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VoIP Testing

IxChariot

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This Test Plan Primer contains a general outline for testing a particular technology. Not all the capabilities of Ixia technology have been exposed in this document. Please feel free to contact us if additional capabilities are required.

1. VoIP Testing with IxChariot

1.2. Key Facts

- The default values in a IxChariot VoIP test emulate a unidirectional voice stream. If you are emulating a full-duplex bi-directional voice stream like G711, you need to setup two pairs using the same codec for each voice channel that you are emulating.
- The number of pairs that you can run depends on the platform you are using.
- Enabling silence suppression changes your voice activity rate, thus leading to lower performance measurements.

2. Determine Voice Quality Deterioration with Increasing Application Traffic Load

2.1. Objective and Setup

The move to packetized voice (VoIP) is driven by the desire to use the existing data network for both application traffic and voice. This means that effective VoIP performance testing cannot be done in isolation since few networks will exclusively run VoIP. Figure 1 shows the performance of a pure VoIP network.

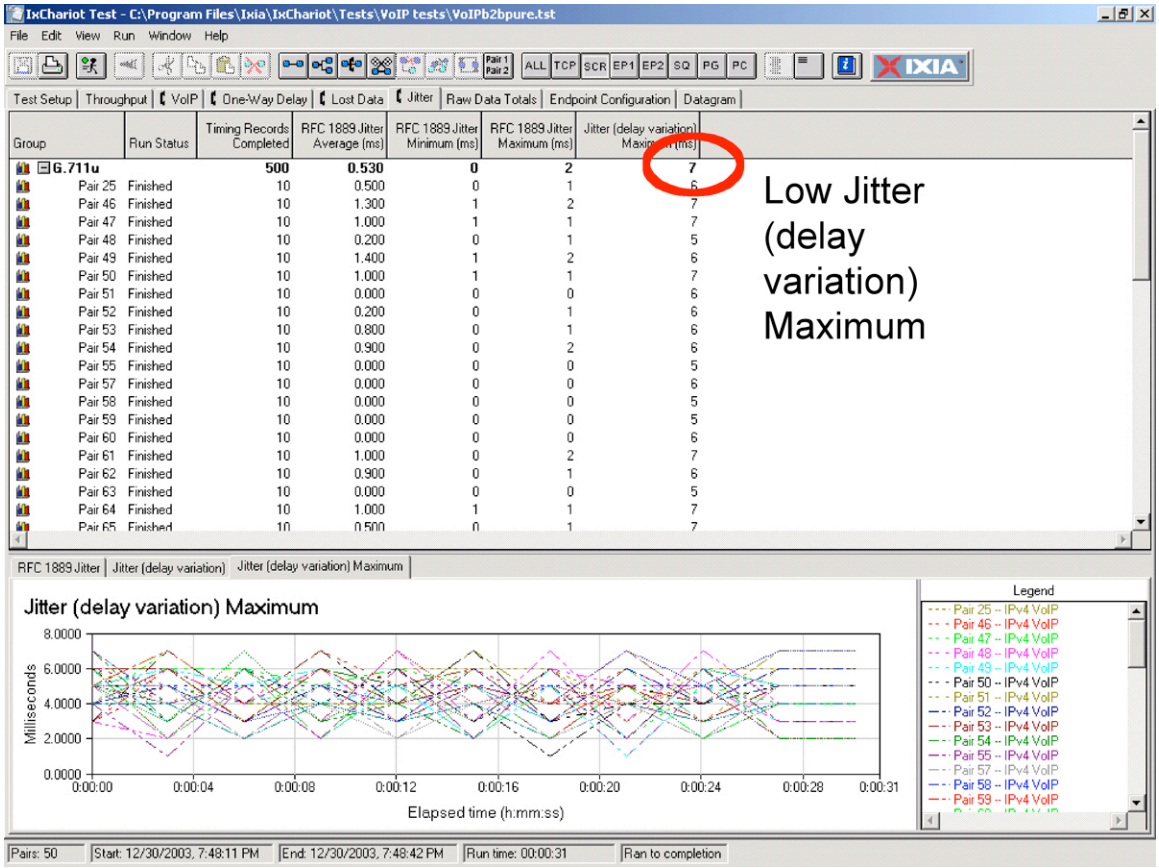

Figure 1

Figure 2 shows the impact general application traffic will have on the same VoIP network.

