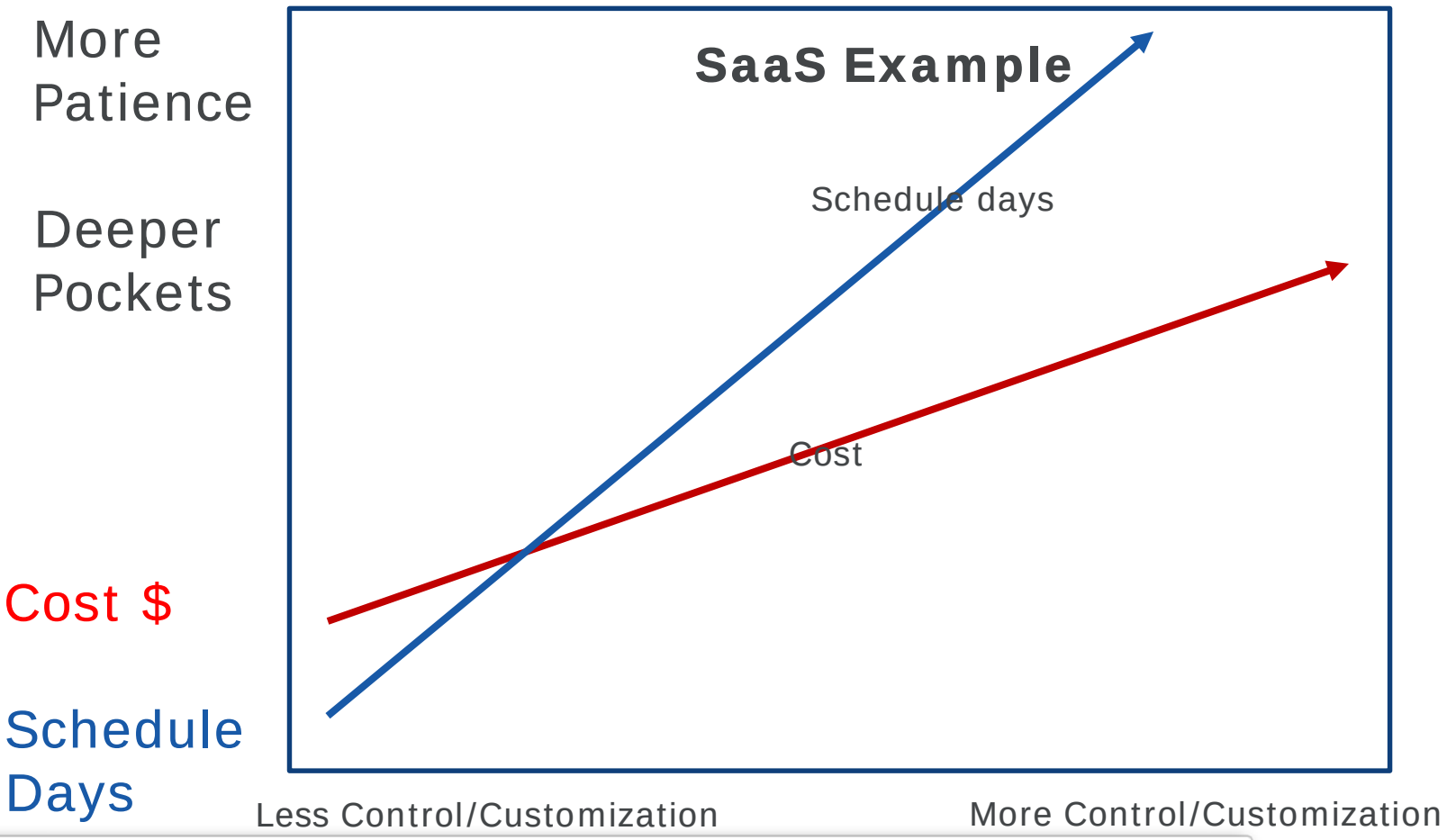
You Must Control Costs Just Like Always... Customization, Configuration, Database, etc. Or Costs Can Skyrocket



Take SaaS as is costs can be low...Customization drives cost dramatically... just like COTS

Galorath Force.com Using SEER: FAA Funded Study Findings

- Effort reduction from 30% to 40% over JAVA
- About 80% reduction in the actual development effort for appropriate applications
- Point-and-click operations to support prototyping reduced requirements & design from 10% to 25%.
- Testing reduced due to robustness of built in capabilities reduced effort by an estimated 5% to 20%.

