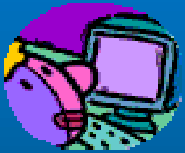




# Network Performance



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engineer



# Agenda

- o Objective (3 slides)
- o Solutions (3)
- o Solution details (4)
- o Results network dependent (2)
- o Results network independent (4)



## Objective (1/3)

- o subject: network performance w.r.t. Inmarsat Mobile Packet Data System (Global Area Network - MPDS: 64kbit/s shared channel)
- o simulate, analyze, refine
- o trial on-air



# Objective (2/3)

- o ... simulate: create base band representation of packet data satellite network
- o why? to examine BOD/application interactions
- o ... e2etb ...



objective:

Two prime areas under examination:  
protocol and application layers (3/3)

- o Network Dependent -
  - Protocol engineering: yields for
    - application performance
    - resource utilization
    - protocol correctness
  
- o Network Independent -
  - Application analysis, based on measurements for TCP

(results graphs for all these follow later in the presentation)



solutions (1/3):  
the truth is out there,  
and it begins with ... simulation

- o Simulation (where necessary)
  - simulated satellite channel ( so ...
  - simulated channel protocols

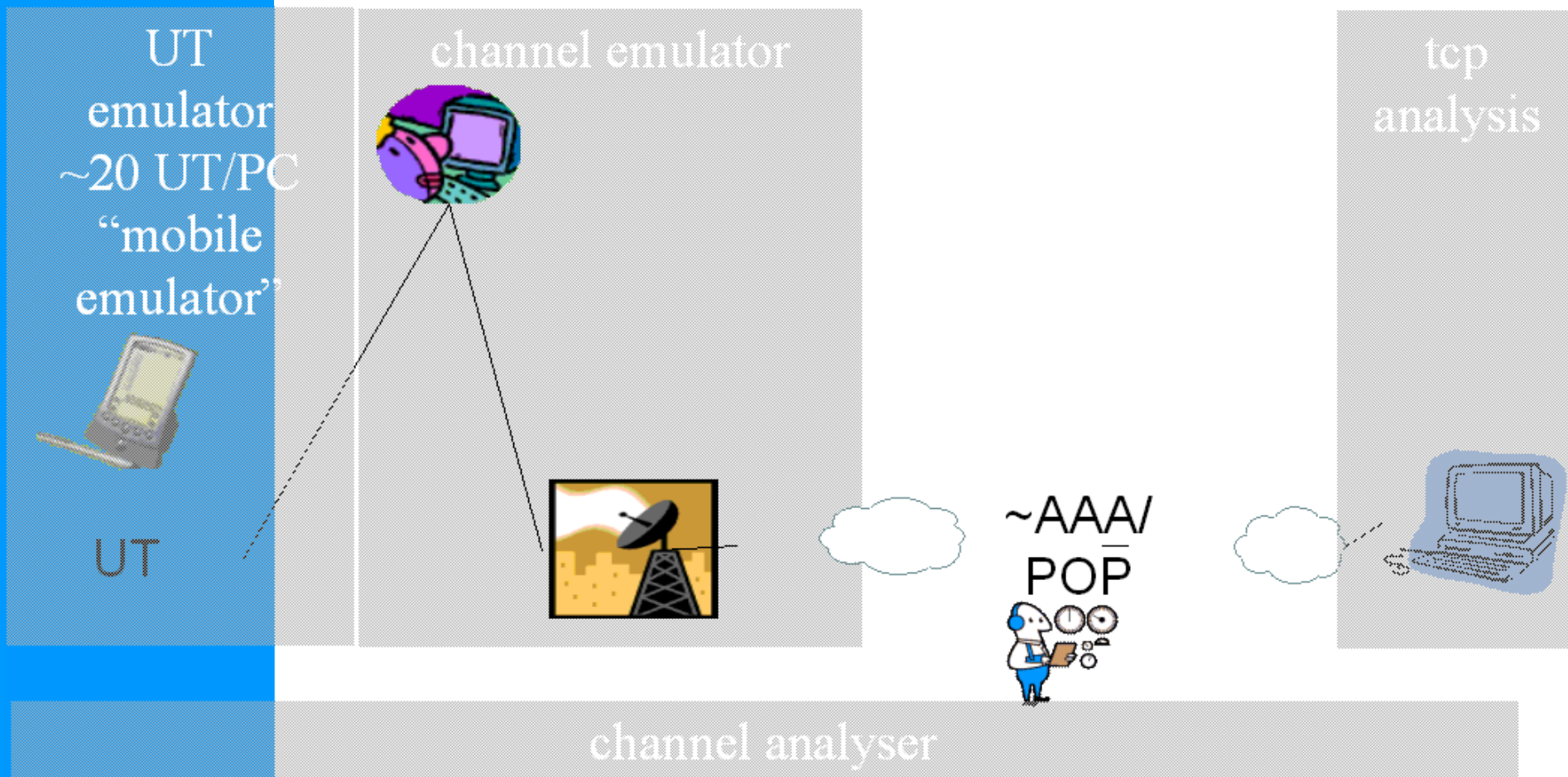


## solutions (2/3): ... and analysis

- o Analysis: network dependent protocol engineering
  - protocol analyser (not just your average da de da), and
  - diagnostic tools at each stage



# solution (3/3) – e2etb: overview







# soln. details (1/4) - e2etb: mobile emulator

USER  
meslab10  
Connected

MES  
989693  
Connected

Active :1

Pending:1

FTP

In:27.982K

Out:792.26K



# soln. details (2/4) - e2etb: mobile emulator – 20 mobiles on one pc

The screenshot displays the MPDS LAB v1.30 software interface. The main window is titled "MPDS LAB v1.30" and contains several panels:

- Top Panel:** Shows "MES LAB [Users States: This Hour - Active:1 Waiting:0 Completed:0 Failed:0 This Run - Completed:2 Failed:0]". It also displays system information: "Day:1 02:03:41", "System Time [x1]", and "Current Lab:BLT Performance Test 1 - ManeA Key Holder:Dermott Creegan".
