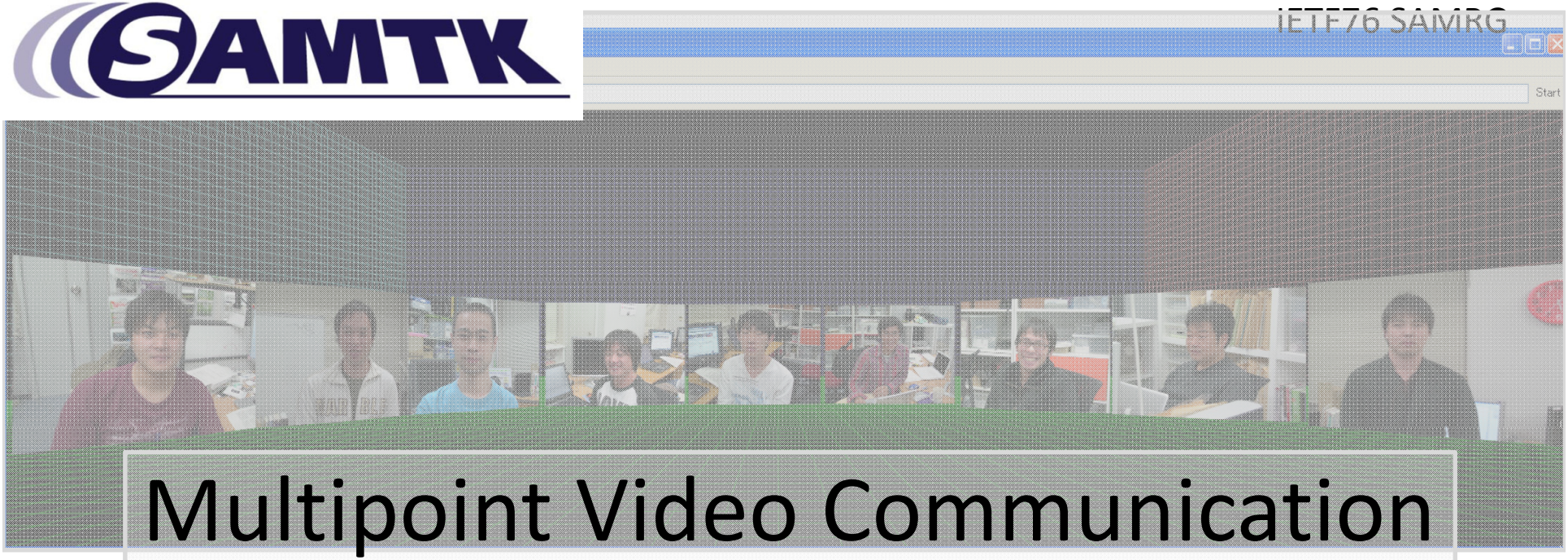
SAMTK



Multipoint Video Communication System with 3D Virtual Space

Shuntaro Nishiura, Nobuo Kawaguchi

Nagoya University / WIDE Project

Point of this talk.

- Deployment of "**Small Group Multicast**".

- **New application** area for the
  "Scalable Adaptive Multicast"

Proposal :

- 3D Virtual Space Multi-Point Video Comm. App.
  - Implementation for Online conference over **1000**
- **Dynamic selection/classification** of destinations.

Background

- **Small Group Multicast** (SGM)is one of the ‘ **Desirable** ‘ technology in the Internet.
  Small Group = 2~30 people…

- XCAST6 is one of the candidates to support it.

- There might be **several technologies** which will support “**Small Group Multicast**”.

- So, we have developed a **middleware** to enable easy migration of protocols.

