Cloud Solutions – Infrastructure, Platform or Software: Where should you go?

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Agenda

- Introduction
- Cloud Computing
- Picking the right ‘as a Service’
- Case Study
- Discussion and Final Thoughts

Introduction

- Cloud Computing as defined by National Institute of Standards and Technology (NIST

  "Cloud computing is a model for enabling ubiquitous, 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 release with minimal management effort or service provider interaction"

- *PRNewswire reports that 90% of medium to large enterprises plan to increase or maintain annual spend on cloud for 2016*
- According to CIO Magazine, the battle of the infrastructure is over – organizations have embrace outsourcing their hardware
- The new battle will be in the application space

Application Migration comes with Management and Planning Challenges

- How does an organization determine the right solutions to migrate to (or host in) the cloud?
- How do they identify the right platform for migration?
- What challenges do the various cloud solutions present?
  - Infrastructure as a Service (IaaS)
  - Platform as a Service (PaaS)
  - Software as a Service (SaaS)

- This paper
  - Defines the different solutions
  - Explains the implications of each
  - Presents a case study which proposes an analysis of the 'same' capability being migrated to IaaS, PaaS, SaaS – identifying potential short term and long term costs of each instance

Cloud Computing Overview

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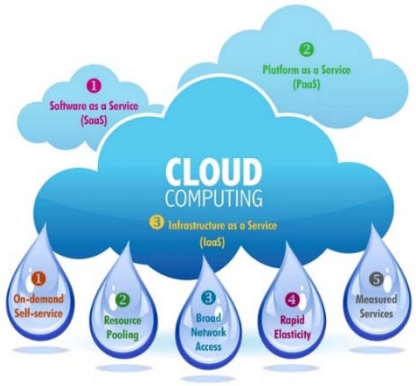
Cloud Computing Overview



- According to NIST, cloud computing delivers five essential characteristics
  - On demand self service – required IT resources are available when and where they are needed
  - Broad network access – all one needs is a browser and a network connection to get to their applications and data
  - Resource pooling – the location of the data centers is irrelevant – allowing cloud providers to pick locations where real estate and power are affordable
  - Rapid elasticity – through virtualization and distributed processing the offerings expand and collapse based on the users requirements for resources
  - Measured service – infrastructure is in place to monitor and measure service deliveries – with automatic correction and optimization

Cloud Computing Platforms

- Public Cloud
  - Available to any user of the Internet willing to meet the terms and condition of the cloud service provider.
  - Key characteristic of public cloud computing is multi-tenancy
- Private Cloud
  - Cloud computing infrastructure and technologies are maintained and operated for a single organization, department or agency
  - Private cloud could be housed on premise or remotely
  - Could be run internal resources or a cloud computing provider
  - Private cloud applications service a single customer
- Hybrid cloud
  - Intermingling of private cloud, public cloud and on premise resources
  - Organizations take advantage of public cloud where it makes sense
  - Gartner predicts 50% of enterprises will have hybrid cloud solutions by 2017

Picking the Right 'As a Service'

- Infrastructure as a Service
  - Computer infrastructure is accessed via the cloud.
  - Cloud providers manage the hardware and network
  - Cloud consumers manage operating system, middleware, applications, etc.
- Platform as a Service
  - Development environment is accessed through the cloud and application is deployed through the cloud
  - Cloud providers manage all of the infrastructure, supporting software and runtime environment
  - Cloud consumers manage data and applications
- Software as a Service
  - Software applications are accessed through the cloud and data is maintained in the cloud
  - Cloud provider provides entire software stack and all supporting hardware
  - Cloud consumer runs the application through a browser or front end app

