Comp-361 : Network Programming
Lecture 7

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Winter 2008

Distributed Process

A process (or an application) that is distributed (seperated) across several machines.

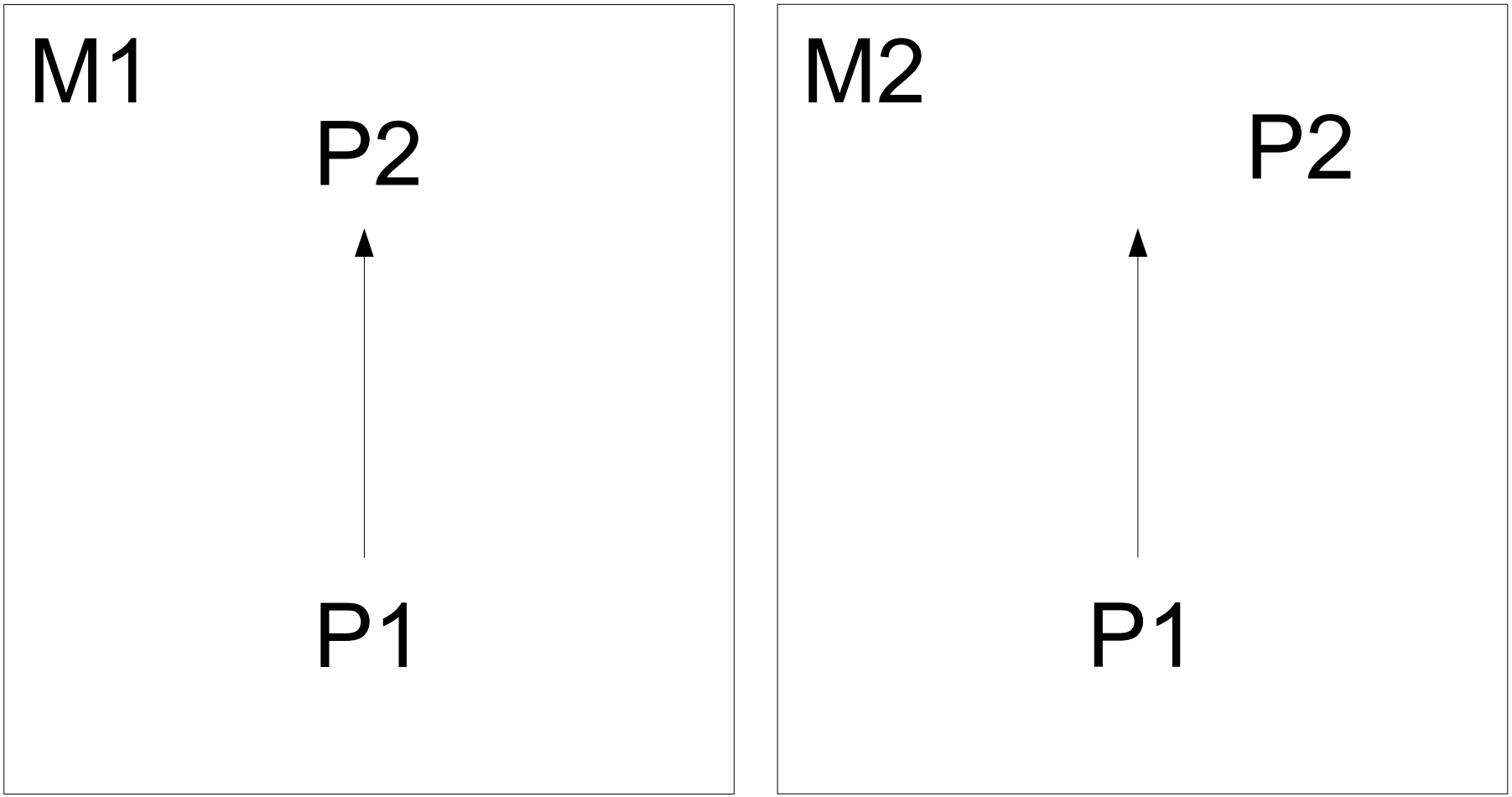
Problems?

