Google Application Engine

Introduction

Charles Severance

Web Applications

http://en.wikipedia.org/wiki/HTTP
Internet

Your Computer

The Internet

Data Center

Click

Request

Response

Your Computer

The Internet

Data Center

Cloud Computing

http://en.wikipedia.org/wiki/Cloud_computing
In a pre-cloud view, servers have a geographic location and we use the Internet to exchange data with those servers.

Google I/O 2008 Keynote

- Google I/O '08 Keynote by Marissa Mayer
- Usability / User Experience / User Testing / Architecture / Philosophy

http://www.youtube.com/watch?v=6x0cAzQ7PVs
Lessons

- The cloud is wide - we can touch 1000 servers in 0.1 seconds
- For things that seem “intelligent” 0.2 seconds is fast enough - as long as you can do a lot of them
- Lots of spread-out storage and a fast scan is important
- Data - Information - Knowledge - starts with data and the ability to look through that data quickly

Infrastructure

- The only sustainable scalability is when you scale with inexpensive, green solutions
- Tape Backup is a rate limiting factor - so we need something creative
- Disaster recovery - “Of course!”
World-Scale Applications

• For world-scale applications - the servers must be distributed around the world
• But users must see a uniform “single image” - www.google.com
• Also the programmers cannot know the structure or geography of the servers - because this always changes

Google Server Locations


Programming in the Cloud

• Programmers operate in a controlled environment
• Programs do their programming thing - code + data
• A complex software framework manages getting the right code and data to/from the right servers.
• Software developers are unaware of geography
The geographic location no longer matters - the software “runs somewhere in the cloud”.

Resources can be dynamically adjusted as load changes.

Post-Cloud View

The nature of the HTTP Request/Response cycle makes the cloud possible

• Since clients are not connected for very long - the cloud can be changed in between requests

• As long as the cloud “fakes” everything about the protocol - no one is the wiser..

• The cloud engineers at Google/Amazon/Yahoo are pretty clever.
Cloud Summary

• The cloud is the Internet plus computing that is “embedded” “inside” the network

• Companies like Google, Amazon, and Yahoo put servers all over the world

• Software runs on whichever server is most appropriate and data/code is moved around and the cloud can be reconfigured dynamically

Google App Engine

• Expose Google’s worldwide Infrastructure to us as developers

http://www.youtube.com/watch?v=3Ztr-HhWX1c
http://www.youtube.com/watch?v=oTFL7FPlnXY

Google App Engine

• When you write a Google Application Engine Application - you are running in the Google Cloud

• Just like you were a Google Developer

• You don’t know where you are running or if one copy of a thousand copies of you are running

• Google hosts small applications for *free* - larger applications pay by usage
Free Accounts

- A free account can use up to 500MB of persistent storage and enough CPU and bandwidth for about 5 million page views a month.

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Why is App Engine Free?

- Make the web better
- Be the first widely used “cloud” environment - beat Amazon, Microsoft, and Yahoo!

Summary

- We introduced Cloud Computing - servers move “into” the network cloud
- Google App Engine allows us to use the Google Cloud for free
- To make use of this resource we need to “learn the rules of the road”