- Left Panel:** Contains "Random Startup Delay [sec]" with a value of 60 and a "Stop" button. Below it is a "Users:" list with checkboxes for "meslab01" and "meslab10". At the bottom is a "MES List:" with checkboxes for "989681" and "989693".
- Main Grid:** A 4x5 grid of 20 small windows, each representing a mobile emulator. Each window shows "USER" and "MES" status, along with "Active", "Pending", "Bytes In", and "Bytes Out" metrics. The first window in the top-left is highlighted in yellow and green, indicating it is active.
- Bottom Panel:** Contains performance and configuration settings. It includes "Time" (Start, End, Session), "Received" (Bytes, Frames, Bytes/Sec, Avg), and "Transmitted" (Bytes, Frames, Bytes/Sec, Avg) statistics. It also has "% Compression" (In, Out) and "Errors" (Alignment, Buffer Overruns, CRC, Timeout, Total) fields.
- Status Bar:** Shows "Day:1 Hour:02 Minute:03 Seconds:41 [System Time x1]".

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## soln. details (3/4) - e2etb: Channel Analyser (intro)

- o based on free ethereal software
- o “dissectors” built for MAC layer
- o for each PCO in the topology



# soln. details (4/4) - e2etb: Channel Analyser

ftp.cap - Ethereal 0.9.0 (MPDS Traffic Viewer 3.0 SDM v2.02)

File Edit Capture Display Tools Help

No. .	Time	Source	Destination	Protocol	Info
-------	------	--------	-------------	----------	------

Channel UNIT PROTOCOL  
IPDS MACP  
  Forward Bct Frame Header  
  Bct SDU Format  
    Bct SDU Follows 0  
    Extended Length 0  
  SDU Length and Type  
  SDU Payload  
    Return schedule SDU Type  
      Channel Number  
        offset 0  
        Channel Index 14542  
      Bearer Type & Spot ID Present 0  
      Resource Plan Present 0  
      Number of slot Plans 4  
      slot Plan 15  
      slot Plan 15  
      slot Plan 2  
      slot Plan 2

0040	06 14	38 ce 3f f2 20	00 85 7d 14 00 00 00 00 86	..8.?. .}	.....
0050	7d 14	00 00 00 00 87	7d 14 00 00 00	}.....}	....