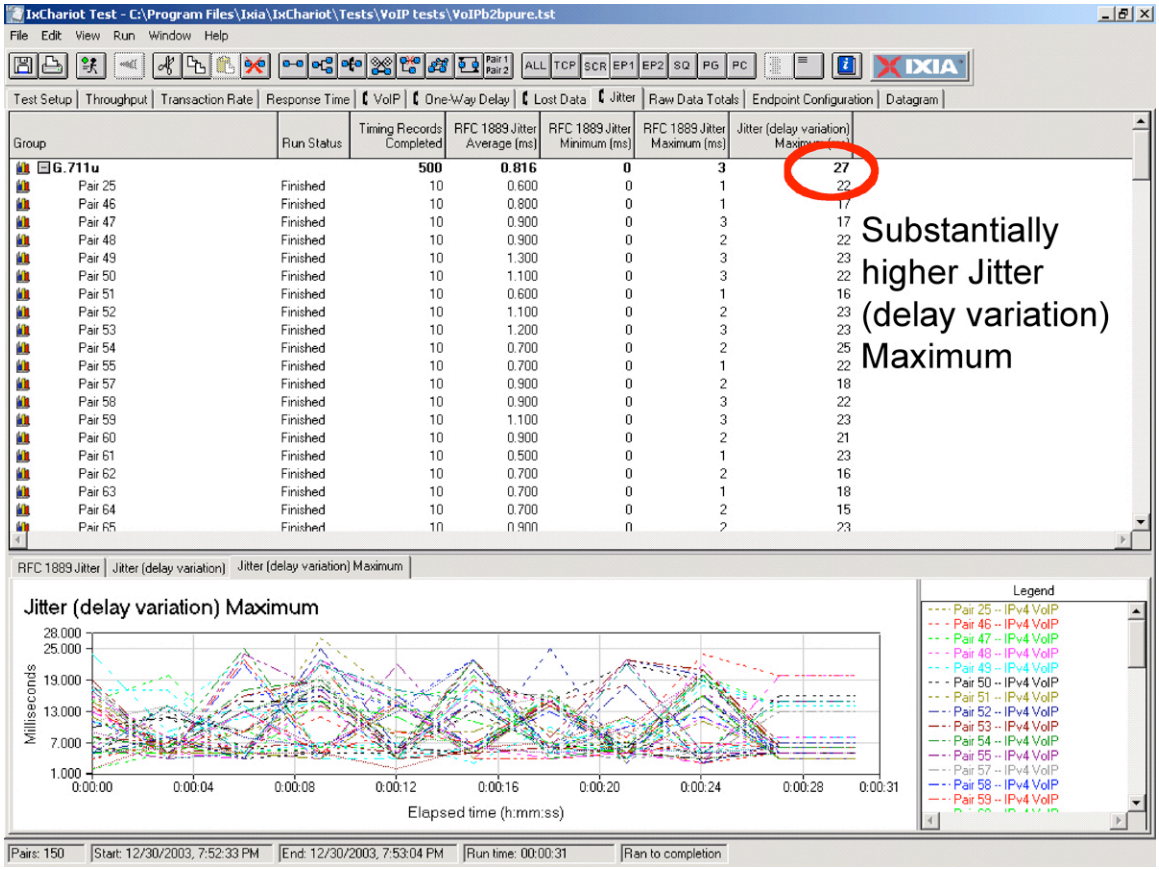

Figure 2

2.2. Test methodology

- Setup series of VoIP pairs (e.g. 50 pairs). Run test and check VoIP metrics such as Jitter.
- Add mixture of high performance test script to emulate other applications. Run test and determine new VoIP metrics.

3. Measure Impact of Voice Traffic on Constant Application Traffic Load

3.1. Objective and Setup

As a reverse option to test 1, this test assumes an existing data network to which VoIP is now being added. The key question is the number of channels (pairs) that can be added while maintaining adequate response times and throughput for the existing business applications. At the same time, the MOS estimates for the VoIP pairs should also demonstrate the quality of the calls.

