

INTRODUCTION TO CLOUD COMPUTING

CIT 3400

LECTURE 6

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TYPES OF CLOUDS

- Public, Private, Hybrid Clouds
- Names do not necessarily dictate location
- Type may depend on whether temporary or permanent

PUBLIC CLOUDS

- 3rd party , applications from different customers mixed together
- Typically hosted away from customer premises

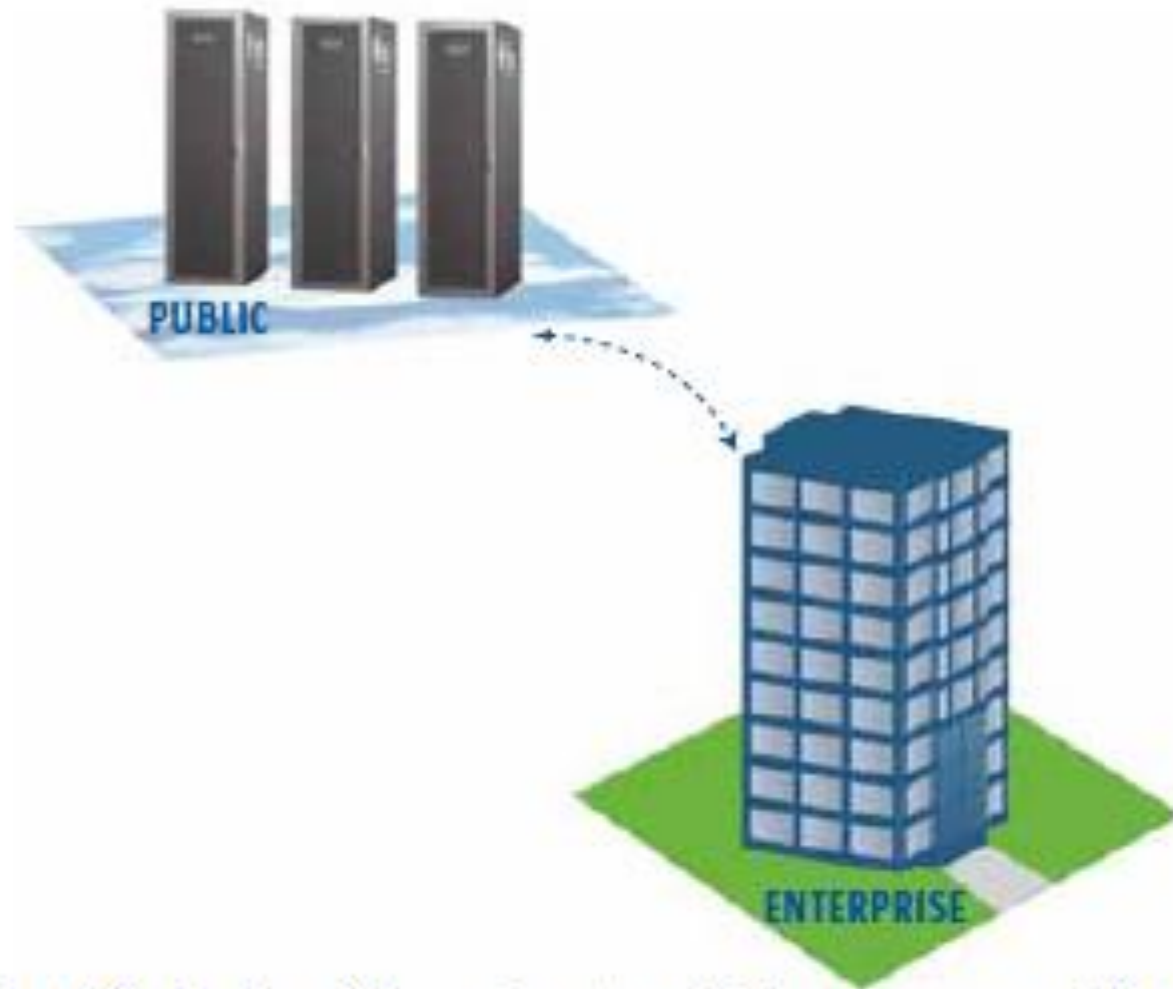


Figure 3. A public cloud provides services to multiple customers, and is typically deployed at a colocation facility.

