Distributed Systems

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Distributed Computing Systems
Distributed Systems

• 교재:
  – Distributed Systems, Principles and Paradigms
    – by Andrew S. Tanenbaum, Maarten van Steen, Prentice Hall, 2002

• 부교재:
  – Distributed Systems, 2nd Edition
    – edited by Sape Mullender, ACM Press, 1993
Some Papers


• Fischer, Lynch and Paterson, "Impossibility of Distributed Consensus with One Faulty Process" Journal of ACM Vol.32 No.2 April 1985, pp. 374–382


Some Preliminaries

- Characteristics of Distributed Systems
- Networked vs. Centralized Systems
- The Properties and Services Model
- Fundamental Properties of DS
- Basic services of DS
What is Distributed Systems?

• Three Primary Characteristics of DS
  – Multiple Computers
  – Interconnections
  – Shared State

• Major Obstacles
  – Independent Failure
  – Unreliable Communication
  – Insecure Communication
  – Costly Communication
Networked vs. Centralized Systems

- **Centralized**
  - Accessibility
  - Coherence
  - Manageability

- **Networked**
  - Sharing
  - Growth
  - Cost
  - Autonomy

An Ideal State-of-the-Art Distributed System
Combination of both advantages + security + high availability
Does not exist in real world: **OUR GOAL !!!**
The Properties and Services Model

• Technical goals of DS
  – a heterogeneous set of h/w, s/w, and data components
  – whose size and geographic extent can vary over a large range
  – connected by a network
  – providing a uniform set of services
  – with certain global properties
Fundamental Properties

• Global names
  – the same names everywhere
• Global access
  – the same functions everywhere
• Global security
  – the same user authentication and access control
• Global management
  – the same person can manage them everywhere
• Global availability
  – the same services work even after some failures
Basic services

- Replicated, distributed, global name service
- Service interface like RPC
- Replicated, distributed, global file system
- Consistent, accurate, global time
- Management
- User registrations