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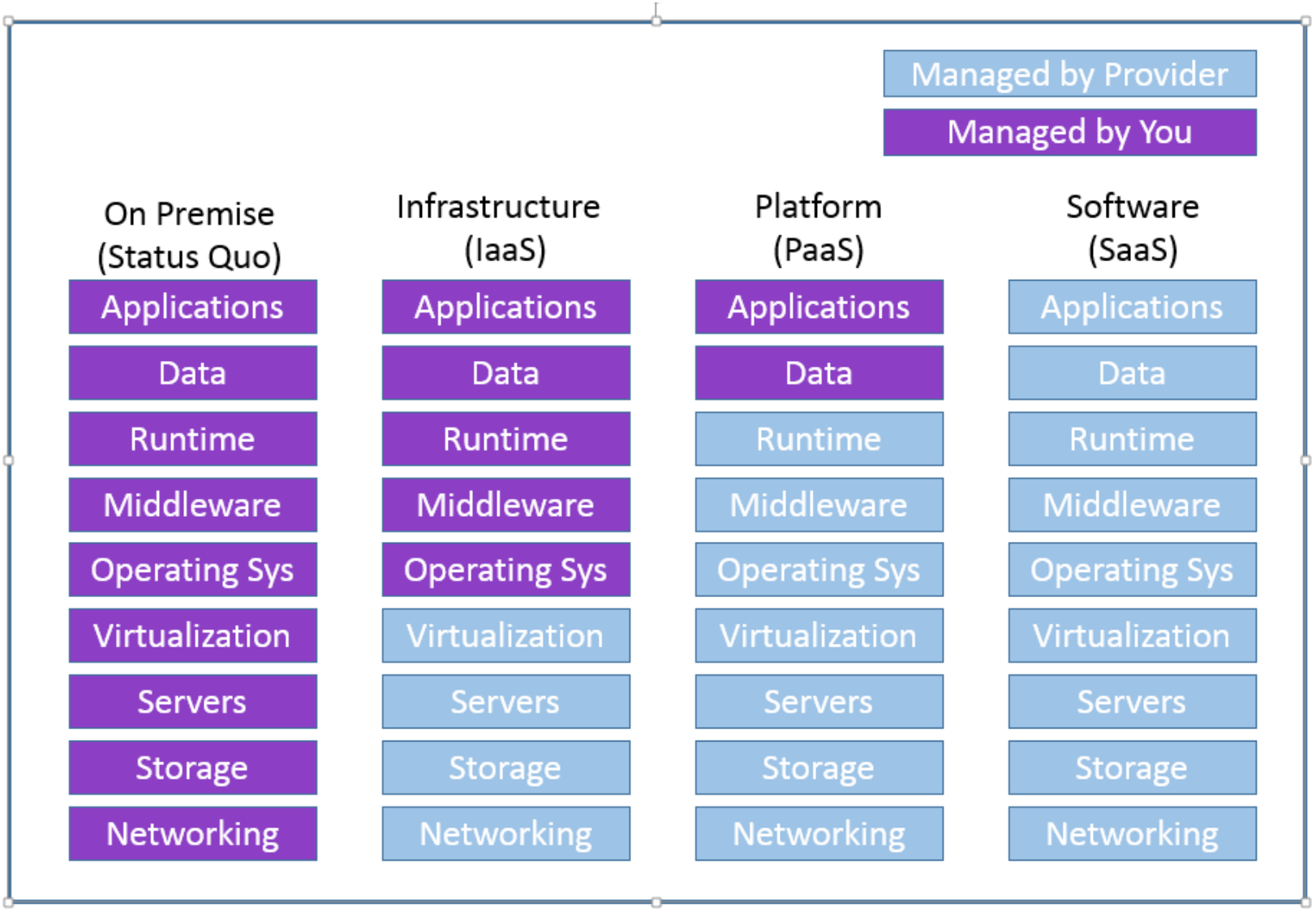
Picking the right ‘As a Service’



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Infrastructure as a Service

- Consumers purchase computing power, storage space, networks and networking services using some sort of consumption model
- Providers are responsible for maintaining all hardware and providing virtualization
- Consumers are responsible for installing and managing the entire software stack along with any applications and data they host
- An organization embracing IaaS could reduce their hardware footprint but would need to maintain basically the same IT skill set required for on premise operations