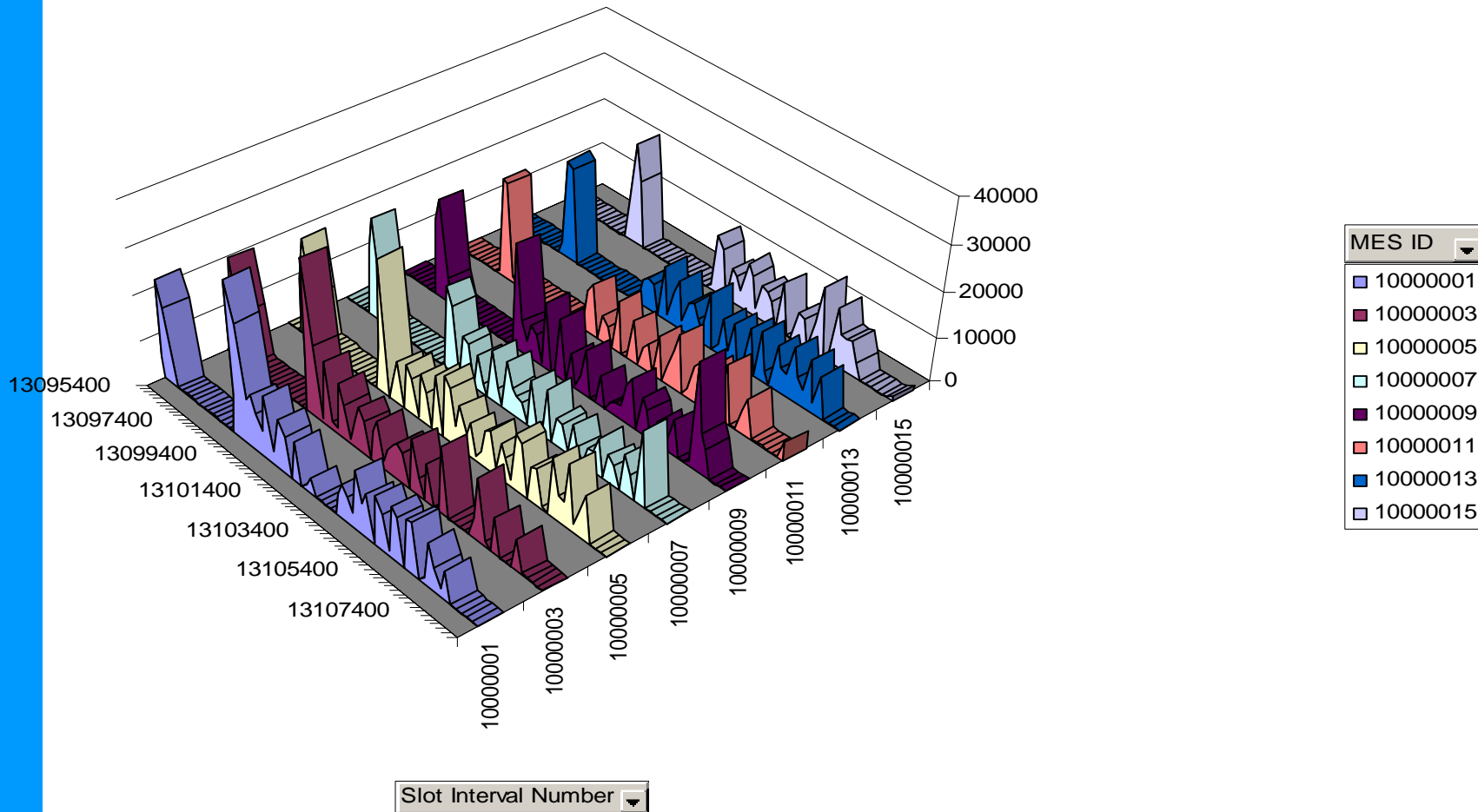
Filter: [ ] [Reset]



