Network Simulator

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General Tools

Python (2.7)

- All simulation code will be in Python

SimPy

- Process-based simulation for Python

Github

- Source control

Additional tools:

- **Hackpad -** for easy collaboration
- **Google Docs** - for presentation

Architecture Overview

Main classes:

- **Device**
  - **Host, Router, Link**
- **Packet**
  - **DataPacket, AckPacket, RoutingPacket**
- **Network**
- **Flow**
- **Tracker**

Class Device

Unified interface for network devices

- dev_id: unique ID in network
- attach2(device): connect 2 devices mutually
- send(packet, to_id)
- receive(packet, from_id)
- (generators as SimPy processes)

Subclasses of Device

Host

- (APIs for coordinating with Flow)

Router

- look_up(dest_id): find where to route packet
- (APIs for managing routing table)

Link

- rate, delay, buffer_size

Class Packet

Unified interface for all kinds of packets

- **size**
- **reach_router**(router):
  called by Router.receive
- **reach_host**(host):
  called by Host.receive

Subclasses of Packet

DataPacket

- src, dest, packet_id
- payload_size

AckPacket

- src, dest, packet_id

RoutingPacket

- (data and APIs for updating routing table)

Class Network

The top-level simulator that contains all network objects.

Attributes and methods:

- links, routers, hosts, flows
- parse_network(spec_text)
- add_router(router), add_link(link), ...
- start_flow(flow)
- run_simulation(until_time)

Class Flow

Represents flow of packets through network. Congestion control is handled here.

Attributes:

id, src, dest, data_amt, start_time, packets_sent, packets_received, flow_alg

Methods:

next_packet(), acked(packet_id)

Division of Labor

Ying-Yu

- Project Manager
- Network class
- Congestion control

Chris

- Router class
- Tracker
- Link Class
- Graphics
- Packets

Emily

- File Parser
- Host class
- Flow class
- Congestion control

Sharjeel

- Links class
- Graphics
- Tracker
- Simpy

Weekly Schedule (Monday 10:30 pm)

Week 5

- Finalize architecture
- Implement input file parser
- Begin implementing Host, Router, Link, and Packet.

Week 6

- Complete implementation for Device and Packet
- Start Flow implementation.

Weekly Schedule (Monday 10:30 pm)

Week 7

- Complete basic implementation for Flow.
- Basic Tracker functionality.
- Prepare for progress report.

Week 8

- Implement congestion control for Flow.
- Implement graphics for Tracker.

Week 9

- Prepare for presentation

Week 10

- Final presentation & report

End

Thank you for your attention!