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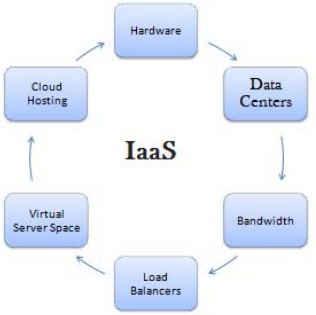
Infrastructure as a Service

- For Application migration cloud consumer must….
  - Install Operating System
  - Install, instantiate, and configure database management system
  - Install all necessary middleware and supporting software (required by the application)
  - Install and configure applications – this step is generally relatively simple as it can be migrated into the exact same environment (may need to be modified to take advantage of cloud features such as virtualization and scalability)



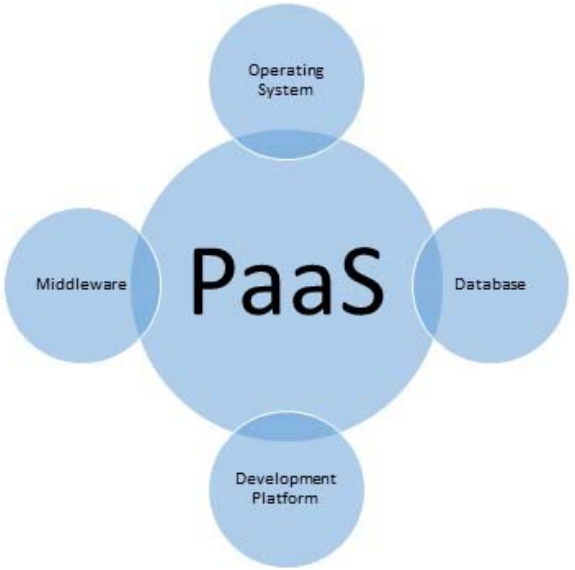
- Cloud consumer is also responsible for…
  - Load balancing
  - Management of the database management system
  - Management of operating system and all supporting software (updates, upgrades, etc.)

Platform as a Service

- Applications are developed and deployed in the cloud – hosted by the PaaS provider
- Feature rich environment for development, testing and deploying applications
- Generally provide multiple development and runtime environments
- Allows developers of products to eliminate the IT related and low level distractions and focus on implementing business logic
- Developers create business logic then use PaaS provided services to deliver that business logic
- Drag and drop interfaces and availability of many services results in extreme agility with…
  - Rapid deployments
  - More frequent deliveries of functionality
  - Continuous integration with automated testing
  - Automatic application deployments

Platform as a Service

- For application migration the consumer must….
  - Provision and configure database
  - Implement the business logic of the application
  - Construct the rest of the application using services available through PaaS
  - Deploy the application
- PaaS consumer is also responsible for …
  - Managing and maintaining the application
  - Managing the data



Software as a Service

- Software is accessed via a web browser or using a front end application (think Facebook or LinkedIn on your smart phone)
- SaaS Provider is responsible for managing and maintaining hardware, networks, software stack, application and data
- For application (capability) migration the consumer must
  - Migrate any databases to the SaaS platform

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IaaS, PaaS, SaaS Case Study

- Case Study intended to present three comparable solutions for migrating a capability from on premise to the cloud
- Some simplifications and a bit of scenario stretching was involved
  - in other words it's not likely that a single organization would consider all of these exact scenarios
- The intent is to walk through the thought process an organization would go through when considering various alternatives in the cloud