# results: network dependent(1/2): channel utilisation graph

Contention 20ms Reserved

Sum of Allocated

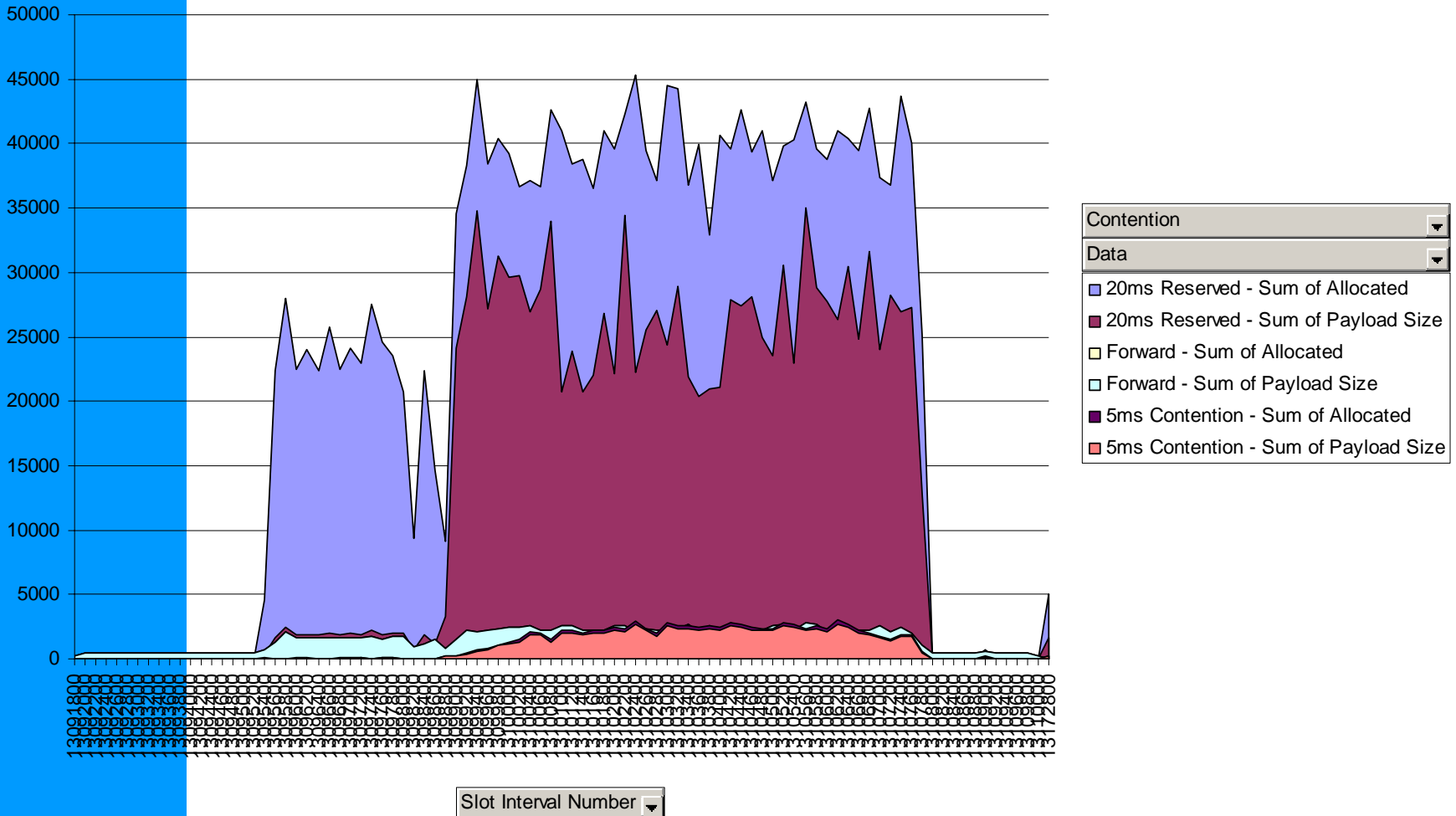


Slot Interval Number



# network dependent(2/2): resource utilization graph

