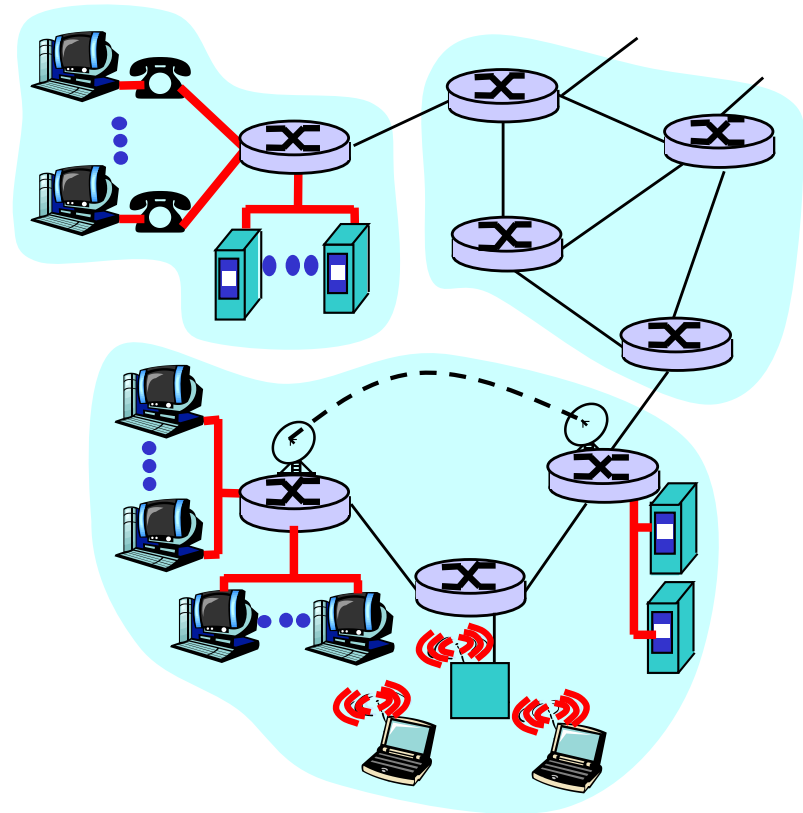# COMP 3331/9331: Computer Networks and Applications

Recap

T1, 2023

Recap from Week 1: A top-down approach

We've covered networking using a top-down

- ❑ end-system applications, end-end transport
- ❑ network core: routing, hooking nets together
- ❑ link-level protocols, e.g., Ethernet
- ❑ other stuff: security, wireless networks

What you have accomplished

- Comprehensive overview of the entire protocol stack with a particular focus on the Internet

- Key principles

  - Layering, scale, hierarchy, etc.

- Key design issues

  - Application architectures, reliability, congestion control, routing, medium access, etc.

- Hands-on practical laboratory experiments using several diagnostic tools, Wireshark and ns-2

- A "real-world" assignment

  - Simplified TCP (focussing on reliable transfer)

Key topics (1)

- ## Organisation principles
  - Layering, hierarchy, encapsulation
- ## Application layer
  - Protocol design, P2P, socket programming
- ## Transport layer
  - Error detection, reliable data transfer, flow control, congestion control
  - TCP and UDP

Key topics (2)

- Network layer
  - Network addressing, scalability, hierarchical addressing
  - Fragmentation as an example to deal with heterogeneous link layer technologies
  - Routing protocols and algorithms: link state, distance vector
- Link layer
  - Addressing, ARP
  - Medium access control, especially random access
  - Interaction between link and network layers

Key topics (3)

- Wireless Networks

  - 802.11

- Security

  - Symmetric key and public key cryptography

  - Confidentiality, message integrity, authentication

  - The role of encryption in these

What next?

- COMP 9333: Advanced Computer Networks (refreshed)
- COMP 9334: System Capacity and Planning
- COMP 4336/9336: Mobile Data Networks
- COMP 6441/9441: Security Engineering and Cybersecurity (+ other security courses)
- COMP4337/9337: Wireless Network Security
- COMP6337: IoT Experimental Design Studio
- Undergraduate/Postgraduate Projects and Thesis

Information Security and Privacy (ISPri)

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ISPri's mission is to conduct advanced applied security research and devise practical solutions to address real-world information security and privacy challenges. IsPri's members have an established track record of conducting research with impact and have secured major national and international research grants from both government and industry. The group focuses on:

- Security of critical infrastructure
- Secure software systems and communication protocols
- Secure authentication and identity management
- Security of AI algorithms and systems

- Security and privacy by design solutions
- Security and privacy of social systems
- Blockchain security and privacy
- Applied Cryptography including Post Quantum Cryptography

Keywords
Security, privacy, critical infrastructure, AI, computer networks, blockchain, social networks, cryptography

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