SAMTK

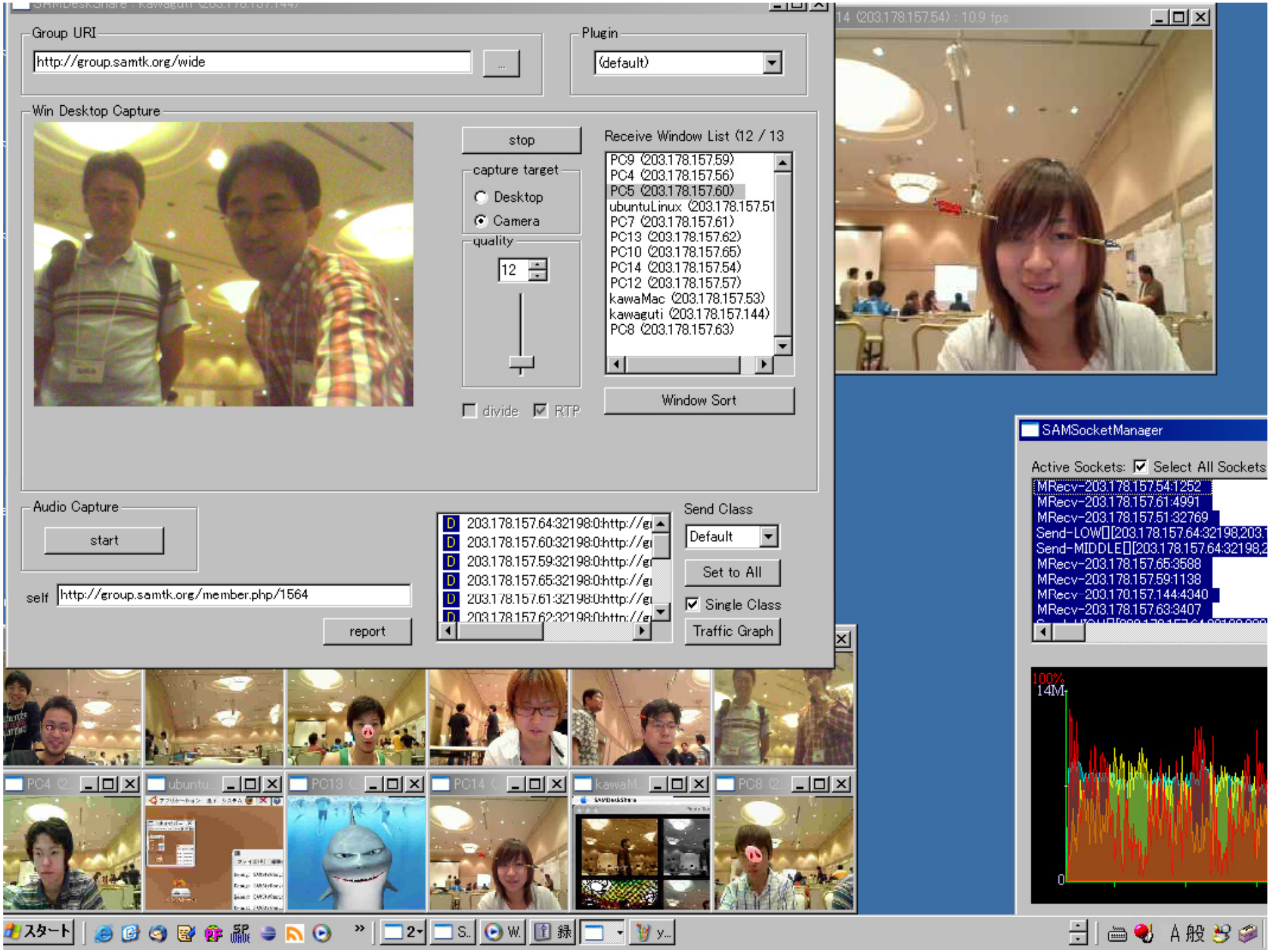
www.samtk.org

http://sourceforge.net/projects/samtk/

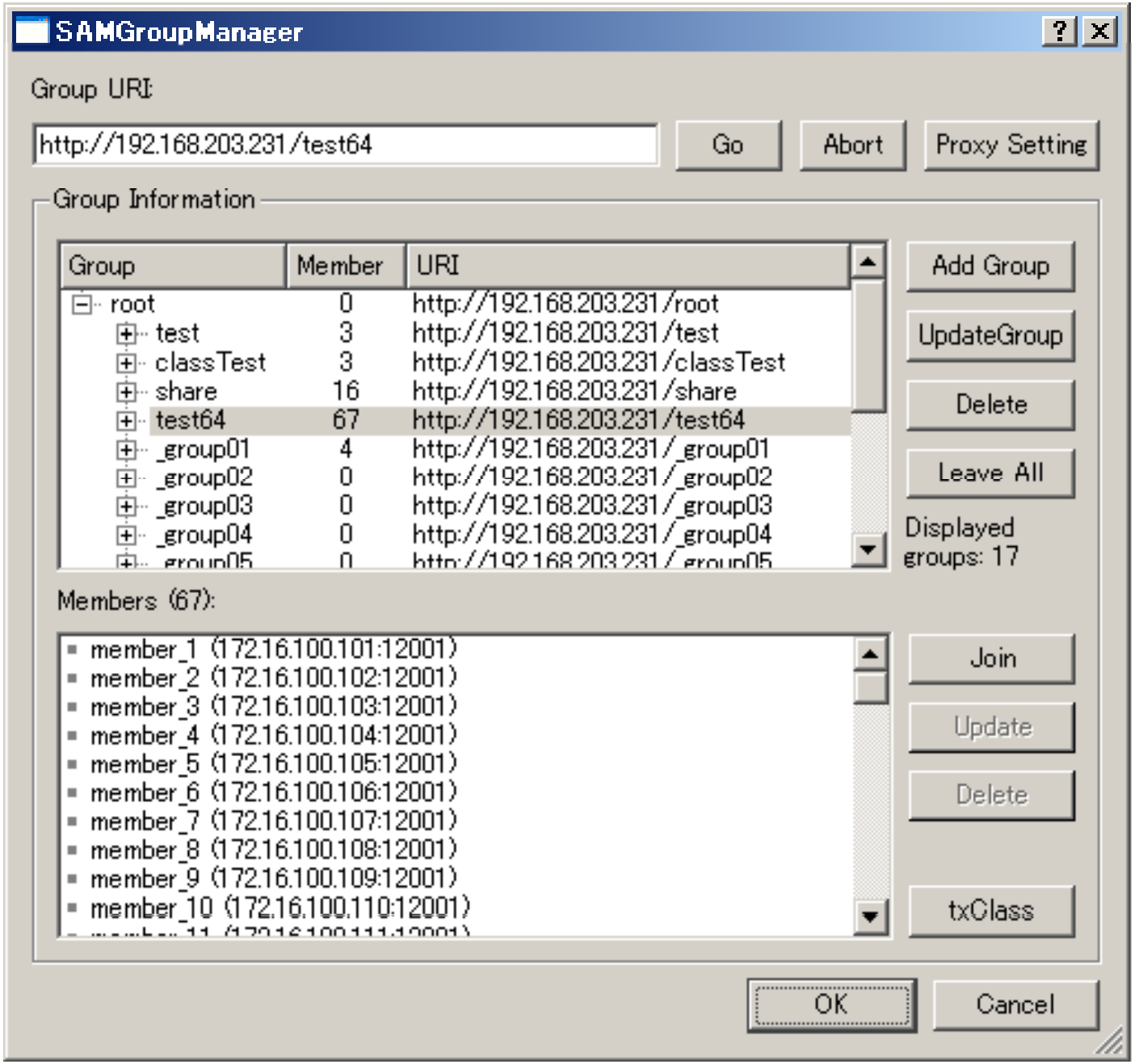
- Scalable Adaptive Multicast Toolkit
- **Multi-platform** / **Open Source** Toolkit