ISEC 2008

ISEC 2008
1st India Software Engineering Conference
  - Feb 19-22 2008

ARE SOFTWARE AS A SERVICE (SAAS) AND CLOUD COMPUTING THE FUTURE?

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Cloud Computing

Flexible access to a pool of remote computing resources across the internet (intranet)

- Computing can be more readily be divided (virtualization)
- Doled out on demand, and combined
- Naturally coupled with a pay-per-use business model ("utility computing").
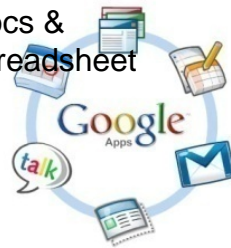- "Web Scale Computing" is a similar term

Hardware Cloud

amazon.com
IBM

Desktop Cloud

Docs & spreadsheet
Google Apps
talk
Zimbra
Microsoft Office Live Workspace Beta

Services Cloud

amazon webservices™
YAHOO!
ebaY

SaaS Cloud (as of today)

CrownPeak — MANAGE CONTENT NOT TECHNOLOGY
NETSUITE — ONE SYSTEM. NO LIMITS.
salesforce.com — Success On Demand.™

What's in The Cloud?
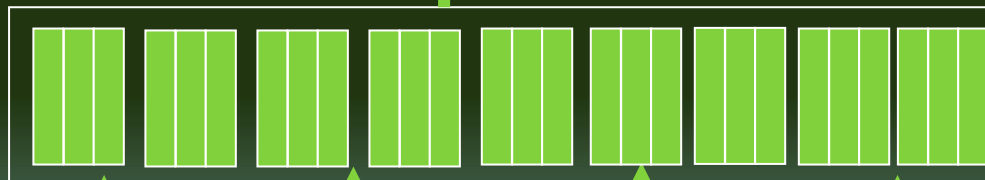
Computing Requests from the Internet (Intranet)

a set of technologies to create a virtual computing infrastructure by allowing division of physical assets (processing power, storage and network bandwidth) into virtual machines (e.g., VMware virtual server)

Elastic Computing

A technology for provisioning and load balancing that doles out the virtual infrastructure on demand (e.g., Amazon's EC2)

Virtualized Computing Resources

VM, VM, VM

Grid Computing

A computing architecture in which a large number of individual computers work in a pool and in parallel (e.g., Google's Map-Reduce)

Physical Computing Resources

Remote Computing Center

Clouds in Existence Today

- **Amazon External Internet Cloud:**
  - **Simple Storage Service (S3**) – $0.15c/month per a gig
  - **Elastic Computing Cloud (EC2)** – pay per use via on demand VMs- $0.10 VM instance/hour.

- **Google's Proprietary Internal Cloud**
  - Estimated to harness 100,000's of servers. Google is also said to be preparing to offer an external storage cloud.

- **IBM "Blue Cloud" Offering for Enterprise Data Center** Cloud Creation:
  - Combines data-intensive Grid virtualization (via IBM offering), and elastic computing (via Tivoli)

Coupa- eProcurement company uses open source SaaS, S3 & EC2- entry within 6 weeks!!
SmugMug: Online photo sharing – uses S3
JamGlue: Online music mixing (S3,EC2)
PowerSet: Natural language Search
line mail

Very attractive for SMBs and Startups
Large enterprise will be slow to adopt

SaaS and Cloud Computing

- Next generation SaaS promises everything as a service over the internet
- Cloud computing started with a similar premise
  - A computing paradigm where there exists a flexible set of computing resources across the internet

