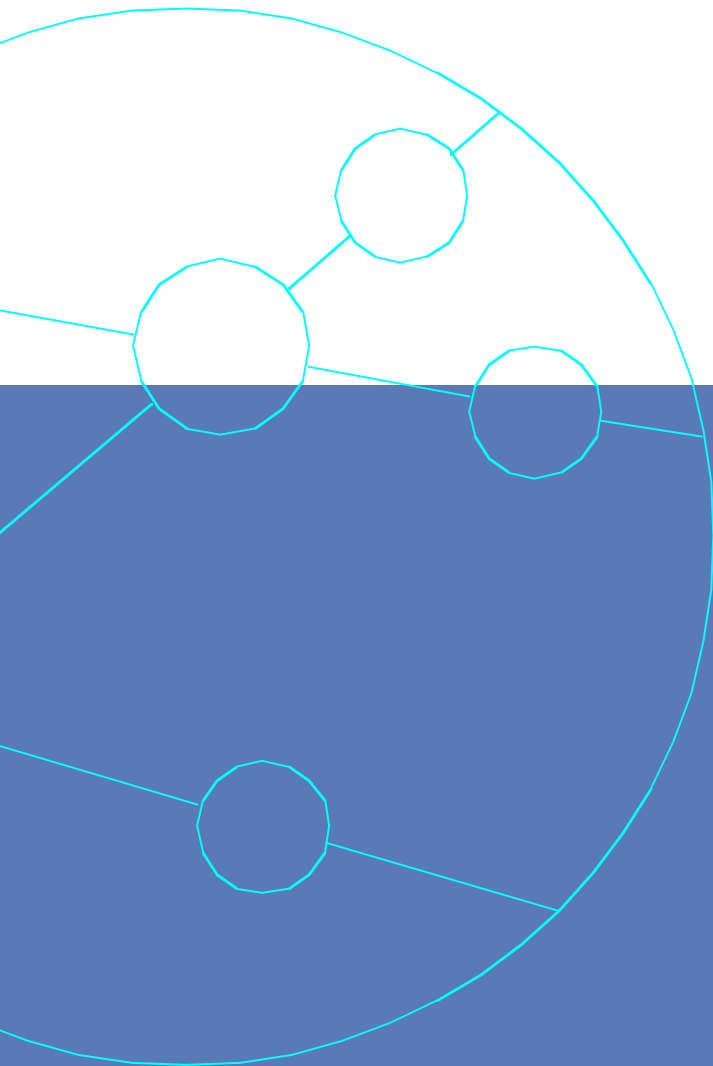


Frame Relay Performance Tests with the Aurora Tempo

Problems with the network configuration, faulty or misconfigured equipment, discarded frames, less throughput on DLCIs than promised, unacceptable transit delay of frames through the network – this document gives a short overview of problems in a Frame Relay network.

Application Note ANTEMPO_3



Testing the World's Digital Networks

TrendCommunications

Problems with the network configuration, faulty or misconfigured equipment, discarded frames, less throughput on DLCIs than promised, unacceptable transit delay of frames through the network can be major issues in a Frame Relay network.

The auroraTempo offers a range of user configurable performance tests that help to identify and prevent network problems.

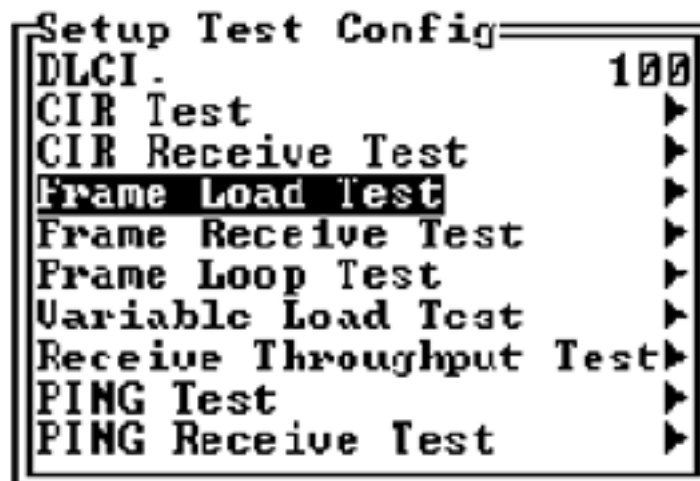
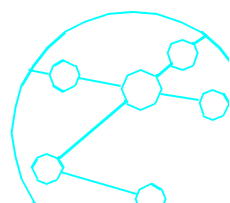


Figure 1

List of Frame Relay Performance tests

Variable Load Testing

With the Variable Load Test, the Quality of Service (QoS) parameters can be verified at both receive and transmit side on active DLCIs to ensure the promised throughput is available. The Committed Information Rate (CIR), the Committed Burst Size (Bc), the Excess Burst Size (Be) and the Time Interval (Tc) are determined with rising traffic rates up to a user defined end rate. This test permits simulated load below, within and above all the relevant parameters. The Receive Throughput Test determines the Quality of Service parameters on received traffic from the network or user equipment on an active DLCI without sending data by itself and is available also in Monitor mode.



CIR Testing

The CIR Receive Test is a receive test that can be run in Simulation and Monitor mode. You can obtain a result only with the incoming traffic that is offered by the network or user equipment. Figure 2 shows the coherence of the QoS parameters: If the network or user equipment has to transmit more data during time interval T_c (default: 1 or 2 sec.) than the QoS parameters defined, then all frames above the line rate B_c are marked as being DE (discard eligible, Frame 3) and given preference for discarding in case of congestion. All data above the line rate $B_c + B_e$ (Frame 4) are discarded immediately at the local switch. The traffic without DE should be equal to the QoS parameters (Frames 1 and 2). The CIR depends on the Committed Burst Size (B_c) and the Time Interval (T_c) and is defined as: $CIR = B_c / T_c$.

