



ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
UNIVERSITY OF CRETE

HY-559

Infrastructure Technologies for Large-Scale Service-Oriented Systems

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Course requirements

- Project (60%)
 - Study and experimental evaluation of a real system
 - Individual assignment
- Two presentations of recent research papers (30%)
 - Select from recent conferences (SOSP, OSDI, EuroSys, etc.)
- Class participation (10%)

Course administration

- Meeting Mon/Wed 6-8pm (A-121)
- Office hours: By appt., contact via email (H-311)
- Web site : <http://www.csd.uoc.gr/~hy559>
- Subscribe to hy559-list
 - Email majordomo@csd with body “subscribe hy559-list”

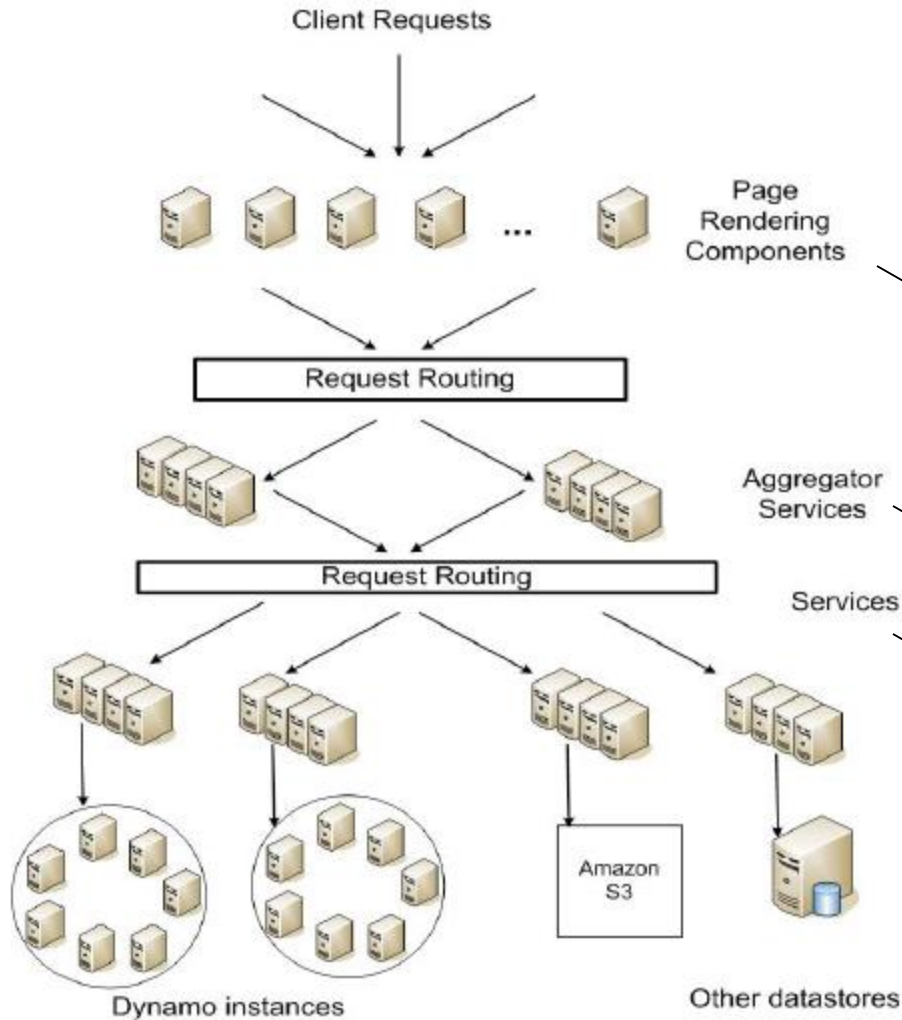
Course administration

- Projects are individual
 - Research report
 - Final presentation
 - Demo optional, considered a plus
- Platform options
 - AWS Academy (HY-559 students will be invited to join)
 - Oracle VirtualBox and other VM/container technologies

Course themes

- Coordination services: Chubby, ZooKeeper
 - Based on consensus algorithms such as Paxos, Raft
- Scalability, availability, consistency across tiers
 - Load balancing approaches
 - Scalable caching
 - Messaging systems
 - Data stores
 - Geo-distribution
 - Cloud execution platforms: Serverless/FaaS
 - Distributed stream processing
- Data center management: Autopilot, Borg

