MultiDSLA Application – Advanced VoIP Test

This application note discusses VoIP performance assessment in diverse applications including Conference Bridges, Trunk and Softswitch Loading Analysis and Remote Subscriber / Homeworker Services.

Malden Electronics

WHAT IS THE VIRTUAL NODE (VN)?

The Virtual Node products form a family of VoIP test interfaces which work with the MultiDSLA test system. VN applications run on Windows platforms and provide the equivalent of a high-quality soft phone for test-ing purposes. There are three variants of Virtual Node:

VN – a single instance

sVN – scalable VN, providing multiple VN instances on a PC at the same IP address, e.g. sVN10 = 10 instances.

5 VN SIP instances at one IP address in test calls to 5 other SIP end-points

Scalable Virtual Node Concept

dVN – downloadable VN, a transient VN instance which is downloaded from a network operator's web page to test a VoIP service at a remote end-point.

5 VN instances (sVN5) in test calls to dVN instances

dVN stock
download

Downloadable Virtual Node Concept

Applications of the single VN are described in "MultiDSLA Applications – Virtual Node for VoIP Test".

Testing VoIP Performance

The emergence of VoIP as the future of telephony has offered the prospect of economy – whether through the rationalisation of network infrastructure or through toll-bypass – but it has left a trail of dissatisfaction amongst many users. Translating designs which appear to function perfectly in the laboratory into products for the real world can be problematic. Furthermore, the successful deployment of "perfect" network elements into a working VoIP system requires the expertise of system integrators and installers. Increasingly (and necessarily), these professionals come from a data background rather than a telephony background. Concepts such as "speech level" and "speech delay", central as they are to the user's perception of good quality of service, may be unfamiliar. There is a requirement for straightforward, reliable and thorough speech quality testing at all stages, in order to quantify VoIP performance and understand the nature of any problems identified. This note describes how the MultiDSLA system with Virtual Node technology meets these requirements in several advanced applications.

Advanced VoIP Test – from one channel to many

The application note "MultiDSLA Application – Virtual Node for VoIP Test" describes a number of test types involving single speech paths: these include tests across the corporate WAN as well as terminal and gateway tests in the laboratory. This application note deals with advanced VoIP test applications such as conference bridges, subscriber service testing for network operators and service providers, and home-worker testing for enterprises; these involve multiple end-points which may be all VoIP, or VoIP and analogue.

The application examples below indicate some ways in which the MultiDSLA system with Virtual Node tech-nology can be used to predict and understand the opinions of IP telephony users.
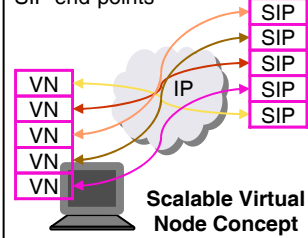
Application Examples

Application 1 shows MultiDSLA with a scalable Virtual Node (sVN) used to test a VoIP conference bridge. sVN simulates a number of conference participants. Under control of Mul-tiDSLA these 'speak' in turn whilst speech levels and quality are assessed simultaneously for each 'listener'. The VN technology also provides the packet loss and jitter measurements needed if a conference service is being tested across a live network.

VN's emulate conference participants

MultiDSLA Controller

Bridge

Application 1: Conference Bridge Test

VN's generate varying traffic load

MultiDSLA Controller

Application 2: Analysis of Quality vs. Traffic

Application 2 shows the use of two sVN applications to generate specified levels of VoIP traffic between two remote locations. MultiDSLA controls the test process, con-currently reporting packet statistics, speech levels and speech quality scores for each measurement of each VoIP call. Using this method, limited bandwidth IP trunks can be systematically evaluated for their VoIP-carrying capacity using selected codecs and traffic loads, enabling an in-formed trade-off to be made between performance and bandwidth economy.

VN's behave as IP phone extensions

MultiDSLA Controller

Softswitch

Application 3: IPT Call Loading Analysis

In Application 3 multiple VN's act as SIP or H.323 clients to an IP telephony softswitch. This offers a flexible and convenient way to load the softswitch with defined traffic patterns and determine the impact on call quality. sVN10 provides 10 SIP end-points at a single PC, for example. A number of PC's can be used to provide further groups of end-points at other locations. As with other scalable Virtual Node configurations, a full speech performance analysis is available for each speech path.
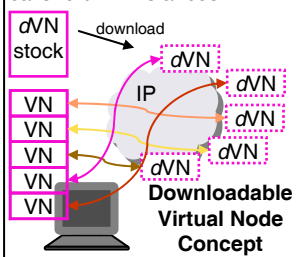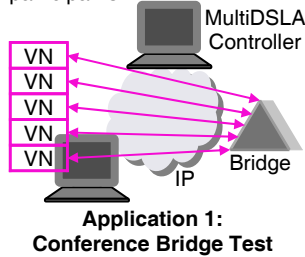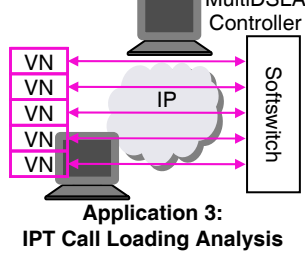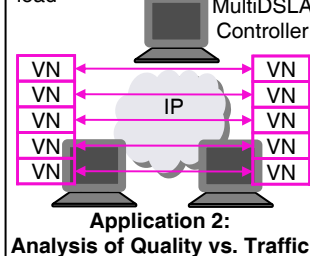
Application Examples – cont.