for Multipoint Communication (in C++ with Qt)

  (Windows/ Mac/ Linux / BSD)
- Under development since 2006

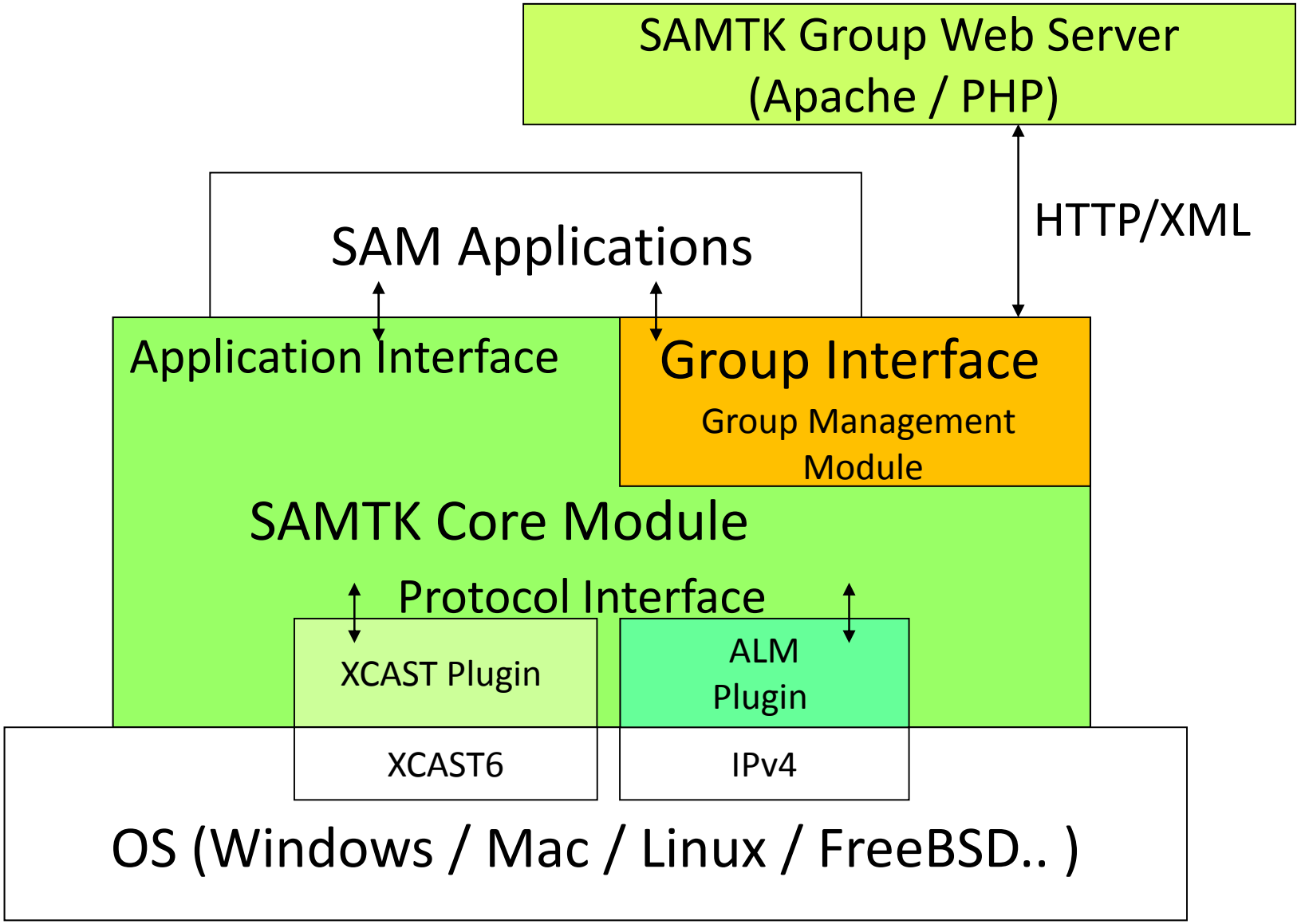
- Support s **easy** programming for multi-point communication applications.


