Super high-resolution video handling system and highly accurate video traffic monitoring technology

- Demonstrations at SC10 -

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NTT Laboratories.

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Overview of the demonstrations

1. Over 10-Gbps high-resolution video handling system
   – Video editing work flow of broadcasting station on IP networks
2. PRESTA 10G: 10-Gbps high-resolution network monitoring platform
   – Network measurement for stable transmission of high-quality video streams
   – Integration of multi-layer network monitoring into perfSONAR
1. Over 10-Gbps high-resolution video handling system overview

- Functions:
  - Transferring, recording, playback, and transcoding in real time
- Video formats:
  - Uncompressed SD/HD/4K/8K-resolution video, compressed HD
Components of the video handling system

**Media server**
- PC-cluster based ultra-high-speed video server
- Recording/delivery high-quality video stream in real-time through IP network
  - Uncompressed/compressed HD, uncompressed 4K/8K video
- Also delivery the video as a video file instead of video
- Maximum video delivery capability: 25-Gbps
  - Equivalent to capability of 16-uncompressed HD video

**Media gateway**
- Connecting between video network and IP networks
- Simultaneously converting two HD-SDI video signals to IP packets and vice versa with ultra-low latency
- Converting ultra-high resolution video, such as 4K video or SHV using multiple “Media Gateways”

**Media transcoder**
- Compress or decompress HD video in real time
- Transferring high-quality video over various bandwidth IP networks by implementing “Media transcoder” between “Media server” and “Media gateway”
2. PRESTA 10G: 10-Gbps high-resolution network monitoring platform

Features:

- Supports 10-Gbps Ethernet LAN-PHY/WAN-PHY and OC-192c POS
- 10-Gbps wire-rate full-packet capture and generation capabilities
- 10-ns-order packet time-stamping using external timing source
- Hardware packet-filtering
- Highly-accurate streaming traffic playback
- libpcap compatible API library
In 10-Gb/s networks, the time resolution at microseconds is necessary especially for measuring the video stream of 1-Gb/s and higher.

Disorder of image by packet drop (uncompressed HDTV transmitted by i-Visto)
Integration of multi-layer network monitoring into perfSONAR

Layer-7: streaming application header analysis

Layer-3/4: non-sampling Netflow v9 flow-records

Layer 2: real-time behavior of traffic bit-rate, delays, and jitters in micro-second resolution

perfSONAR with high-resolution extension
Tokyo
Video shooting
Media gateway & transcoder
Media server

Osaka

Demonstrations of video transferring on IP networks

Compressed/Uncompressed HD

Uncompressed 4K

Media gateway
Compressed/Uncompressed HD

Tablet PC
HD-Video
4K-Video

Media gateways

PRESTA 10G

Highly accurate traffic monitoring
Schedules of demonstrations

Local demo.: any time

On-demand streaming from Japan:

Wed.  1:00 PM – 1:30 PM (HD)
        4:30 PM - 5:00 PM (4K)

Thu.  10:30 AM- 11:00 AM (4K)
       12:30 PM- 1:00 PM (HD)