(Press Release)

September 27, 2002

NTT Corporation
Pioneer Corporation
Matsushita Electric Industrial Co., Ltd.
NEC Corporation
Pace Micro Technology plc
nCUBE Corporation

Establishing Interconnectivity among Various Makers' Products through Standardization of VOD Protocol

- Taking a major step toward practical HIKARI broadband streaming video delivery -

NTT Corporation (NTT; Head Office: Chiyoda-ku, Tokyo; President: Norio Wada), Pioneer Corporation (Pioneer; Head Office: Meguro-ku, Tokyo; President: Kaneo Ito), Matsushita Electric Industrial Co., Ltd. (Matsushita; Head Office: Kadoma City, Osaka; President: Kunio Nakamura), NEC Corporation (NEC; Head Office: Minato-ku, Tokyo; President: Koji Nishigaki), and Pace Micro Technology plc (Pace; Head Office: West Yorkshire, England; CEO: Malcolm Miller) have conducted interconnectivity tests of each company's VOD (*1) servers and set top boxes (STB), aimed at achieving standardization of streaming (*2) video delivery technologies. Through these tests, which used prototypes equipped with VOD control protocol as prescribed by the HIKARI Service Architecture Consortium (HSAC)(*3), the participants confirmed normal operations between VOD servers and STBs. (See Attachment 1) The success of these tests represents a major step toward the standardization of streaming video delivery technologies. Standardization of specifications will enable the delivery services that are not dependent on the implementations of various makers' products. As a result, content providers can expect their contents to be applied by a wide range of users, which will in turn lead to a broader lineup of contents being offered. Customers, meanwhile, will be able to enjoy an abundant variety of services. The market for "HIKARI Broadband" streaming video delivery is thus expected to see a high level of activity.
NTT and Pioneer have also developed a high-definition MPEG-2 (*4) playback technology with a maximum speed of 25 Mbps, making a good use of photonic network, which is expected to become a mainstream technology in the future. Using STB prototypes equipped with these technologies, they have conducted interconnectivity tests with VOD servers manufactured by nCUBE Corporation (nCUBE; Head Office: Oregon, USA; President: Michael J. Pohl), and have confirmed normal operation of these devices as well. Furthermore, NTT, Pioneer, and Matsushita have developed an MPEG-2 encrypting technology for protection of contents, which is essential to streaming video delivery business. Tests were conducted with each company's VOD servers using STB prototypes equipped with the MPEG-2 encrypting technology, and normal operation was confirmed in all cases.

(Significance of Interconnectivity)

Currently, because companies are conducting independent development on connection

procedures between VOD servers and clients, connections among different manufacturers' products are not viable, and interconnectivity is becoming a critical issue as we approach a practical entry into the era of photonic network. As part of its efforts to resolve this issue, NTT, which is a member of HSAC, called upon these other companies to participate in the interconnectivity tests.

(Key Technologies that Support Streaming Video Delivery)

1. Achieving high-definition playback of MPEG-2 contents at speeds up to 25 Mbps (see Attachment 2)

In the reception of streaming contents using IP protocols, there is a significant processing load when extracting streaming data (TS(*5) packets) from the IP packets. In the case of conventional software processing, the CPU is monopolized making it difficult for other applications to operate. As a result, there has been a limit to the quality that could be achieved in playback by comparatively low-cost, home-use processors (up to 5 Mbps). Now, by developing hardware for the process of extracting TS packets from IP packets, the group has achieved high-speed processing as well as high quality playback (up to 25 Mbps).

In the case of IP streaming, because the IP packets are sent discontinuously, rather than at fixed intervals as in broadcasts, it is not possible to achieve synchronous playback based on the packet arrival time, a method adopted in broadcast transmissions. To resolve this problem, the BB-NIM corrects inconsistencies in speed by adjusting the speed at which data is transferred to the decoder (*6) based on time information inserted in the MPEG-2 data (referred to as a "time stamp"), thus enabling stable, long-time playback even of high-definition video at 25 Mbps.

2. Protecting contents using MPEG-2 encrypting methods that enable high-speed processing (see Attachment 3)

MPEG-2 TS packets are well suited for high-speed processing because of their fixed lengths, but because time stamps or other control information may be included in the data segment except the header (the "payload"), it is impossible to encrypt all the data. Because detecting the boundary between the control information and the video information in the payload increases the processing load and undermines the advantages of fixed lengths, the group has developed a method of appropriately controlling the segments that should be encrypted. In this way, it is possible to protect contents without the need for high-speed processors to execute real-time decrypting processes, and without adding to the cost of the STB.

(Future Developments)

In the future, these companies will form ties with a wide range of other manufacturers to promote the standardization of various protocols, with the goal of starting up and promoting the market for "HIKARI Broadband" streaming video delivery. At the same time, they will promote technological development targeting content transmission, interactive communications, and other functions aimed at facilitating diverse video delivery services, and will work toward expanding business in the fast-growing field of streaming video delivery. Based on the recently established specifications, the companies named in this press release are playing a central role in the kick-off of a new study group--the purpose of which will be to develop even more diverse and valuable services--and will continue to put out calls for participation by a wide range of member companies.

[Glossary]

(*1) VOD (Video On Demand)

A video delivery format that enables the user to play back, stop, pause, or otherwise control video contents according to subscriber's needs by using a VOD control protocol.

(*2) Streaming

A technology for playing back video or music data from a server while the data is being received via a network. By using streaming technologies, it is possible to play back even large volumes of video data without having to waste time waiting for downloads, or to deliver video contents in real time as they are being filmed.

(*3) HIKARI Service Architecture Consortium (HSAC)

Anticipating an era in which optic fibers will be laid to regular households to provide 100-Mbps class services on a regular basis, this organization studies and publishes service models and technical conditions--for example, the protection of rights and the assurance of information security and service quality in the context of broadband services--aimed at creating an environment that will enable anyone to use networks with confidence. Currently, HSAC is conducting its activities with a membership of roughly 80 companies.
(http://www.hikari-sac.org/)

(*4) MPEG-2 (Moving Picture Experts Group-2)

MPEG is an international standard for compression of video data. MPEG-2 in particular is a standard encoding method for TV images and other high-quality video data, including HDTV, and is already being applied in DVD and digital TV broadcasts.

(*5) TS (Transport Stream)

A standardized format for multiplexing MPEG-2 encoded data and sending this data across communication lines. Data is forwarded in units of 188-byte fixed-length packets.

(*6) Decoder

A device for decompressing data from compressed streams into video or music data.

- Attachment 1
  Interconnectivity Tests using HSAC Video Distribution Protocol
- Attachment 2
  High-definition playback technologies at speeds up to 25 Mbps
- Attachment 3
  MPEG-2 encrypting methods that enable high-speed processing

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