Assignment-1
File Transfer over High Delay Network

Task: Design a Protocol for sending files over a High Delay Network

- Characteristics of the network are given
- Sender/Receiver constraints are given
- TASK: Design the Protocol for the best utilization of the available resources(by also taking the constraints into the equation)
- Remember: There are many ways to approach the task (THERE IS NO ONE RIGHT SOLUTION)

Network Characteristics

- **Bandwidth Range:** 1 to 10Mbps
- **One Way Delay:** few seconds to few minutes (upto 4mins)
- Similar delays are observed in the communication between Earth and other planetary objects like Moon, Mars)

Receiver Buffer Space

- Receiver Buffer Space: 1MB

(Here Buffer Space Refers to the Memory Space used for ordering the packets and to store the packets that did not arrive sequentially)

Background Info on Application

- The Distribution on the size of files that shall be transferred by the application shows high percentage of files< 200KB (Kilo Bytes)

Issue with High RTT and Small File Size

- Sample Scenario:
  - File Size: 200KB
  - Link Delay: 120 seconds, Bandwidth: 10 Mbps

  Time Taken to Establish Connection (if TCP were to be used -> 2*120 = 240 seconds (minimum)

  Data Transfer starts only after 240 seconds (using TCP)

  Under-Utilization of Link

  (> 240s to start transferring 200KB)

Your Protocol Features

- Should address the under-utilization issue(Prev Slide)
- Should have support for transferring files of ANY size
- Build your protocol over UDP
- Specify a suitable Flow Control mechanism(depending on the available receiver memory space)
- Provide Reliability

Assignment-1 Submission

- Submit a document that describes your protocol specifications, design decisions made.
- It must explain why you chose a particular method
- Give Reasons for all the design decisions made
- Preview: In Assignment-2
  - You shall be implementing your specification
  - Add new features to the protocol specification
- Deadline:
  - For document(In PDF Format): 23:59 14.04.2008

Analyzing the cost of the Protocol

- Assignment-2 task involves implementation
- Make your implementation keep track of the number of bytes sent(including re-transmission, your protocol header overhead)
- Once a file transfer completes, print the following information
  - Original File Size (In Bytes)
  - Number of Bytes actually sent
  - Time taken for the File Transfer
- Above information can help you in Optimizing and Analyzing your protocol performance

Any Questions ?