The Case

- *The Ajax Company sells widgets. They have 100 employees doing sales and sales support. They have 5000+ customers worldwide. They currently use Seibel for Customer Relationship Management (CRM) along with a custom application they have developed to handle internal reporting requirements and analysis functions. For some time business leaders have seen the value in moving to the cloud and see CRM as a good place to start. They have been concerned as to how this would impact this custom capability on which they have become very dependent. At this time they have decided to do a more detailed analysis of what a move to the cloud would entail and what the benefits would be. For completeness they have decided to consider the various cloud platforms before deciding. The options they are considering include:*
  - *Status quo - Stick with Seibel*
  - *SaaS - Migrate to SalesForce.com and create an interface with their custom application using Salesforce.com APIs*
  - *PaaS – Migrate to SalesForce.com and use force.com to develop and integrate report and analysis capability with their SalesForce database*
  - *IaaS – Migrate the entire solution to Rackspace*

Status Quo

- Current Situation
  - Three full time IT Technicians for the entire enterprise
  - Two full time programmers
  - Average fully burdened salaries of $142,600 per employee
  - IT Organization maintains 3 servers and support 125 end user devices – 1 server is completely devoted to CRM and the custom application
  - They estimate that approximately 40% of IT Technicians' time is spent with activities related to CRM (maintenance of server, updates, upgrades, database maintenance and configuration, internal help desk support, etc.)
  - They estimate that approximately 50% of programmers' time is spent maintaining and updating the custom application
  - They have 100 Seibel licenses at a discounted annual rate of $1000 per user

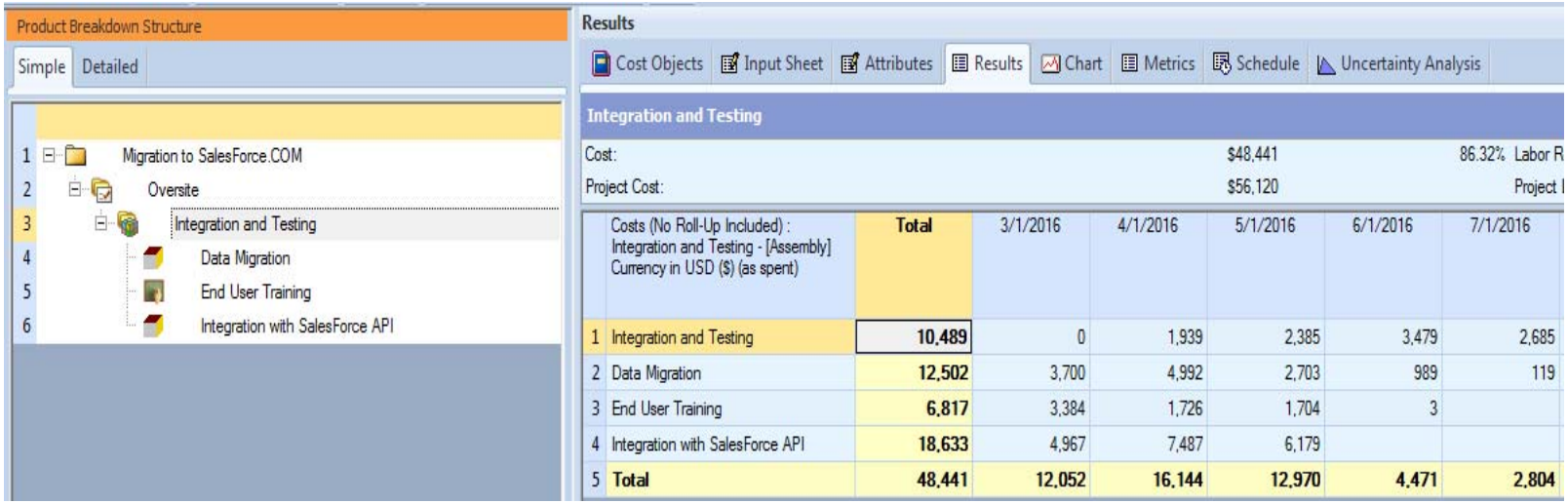
Status Quo

- Five year projected of cost related specifically to CRM activities
  - Assumes 2% inflation