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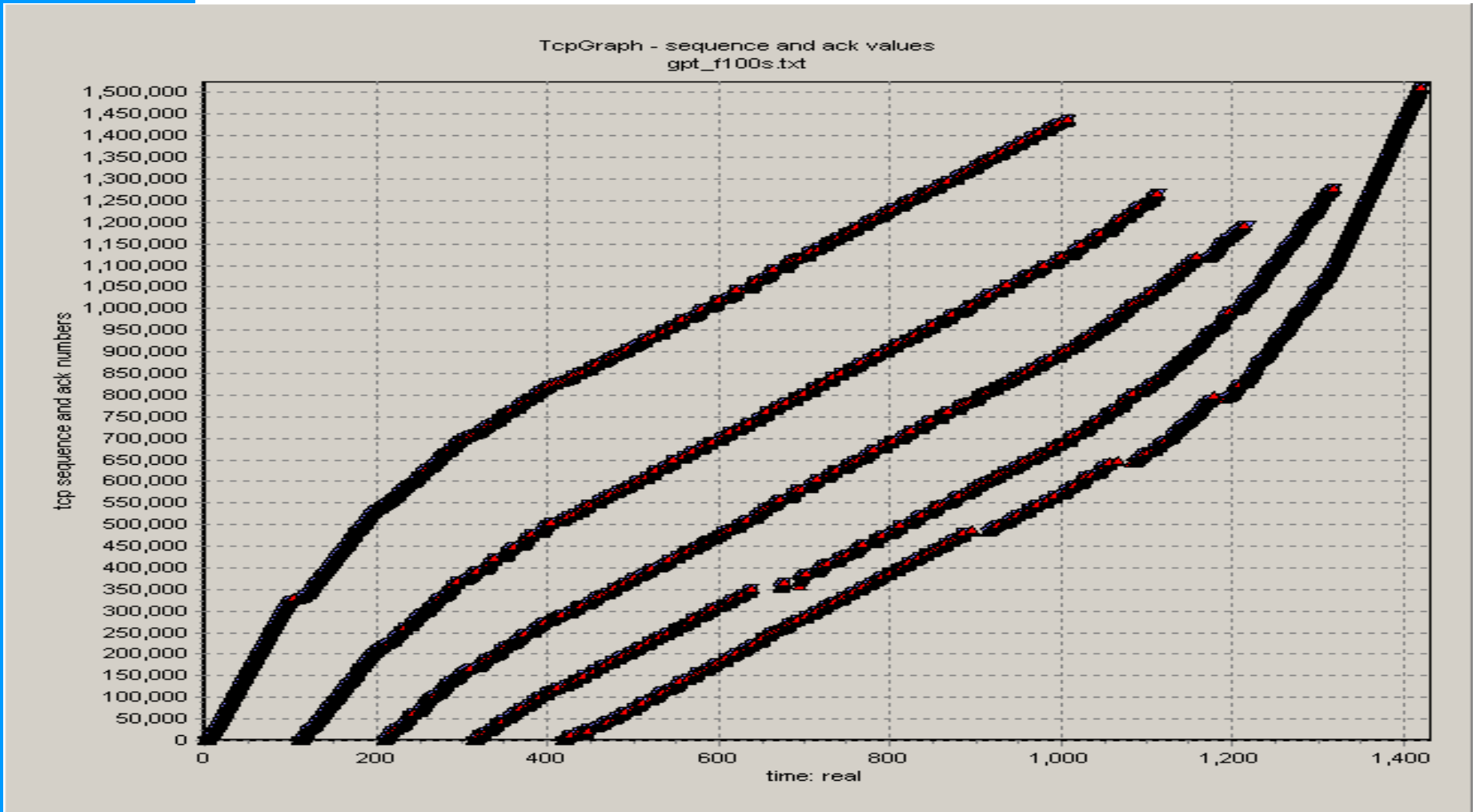


## network independent(1/4): tcpgraphs

- o application demo
- o Application Note - WTcpGraph.pdf
- o software currently available from  
<http://apps.inmarsat.com/tom/tcpgraph.htm>