Due to efficiency of PaaS development environment Rather than the cloud generally

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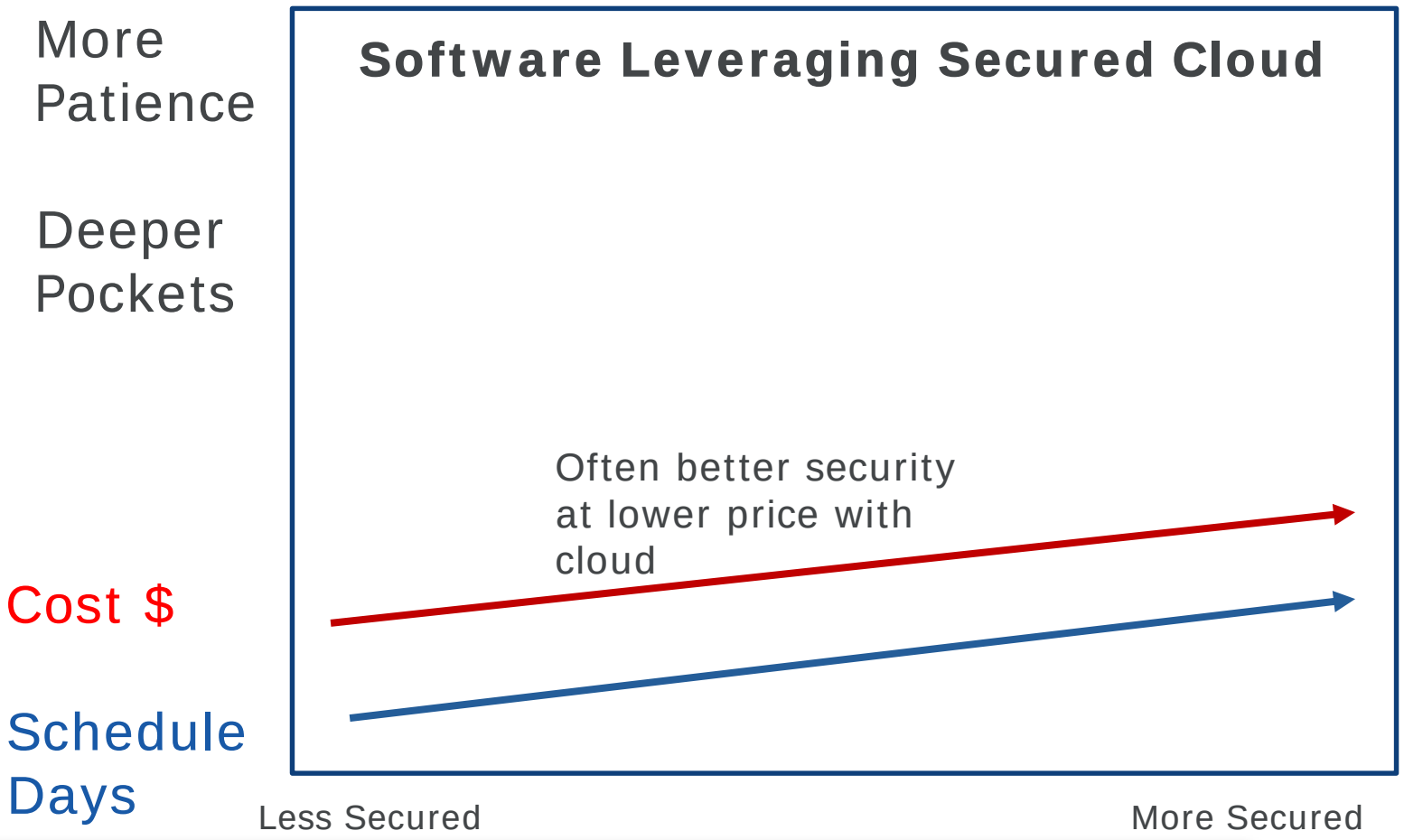
Observation – Cloud Often Secures at Lower Price Points



Cloud security solutions may reduce costs e.g. tokenization, continual sniffing

Some Potential Cloud Black Swan Costs

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http://www.datacenterknowledge.com/archives/2012/12/05/the-cloudy-side-of-cloud-computing/

- **Security & Breaches:** Anticipate growing Malicious attacks and accidental data loss
- **Outages:** 2007- late 2012 568 hours downtime between 13 major cloud carriers. Cost the customer base about $72 million (International working group on cloud computing resiliency)
- **Learning curve: S**uccessful cloud model takes knowledge around multiple technological disciplines. Once in place, however, managing can also be issue
- **Vendor lock-in:** Migrating cloud environment to anther provider difficult… Not often considered in decision analyses
- **Data portability and porting costs**
- **Software modification Costs (PaaS)**
- **Software Setup (SaaS)**