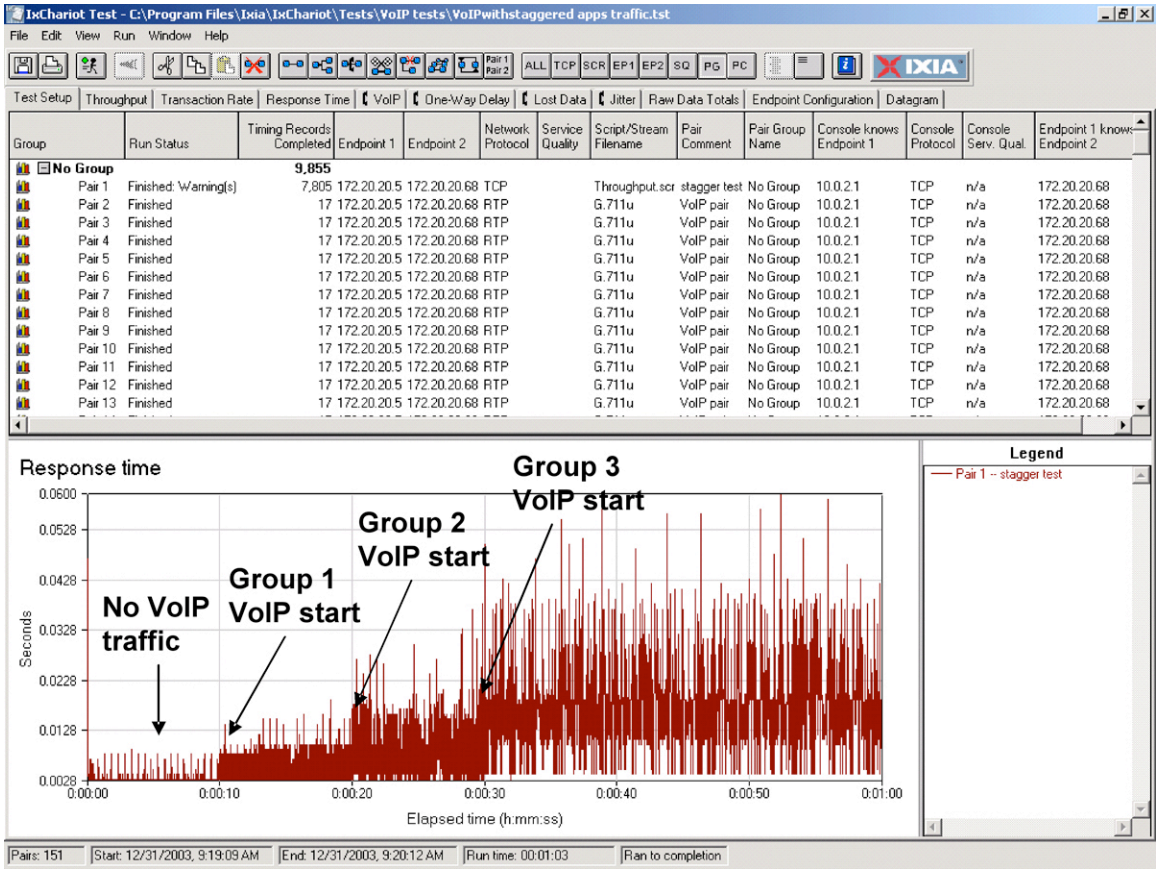

Figure 3

3.2. Test Methodology

- Setup single throughput pair to run for 1 minute. Run test.
- Add 50 VoIP pairs with an initial delay time of 10 seconds. Determine throughput and response time impact on throughput pair.
- Add another 50 VoIP pairs with in initial delay time of 10 seconds. Determine throughput and response time impact on throughput pair.
- Add another 50 VoIP pairs with an initial delay time of 10 seconds. Determine throughput and response time impact on throughput pair.

4. Verify VoIP Dual Stack Functionality of DUT

4.1. Objective and Setup

Many higher-end networking devices now simultaneously support IPv4 and IPv6 to respond to customer requirements to be future-proof for pure IPv6 networks. As shown in Figure 4, IxChariot allows you to simultaneously run both IPv4 and IPv6 traffic through the DUT, thus testing its dual stack capabilities of specifically handling VoIP traffic.

