Lecture 5: The Cloud

Announcements

- Assignment 2 is posted tonight,
  - New due date: Friday Feb 17th at 11:59pm

- Next lecture:
  - MapReduce!
What’s the cloud?

– According to NIST:

Cloud computing is a model for enabling 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 released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.
What’s the cloud?

- It’s a set of utilities offered to applications:
  - Computing
  - Storage
  - Communication

- With the appearance of infinite capacity

A bit of history

- 1940s: The first datacenters
- 1960s: Time sharing
- 1980s: PCs appeared
- 1990s: Grids and clusters
- 2000s: Clouds are the new trend

Do you think it’s there to stay?
Characteristics of the cloud

- According to NIST, it must have the following characteristics:
  - On-demand service
  - Broad network access
  - Resource pooling
  - Rapid elasticity
  - Measure service

- More:
  - Availability
  - Network performance
  - Security

Why use cloud services?
How does it look like?

Inside the cloud
Inside the cloud

- So a datacenter is just a big network of machines.
- How can we achieve all of the characteristics we just mentioned?
- Virtualization is a key!
- What is virtualization?

Virtualization

[Diagram of virtualization concept]

*Infrastructure as a service is built on pooled resources for computing, storage, and networking. (From *An Enterprise Private Cloud Architecture and Implementation Roadmap*, Intel IT, June 2010)*
Models of cloud services

- SaaS
- PaaS
- IaaS
- HaaS

Security - Who is in control?