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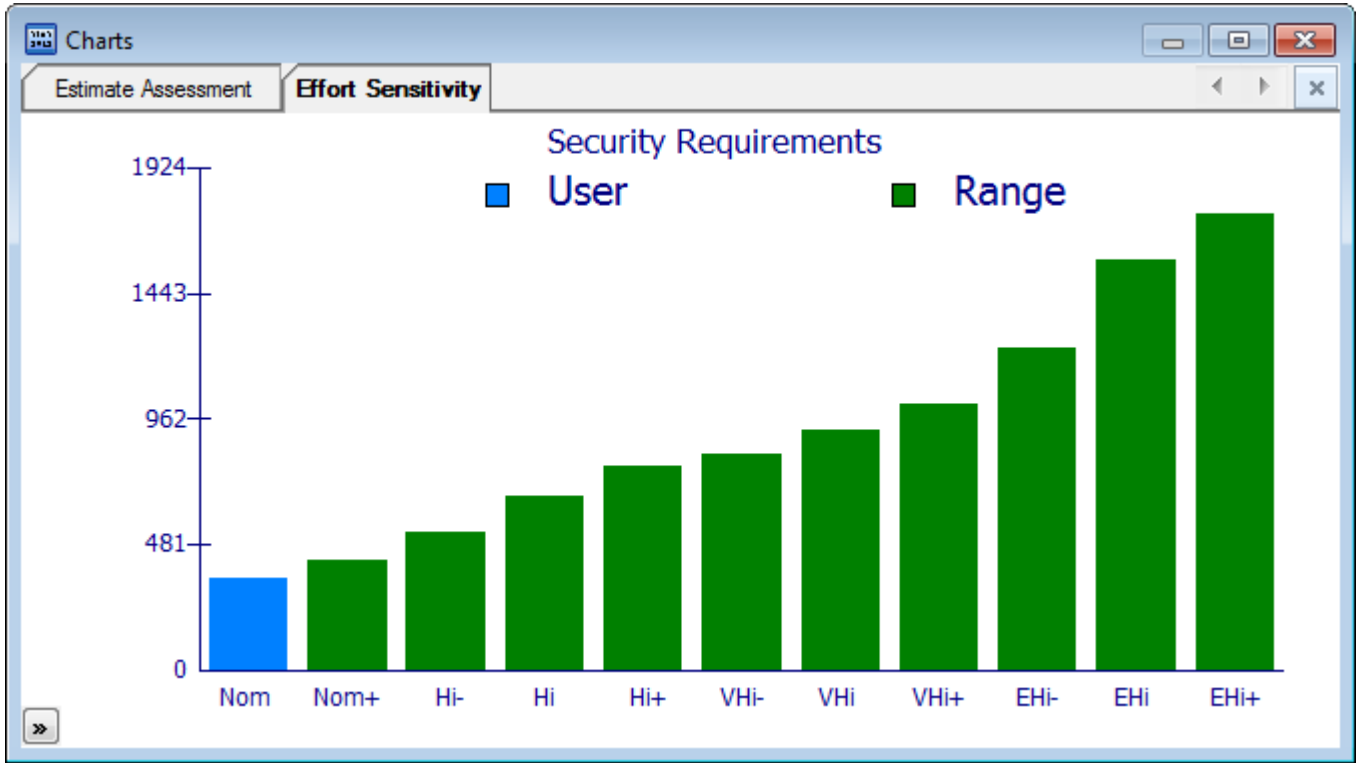
Building Secure Systems Is Very Costly

- Building software cost can be massive…
  - Depending on the cloud supplier's investment in security and your organizations investment
- Cost of breaches can be worse