	Five Year Cost	2016	2017	2018	2019	2020
Licensing	$ 520,404	$ 100,000	$ 102,000	$ 104,040	$ 106,121	$ 108,243
IT Operations	$ 718,158	$ 138,000	$ 140,760	$ 143,575	$ 146,447	$ 149,376
Development	$ 957,543	$ 184,000	$ 187,680	$ 191,434	$ 195,262	$ 199,168
Total	$ 2,196,105	$ 422,000	$ 430,440	$ 439,049	$ 447,830	$ 456,786

SaaS – Migrate to Salesforce.com

- Costs associated with Migration include
  - Data Migration of Seibel database to Salesforce
    - *Assume minimal modification and 15 tables per database*
  - Integrating Custom App with Salesforce via API (development effort will be outsourced)
    - *Integration touches approximately 10% of the 500 Function Point application*
  - End user training
    - *Each of the end users will spend 1 to 2 hours self training*
  - License for salesforce Enterprise edition is $65/user/month
- Cost estimate based on these assumptions:



	Costs (No Roll-Up Included) : Integration and Testing - [Assembly] Currency in USD ($) (as spent)	Total	3/1/2016	4/1/2016	5/1/2016	6/1/2016	7/1/2016
1	Integration and Testing	10,489	0	1,939	2,385	3,479	2,685
2	Data Migration	12,502	3,700	4,992	2,703	989	119
3	End User Training	6,817	3,384	1,726	1,704	3	
4	Integration with SalesForce API	18,633	4,967	7,487	6,179		
5	**Total**	**48,441**	**12,052**	**16,144**	**12,970**	**4,471**	**2,804**

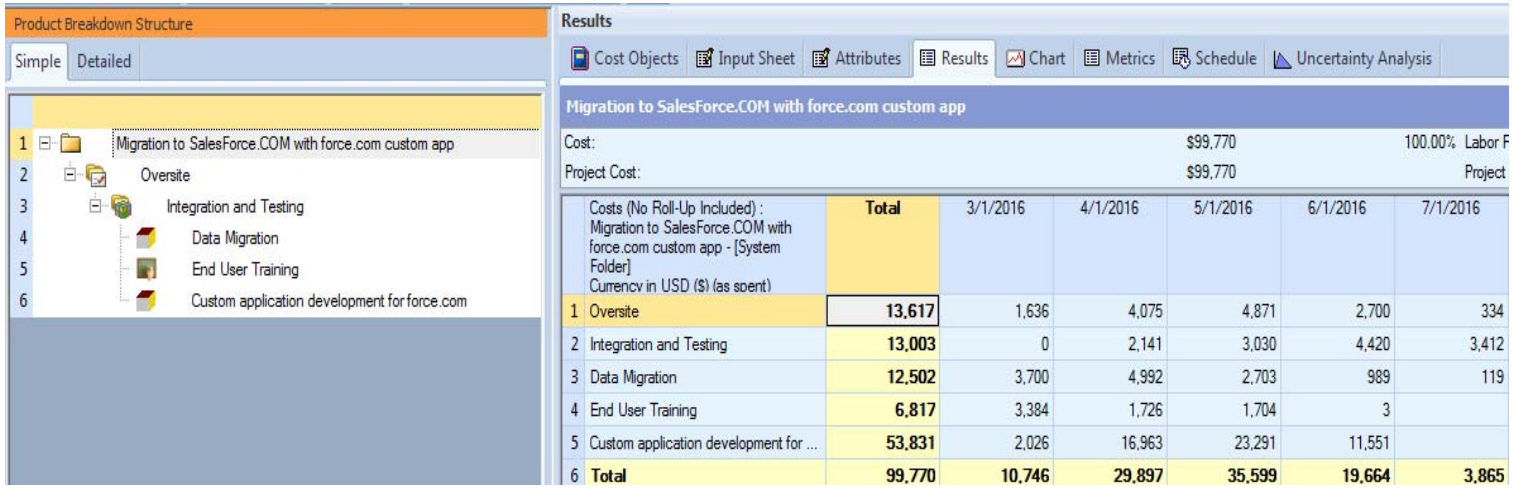
SaaS – Migrate to SalesForce.com

- Five year projection for SaaS solution includes the following assumptions
  - For transition period Seibel license is maintained the first year, Salesforce license kicks in the middle of the year
  - Assumes that after the first year, the IT Technicians' involvement in CRM system drops to 20% of total time
  - Assumes 2% inflation