What are the problems typically associated with distributed application?

Problems?

- Who does what?
- Performance?
- Synchronization?

Synchronization



Level of Accuracy

Dead Reckoning

Quake 3

Time Lapse

Burnout Revenge

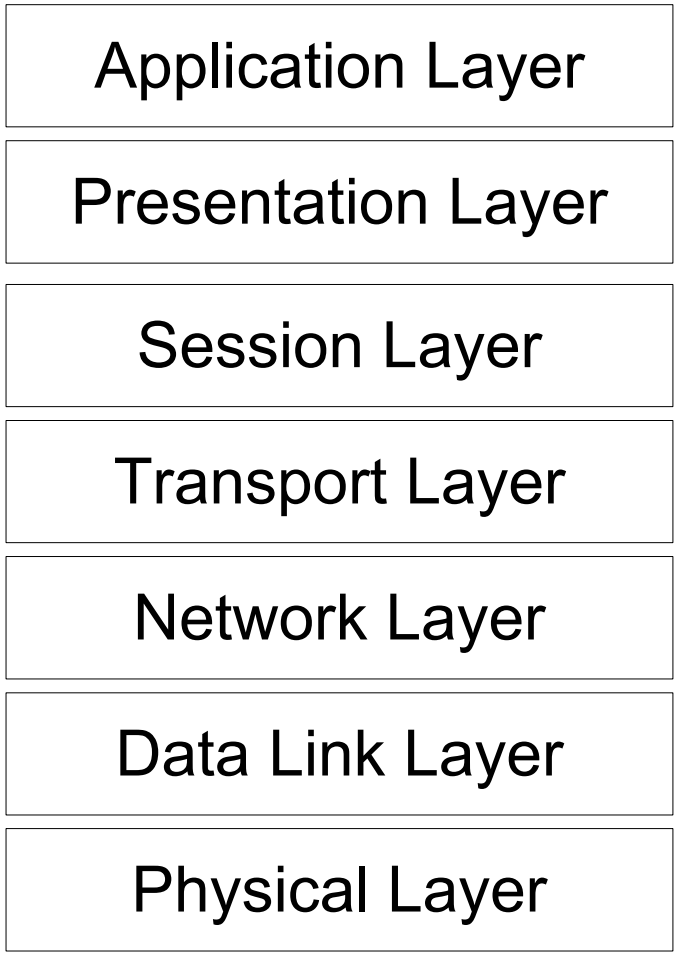
Why turn based?

- Nice time slices
- Easy synchronization

Laptop

Get your laptop out if you have one

ISO Model


Application Layer
Presentation Layer
Session Layer
Transport Layer
Network Layer
Data Link Layer
Physical Layer

IP

- Every unique machine has a unique address called an IP address
  - ex: 132.206.51.234 is the CS mail server
- IP address are hard to remember
- We use domain names instead (DNS)
  - ex: mail.cs.mcgill.ca

