

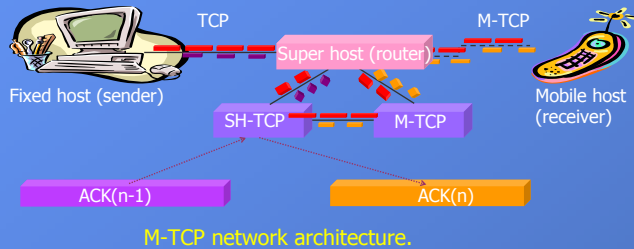
Communication Networks Research

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Improving TCP over wireless links



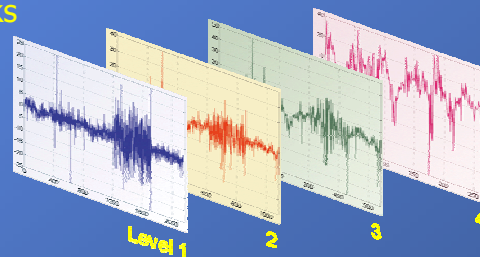
- Packet loss is an indicator of congestion and it causes TCP to reduce its congestion window size and throughput.
- TCP is designed for wired networks, where packet loss is mainly due to congestion.
- In wireless networks, TCP packet loss is often caused by transmission errors and handoffs. Hence, there is no need to reduce the TCP congestion window size.



M-TCP network architecture.

Analyzing packet loss in IP networks

- A signal is decomposed into a hierarchical set of approximations and details using wavelet analysis.
- The detail part provides information in the time and frequency domains.
- It serves as a mathematical microscope for investigating complex traffic and loss pattern.



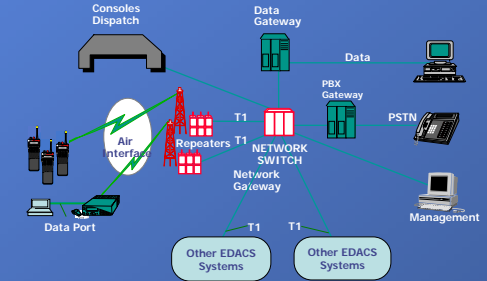
Loss pattern analysis: details on various time scales.

References:

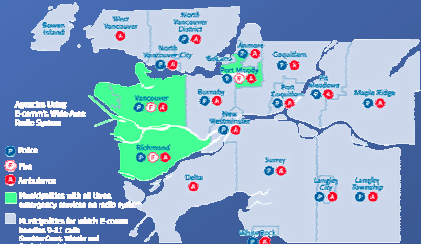
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Modeling traffic from a public safety wide area network

- Statistical analysis of collected data reveals that:
 - call inter-arrival times are long-range dependent
 - call holding times follow lognormal distribution and are uncorrelated.
- Clustering analysis is used to model user behavior.
- Traffic is predicted using Seasonal Autoregressive Integrated Moving Average (SARIMA) models.



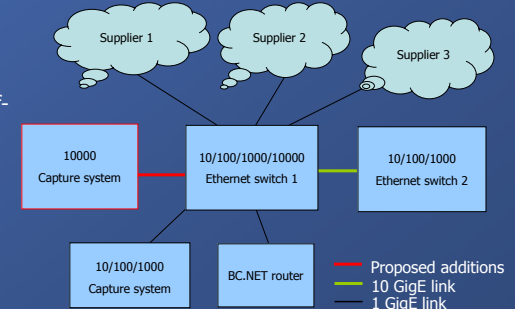
E-Comm network architecture.



E-Comm network coverage.

Measuring traffic from BC.NET

- Characterize, model, and analyze collected traffic data.
- Apply statistical analysis and search for traffic invariants: self-similarity and long-range dependence.
- Understand underlying dynamical behavior of complex systems representing packet networks.



BC.NET client diagram.