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Press Release

Nippon Telegraph and Telephone Corporation
NTT Communications Corporation
NTT Smart Connect Corporation
Asahi Broadcasting Corporation
Matsushita Electric Industrial Co., Ltd.

Start of Joint Cooperative Trials Running a Distributed Content Production and Delivery Platform: Laying the Groundwork for Multi-Angle, Multi-Channel Broadcasting in the Broadband Age

Five companies will jointly participate in a series of collaborative trials beginning today and running to the end of March 2002 involving the construction and operation of a distributed video production and delivery platform that will support the delivery of future multi-angle, multi-channel broadcasts over broadband networks. The five companies involved in these trials are Nippon Telegraph and Telephone Corporation (NTT, President Jun-Ichiro Miyazu), NTT Communications Corporation (NTT Com, President Masanobu Suzuki), NTT Smart Connect Corporation (NTT-SMC, President Akitoshi Ito), Asahi Broadcasting Corporation (Asahi Broadcasting, President Toshiharu Shibata), and Matsushita Electric Industrial Co., Ltd. (Matsushita Electric, President Kunio Nakamura). Some of the contents in these trials will be made available to the general public over broadband access lines.*1

Trial Overview

Now that we are starting to see the deployment of fully evolved broadband IP networks*2 based largely on optical capabilities, the broadcast industry and video content providers eagerly anticipate an infrastructure that will allow them produce and deliver far more appealing video contents at relatively low cost.

The way video programming is produced today, the raw footage taken on location is first sent to an editing site by satellite link or VTR tape, then the edited material is sent over a dedicated line or again via VTR tape to the broadcasting station (see Fig. 1). The obvious drawback of this scheme is that the dedicated line and VTR tape costs are redundant. Furthermore, the televising of multi-angle video footage shot at sports events, concerts, and the like over multiple channels is currently difficult because (a) editing while maintaining the synchronization of multiple video streams is very complicated, and also because (b) it costs several times more than it should (due to redundancy) to reserve the required bandwidth for transmission.

It was these inefficiencies that brought the five companies together (NTT, NTT Com, NTT-SMC, Asahi Broadcasting, and Matsushita Electric) to conduct collaborative trials to build and operate a Content Trading Network (CTN)*3 (see Fig. 2) that will permit video footage shot from multiple angles at various events and other on-site locations to be sent at lower cost to broadcast stations or data centers over a broadband IP network where the video contents can be efficiently edited and rebroadcast.

The scope of the trials goes beyond simple transmission of video contents. Another

fundamental objective is to determine whether prevailing costs can be reduced by using a broadband IP network-based Content Delivery Network (CDN) [*4] to broadcast multi-angle, multi-channel streams and locally produced programming to nationwide audiences.

Trial Highlights

The trials will cover a range of capabilities including the shooting of sports events and concerts from multiple angles, the transmission of multi-channel high-picture-quality video materials between remotely located data centers and broadcast stations over a broadband IP network, and various editing and processing of the video contents. In addition, some video content will ultimately be sent on a trial basis over Content Delivery Networks (CDNs) to general users connected by broadband access lines.

Roles of the Participants

Asahi Broadcasting	The company will produce video contents that are more interesting and appealing than are generally available by shooting sports events and concerts from multiple angles using a multiple content video recording scheme[*5] developed by Asahi.
Matsushita Electric	Using a high picture quality transmission scheme for DVCPRO IP transmission equipment[*6] developed by Matsushita, the company will send video materials over the IP network.
NTT	NTT will implement the broadband synchronous transmission over the IP network using a wide-area synchronization scheme (UniSync)[*7] developed by the NTT Information Sharing Platform Laboratories. NTT is also in charge of efficiently multicasting the edited video stream to multiple delivery bases using a video streaming relay scheme (LSS)[*8] that was also developed by the Information Sharing Platform Laboratories.
NTT Com	NTT Com will build the wide-area content trading network employing a highly reliable broadband IP network architecture that is provided by NTT Com.
NTT-SMC	The company will store the video contents on a server in the data center environment made available for the trial and redeliver the contents using a multi video content storage and delivery technology.[*9]

Future Plans

A public demonstration of the trial capabilities will be presented at the NTT Group's exhibition booth at Networld+Interop 2001 that is scheduled to open at Makuhari Messe (Japan Convention Center) on June 6. The demonstration will involve synchronous playback of multi-angle video received from a remote video server over an IP network (see Fig. 3).