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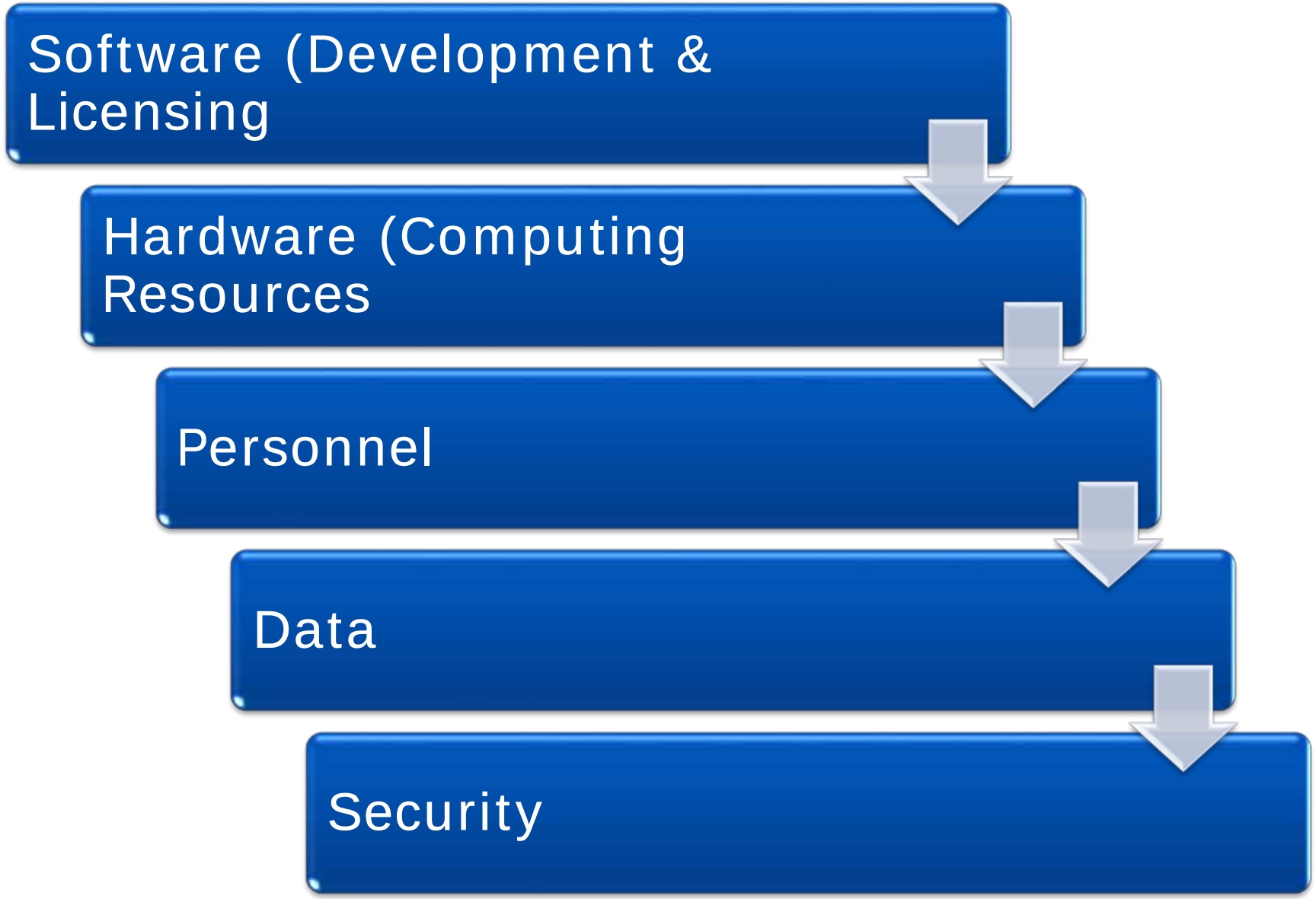
Five Dimensions of Cloud Costing



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We Know How To Estimate Cloud Costs and ROI

- Cloud isn't so different that alternate approaches to cost, ROI or business case are needed
- Important to identify costs that will increase as well as decrease.. E.g. bandwidth
- Risk must be factored in
  - E.g. data inaccessibility
- SaaS and on-premises setup costs could be similar..
  - No SaaS savings
- Measurement, estimation and ROI processes are essential to make the most viable decisions

When cloud computing is perceived
as a panacea, with assumed savings, it's buyer beware
Jobs Changing, NOT Disappearing

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SaaS and COTS Are Costly To Organizations

- "Commercial application program or collection of programs developed to meet the needs of a variety of users, rather than custom designed for a specific organization"
- Many are enterprise applications
- Often allows / requires customization
- Examples: SAP; Rational PPM, SEER for Software; Microsoft Excel, CA Clarity, Oracle Business Suite

"One-third [of the budget] has to go to testing. Don't ever short change testing. Everyone always underestimates it, and says it's the last thing to worry about. Don't do that!"

