



# NDT: Update Duplex Mismatch Detection

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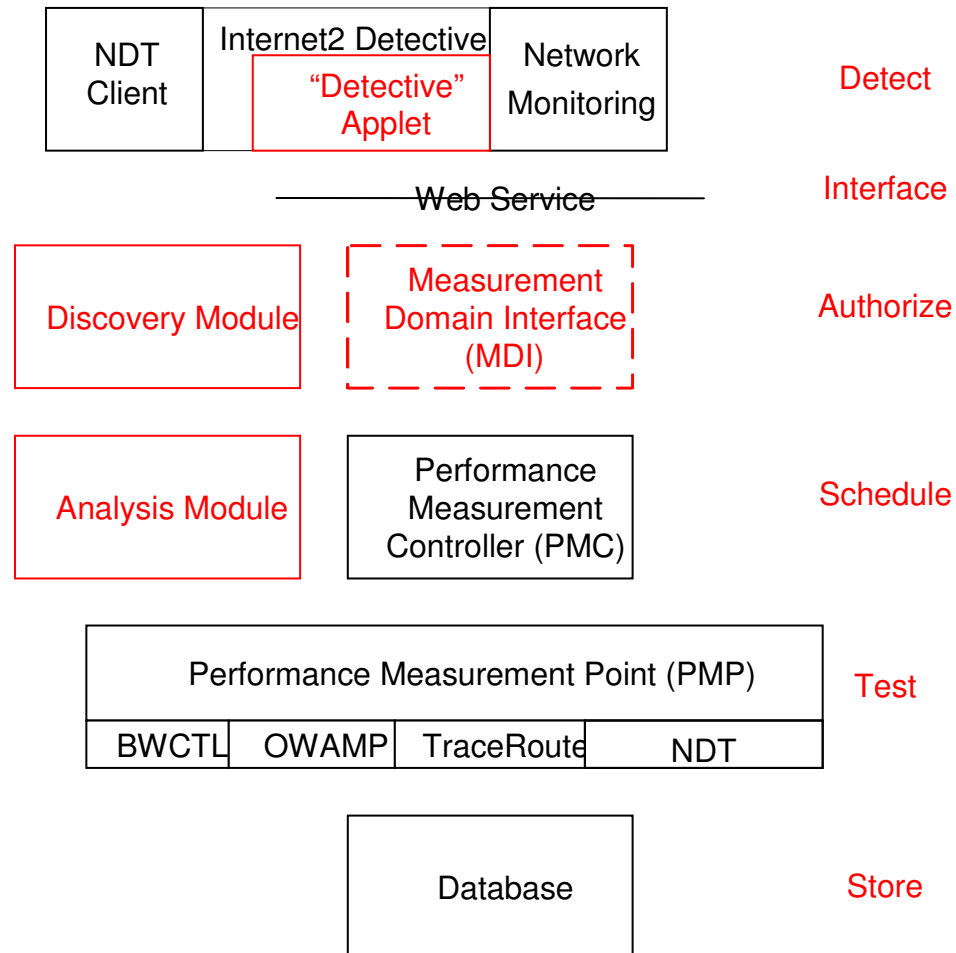
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# NDT Background

- Web100 enhanced server handles testing and diagnostic services
- Java based and command line clients allows testing from any client (local or remote)
- Performance and configuration faults reported back to client
- Drill-down functions provide more details & error reporting capabilities



# piPEs Measurement Software Components



# Future Directions

- Focus on improving problem detection algorithms
  - Duplex mismatch
  - Link detection
  - Improve performance tuning messages