The example of Amazon

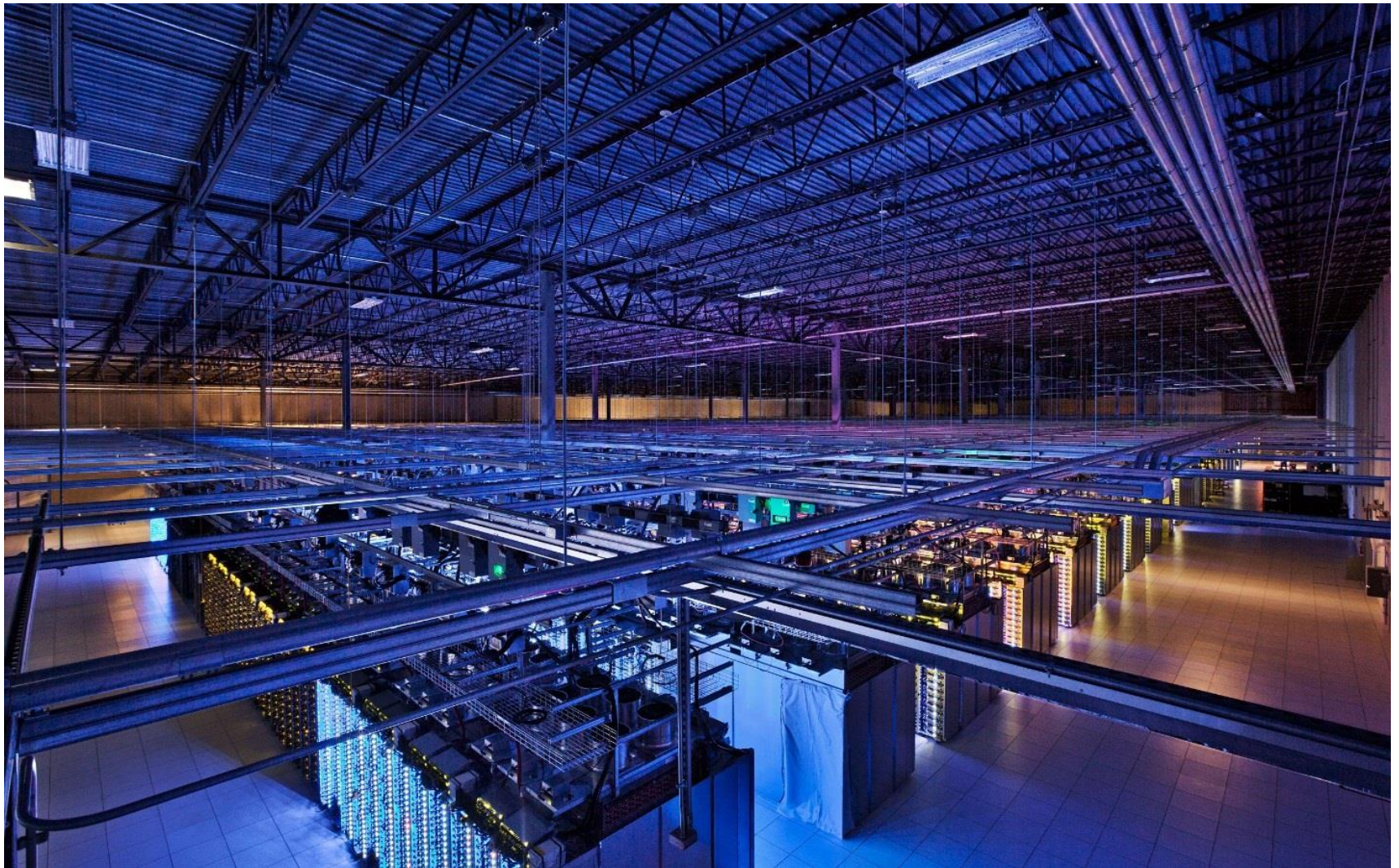


Rendering service may construct its response by sending requests to over 150 other services