	Five Year Cost	2016	2017	2018	2019	2020
Licensing	$ 460,485	$ 139,000	$ 78,000	$ 79,560	$ 81,151	$ 82,774
Migration Project	$ 48,441	$ 48,441	$ -	$ -	$ -	$ -
IT Operations	$ 428,079	$ 138,000	$ 70,380	$ 71,788	$ 73,223	$ 74,688
Development	$ 957,543	$ 184,000	$ 187,680	$ 191,434	$ 195,262	$ 199,168
Total	$ 1,894,549	$ 509,441	$ 336,060	$ 342,781	$ 349,637	$ 356,630

PaaS – Salesforce and Force.com

- Costs associated with migration include
  - Data migration and end user training as with SaaS
  - Development of custom capability
    - *Services available through force.com indicate only 100 Function Points of business logic need to be created*
  - Force.Com Enterprise edition is $25/user/month
    - *Since only 40 of the users use the custom capability – only 40 licenses are required*
  - Development effort will be outsourced
- Cost Estimate based on these assumptions…..



	Costs (No Roll-Up Included) : Migration to SalesForce.COM with force.com custom app - [System Folder] Currency in USD ($) (as spent)	Total	3/1/2016	4/1/2016	5/1/2016	6/1/2016	7/1/2016
1	Oversite	13,617	1,636	4,075	4,871	2,700	334
2	Integration and Testing	13,003	0	2,141	3,030	4,420	3,412
3	Data Migration	12,502	3,700	4,992	2,703	989	119
4	End User Training	6,817	3,384	1,726	1,704	3	
5	Custom application development for ...	53,831	2,026	16,963	23,291	11,551	
6	**Total**	**99,770**	**10,746**	**29,897**	**35,599**	**19,664**	**3,865**

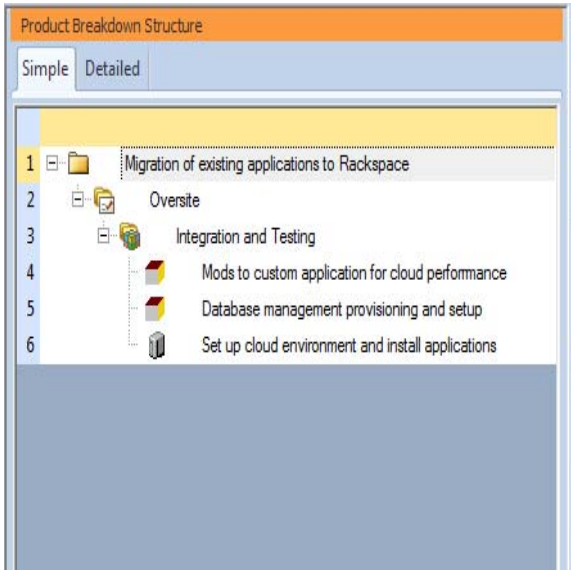
PaaS – Migrate to Salesfoce and force.com

- Five year projection for PaaS solution includes the following assumptions:
  - After transition, one server can be eliminated
  - One IT Technician could have been eliminated but since the IT Technicians are more cloud savvy than programmers
    - *Trained an IT Technician in force.com to maintain custom solution*
    - *Eliminated one programmer position*
  - Assume that with maintenance of custom application IT Technicians' time devoted to CRM is approximately 25%