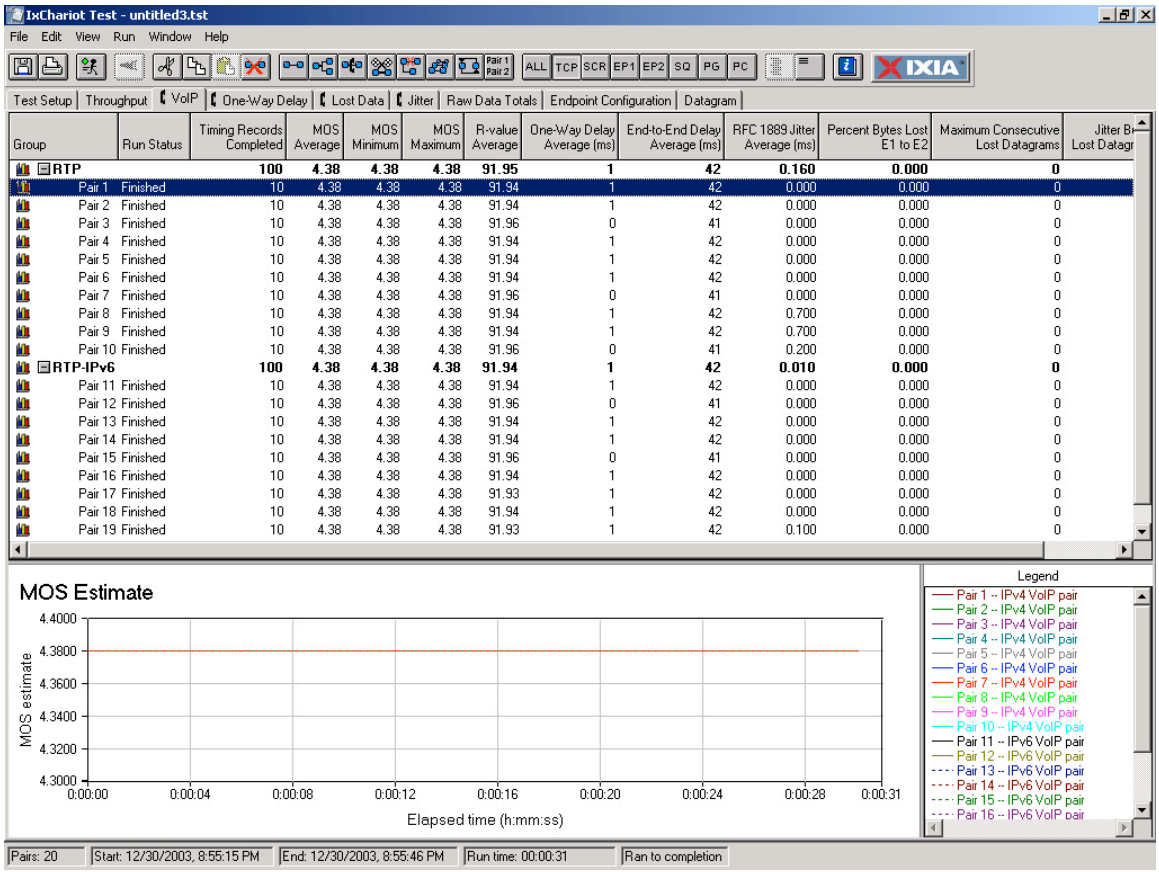

Figure 4

4.2. Test Methodology

- Setup 10 VoIPv4 pairs. Run test.
- Setup additional 10 VoIPv6 pairs. Run combined test.

5. Analyze the Impact of Prioritizing VoIP Traffic

5.1. Objective and Setup

The critical nature and QoS sensitivity of packetized voice has sparked the widespread usage of VoIP QoS mechanisms in many enterprise, hospital and government networks. IxChariot support of VoIP QoS in IPv4 networks allows you to measure both the quality improvements from implementing QoS vs. non-QoS, as well as determining the impact of prioritized VoIP traffic on the performance of your existing business applications.