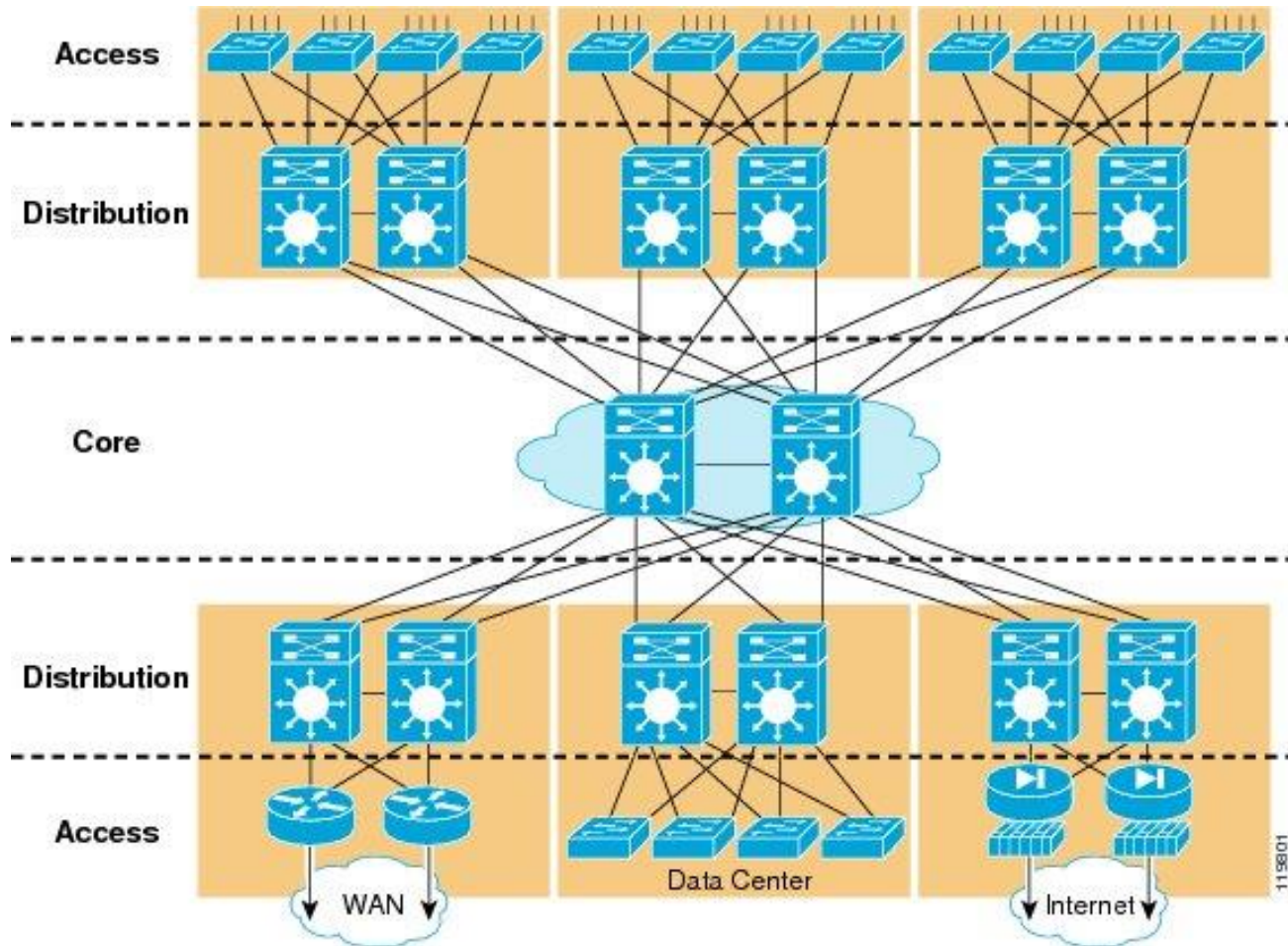
Stateless but may use caching

Each service in the call chain must obey performance contract

Data centers



Network design



Source: http://www.cisco.com/c/en/us/td/docs/solutions/Enterprise/Campus/HA_campus_DG/hacampusdg.html

Scalability dimensions

- Expandability
 - Increase system size (capacity) as needed
- Performance
 - Increase linearly with system size
- Availability
 - Survive failures gracefully
- Manageability
 - React to changes automatically