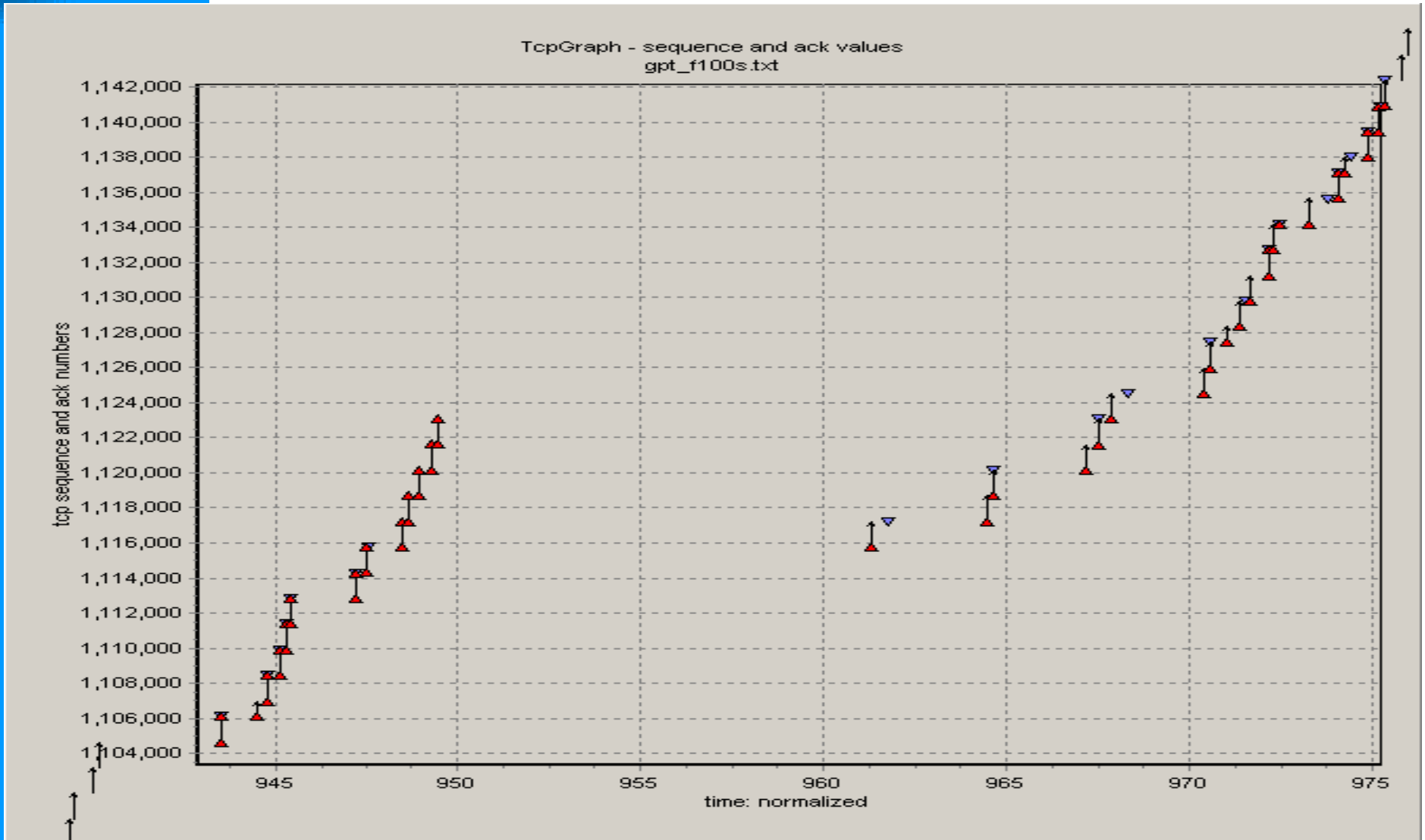
# network independent(2/4): tcpgraphs: 5 mobiles/one channel







# network independent(3/4): tcpgraphs: TCP retransmissions





# network independent(4/4): tcpgraphs: seq/ack good for retx, also need goodput indication

