H.323 Beacon Update

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http://www.itecohio.org/beacon
Topics of Discussion

- Introduction
- What is H.323?
- H.323 Beacon Overview
- Tool Features!
- Looking beyond…
- How to deploy this tool?
- More Details…
- Conclusion
What is H.323?

- H.323 is an umbrella standard that defines how real-time multimedia communications such as Videoconferencing can be supported on packet switched networks (Internet)
- Devices: Terminals, Gateways, Gatekeepers and MCUs
- Codecs: H.261, H.263, G.711, G.723.1
- Signaling: H.225, H.245
- Transport Mechanisms: TCP, UDP, RTP and RTCP
- Data collaboration: T.120
- Many others…
H.323 System Architecture

Switched Circuit Network (POTS and ISDN)

- H.323
- H.320 (over ISDN)
- H.324 (over POTS)
- Speech-Only (telephones)

Gatekeeper

Gateway

Corp LAN

Internet

router

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H.323 Beacon Overview

- A tool that can be used to measure, monitor and qualify the performance of an H.323 Videoconference session
- It can be used by an end-user/conference operator/network engineer as a debugging tool to troubleshoot H.323 application performance problems in the network and at the host (end-to-end)
- Provides H.323-protocol-specific evidence and other information necessary to troubleshoot a Videoconference performance problem
- It has a distributed client/server architecture
- No manual intervention is necessary for qualifying an H.323 Videoconference at the remote end
- Easy to install and use!
Scenario I: A Researcher and an Industry professional want to Videoconference!

Internet2 Abilene Network

\[ \text{GigaPOP} \quad \text{OC2} \quad \text{OC192} \]
Case 1: Researcher is unable to make a call!
There was a firewall blocking ports that were required...
Case2: Industry professional is unable to make a call!
His LAN’s Internet connectivity was non-functional at that time...
Case 3: Both of them are in a call, but bad video & audio!
There is congestion at one of the routers along the path…
There is congestion at one of the routers along the path...
There is congestion at one of the routers along the path...
The performance problem can be anywhere in the E2E Path!!!

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GigaPOP
OC2
OC192

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What if we had instrumented the network?

Seattle

Sunnyvale

Los Angeles

Denver

Chicago

Kansas City

Atlanta

New York

Washington

Houston

CDMA Device

GigaPOP

OC2

OC192

Core Router

Switch

NMS

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And we had a troubleshooting client at the end-user…
And the troubleshooting client ran tests to a server in the path...

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GigaPOP
OC2
OC192
Core Router
Switch
NMS
CDMA Device

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Case 4: If the industry professional could not connect...
Ah.. A firewall in the path!

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GigaPOP
OC2
OC192
Core Router
Switch
NMS
CDMA Device

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By suitably distributing the servers, any E2E problem can be identified!
Multi-threaded Server

Client and Server interoperability with commercial clients

Call Status: "In Session", "Normal Close", "Exception Close"

- Call exception handling Alarms: local client has no Internet connectivity, network congestion, firewall presence, remote client/server not online, transport error, insufficient bandwidth, invalid IP address of remote client or server, ...
Version 1.0 Features… (Contd.)

- Call bandwidth selection capability in client
- H.323 session statistics: Round Trip Time, Audio jitter, packet loss, packets and octets sent/received, codec information, ...
- Excel sheet generation for offline graphical-viewing of statistics!
- Real time audio/video feedback: Test audio (in wav format) and video quality (in MPEG, QuickTime and AVI formats) of the end-user as seen on the remote side!
- Easy to install setup programs and help utilities…
Version 1.3 Features…
(Latest Version)

- New GUI layout that reflects the V1.3 features
  - Activities-log: real-time display of all the activities occurring during the test session
  - Traffic light functionality to indicate test session result
  - Settings tab: customize test session data folder, TCP/UDP/RTP port settings, H.225 and H.245 configs, audio/video codec selection, saving/deleting test data, graph formats (bmp/png), ...
  - Report of test session summary: periodic traceroutes, ping, 50th and 90th percentile summary of statistics, exception information (if any), ...

- Call Detail Record at Server to track details of test sessions conducted
- Graph plotting of statistics and ladder diagram for test session signaling message sequences
- Miscellaneous bug fixes and modifications (dynamic tab handling, deleting file locks on server for wav files, etc…)
- Other activities include-
  - LAN testing to test viability of statistics, alarms such as firewall detection, excessive packet drop indicated as congestion, …
  - Video handling and loop back feature research with C++
Some Screenshots...
Some Screenshots... (Contd.)

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More statistics variables such as duplicate packets, packets out of order, packets too late, frame rate,…

Add video capability and loopback feature to C++ client and the C++ server

(ps:Java version has video loopback implemented!)

Port H.323 Beacon Server source code to run on *nix platforms

Client-to-client testing capability

Develop the server-to-server H.323 Beacon
  - Make the H.323 Beacon be able to generate Mbps of traffic with multiple call generation and perform more extensive graph plotting for the large data sets in a web based format

Local Audio/Video Tuning Wizard
How to deploy this tool?

TYPICAL STAR TOPOLOGY
How to deploy this tool? (Contd.)

TYPICAL STAR TOPOLOGY

H.323 Beacon Server
MCU

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More Details…

- Project Website
  http://www.itecohoio.org/beacon

- Sourceforge.net
  http://sourceforge.net/projects/h323beacon/
  - Latest CVS code and Releases …
  - Mailing lists (developers, users, announcements)
  - Discussion form
  - Bug tracking, New feature requests, documentation,…

- Invitation to join the development
  - Add new features, Fix bugs, …

- Ideas and participation are welcome for a white paper on “Troubleshooting H.323 Videoconferencing performance problems”
Questions?