- Jim Larson, consultant for communications solutions provider

SaaS doesn't reduce testing effort compared to on- premise

Cloud Costs Antidotal Evidence

http://www.forbes.com/sites/kevinjackson/2011/09/17/the-economic-benefit-of-cloud-computing/

SEER by GALORATH

- Cloud computing makes web startups easier
- 1,000 server deployment can save 50% to 67% of lifecycle cost (BAH)
- Cloud delivered greater investment returns with a shorter payback compared to traditional on-premise (Deloitte)
- Transitioning IT services from agency-owned IT infrastructure to GSA IaaS platform should deliver about 7:1 cost (Assumed From BAH study)
- Application portability, particularly in a PaaS scenario, and associated costs can be significant. Microsoft
- One analysis of moving to cloud over 30% more
  http://www.uptimesoftware.com/uptimeblog/cloud-virtualization/cost-of-cloud-computing-expensive/

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Long Term Contracts Add Risk

Linux | Windows

Light Utilization Reserved Instances

Region: US East (N. Virginia)

	1 yr Term		3 yr Term	
	Upfront	Hourly	Upfront	Hourly
Standard Reserved Instances				
Small (Default)	$69	$0.039 per Hour	$106.30	$0.031 per Hour
Medium	$138	$0.078 per Hour	$212.50	$0.063 per Hour
Large	$276	$0.156 per Hour	$425.20	$0.124 per Hour
Extra Large	$552	$0.312 per Hour	$850.40	$0.248 per Hour
Second Generation Standard Reserved Instances				
Extra Large	$607	$0.344 per Hour	$935	$0.272 per Hour
Double Extra Large	$1214	$0.688 per Hour	$1870	$0.544 per Hour
Micro Reserved Instances				
Micro	$23	$0.012 per Hour	$35	$0.012 per Hour
High-Memory Reserved Instances				
Extra Large	$353	$0.22 per Hour	$548	$0.175 per Hour
Double Extra Large	$706	$0.44 per Hour	$1096	$0.35 per Hour
Quadruple Extra Large	$1412	$0.88 per Hour	$2192	$0.70 per Hour
High-CPU Reserved Instances				
Medium	$178	$0.10 per Hour	$273	$0.088 per Hour
Extra Large	$712	$0.40 per Hour	$1092	$0.352 per Hour
Cluster Compute Reserved Instances				
Quadruple Extra Large	$1450	$0.742 per Hour	N/A*	N/A*
Eight Extra Large	$1762	$0.904 per Hour	$2710	$0.904 per Hour

spectives

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due to the development environment
Rather than the cloud

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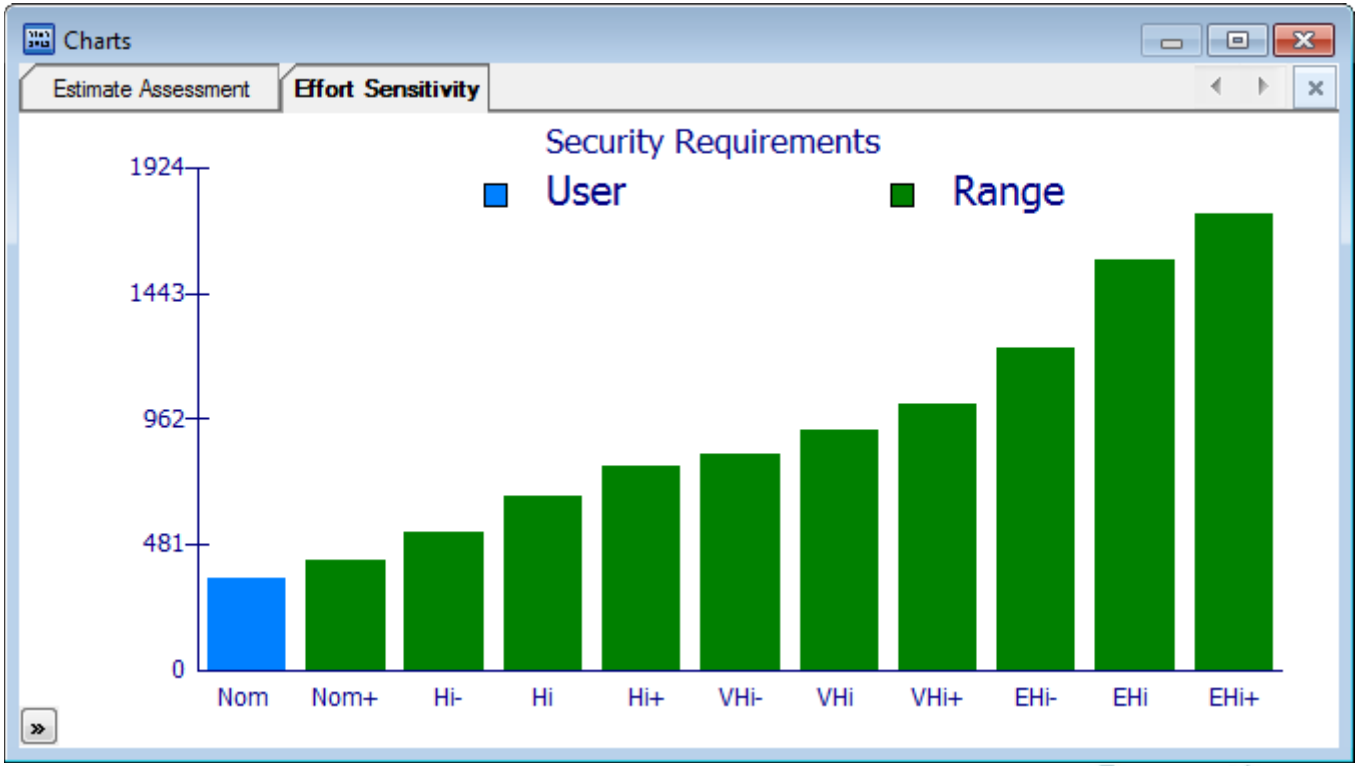

