



Intertwined histories of communication, computation and control Perhaps the most exciting developments in the information area relate to the large-scale divide

 remaps the inside exclusion greater to the large-scale digital computing machines."
 Claude Shannon, 1953



 "I think I can claim credit for transferring the whole theory of the servomechanism bodily to communication engineering." – Norbert Wiener, 1956



"...the era of cyberspace and the Internet, with its emphasis on the computer as a communications device and as a vehicle for human interaction connects to a longer history of control systems that generated computers as networked communications devices." – David Mindell in "Feedback, Control and Computing before Cybernetics," 2002

The themes

- Temporal guarantees
- Clock synchronization and man-in-the-middle detection
- In-network information processing in sensor networks
- Abstraction for cyber-physical systems
- Analyzing the cyber-physical system

QoS for Wireless*

- Increasing use of wireless networks for serving traffic with QoS constraints:
 - VolP
 - Networked Control
- "Best-effort" services are not adequate for QoS support

 Not really "best"

*Hou, Borkar & K '08 5/-

Challenges

- How to formulate a mathematical framework for QoS?
- Jointly deal with three QoS criteria/constraints:
 - Deadlines
 - Delivery ratios
 - Channel unreliabilities
- Solutions needed for providing QoS support:
 - Admission control policies for flows
 - Packet Scheduling policies



















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