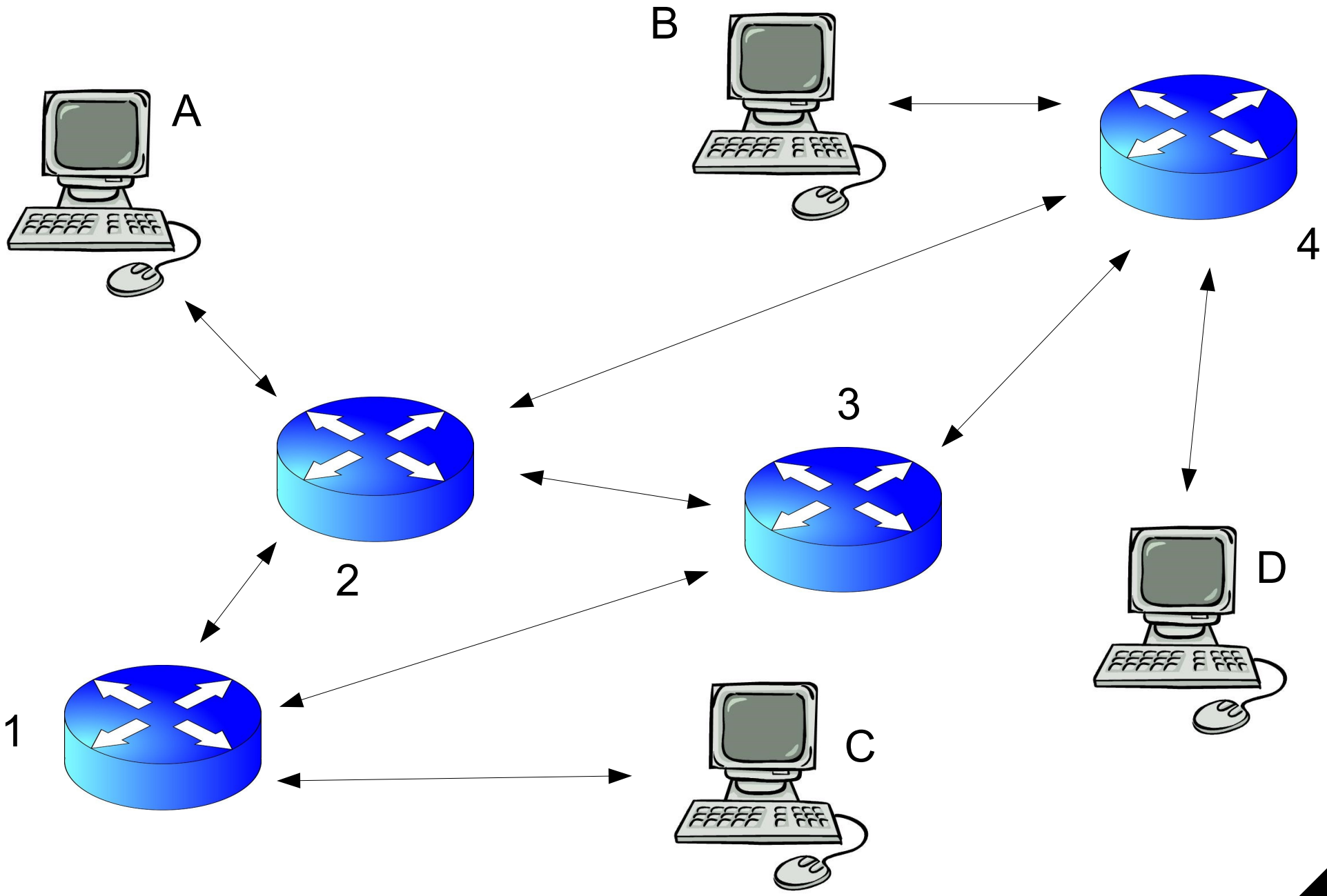
Ports

- Every machine has a fixed number of ports (65536).
- Ports allows us to recognize IP data from different applications.
- The port range is divided as follows
  - 0-1023: The Well Known Ports
  - 1024-49151: The Registered Ports
  - 49152-65535: The Dynamic and/or Private Ports

Important listening ports

- 20/21 : File transfer protocol (FTP)
- 22 : Secure Shell (SSH)
- 23 : Telnet
- 25 : Simple Mail Transfer Protocol (SMTP)
- 80 : World Wide Web (HTTP)
- 137/138/139 : NetBIOS (Microsoft File Sharing)
- 143 : Internet Mail Protocol (IMAP)
- 443 : HTTP protocol over TLS/SSL
- 2049 : NFS

