



# intro

## SYSTEM & COMPLEXITY

- What is a System (P12)
- Compare with the Computer Systems (P17)

## 14 PROPERTIES

- overview (P19)
- Property-1: Correctness (P20)
- Property-2: Latency (P24)
- Property-3: Throughput / Capacity (P25)
- Property-4: Scalability(P26)
- Conflict between these Properties(P41)

## SYSTEM COMPLEXITY

- Problem Types(P43)

## COPING WITH COMPLEXITY

- M.A.L.H(P65)
- Two properties of computer systems(P78)
- M.A.L.H are NOT enough(P79)

## lec2: distributed system

- Step #1 for scalability: disaggregating application & data(P9)
- Step #2 Avoid the slow data accesses? Caching(P10)
- Step #3 for scalability: more servers(P12)
- Step #3 for scalability: How to do the load balance?(P13)
- Step #4 for scalability: scaling database(P14)
- Step #5 for scalability: using distributed file system(P15)
- Step #6 for scalability: using CDN(P16)
- Step #7 for scalability: separate different applications(P17)

- How different applications communicate? MQ or DB(P18)
- Use distributed computing frameworks for complex queries(P20)
- Step #7: separated applications + distributed computing(P21)
- Step #8: Fine-grained (细粒度) distributedServices (P25)
- 什么是Distributed system (P28)

## **Faults**

- **Faults are common, especially in large distributed systems (P34)**
- **Faults and partial failures (P35)**
- A common network fault: network partition (P38)
- Availability and reliability (P42)
  - Metrics to measure reliability (MTTF and etc)
- Achieving high availability: handling failures w/ replications (P44)
  - Challenge: consistency (P48)

## **The CAP theorem : Consistency, Availability & Partition tolerance**

- CAP: an example (P50)
- The CAP theorem: 2 out of 3 (很难3个同时保证) (P51)
- Partition Tolerance (P52)
- CAP: not a Binary Decision (P53)
- Summary of the (ideal) properties of distributed systems (P54-56)