Comp-361 : Network Programming
Lecture 7

Alexandre Denault
Computer Science
McGill University
Winter 2008
A process (or an application) that is distributed (separated) across several machines.
What are the problems typically associated with distributed application?
Problems?

- Who does what?
- Performance?
- Synchronization?
Synchronization

M1
  P2
   ↓
  P1

M2
  P2
   ↓
  P1
Level of Accuracy
Dead Reckoning

Quake 3
Why turn based?

- Nice time slices
- Easy synchronization
Get your laptop out if you have one
• 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
■ 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
ping halo.cs.mcgill.ca
tracert halo.cs.mcgill.ca
or
traceroute halo.cs.mcgill.ca

now ssh to mimi and try it again
- 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
Let's compare

- Setup
- Speed
- Authority
- Synchronization
- Fault Tolerance
What to send?

- Events vs Results
What to send?

- Text vs Object
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.