Routed Protocol



Lattency

ping halo.cs.mcgill.ca

Hops

tracert halo.cs.mcgill.ca
or
traceroute halo.cs.mcgill.ca

now ssh to mimi and try it again

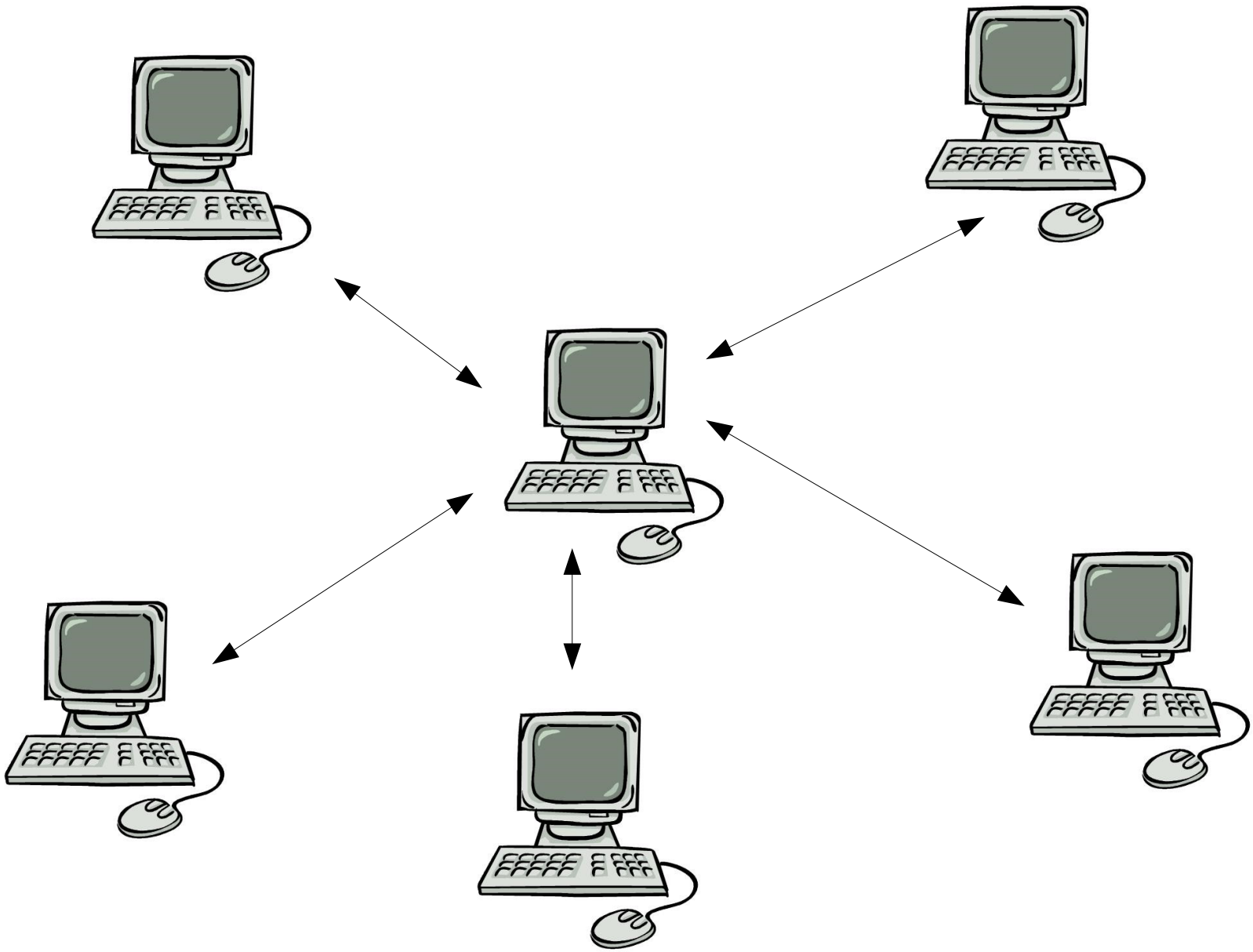
TCP Sockets

- Connection using Session
- Provides extensive features
  - error handling
  - flow control
  - message ordering
  - etc ...