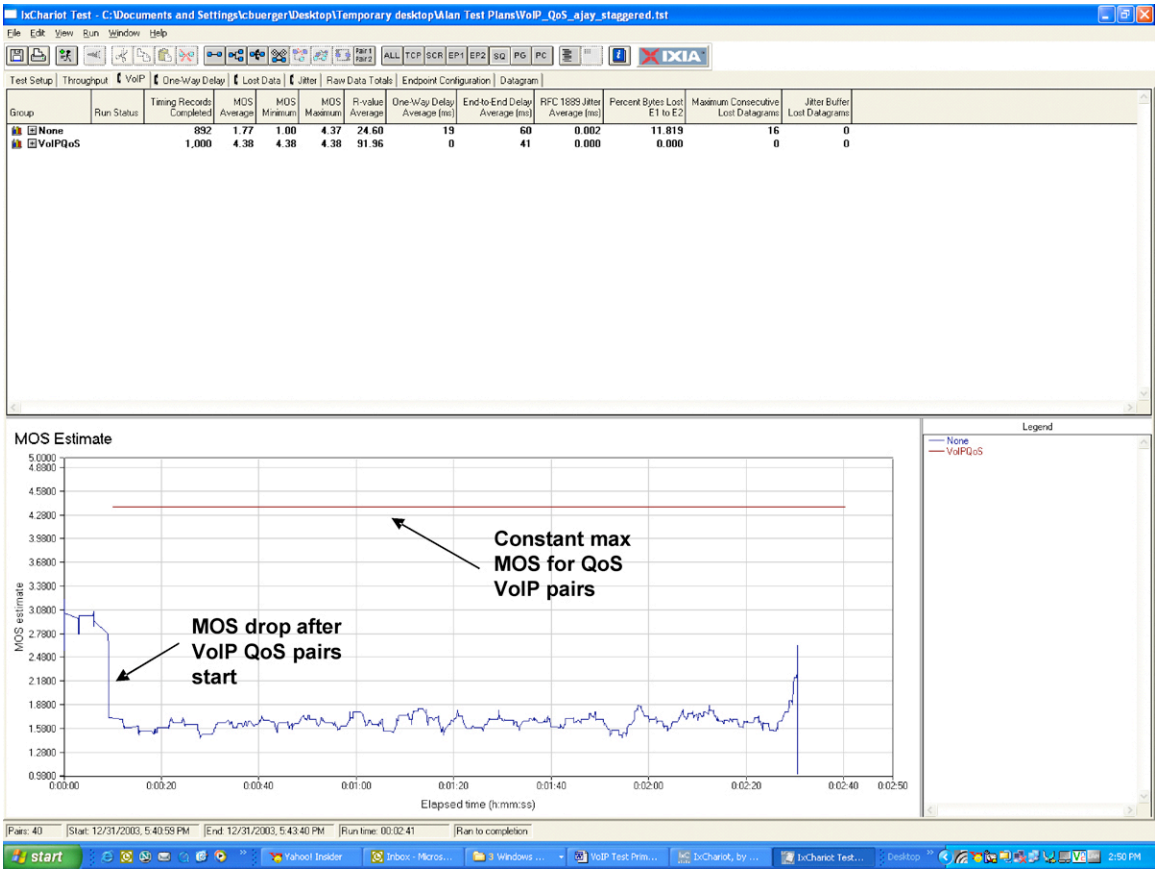

Figure 5

5.2. Test Methodology

- Setup DUT with QoS support.
- Create 20 IPv4 VoIP pairs with no QoS support. Run test and determine MOS/Delay data points.
- Create additional 20 IPv4 VoIP pairs with QoS support. Depending on the capacity of the DUT and the performance of the devices running the Performance Endpoints, it may be necessary to create some background traffic to generate QoS prioritization.
- Group by Service Quality.
- Run test and determine MOS/Delay data points.

6. Combine Stateless and Stateful VoIP Traffic

6.1. Objective and Setup

Using IxChariot on Ixia platforms uniquely allows you to fill a percentage of your network pipe with stateless VoIP traffic (using Ixia l VoIP streams running at a line rate defined by you) with stateful VoIP traffic generated by the IxChariot application. Alternatively, it is also possible to substitute any of these traffic types with enterprise application (e.g. Oracle) and web traffic (e.g. HTTPText). The screenshot below shows the results from a combined stateless and stateful VoIP test.