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Scope of Cybersecurity – Technology Domain Convergence (Source: PWC)

Information Technology	Computing resources and connectivity for processing and managing data to support organizational functions and transactions
Operational Technology	Systems and related automation assets for the purpose of monitoring and controlling physical processes and events or supporting the creation and delivery of products and services
Consumer *(Products and Services)* ***Technology***	Computing resources and connectivity integrated with or supporting external end-user focused products and services

Cybersecurity encompasses all three **technology types**

Cost of Cybercrime

- Mean annualized cost for 58 benchmarked organizations $15 million annually
- Rising costs each yeat
  - Last year's mean cost per benchmarked organization was $12.7 million
  - 2.7 million (19 percent) increase in mean value
  - Net increase over six years in the cost of cyber crime is 82 percent

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Direct, indirect & opportunity costs from cyber crime (Source HP)

- Detection
- Investigation & Escalation
- Containment
- Recovery
- Ex-Post Response

- Information loss or theft
- Business disruption
- Equipment Damage
- Revenue Loss

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Some Potential Cloud Black Swan Costs

http://www.datacenterknowledge.com/archives/2012/12/05/the-cloudy-side-of-cloud-computing/

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- **Software modification Costs (PaaS)**
- **Software Setup (Saas)**

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Cloud Trends (Source PWC)

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Cloud	Social Networks	Information Explosion	Mobility	Industry Verticals as the 3rd Cloud Platform
21% Estimated CAGR of in SaaS market through 2018	**82%** of Sales teams will adopt public social networks by 2014	**100%** growth every two years, reaching 44 zettabytes by 2020	**66%** of mobile apps developed in the next 3 years will be integrated with Enterprise Apps (SAP, Oracle,	**35%** High value industry solutions will become the 3rd platform for cloud expansion. (Health, Energy, Govt.)

35% of enterprises IT dollars will be spent outside of IT by 2015 - Gartner

$1 of every **$4** spent on applications will be consumed via the cloud by 2018 - IDC