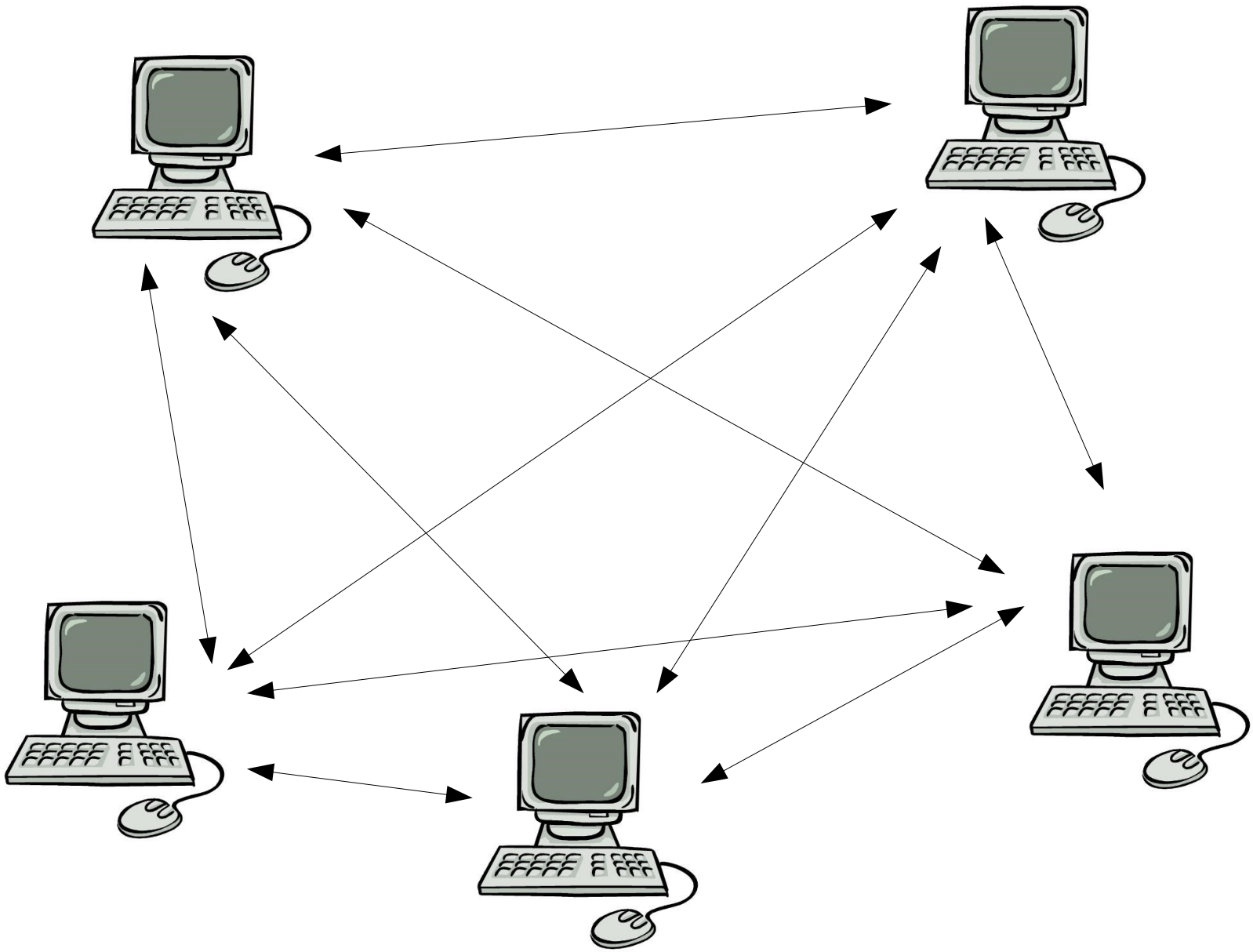
UDP Sockets

- Work in a connectionless mode
- Much faster than typical TCP connections
- Provides no error handling (detection, recovery, etc)

Connection Model : Client/Server



Connection Model : P2P



Lets compare

- Setup
- Speed
- Authority
- Synchronization
- Fault Tolerance

What to send?

- Events vs Results

What to send?

- Text vs Object

What is Serialization

Serialization is the process of taking the memory data structure of an object and encoding it into a serial (hence the term) sequence of bytes. This encoded version can then be saved to disk, sent across a network connection, or otherwise communicated to a recipient.

-- Wikipedia.org

Remote Method Invocation

- Create remote copies of objects.
- Execute methods remotely on those objects.