# Duplex Mismatch effort

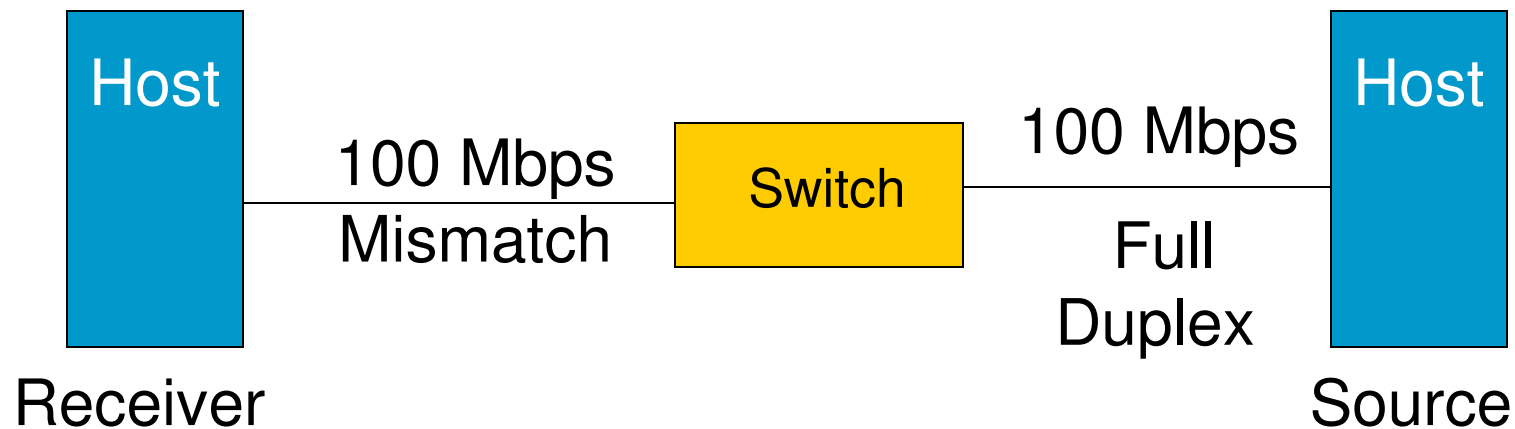
- NIH/NLM funded project
- Accurately describe how mismatch condition creates loss
- Define methods to reliably detect and report this condition
- Paper being published in PAM 05 proceedings

# Duplex Mismatch effort

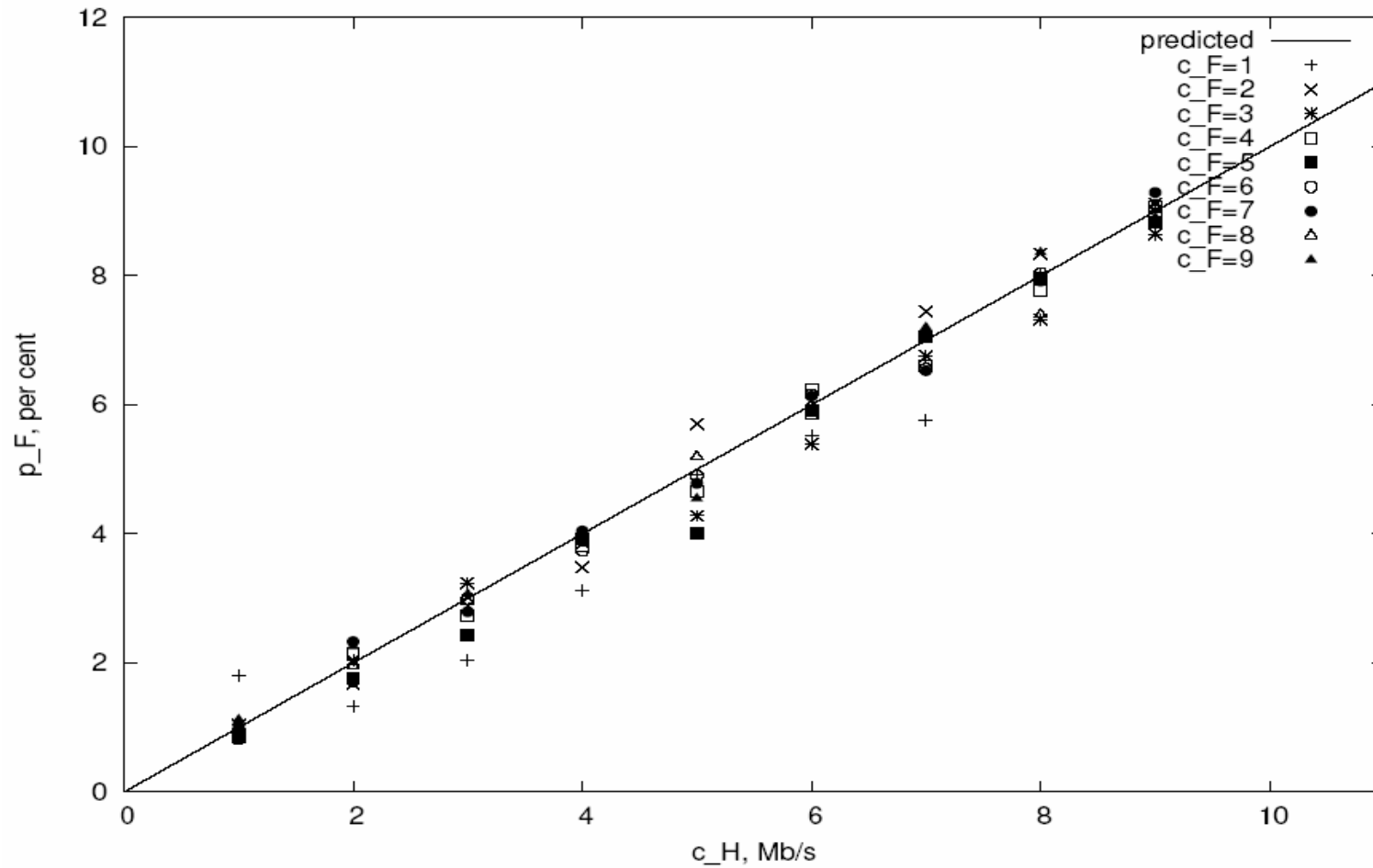
- **When collisions occur**
  - Full duplex interface will lose frame
  - Half duplex interface may lose or retransmit frame
  
