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

-- Santonu Sarkar
accenture
Technology Labs
Bangalore
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.
What's in The Cloud?

Computing Requests from the Internet (Intranet)

**Virtualized Computing Resources**

- **Elastic Computing**
  - 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)

- **Remote Computing Center**

**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)
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
WebMail.us: Online 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)
  - The SaaS cloud is nothing but today’s SaaS 2.0
Evolution of SaaS—1.0 to 2.0

**SaaS 1.0**
- ASP
- SaaS providers sourced software from 3rd party software providers
- 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 2.0**
- SaaS providers own the software
- Application-centric
  - 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
- Technology Maturity
  - High bandwidth
  - Services Architecture
  - Flexible Integration
  - Rich media UI

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

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SaaS 3.0—“everything as a service” over the Internet

Vendors provide platforms for development, runtime, and integration as a service.

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

Key Providers:
SalesForce.com
NetSuite, Oracle, Microsoft

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

Hardware Cloud

Similar to
Development-Platform-as-a-Service

Programming environment and workflow

Salesforce.com provided
1. AppExchange - to create new apps
2. Ability to 1 click process

Integration and ability to create mashup

UI (User interface)

DreamFactory is a middleware layer which

Dreamfactory application framework (WMM) - AppExchange
It is a browser based IDE by integrating WebEx, Salesforce.com and Outlook

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

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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)

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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 than 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!