- Distinction getting blurred

  - The most prominent example of Infrastructure-as-a-Service is Amazon EC2 (which is a hardware cloud)
  - RightScale (provides Runtime platform as a Service) makes EC2 a better fit for SaaS, http://blogs.zdnet.com/SAAS/?p=417
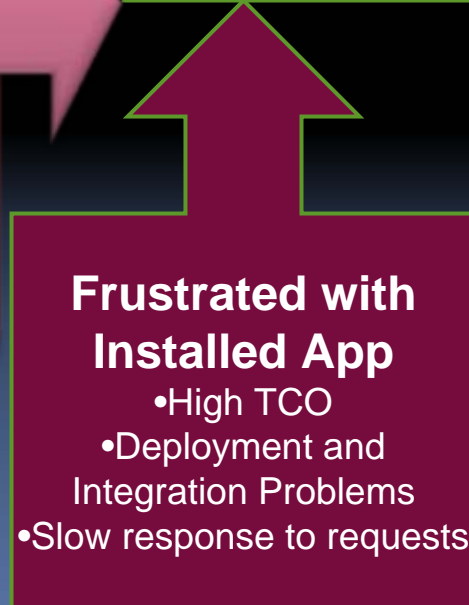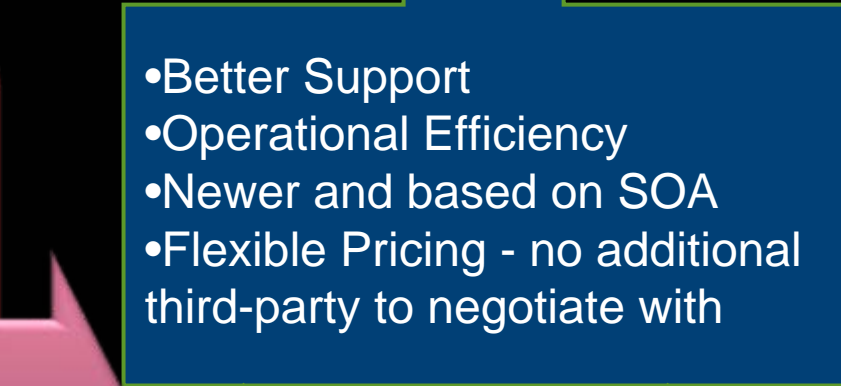 - The SaaS cloud is nothing but today's SaaS 2.0

Evolution of SaaS- 1.0 to 2.0

•Pricing had to be negotiated with the software vendor

•Ability to meet customer needs was limited by the 3rd party software

•Operation efficiency was largely dictated by the software

•**Thus, it was hard to differentiate their operations with their competitors**

SaaS 1.0

ASP

SaaS providers sourced software from 3rd party software providers

SaaS 2.0

Application-centric

SaaS providers own the software

Salesforce.com has 44% of the hosted CRM market

•Better Support
•Operational Efficiency
•Newer and based on SOA
•Flexible Pricing - no additional third-party to negotiate with

Frustrated with Installed App
•High TCO
•Deployment and Integration Problems
•Slow response to requests

Technology Maturity

•High bandwidth
•Services Architecture
•Flexible Integration
•Rich media UI

SaaS 3.0-"everything as a service" over the Internet

SaaS 3.0

Vendors provide platforms for development, run-time, and integration as a service.

SIs/customers can customize the SaaS offerings using the platform.

Key Providers: SalesForce.com NetSuite, Oracle, Microsoft

SaaS 1.0
ASP

SaaS providers sourced software from 3rd party software providers

Ability to meet their customers' needs was limited by the third-party software

SaaS 2.0
Application-centric

SaaS providers own the software

Greater ability to customize software based on customer needs

More flexible pricing

Key Providers: SalesForce.com NetSuite

Integration-as-a- service

A business solution is created by integrating on-premise, partner and SaaS applications

Application-as-a-Service (SaaS 2.0)

Microsoft Exchange Server
Oracle CRM
SAP on Demand
Salesforce.com

Runtime-Platform-as-a-Service

Provides runtime resources and infrastructure for SaaS applications

OpSource offers Infrastructure provisioning with 100% uptime guarantees to SaaS providers

Development-Platform-as-a-service

Infrastructure-as-a-Service

Similar to

Hardware Cloud

Development-Platform-as-a-Service

Integration-as-a-service | Application-as-a-Service | Development-Platform-as-a-service
Runtime-Platform-as-a-Service
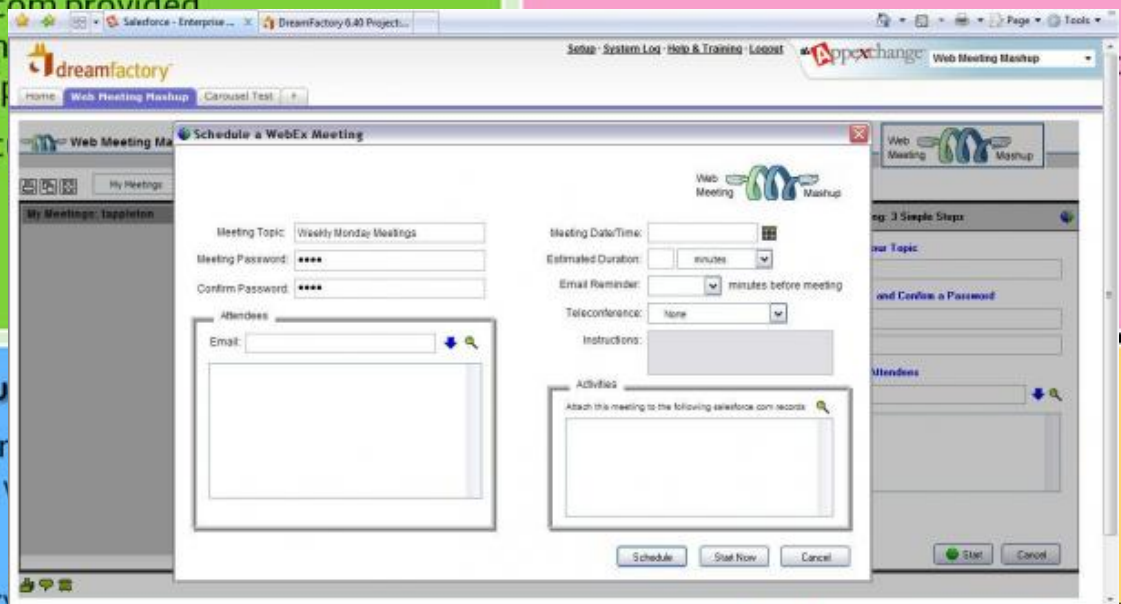Infrastructure-as-a-Service