- **Generate analytical models for loss**
  - Using Poisson streams (ThruRay)
  - Using UDP packet trains (TTCP)
  - Using TCP flows (NDT)

# Test environment

- Receiver is put in various states
  - Switch = full & Host = full or half
  - Switch = half & Host = full or half



# Mismatch loss probability



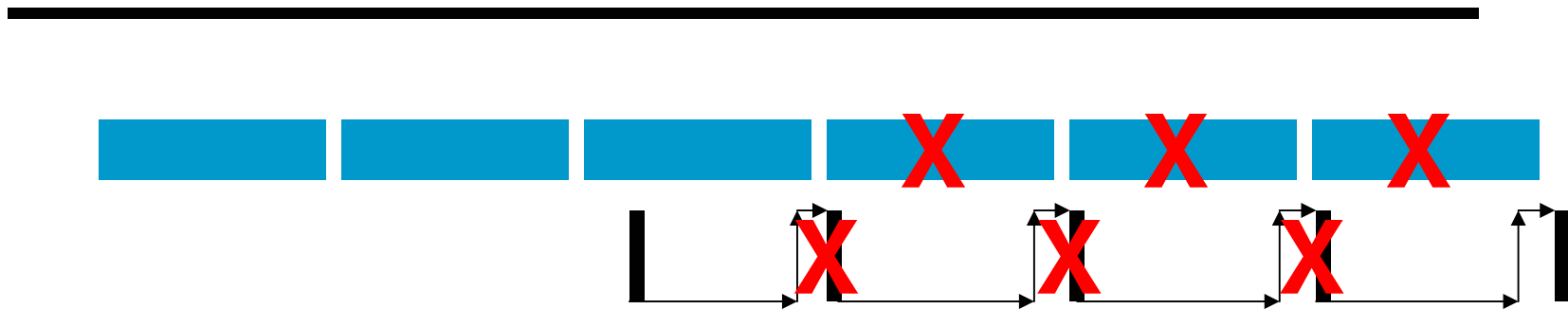
# Mismatch behavior 1

## Remote server with local client

- Switch = Full, and Host = Half
  - TCP experiences multiple packet loss events
  - Ack packet 'syncs up' with multiple data packets