Application 4 is an integrated MultiDSLA / sVN / dVN solution for testing the VoIP services delivered to remote locations by a network operator, service provider or enterprise. Examples include suppliers providing VoIP to corporate and residential customers, and enterprises with home-worker installations. The numerous advantages of this technique include:

- The testing service is presented as an integral part of the VoIP provider's web site – typically a Support web page.
- Testing is initiated by the end-user and continues as an automated process.
- No site visit or equipment deployment is required.
- The solution can be scaled for a required number of tests per (peak) hour (see below).
- Results are stored centrally in the MultiDSLA SQL database.
- MultiDSLA reports Alerts to proprietary network management systems using SNMP traps.
- MultiDSLA provides reports based on any combination of node or group and any time period.

Application 4: Automated Test for Remote VoIP Users
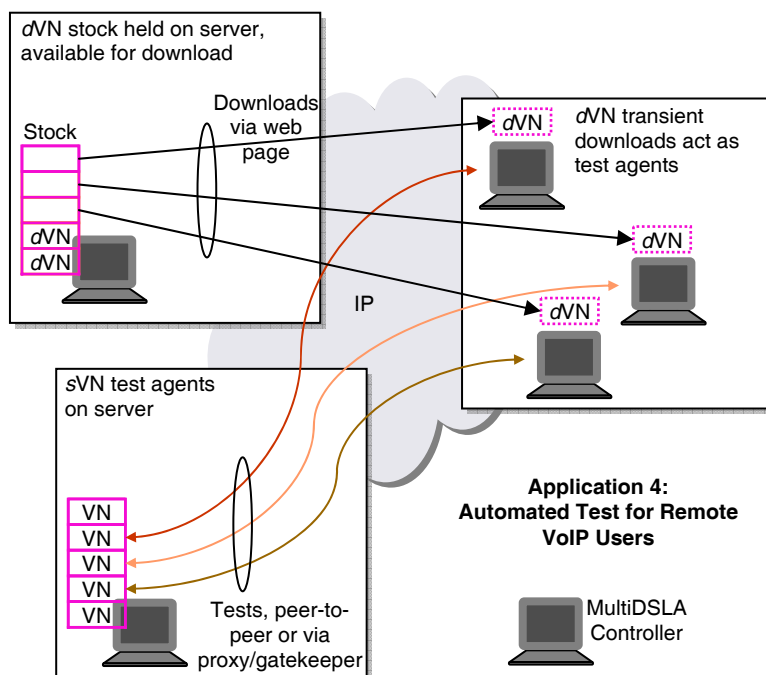
How Many dVN and VN Are Required for Application 4?

The MultiDSLA application automatically queues test requests from users when test resources are fully utilised. dVN and VN may be provisioned according to a required level of availability for the end user or according to the degree of utilisation of test resources. The quantities in the table below are based on a typical cycle of 140s including 40s of active testing – Malden Electronics or its local distributor can advise on specific requirements.

Calls per Hour (Peak)	Provision by Availability (dVN / VN)			Provision by Utilisation (dVN / VN)		
	99.9%	99%	90%	99%	90%	75%
10	4 / 3	3 / 2	2 / 1	1 / 1	1 / 1	1 / 1
20	4 / 4	4 / 3	3 / 2	1 / 1	1 / 1	2 / 1
50	8 / 5	7 / 4	4 / 2	2 / 1	3 / 1	3 / 1
100	12 / 6	10 / 5	7 / 3	4 / 2	5 / 2	6 / 2
200	18 / 9	15 / 7	11 / 5	8 / 3	9 / 3	11 / 4
250	21 / 10	18 / 8	13 / 5	10 / 3	11 / 4	13 / 4
500	34 / 15	29 / 12	22 / 8	20 / 6	22 / 7	26 / 8
750	46 / 19	41 / 16	31 / 11	30 / 9	33 / 10	39 / 12
1000	58 / 23	52 / 19	41 / 14	40 / 12	44 / 13	52 / 15

Table 1: Provisioning of dVN and VN