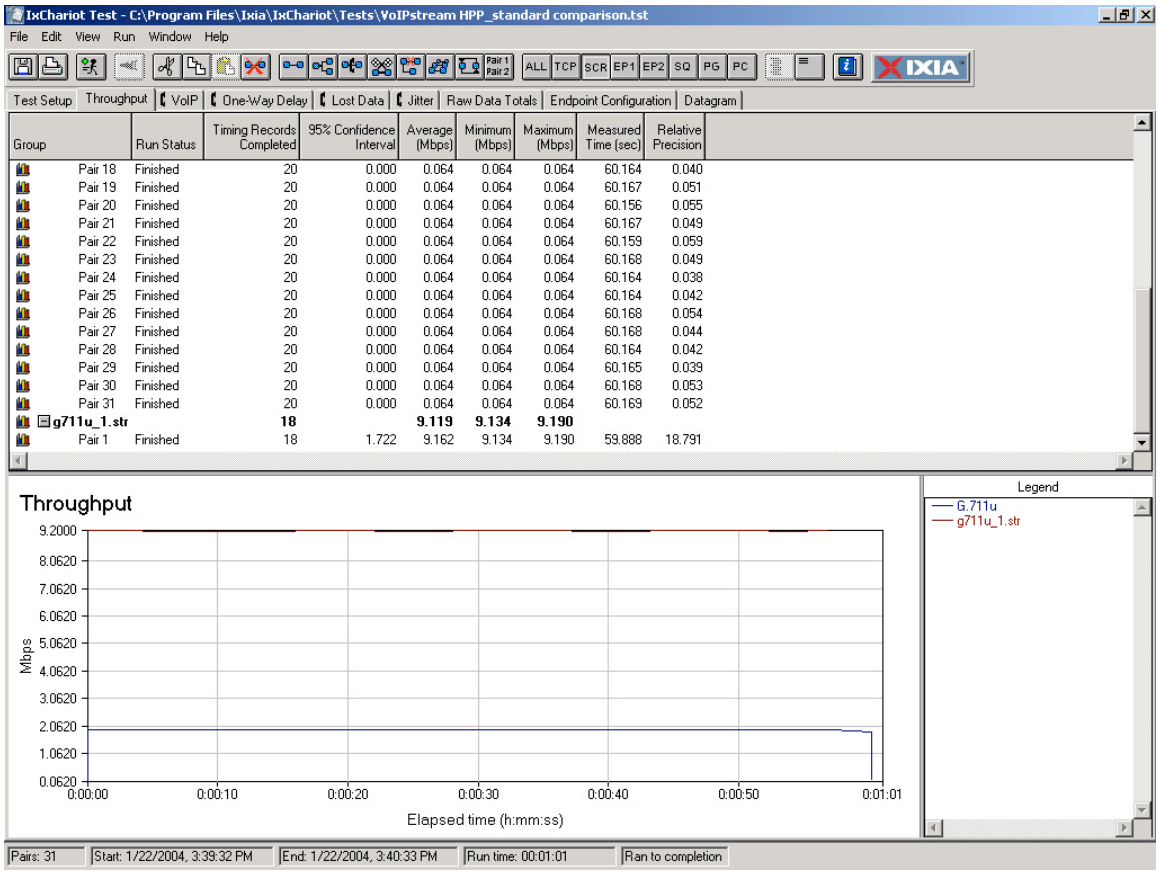

Figure 6

6.2. Test Methodology

- Create VoIP Hardware Performance Pair using Ixia VoIP stream (e.g. G.711u_1.str).
- Create x number of VoIP Application script pairs using G.711u codec (e.g. 30 pairs).
- Run test and determine MOS/Delay data points.

7. Determine WAN Capacity for QoS VoIP Traffic

7.1. Objective and Setup

In many cases, enterprise VoIP is leaving its birthplace in the LAN and is rapidly moving to cross WAN connections. You can use IxChariot to determine how much voice traffic can be supported using excess WAN capacity by multiplying the data rate by the number of voice channels that are being emulated (e.g.:10 64 kbps channels = 10x64 kbps = 640 kbps) and sending it across your existing WAN connections.

7.2. Test Methodology

- Determine WAN capacity (e.g. from router statistics).
- Create IxChariot application traffic simulating your existing applications (e.g. using Application Scanner) to the throughput number obtained from your router.
- Create appropriate number of VoIP pairs to theoretically fill WAN link to full capacity.
- Run test and determine VoIP and application performance data.