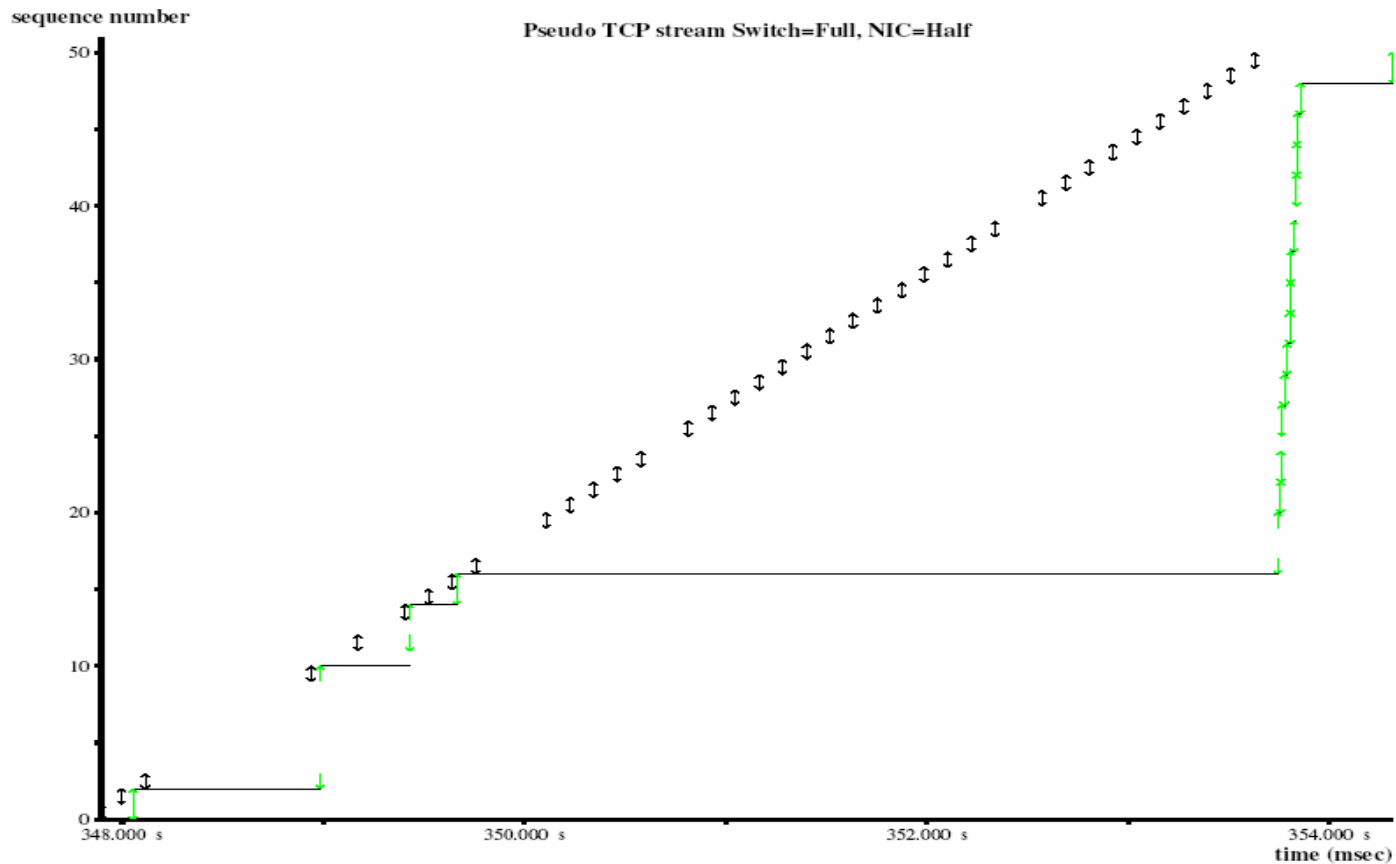


Server Side view

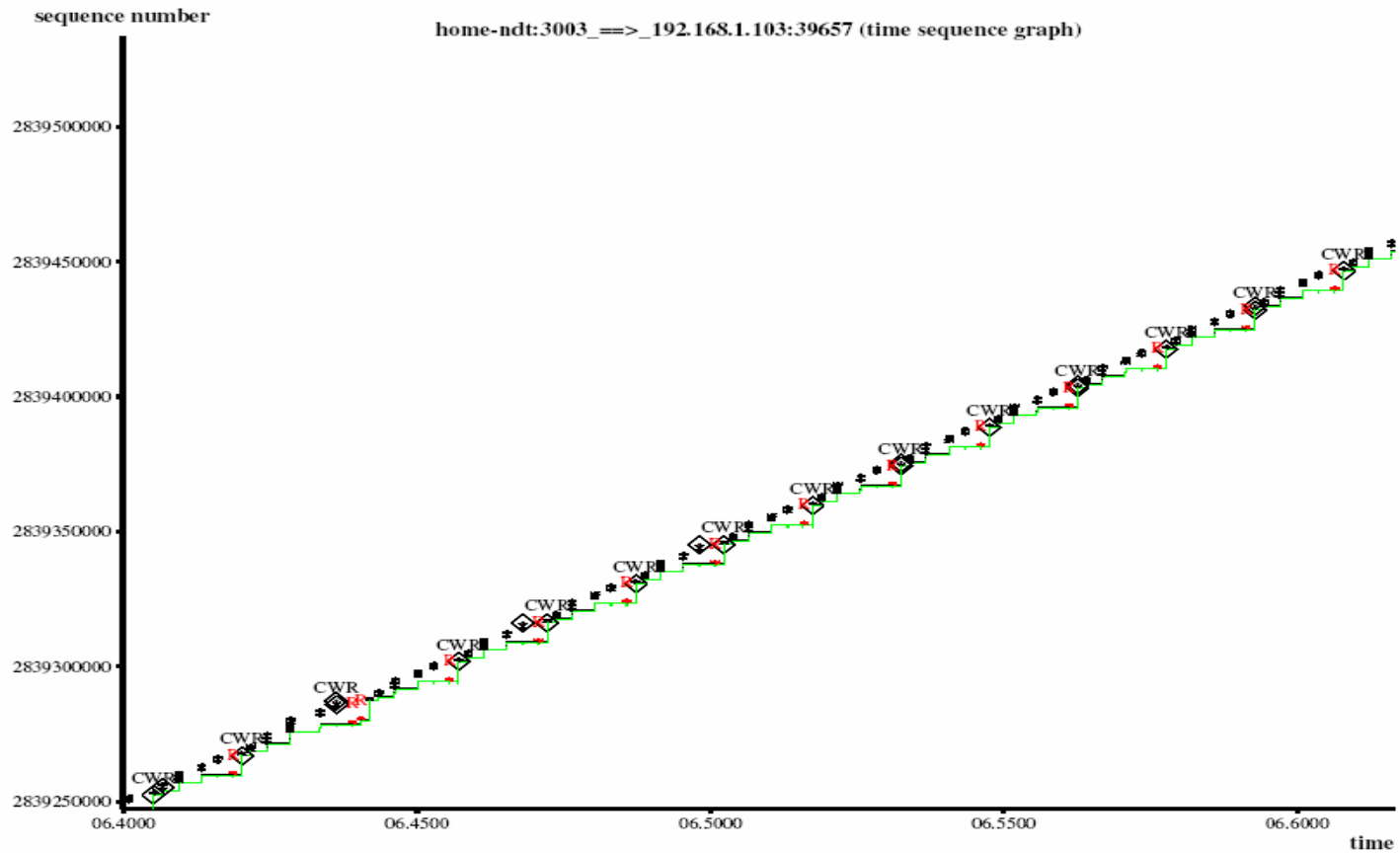


Receiver Side view

# Packet train behavior 1



# TCP behavior 1



