CPSC 641: LAN Measurement

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LAN Traffic Measurements

- Some of the first network traffic measurement papers were for measurements done on Ethernet local area networks (LAN's)
- We will look at one such example:
- Riccardo Gusella, ‘‘A Measurement Study of Diskless Workstation Traffic on an Ethernet Local Area Network”, 1988

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Overview

- Studied UC Berkeley campus LAN environment
- Medium size Ethernet LAN
- About 100 workstations
- Consists of file servers, diskless workstations

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Measurement Methodology

- Dedicated VAX 8600 for data collection
  - 32 MB RAM
  - Dual buffering strategy (memory to disk to tape)
  - Microsecond resolution for timestamps
  - Less than 1% packet loss
- Highly detailed and accurate study
  - Three weeks of trace collection
  - 6.5 Gigabytes of trace data
  - Detailed protocol information extracted from traces
- Paper reports for 24-hour period (11.8 M pkts)

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Main Observations

- Average Ethernet utilization is higher than that reported in earlier studies
- Traffic patterns highly skewed
- Single workstations can dominate
- Packet size distribution bimodal
- Definite spikes in interarrival times
- Packet arrival rate varies a lot (bursty)

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Per Protocol Analysis

- One of the novel aspects of Gusella's work was a complete breakdown of the results by protocol type (e.g., TCP, UDP, NFS, ND)
- Able to identify characteristics in traffic that can be linked to specific protocols and/or machines
- Possible because of high resolution timestamps and complete protocol info

Summary

- Gusella's work was one of the first detailed studies of Ethernet LAN traffic
- Had excellent measurement tools, high resolution timers, lots of storage
- Identified traffic characteristics common to most campus LAN environments
- Identified impact of new workstation technologies, protocols, applications on network load