	Five Year Cost	2016	2017	2018	2019	2020
Licensing	$ 515,945	$ 145,000	$ 90,000	$ 91,800	$ 93,636	$ 95,509
Migration Project	$ 99,770	$ 99,770	$ -	$ -	$ -	$ -
IT Operations	$ 448,848	$ 86,250	$ 87,975	$ 89,735	$ 91,529	$ 93,360
Development	$ 570,772	$ 184,000	$ 93,840	$ 95,717	$ 97,631	$ 99,584
Total	$ 1,635,335	$ 515,020	$ 271,815	$ 277,251	$ 282,796	$ 288,452

IaaS – migrate to Rackspace

- Costs associated with migration include…
  - Custom application requires about 10% rework to take advantage of cloud features such as virtualization and scalability
  - Technicians need to install, provision and configure the DBMS
  - Technicians need to recreate the software stack in the cloud
  - Technicians need to port the applications and the data to the cloud environment



Results

Cost Objects | Input Sheet | Attributes | Results | Chart | Metrics | Schedule | Uncertainty Analysis

Migration of existing applications to Rackspace

Cost: $63,019 100.00% Labor F

Project Cost: $63,019 Project

	Costs (No Roll-Up Included) : Migration of existing applications to Rackspace - [System Folder] Currency in USD ($) (as spent)	Total	3/1/2016	4/1/2016	5/1/2016	6/1/2016	7/1/2016
1	Oversite	8,866	2,694	2,030	2,065	1,265	477
2	Integration and Testing	16,597	0	817	2,726	4,357	5,118
3	Mods to custom application for cloud...	24,591	1,031	8,635	10,346	4,579	
4	Database management provisioning ...	5,733	2,679	2,579	447	24	3
5	Set up cloud environment and install...	7,232	7,232	0			
6	**Total**	**63,019**	**13,638**	**14,062**	**15,584**	**10,226**	**5,599**

IaaS – Migrate to RackSpace

- Five year projects for IaaS solution includes the following assumptions
  - Reduction of one server
    - *This does not reduce the need for an IT Technician as the maintenance, care and feeding of the RackSpace VMs will be handled by IT Technicians*
  - IT Technicians' involvement in CRM assumed to be 20% (no hardware issue but still software issues)
  - Using the RackSpace calculator it was determined that the required computing power, storage space, and bandwidth would cost $8396. per month

	Five Year Cost	2016	2017	2018	2019	2020
Licensing	$ 573,941	$ 150,376	$ 102,767	$ 104,822	$ 106,919	$ 109,057
Migration Project	$ 63,019	$ 63,019	$ -	$ -	$ -	$ -
IT Operations	$ 359,079	$ 69,000	$ 70,380	$ 71,788	$ 73,223	$ 74,688
Development	$ 957,543	$ 184,000	$ 187,680	$ 191,434	$ 195,262	$ 199,168
Total	$ 1,953,583	$ 466,395	$ 360,827	$ 368,044	$ 375,404	$ 382,913

What's the right 'As a Service' ?

	Five Year Cost	2016	2017	2018	2019	2020
Status Quo	$ 2,196,105	$422,000	$439,449	$439,049	$447,830	$453,786
Salesforce.Com (SaaS)	$ 1,894,549	$509,441	$336,060	$342,781	$349,637	$356,630
Force.com (PaaS)	$ 1,635,335	$515,020	$271,815	$277,251	$282,796	$288,452
Rackspace (IaaS)	$ 1,953,583	$466,395	$360,827	$368,044	$375,404	$382,913

Discussion and Final Words

- Three flavors of Cloud solutions available
  - IaaS – provider provides infrastructure, consumer manages software, data, applications
  - PaaS – provider provides infrastructure, development platform, services, consumer manages applications and data
  - SaaS – provider provides infrastructure, platform, application, provider manages application and data
- Concerns when planning a cloud migration
  - Do we have the right IT skill set to consider IaaS, PaaS, SaaS?
  - Are we willing the spend money to develop cloud skills?
  - Are we comfortable housing our data in the cloud?
  - Is Public, Private or Hybrid solution suitable for our applications?
  - What are the integration issues?