30% of all new business software purchases will be service-enabled by 2018- IDC

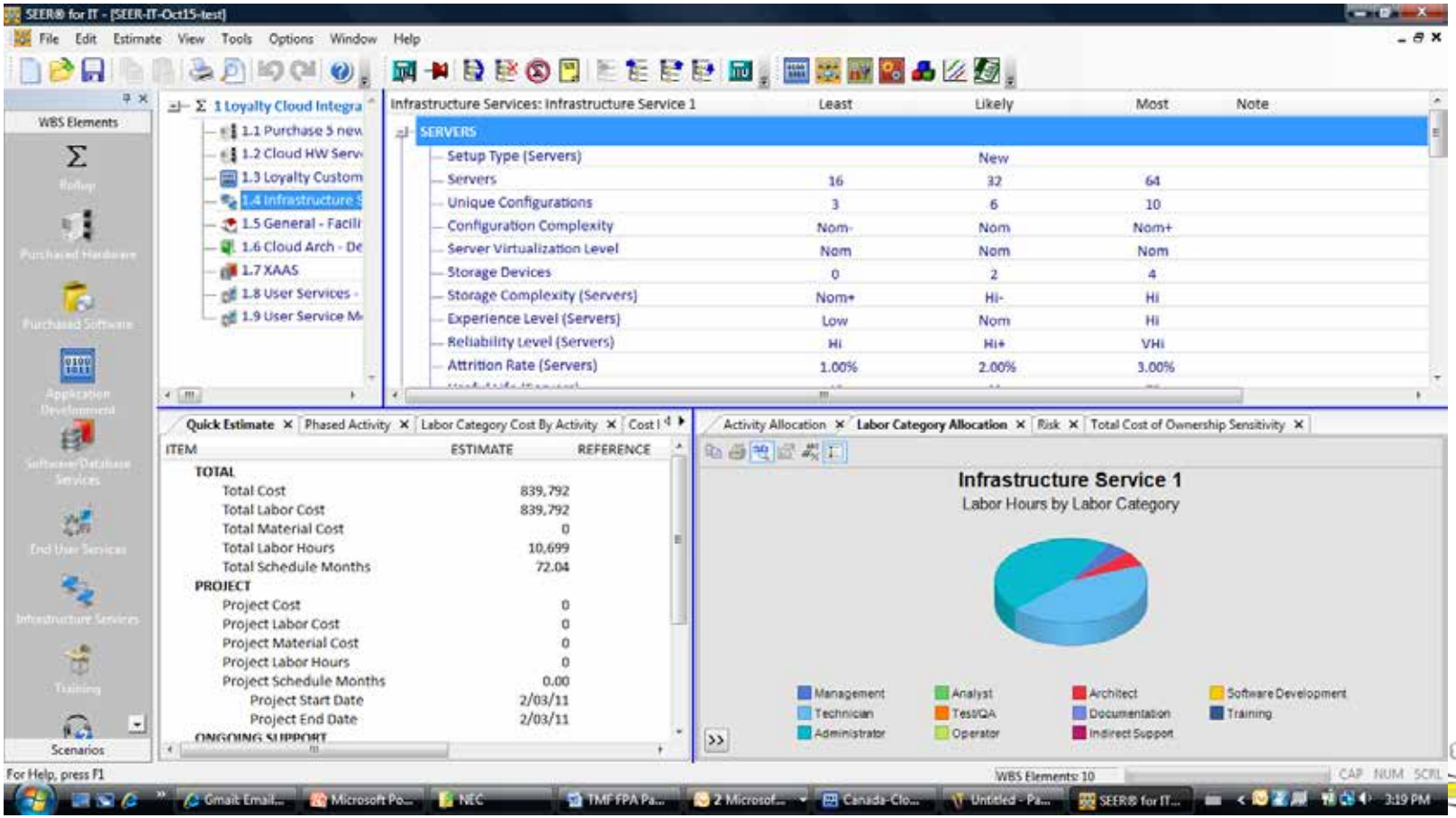
70% of the G2000 will still have 75% of IT resources running onsite by 2018 - IDC

December 2015

Parametrics Modeling Can Estimate Both Software and IT Costs

SEER by GALORATH

Size, approach, help desk, training, and many more IT / software cost modeling functions



SEER by GALORATH

- 1 Web Application Infrastructure
  - 1.1 Multi-Tier Web Application
    - 1.1.1 Web Tier
      - 1.1.1.1 Web Server
      - 1.1.1.2 Web Service
    - 1.1.2 Application Tier
      - 1.1.2.1 Application Host
      - 1.1.2.2 Application
    - 1.1.3 Data Tier
      - 1.1.3.1 Database and Storage Host
      - 1.1.3.2 Database Configuration
    - 1.1.4 Procurement of Hardware and Software
      - 1.1.4.1 Production Servers Purchase
      - 1.1.4.2 Purchase QA and Dev Server
      - 1.1.4.3 SQL Server
      - 1.1.4.4 Windows Server OS
  - 1.2 Cloud Hosted Multi-Tier
    - 1.2.1 Web Tier
      - 1.2.1.1 Web Service
    - 1.2.2 Application Tier
      - 1.2.2.1 Application
    - 1.2.3 Data Tier
      - 1.2.3.1 Database Configuration
    - 1.2.4 AWS EC2 Hosting (annual cost)
  - 1.3 QA and Dev Environment
    - 1.3.1 Test Server