Programming environment and workflow

Salesforce.com provided

1. AppExchan... create new a...

2. Ability to c... process

Integration and ability to create mashup

...ations

UI u...

DreamFactor... layers which ...

Dreamfactory... Mashup (WMM) application for AppExchange –

It is a browser based IDE by integrating WebEx, Salesforce.com and Outlook

...ERP connectors, ...co and Informatica Middleware connectors

KEY PLAYERS
SalesForce.com
Dreamfactory
NetSuite: SuiteFlex
Oracle SaaS Platform
Microsoft SaaS Platform

Picture Source: www.dreamfactory.com/webmeetingmashup/index.html

Potential Benefits of Cloud Computing

For Infrastructure provider

- Reduce capital expenditures through infrastructure pooling and improved utilization
- Reduce operating expenditures
  - Centralize operations
  - Increase admin efficiency
  - Standardize on best practices
  - Automate processes over time
- Improve service levels
  - Standardize offerings
  - Appropriate service level for applications
  - Can shape the software for better operational efficiency

For Enterprise

- Pay as you go and focus on core business
- Pay only for what you need- useful when the service demand fluctuates
- Reliability – Amazon Cloud claims 99% availability with no loss*
- Fault Tolerance – clouds built with constant component failure presumed

* The cloud computing model can also be adopted within a large organization where different departments are the consumers of the central cloud computing infrastructure (for example IBM Blue Cloud would support)

Adoption Issues

- Security and Transparency – storing enterprise data external to an enterprise and transparency of where the data is being stored?

- Meeting various Non functional SLAs – Reliability? Performance?

- Inefficiencies of Generic Computing
  - More generic → more complex → less understandable, performance drop
  - Google needs a specialized hardware/software cloud to optimize its enormous search problem

- Fixed Cost Advantage vs Variable Rental Cost : No clear answer
  - For bootstrapping and for resource on-demand – Yes. But should we continue to rent when the demand stabilizes?

  - How easy is it to migrate?
- Large enterprises have heavy existing investments in internal non-virtualized data centers. Transition to external cloud will not be easy

Trends to Watch for- Hypothesis

- Cloud Computing- Coupling to SaaS- Natural Partners

- Subservience to SaaS- Customer chooses SaaS, leaving CC to SaaS provider

- Large Enterprises Prefer Making Part of Outsourcing Deals
  - Based on IDC Study July 2007*

- Favored for Emerging Market Entry – given difficulty of maintaining IT infrastructure (electricity etc) in some emerging markets, globalizing companies may prefer provide services via cloud rather then via in-country physical data centers

The Bigger Picture: A General Cloud Trend

- Clouds – the trend of decoupling of the source of consumption of IT from the source of production extends beyond infrastructure (the "Computing Cloud"):
    - Software Clouds – SaaS
    - Desktop Clouds – Google, as well as various startups are making equivalents of the Office suite available over the net. These may have economies for non mobile workers who have always on internet connections (e.g., call centers).
    - Labor Clouds – Amazon is also pioneering human labor as a service from the cloud where one can request a service in code (like article translation or image indexing) where the "computing device" on the other end of the service is a human. Trends like crowd sourcing and open source development are part of this story as well.
- New Innovative Business based on SaaS/CC: Coupa, MuleOnDemand
- SI partner and SaaS provider- CapGemini-Google to offer Google Apps Premier Edition

- In other words much of what was within the corporate boundary as services is being served up increasingly over the internet. Enterprises will have to integrate internal and external services and decide which services are core and must be internal

Thank you!