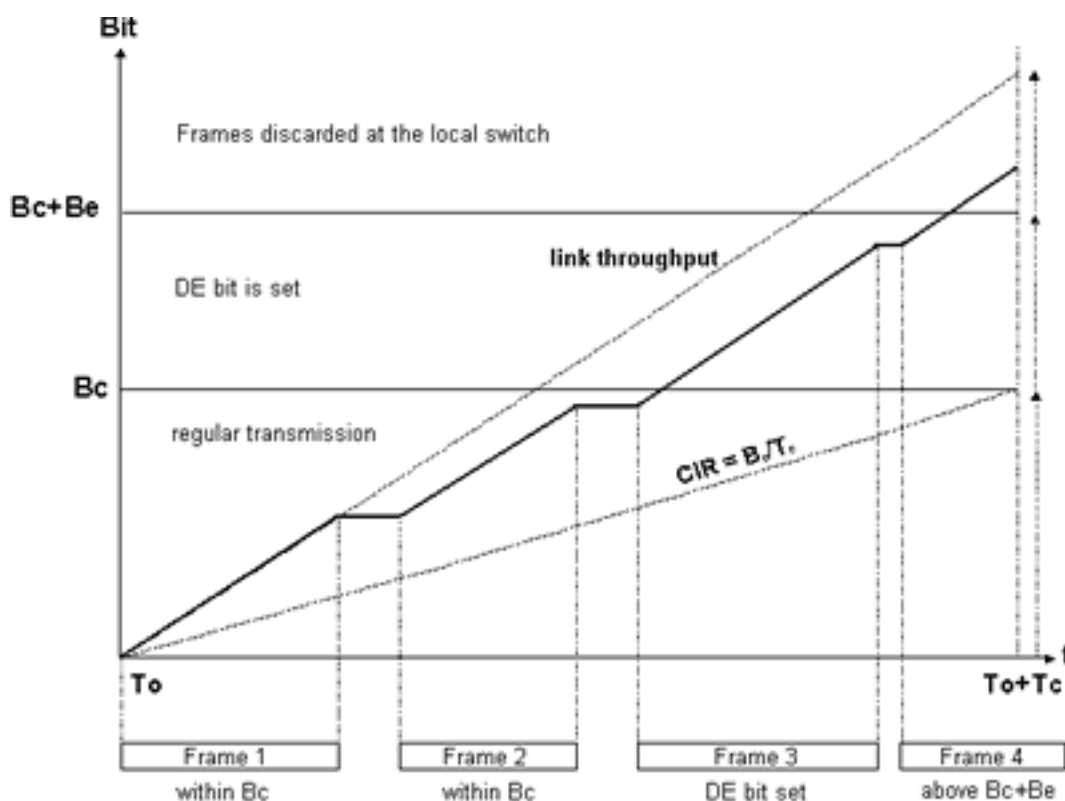
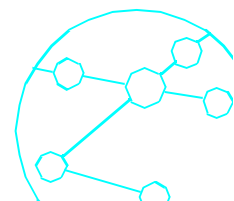


Figure 2

Coherence of QoS Parameters



The CIR Test verifies the actual CIR of any active DLCI. This test generates the highest possible throughput across the link ignoring all Quality of Service (QoS) parameters. If a loop is applied at the far end of the link then it is possible to measure the minimum CIR encountered through the network. With different configurations of the CIR in both directions it is not possible to determine if the minimum CIR was in the transmitted or received direction. A second auroraTempo at the far end of the link running the CIR Test allows measuring of the minimum CIR across the network independent of the direction.

Frame Load Testing

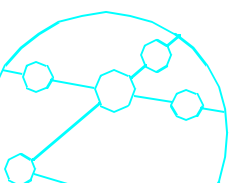
The Frame Load Test with variable frame parameters and user-defined headers allows a flexible and constant frame load to stress the network or user equipment. This allows the simulation of real network traffic with different states of congestion. The transit delay of frames through the network can be determined if the transmitted frames are looped back to the auroraTempo.

If the tester being used is a dual port unit the equipment can be 'surrounded' and tested without connection to a network.

```
Test Results/Status
Test Results: Int[B] DLCI: 100
Frame Load Test Config
Frame Rate [fps]      100
Frame length          64
Frame count           0
Frame header          Normal
Timestamp             Yes
Key [5] to disable transit delay
--Test Results-----
Frms Tx:5751          Rx:5751
Unknown:0             Lost:0           Err:1
Transit Delay (Milli Secs.)
  Avg:1              Max:3           Min:1
```

Figure 3

Results of Frame Load test



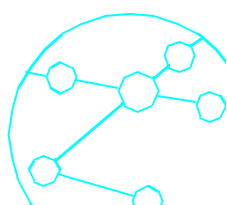
Frame Loop Testing

The Frame Loop Test loops data for a particular DLCI either to itself or to another DLCI (even one on a different interface). The auroraTempo emulates switch functionality if the DLCIs are cross-connected between its two interfaces. In this case possibly faulty switches can be replaced by the auroraTempo to isolate the problem.

IP Ping Testing

The IP Ping Test checks the presence of remote devices through the network including a LAN. The IP Ping message requests the destination device, if present, to respond with an acknowledgement. The IP Ping Receive Test lets the auroraTempo reply to an incoming IP Ping request from another device. The tester can be used like a responder from all over the network.

The functionality detailed above is available in the latest release of auroraTempo software. Please contact your Local Vendor or the Trend Communications Ltd Customer Support. Call the Hotline (tel: +44 1628 851085) for further information.





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