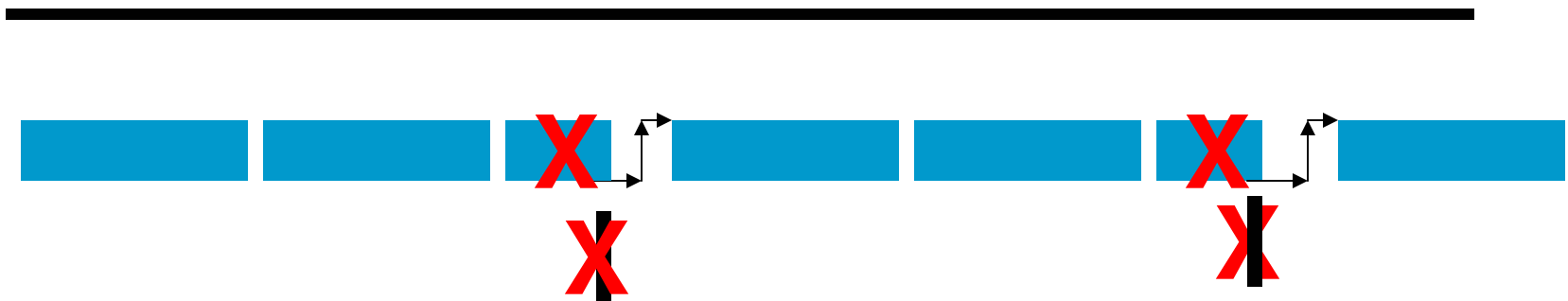
# Mismatch behavior 2

## Remote source with local client

- Switch = Half, and Host = FULL
  - TCP Data packets delayed
  - Ack packet lost

