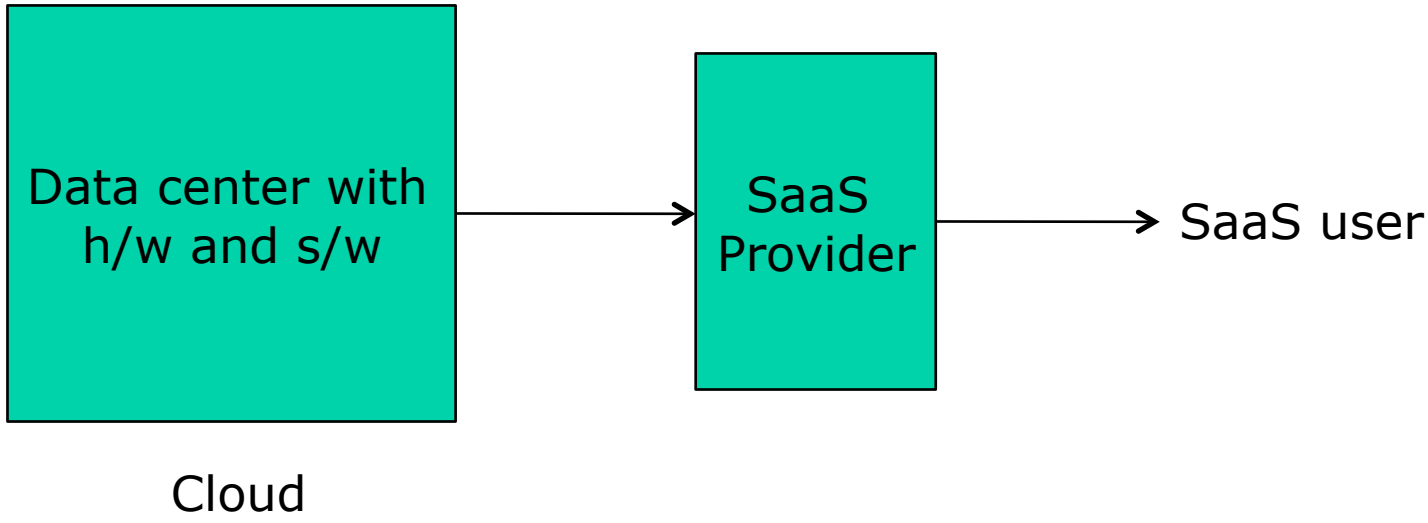
Distributed Systems

Lecture 9: Cloud Computing

Cloud Computing



Suppose you have an innovative idea?

- Large capital outlay in hardware
- Human expense to operate
- Over provisioning concerns - new software not as popular as once hoped
- Under provisioning concerns - missing potential users
- Cloud computing may allow you to start small and grow.

Or, suppose you have as large batch-oriented task?

- Suppose you need 1000 hours on a machine for a large batch task.
- With cloud computing, 1000 servers for one hour costs not more than 1 server for 1000 hours. But the job is done in one hour.
- How do we benefit from using a cloud?
- This degree of elasticity may be unprecedented in the history of IT.

Three new aspects

- The illusion of infinite computing resources on demand (no far ahead provisioning concerns)
- The elimination of up front commitment by cloud users (start small and grow)
- Pay for resources on a short term basis as needed (reward conservation)

Key Enablers

- Construction and operation of extremely large-scale commodity-computer datacenters at low cost locations
- Statistical multiplexing to increase utilization
- Virtualization of computation, storage, and communication

Three Examples

- AppEngine (Google) Build scalable web applications fast. Not for general purpose computing.
- Azure (Microsoft) Use .NET and .NET libraries as needed. General purpose computing on a Microsoft platform.
- EC2 (Amazon) Elastic Compute Cloud (Choose OS and the entire software stack. General purpose computing.