That will be followed by another public demonstration, this one involving reception by general users of live broadcasting of sports events and other video materials on various kinds of terminal equipment via broadband access lines, so they experience multi-

variation firsthand.*10

These public trials will give us an opportunity to evaluate broadcasting technologies for the new era of optical broadband networking, and help define how the fully evolved services of the future should be implemented.

Terminology

***1 Broadband access lines:** Essentially this means upgrading the bandwidth capability of access lines that are currently liable to be bottlenecks in the delivery of large-volume contents over a broadband IP network. There are a range of different transmission speeds and media available ranging from xDSL and CATV to optical fiber (FTTH).

***2 Broadband IP network:** A broader band network complying with IP (Internet Protocol) that not only supports conventional Internet usage (Web browsing), but also supports smooth transmission of TV-broadcast-quality video, music, and other large-volume content streams.

***3 Content Trading Network (CTN):** In contrast to CDNs implemented mainly to deliver contents to end users, a CTN is a network whose primary purpose is to efficiently deliver contents among content producers (content holders, producers, editors, etc.) and industry players involved in content distribution. This is an original concept that emerged out of the present collaborative trials.

***4 Content Delivery Network (CDN):** A network implemented primarily for delivering contents to end users, using a broadband IP network

***5 Multiple content video recording scheme:** A recording scheme that applies unified time codes to multiple concurrent video streams with different formats (e.g., in sports events) to enable future multi-angle, multi-channel (multi-stream) broadcasting.

***6 High picture quality transmission scheme for DVCPRO IP transmission equipment:** A method for accommodating input/output signals for studio-quality video recording and playback equipment (DVCPRO) to a format compliant to IP (Internet Protocol). The video recording and playback equipment can be directly connected to broadband IP networks. (DVCPRO is a registered trademark of Matsushita Electric.)

***7 Wide-area multi-stream synchronization scheme (UniSync):** A studio-quality video signal transmission scheme that preserves the proper synchronization of signals while they are being sent over an asynchronous IP network. It achieves this by combining the video signal with a standard wide-area synchronous signal extracted from an ISDN network. Because it permits proper synchronous transmission, playback, and switching of multiple video signals, this method can also be applied to future multi-angle broadcasting.

***8 Video streaming relay scheme (LSS):** A splitter-type stream switch that replicates and delivers incoming video packets from a video stream server to multi-points in real time. In a CTN and a CDN, the method is mainly used to relay contents to end users. The scheme implements gigabit-class delivery capacity with a single PC server, the fastest throughput that has ever been achieved with a

software switch operating on a PC server. This represents a ten-fold improvement in cost performance over conventional solutions.

*9 **Multi video content storage and delivery technology:** A technology for receiving and archiving large-volume video contents shot from multiple angles incoming from transmission points via a broadband IP network. The contents can be delivered at any time when requested by content editors and providers.

*10 **Multi-variation:** The ability to accommodate recorded video materials to different end-user terminals and access line speeds with multiple streaming formats and transmission speeds. Once broadband capabilities become generally available, it is assumed that there will be a diverse range of different environments for viewing video, so this is a key condition for raising the cost-performance ratio of producing contents.

Attachment

- Figure1 Current Scheme for Video Production and Delivery (Example)
- Figure2 Distributed Platform for Video Production and Delivery
- Figure3 Multi-Angle Video Production and Transmission using Wide-Area Video Synchronization Technique (UniSync)

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