Reliable Software Systems

Week 10:
Netflix and YouTube architecture

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Please fill out the course eval!

https://uw.iasystem.org/survey/204650
Motivating Example: early Netflix

September 2008: Netflix has a streaming service, but ships 2 million DVDs/day.

Netflix had built two data centers next to each other.

One day they noticed database corruption in their shipping system, due to faulty hardware, which spread to all their other databases.

They had 3 days of a total shipping outage.

They decided to move away from system that vertically scaled with single points of failure, instead moving to the cloud and a microservices model.

https://media.netflix.com/en/company-blog/completing-the-netflix-cloud-migration,
Netflix scale

Monthly Streaming Hours

Dec 2007-Dec 2015
>1,000x growth

Netflix architecture

Clients

Services

Processing

Media

AWS

CDN
Netflix - transcoding

https://medium.com/netflix-techblog/high-quality-video-encoding-at-scale-d159db052746
Netflix - serving applications

Networking interlude

Open Connect

https://www.nanog.org/sites/default/files/meetings/NANOG64/1014/20150601_Tenkin_Netflix_Open_Connect__v5.pdf
Netflix - tiered caching

https://www.nanog.org/sites/default/files/meetings/NANOG64/1014/20150601_Temkin_Netflix_Open_Connect__v5.pdf
Netflix - client playback

https://www.slideshare.net/aspyker/netflixoss-meetup-s6e1-spinnaker-kayenta
YouTube circa 2005

Loadbalancer with cache

Linux
Apache webserver
Python application

MySQL
YouTube circa 2013

- CDN for popular content
- Storage for long-tail content
- Database management (Vitesse)
- BigTable for thumbnails
- MySQL for metadata
- Google Internal Cloud
- Clients
YouTube - serving video

https://www.youtube.com/watch?v=w5WVu624fY8
YouTube - serving thumbnails
YouTube - metadata

- Relational
- Vitess
- NoSQL

Strong guarantees  High scalability

https://www.youtube.com/watch?v=midJ6b1LKAO
YouTube - metadata

Scaling with Go: YouTube's Vitess

https://www.youtube.com/watch?v=midJ6b1LkA0
END