PRIVATE CLOUD

- Built for exclusive use of one client – utmost control over data, service, QOS
- Company owns infrastructure – may be located at enterprise or at colocation
- Built and managed by enterprise IT or cloud provider



Figure 4. Private clouds may be hosted at a colocation facility or in an enterprise datacenter. They may be supported by the company, by a cloud provider, or by a third party such as an outsourcing firm.

HYBRID CLOUD

- Combine both private and public models
- Augment private cloud with public resources
 - Good for surge computing
 - How to distribute data across both
 - Best for smaller data

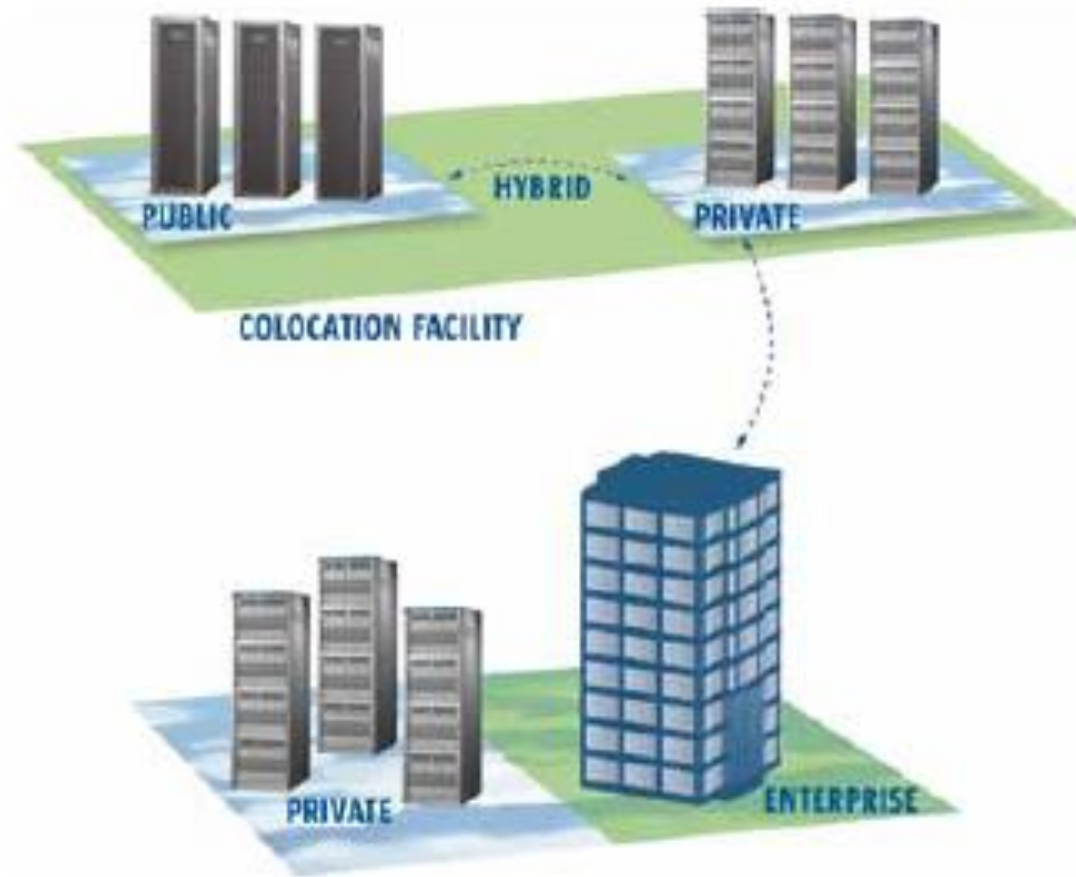


Figure 5. Hybrid clouds combine both public and private cloud models, and they can be particularly effective when both types of cloud are located in the same facility.

COMMUNITY CLOUDS

- Shares infrastructure among several organizations from specific community with same concerns
- Hosted Internally or externally
- Can be managed internally or by 3rd party
- Cost spread over members of community

PUBLIC CLOUD PROVIDERS - AMAZON

- Amazon

- One of the first to offer cloud services to public

- Elastic Compute Cloud EC2 – VM and CPU cycles

- Which as a service?