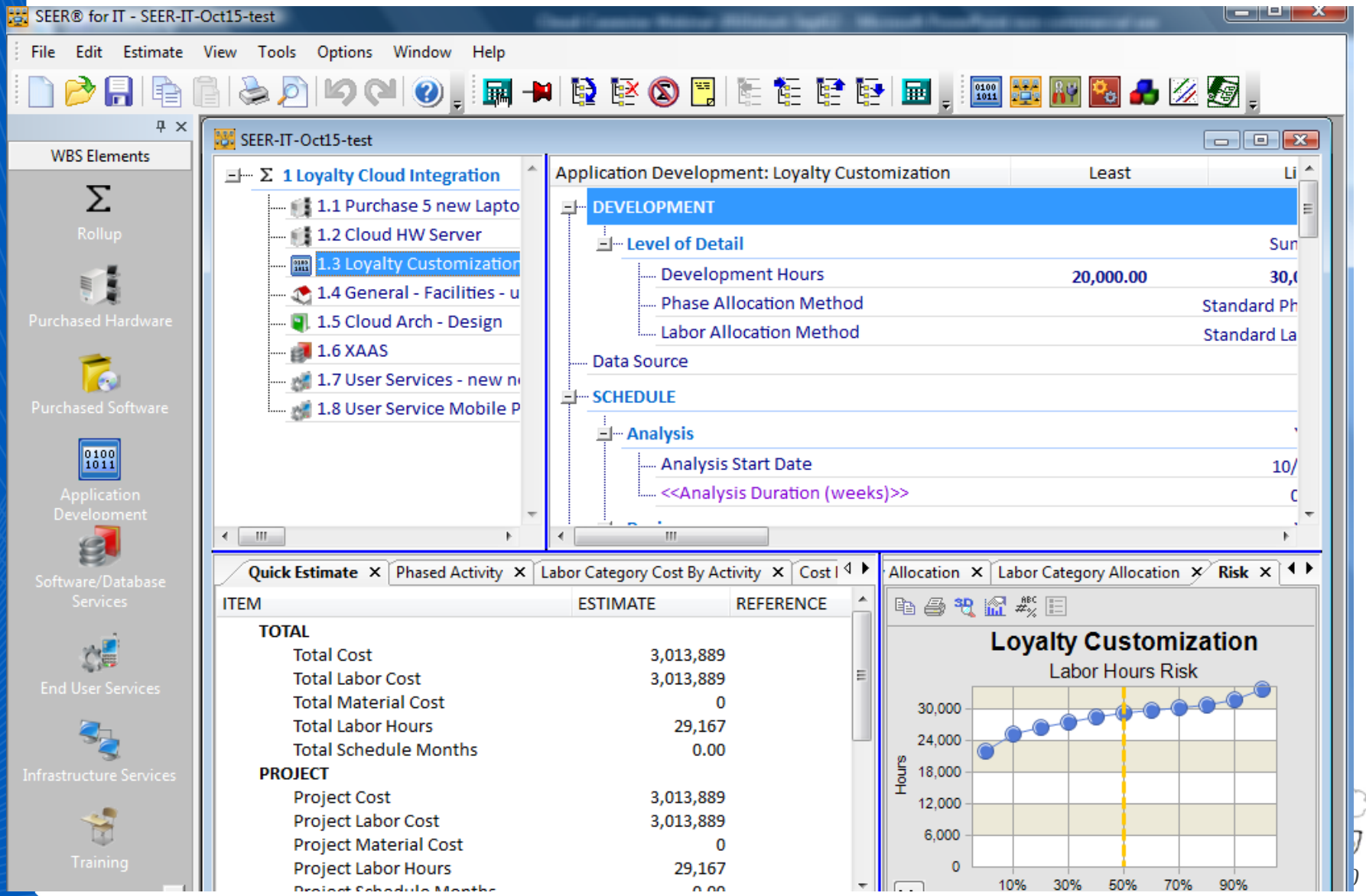
WBS Total Ownership Cost

ELEMENT	PROJECT COST	ONGOING SUPP... COST	TOTAL COST
1 Web Application Infrastructure	481,762	4,859,396	5,341,158
1.1 Multi-Tier Web Application	390,446	4,785,606	5,176,052
1.2 Cloud Hosted Multi-Tier			
1.3 QA and Dev Environment	55,125	0	55,125
1.4 Training and Documentation	36,190	2,224	38,414
1.5 Support	0	71,567	71,567

WBS Total Ownership Cost

ELEMENT	PROJECT COST	ONGOING SUPP... COST	TOTAL COST
1 Web Application Infrastructure	103,679	4,438,289	4,541,968
1.1 Multi-Tier Web Application			
1.2 Cloud Hosted Multi-Tier	12,364	4,364,499	4,376,862
1.3 QA and Dev Environment	55,125	0	55,125
1.4 Training and Documentation	36,190	2,224	38,414
1.5 Support	0	71,567	71,567

SEER-IT Estimate (Internal Cloud)



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Key Points

Cloud Computing Is Becoming Pervasive

Cloud full of challenges and opportunities

Cloud Is not necessarily less expensive from a total cost of ownership viewpoint

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