Overview of Networking

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MS in Telecommunication Networks

- Group 1 Core Courses
  - EL 5363 Principles Of Communication Networks
- Group 2 Core Courses (4 out of 5)
  - EL 5373 Internet Architecture & Protocols,
    or CS 6843 Computer Networking
  - EL 6373 Local And Metropolitan Area Networks,
    or EL 6383 High-speed Networks
  - CS 6133 Computer Architecture I,
    or CS 6233 Introduction To Operating Systems
  - CS 6273 Performance Evaluation Of Computer Systems,
    or EL 7353 Communication Networks I: Analysis, Modeling And Performance,
  - CS 6823 Network Security, Credits: 3.00
- MSTN Project: EL9953 (ECE advisor) or CS6823 (CSE advisor)
- Four Elective Courses
- Optional
  - six-credit thesis: counted as MSTN project + an elective course

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Telecommunication Network Certificate

- Take Four Courses
  - EL 5363 Principles Of Communication Networks
  - EL 5373 Internet Architecture & Protocols, OR CS 6843 Computer Networking
  - EL 6373 Local And Metropolitan Area Networks,
  - CS 6813 Information, Security And Privacy, OR CS 6823 Network Security, Credits: 3.00
- GPA 3.0 or higher on all courses

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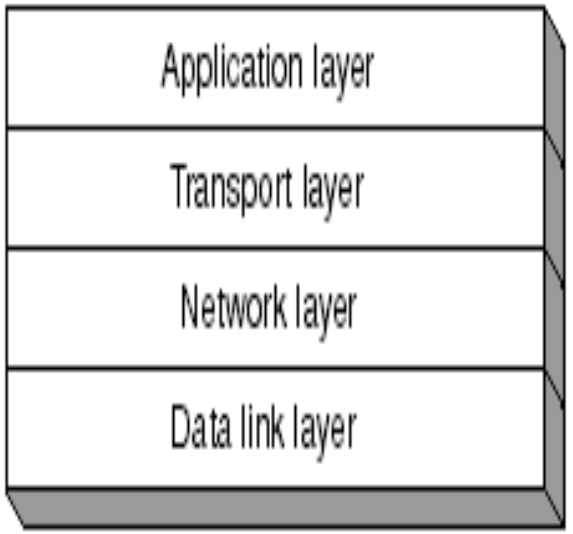
Research in Networking

- Faculty Members:
  - Jonathan Chao, Yong Liu, Shiv Panwar, Yao Wang, and Kang Xi
- Research Projects:
  - cross all network protocol stack layers
  - traditional and emerging networked systems
    - Internet, data centers, sensor networks, and online social networks
  - theory, design, and prototyping



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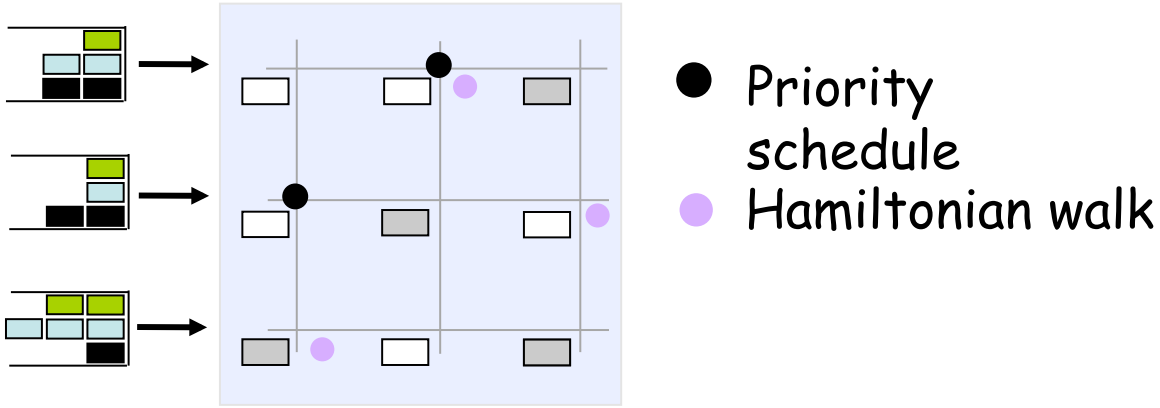
Example 1: Distributed Switching Algorithm (Ye, Shen & Panwar)

