IPv6 Multipoint to Multipoint Video Conferencing System (MCSv6)

Current Issues

The period of migration from IPv4 to IPv6 will result in a mixture of IPv6 and IPv4 islands on the Internet. Until the migration is complete, intercommunicating between IPv6 and IPv4 will pose a problem and challenge for IP based video conferencing software, especially multipoint to multipoint like MCS. The current problems of implementing video conferencing system over IPv6 are as follows:

1. The system should be able to support the 128 bits addressing scheme.
2. The system should be able to handle IPv6 packets that come from IPv6 tunneling network.
3. The system should be able to use the native IPv6 addresses to utilize IPv6 network management features.
4. The system should also use the flow label to control the flow of the packets to make the conferencing run smoothly

Being like other multimedia application, MCS needs to migrate to the new version of IP or else it will lose its market as the IPv4 nodes will be isolated in the IPv6 regions.

Current addressing scheme in MCS needed to be changed to suit 128 bits in IPv6. Temporarily the transition mechanism can be adopted to solve the address compatibility problems. This can be achieved by adopting IPv4-compatible-IPv6 addresses or using address translation mechanism. Besides adopting the transition mechanism, further steps should be taken to develop application that uses native IPv6 addresses to utilize IPv6 network management features.MCSv4 is implemented using the winsock2 socket programming. This IPv4 socket API will be incompatible with IPv6. Thus newer version of winsock is needed for IPv6.

Multicasting is an important feature in MCSv4 and used to limit the bandwidth usage in the network. In order to communicate with other clients in different LAN, MCSv4 uses MLIC to convert the multicast packets. Direct porting of MSCv4 to MCSv6 will benefit MCS. In IPv6, by using new globally recognizable multicast addresses, MCS multicast packets can be directly routed to the other client/s in different LAN/s by IPv6 backbone routers without conversion of packets. This will reduce the conversion workload on MLIC.

History of the World First Multipoint to Multipoint Multimedia Conferencing System

We at Network Research Group (NRG), have done and completed tremendous research towards the creation and development of the world's first **MULTIPOINT-TO-MULTIPOINT** multimedia conferencing system. The core research started in 1992 which shaped the multimedia conferencing architecture for distributed network environment. Based on the observation on how real meetings are done, we have formulated unique control criteria to map the real meeting controls to the virtual controls.

The control criteria allow the chairman of the conference conducted to have full control on how the meeting should go on. To further enhance the control criteria, we have integrated the real time switching between the participants of the conferences. The control criteria called the Real Time Switching (RSW) as whole made the architecture to support unlimited number of participants without increasing the bandwidth consumption. This is a very unique feature that no other video conferencing tool can achieve.

Based on the research and the drawn architecture, the multimedia conferencing system was implementation. The first two versions were experimental prototypes to test the architecture's performance. The next version which is version 3.0 was the first complete MCS implementation with half duplex audio and one fixed sized video. Chat and other modules were not incorporated in the system. It was a basic video conferencing system that was built for Windows 3.1 operating system. The implementation was based on broadcast technology that allows single transmission to be received by many and can be only used in Local Area Network (LAN). There is also no compression integrated in the system.

In year 2002, MCS version 5.0 emerged from the version 4.0 to integrate the latest technologies available. A lot of improvement has been done in this version, mainly from user's feedback. The user interface has been changed to be more comfortable to use. New components added to support more features. Audio and video transmission improved and bigger video sizes are available.

MCSv6-IPv6 Based

There are many issue and challenges have to be addressed in order to get MCS working in both IPv4 and IPv6.

First Phase

The MCS should be able to work on IPv6 islands which are interconnected over IPv4 network (mainly the Internet). As this scenario is the first phase of the IPv4 transition to IPv6 fully, the multicast tunneling software (MLIC) built in to the system will have to adapt v4 to v6 multicast and unicast transmissions.

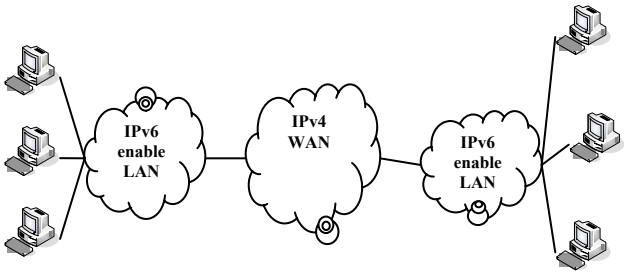

Figure1 shows the MCS on IPv6 LAN over IPv4 WAN

Second Phase

The IPv6 transition will results a mixture of IPv6 and IPv4 islands exist in the Internet itself. In order to allow transparency among the participants, MCSv6 will be able to interconnect all the participating LANs by tunneling the conference data over IPv6 Island and IPv4 islands.

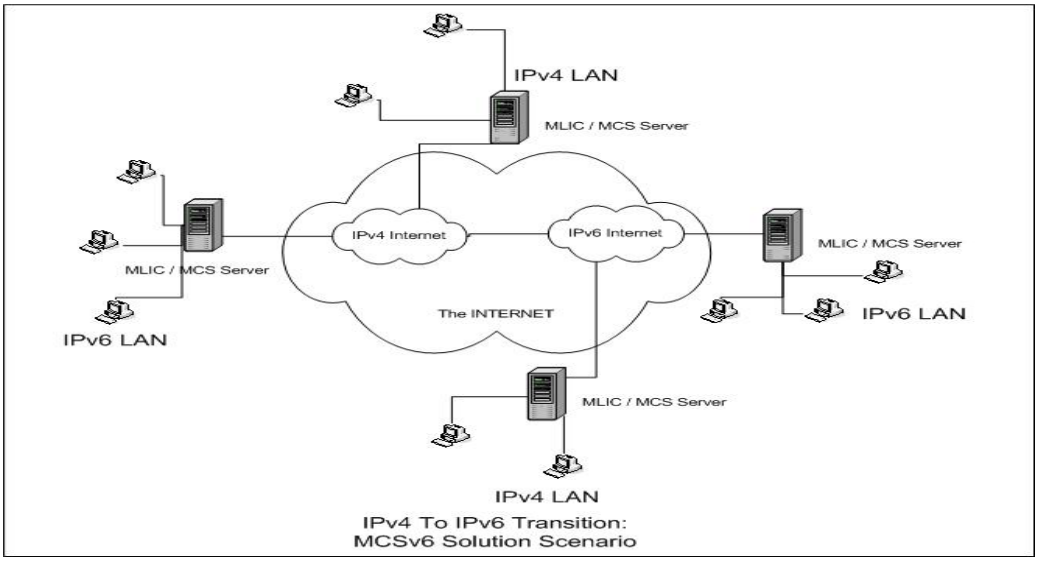

Figure 2 shows the IPv6 and IPv4 Mixture Scenario

This will allow multipoint to multipoint conferencing over these scenarios.

- IPv4 island to IPv4 island, over IPv6 cloud
- IPv4 island to IPv6 island (and vice versa), over IPv6 cloud
- IPv6 island to IPv6 island, over IPv4 cloud
- IPv6 island to IPv4 island (and vice versa), over IPv4 cloud