CLOUD COMPUTING APPLICATIONS

Cloud Storage: Internet-level Filesystem Storage

Prof. Reza Farivar

Internet-level Filesystem Storage

- Object Storage
  - AWS S3, Azure Blob Storage, etc.

- DropBox
- Google Cloud
- Box
- Apple iCloud Drive

Internet-level Filesystem Storage

- Synch and access your file system across a limited number of owned devices
- Block-level file copying
- Synch throttling
- Shared folders and links
- Data recovery (e.g. 30 days, 180 days, etc.)
- File Sync with local file system
- Web-based access
- Shared folders with other users
- Analytics services
  - Text search in documents and images
  - etc.

Data access frequency

- Unlike Object Stores (AWS S3, Azure Blobs, etc.) this market segment does not accept access pattern limits
- Cloud providers use statistics to extract average access patterns and set pricing
  - They may lose money on some customers that access / change their data all the time
  - In average, they have positive profit
- Case study: DropBox
  - Dropbox started as a startup by storing their customer's data on Amazon S3
  - IN 2016 Dropbox moved off of Amazon and onto their own datacenters for storage
  - The economy of scale had grown so far that their "cloudonomics" dictated they should build vs. rent
    - Think of Amazon AWS as an incubator for startups
    - Netflix moved off its CDN from third parties to its own network once it grew large enough
      - Netflix still uses AWS & Google Cloud for everything else: compute, analytics, etc.
      - No Datacenter

Service	Cost per 2TB / month
AWS EFS	$600
AWS EFS infrequent access	$50
S3 standard	$46
S3 infrequent	$25
S3 Glacier	$8
S3 Glacier deep archive	$2
Box	$15
Dropbox	$10
Google Cloud	$10
Amazon Drive	$10
Apple iCould Drive	$10
pCloud	$10
Microsoft OneDrive	$7
Sync.com	$7

Do not include transfer costs

* Prices and bandwidths are a snapshot in time, might be different now

Integration

- Custom integration in company ecosystem
  - Microsoft OneDrive: Comes with Office 365
  - Google Cloud: Integration with Google Docs, Gmail
  - Apple iCould Drive: Integration with iPhones, Macs
  - Dropbox: first to market, product typically more robust, integration with both MS Office and Google Docs
  - Box: Enterprise and government features

Summary

- End-user facing Cloud Storage

- Many competing offerings

- Utilize low frequency access pattern for low-cost offerings