High Speed Mobility Testing Report With Two Vehicles

Test Date: 03 December 2007

Summary

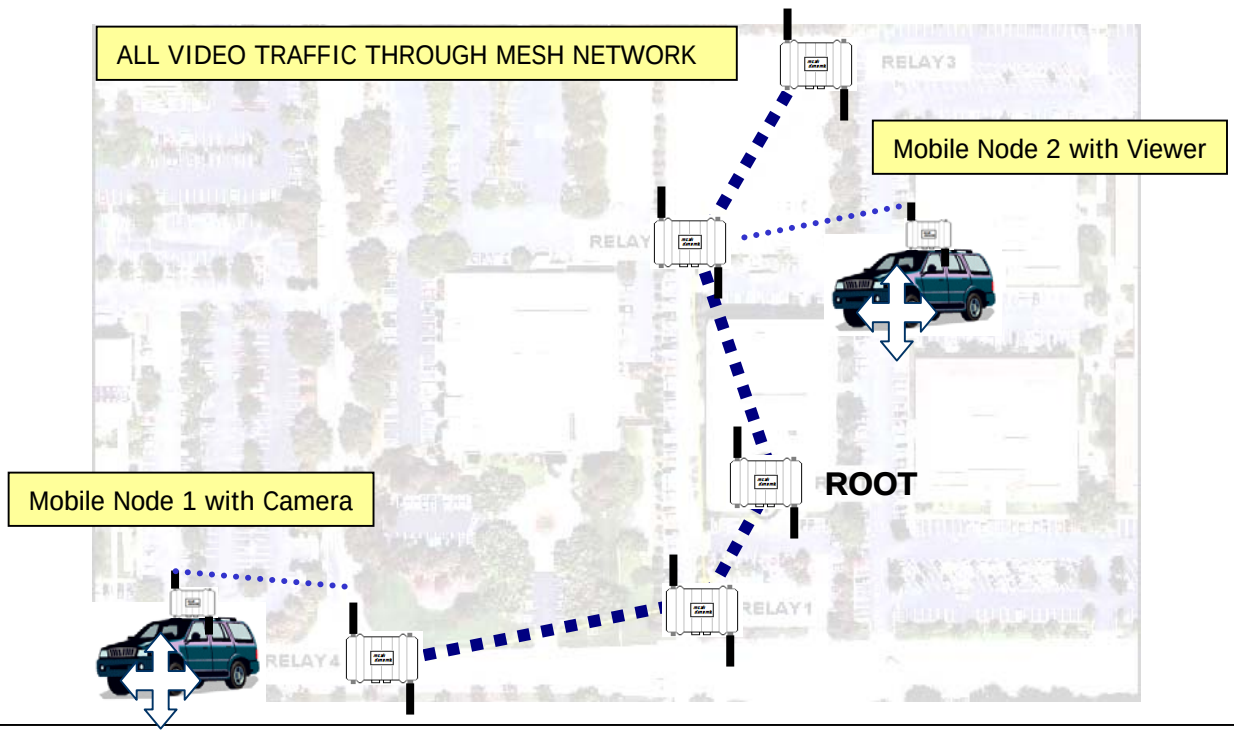
The objective of this test was to demonstrate high performance throughput connectivity between two (distant) mobile sources with all transmissions via a multi-hop mesh comprised of Meshdynamics multi-radio nodes

Live field testing of MeshDynamics wireless mesh mobile-to-mobile mesh node performance was conducted using streaming video and TCP Chariot data generation between one mobile mesh node and another mobile node. For the testing, MeshDynamics MD4350 static wireless mesh nodes were set up along a test course behind the MeshDynamics Santa Clara office parking lots. The static mesh nodes were placed along building corners so the buildings acted as obstructions and forced a multi-hop mesh node network to be formed - despite the close proximity of the mesh nodes.

The two mobile 4455 mesh nodes were mounted in two automobiles. Both automobiles was driven in repeated passes but in a random manner. Video transmission from a camera in one vehicle was transmitted from the vehicle mesh node over to the static mesh network and from there to the second vehicle. During the repeated passes, performance of both streaming video and streaming test data generated from inside one moving vehicle were monitored from the second vehicle. The path of connectivity between the vehicles was always through the mesh network and never directly between the vehicles. As a result, all vehicle-vehicle transmissions varied between 3-5 hops (through the mesh).

TCP/IP throughput tests were conducted between the two mobile units moving in both patterns, with the Video being viewed simultaneously. Throughput was observed to be generally between 2.0-4.0 Mbps. (See next page)

Recent software functionality added to the MD4000 mesh nodes significantly improved the consistency of performance in this mobility test. Past tests had shown problems with "drop-outs" of throughput during mobility testing. These new tests showed very consistent performance for both video and streaming data, with smooth shifting from node-to-node as the vehicle traveled. The changes in the mesh topology as the two vehicles moved were observed using the Meshdynamics Network Viewer on the PC in Vehicle 2. The topology changes in the mesh network did not have any observable effect on the Video and the throughput tests.



Backhaul Frequency	802.11a 5.8 GHz with 20 MHz channel width
Camera Model	Axis 213 PTZ IP camera. 16 QAM mod.
Video Format	MPEG-4, 10 Frames/sec, 1 Mb/s
Number of Units	5 stationary, two mobile.

Command Prompt

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[1920] 20.0-21.0 sec   192 KBytes  1.57 Mbits/sec
[1920] 21.0-22.0 sec   240 KBytes  1.97 Mbits/sec
[1920] 22.0-23.0 sec   240 KBytes  1.97 Mbits/sec
[1920] 23.0-24.0 sec   232 KBytes  1.90 Mbits/sec
[1920] 24.0-25.0 sec   248 KBytes  2.03 Mbits/sec
[1920] 25.0-26.0 sec   200 KBytes  1.64 Mbits/sec
[1920] 26.0-27.0 sec   224 KBytes  1.84 Mbits/sec
[1920] 27.0-28.0 sec   160 KBytes  1.31 Mbits/sec
[1920] 28.0-29.0 sec   296 KBytes  2.42 Mbits/sec
[1920] 29.0-30.0 sec   184 KBytes  1.51 Mbits/sec
[1920] 30.0-31.0 sec   160 KBytes  1.31 Mbits/sec
[1920] 31.0-32.0 sec   112 KBytes   918 Kbits/sec
[1920] 32.0-33.0 sec   440 KBytes  3.60 Mbits/sec
[1920] 33.0-34.0 sec   568 KBytes  4.65 Mbits/sec
[1920] 34.0-35.0 sec   544 KBytes  4.46 Mbits/sec
[1920] 35.0-36.0 sec   184 KBytes  1.51 Mbits/sec
[1920] 36.0-37.0 sec   472 KBytes  3.87 Mbits/sec
[1920] 37.0-38.0 sec   496 KBytes  4.06 Mbits/sec
[1920] 38.0-39.0 sec   536 KBytes  4.39 Mbits/sec
[1920] 39.0-40.0 sec   488 KBytes  4.00 Mbits/sec
[ ID] Interval       Transfer     Bandwidth
[1920] 40.0-41.0 sec   408 KBytes  3.34 Mbits/sec
[1920] 41.0-42.0 sec   520 KBytes  4.26 Mbits/sec
[1920] 42.0-43.0 sec   376 KBytes  3.08 Mbits/sec
[1920] 43.0-44.0 sec   504 KBytes  4.13 Mbits/sec
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