- IaaS

- Simple Storage Service S3

- Store items up to 5GB

- Simple Queue Service (SQS)

- Allows machines to talk to each other using message passing API

- Which as a service?

- PaaS

AMAZON

- Simple DB
 - Web service for running queries on **structured** data in RT
 - Works with S3 and EC2 to store, process, query
- Use command line to use Linux, now has an interface
- Root privilege
- Applications written on own machine and uploaded to cloud
- Cost:
 - <http://aws.amazon.com/ec2/pricing>

PUBLIC CLOUD PROVIDER - GOOGLE

- Google
 - App Engine
 - Offers online documents and spreadsheets, developers can build features for these and other online SW using app engine
 - Web apps reduced to core set of features and good framework for delivering them
 - Can't even write file in own directory
 - Removed file write feature out of Python

GOOGLE

- Must use Google's DB to store data
- Write a layer of python between user and DB
 - Which as a service?
 - PaaS
 - <http://code.google.com/appengine/>
- Cost?
 - <http://cloud.google.com/pricing/>

PUBLIC CLOUD PROVIDER - MICROSOFT

- Microsoft
 - Windows Azure
 - Service hosting, low-level scalable storage, networking
 - Operating System that allows clients to run Windows apps and store files and data
 - Which as a service?
 - IaaS

MICROSOFT

- Azure Services Platform
 - Developers can establish user identities, manage workflows, synchronize data
 - Includes:
 - Windows Azure
- Microsoft SQL Services
 - DB services and reporting
- Microsoft NET Services
 - Service-based implementations of the .NET framework
- Live Services
 - To share, store and synchronize documents, photos, and files
- Microsoft Sharepoint Services and Dynamics CRM Services
 - For collaboration, solution development for business
- Which as a service?
- PaaS

MICROSOFT

- Browser-based Office – not all features?
- <http://www.windowsazure.com>
- Cost?
 - www.azure.microsoft.com/en-us/pricing/calculator

WHEN SHOULD YOU USE CLOUD (PUBLIC) COMPUTING?

- Consider
 - Cost/benefit ratio
 - Speed of delivery
 - How much capacity will be used
 - Whether data is regulated
 - Organization's corporate IT structure

PUBLIC CLOUD - SCENARIOS

- Cloud Storage
 - One of first cloud offerings
 - 100s of cloud storage vendors
- Compute clouds
 - Amazon EC2, Google App Engine, Berkeley Open Infrastructure for Network Computing
 - May not be good for large organizations, do not offer monitoring and governance capabilities
 - Amazon offers enterprise-class support

PUBLIC CLOUD - SCENARIOS

- Cloud Applications
 - Utilize software apps that rely on cloud infrastructure
 - SaaS (Google Apps)
 - P2P (BitTorrent and Skype)
 - Web apps (Facebook and YouTube)
 - Software plus services (MS Online Services)

WHEN NOT TO USE A CLOUD

- Server Control

- If you need control over everything running, e.g. amount of memory, CPU, hard drive specs or interfaces, cloud not for you

- Hardware Dependencies

- If you need specific drivers, chips, etc.
- Cloud may not have or may change chipsets in future

WHEN NOT TO USE A CLOUD

- Cost
 - Over time cloud may cost more
- Lack of need
 - If current solution OK, don't worry about fashion
- Integration with existing apps
 - Should not have one locally and one on cloud
 - Security, speed, reliability problems
- Latency Concerns
 - Slower in the cloud

WHEN NOT TO USE A CLOUD

- Throughput Demands
 - Cost increases and throughput increases
 - E.g. high def video over 100 sources

WHEN NOT TO USE A CLOUD

- Legislative Issues
 - Laws and policy allow freer access to data on a cloud than private server
 - FBI can access data without warrant or owner's consent
- Geopolitical concerns
 - If in Canada, cannot store data on U.S. cloud – Why?
 - (because of patriot act...)
 - What about storing your data on clouds outside of USA?

WHEN NOT TO USE A CLOUD

- Health data
 - HIPAA data could coexist on a server with another organization's data
 - Why is this a problem?
 - Still - MS HealthValue and Google Health on the way



PAPER TO READ

- Above the Clouds: A Berkeley View of Cloud Computing
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