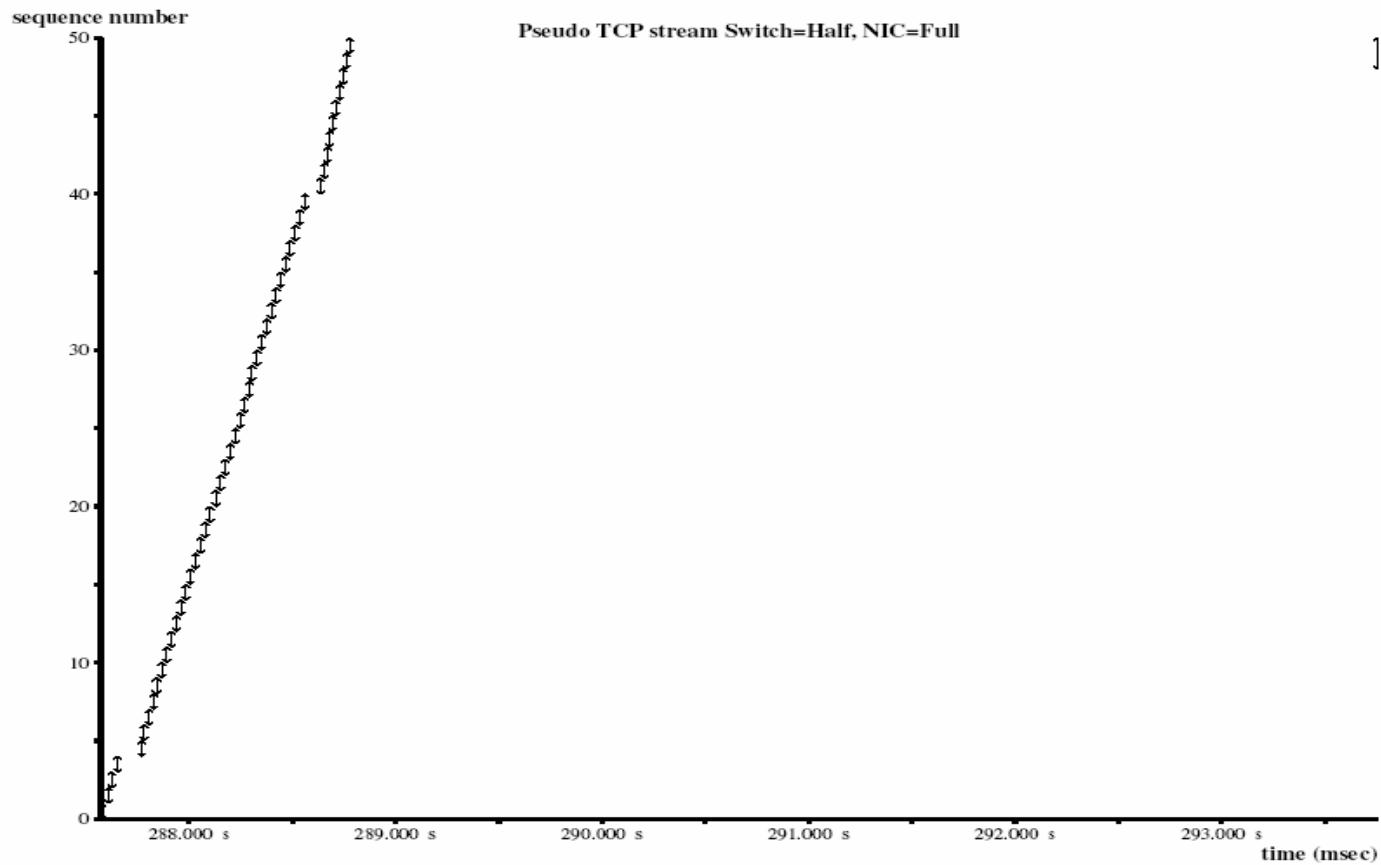


Server Side view

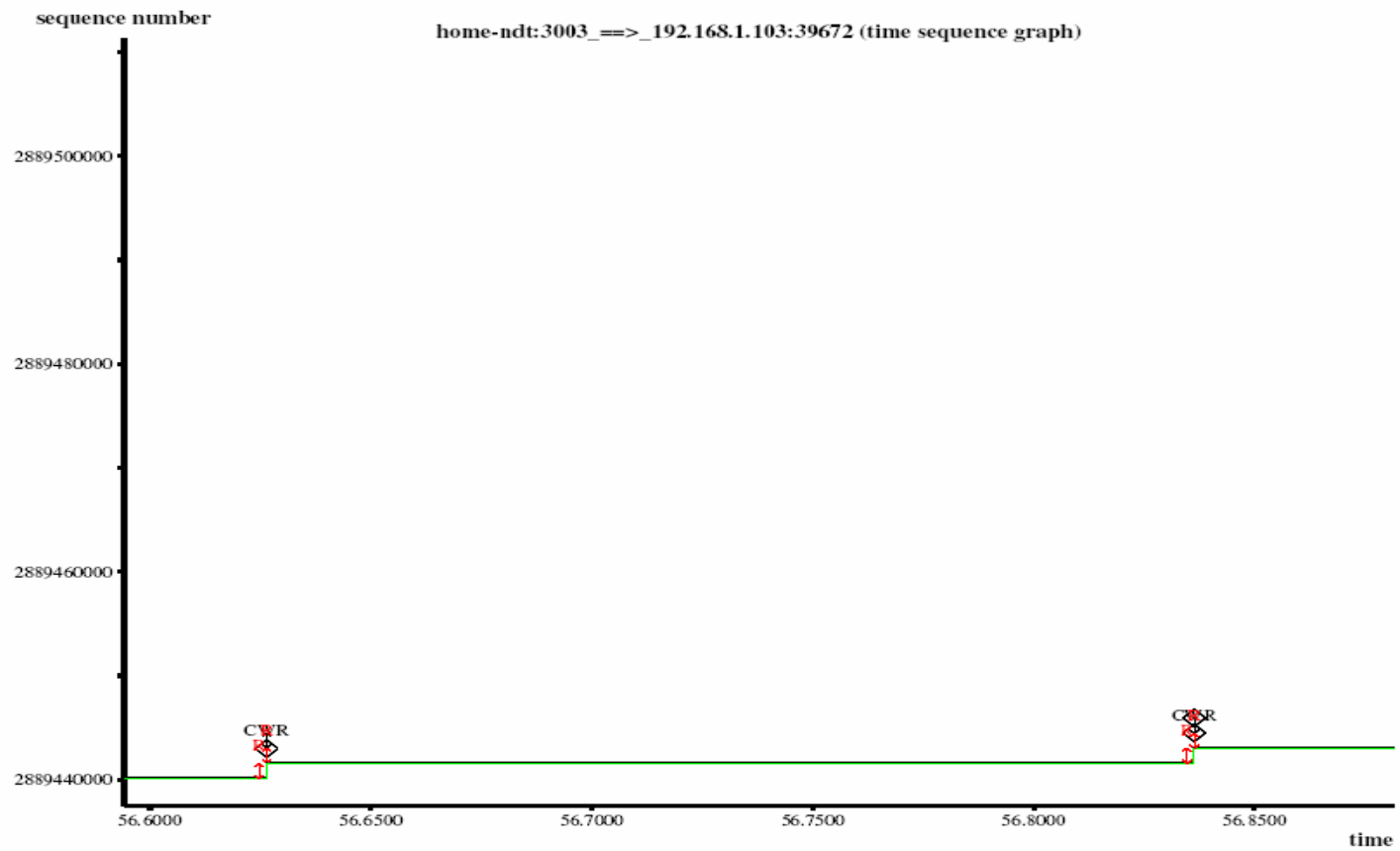


Receiver Side view

# Packet Train behavior 2



# TCP behavior 2



## Underlying assumption

- Model is correct if inter-packet gap is less than time to generate and transmit Ack packet
- Tight links (T1, DSL, Cable Modem) violate this assumption
  - Mismatch on home LAN would not be detected by remote server

# Conclusions

- New duplex mismatch detection algorithm being developed
- Existing trace files being analyzed to examine difference
- NDT administrators being contacted to review their log files
- Investigating packet train model for detecting mid-path mismatch