- Modern packet switches operate at 100 Gb/s per line. Consequently, there is no time to centralize switching decisions because the latency is comparable to a packet transmission time
- A distributed algorithm that can schedule any admissible traffic flow without packet buffers overflowing is highly desirable.
- This problem is like setting the traffic light times in Manhattan so that there is little congestion, while observing only the traffic at the local intersection, i.e., without the knowledge of congestion at all intersections.
- In our solution, the inputs only need the local queue size information to make the scheduling decisions. Thus, scheduling decisions can be *distributed*.



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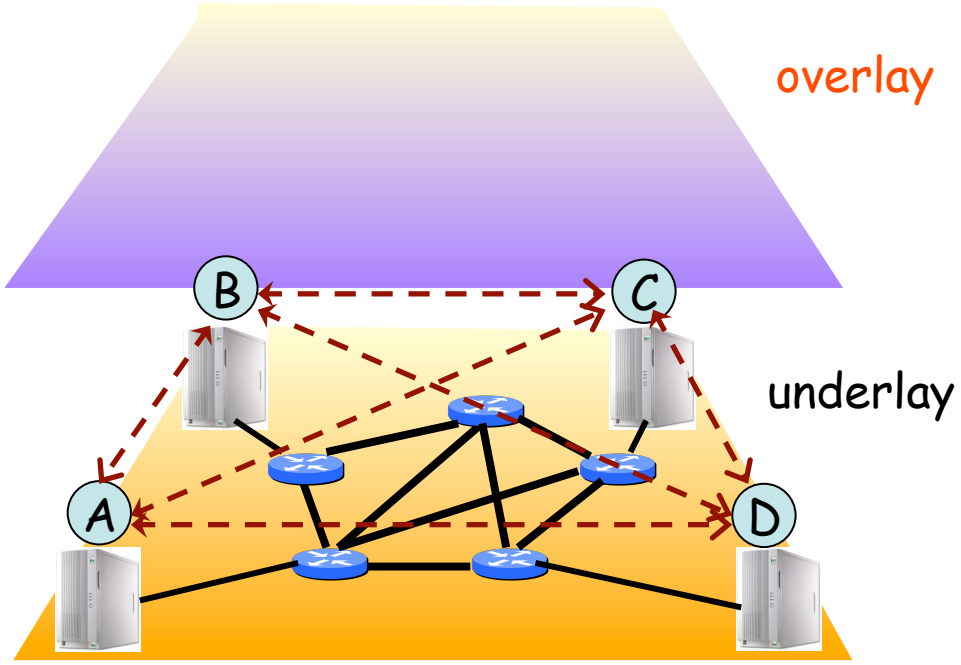
Example 2: Application-layer Networking

- Overlay Networks
  - logical networks on top of physical networks
  - improved end user performance
  - new services:
    - Content distribution: Akamai
    - P2P file sharing: BitTorrent, EMule
    - VoIP/IPTV: Skype/PPLive



- Overlay Network Design
  - efficiency: topologies, routing, scheduling, rate control
  - friendliness to native networks

P2P Video Streaming @ Poly

- Faculty
  - Yong Liu, Shiv Panwar, Keith Ross (CSE), Yao Wang
- Postdoc, Ph.D students, Master students
  - Xiaojun Hei, Hao Hu, Rakesh Kumar, Chao Liang, Jian Liang, Zhengye Liu, Yanming Shen, Angela Wang, Di Wu, Chao Zhang
- Research Sponsors/Collaborators
  - NSF, CATT, WICAT, Huawei, IBM, Microsoft, Thomson, Verizon

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