Group URI
http://group.samtk.org/wide
Plugin
(default)
Win Desktop Capture
stop
capture target
Desktop
Camera
quality
12
Receive Window List (12 / 13
PC9 (203.178.157.59)
PC4 (203.178.157.56)
PC5 (203.178.157.60)
ubuntuLinux (203.178.157.51
PC7 (203.178.157.61)
PC13 (203.178.157.62)
PC10 (203.178.157.65)
PC14 (203.178.157.54)
PC12 (203.178.157.57)
kawaMac (203.178.157.53)
kawaguti (203.178.157.144)
PC8 (203.178.157.63)
Window Sort
divide
RTP
Audio Capture
start
self
http://group.samtk.org/member.php/1564
report
Send Class
Default
Set to All
Single Class
Traffic Graph
SAMSocketManager
Active Sockets:
Select All Sockets
MRecv-203.178.157.54:1252
MRecv-203.178.157.61:4991
MRecv-203.178.157.51:32769
MRecv-203.178.157.65:3588
MRecv-203.178.157.59:1138
MRecv-203.178.157.144:4340
MRecv-203.178.157.63:3407
100%
14M
0
スタート

SAMTK Group Manager



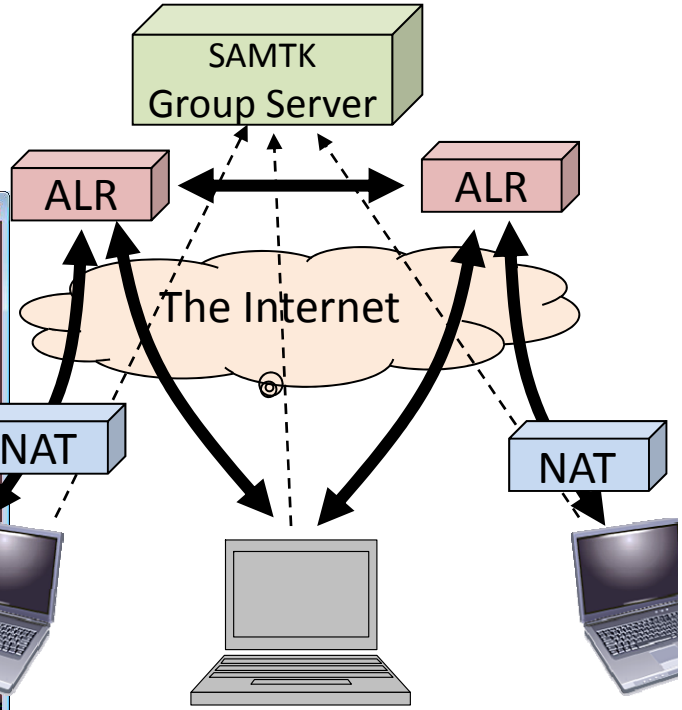
SAMTK Architecture



“Killer App” for Multipoint Comm.

- We are looking for “Killer App”.
- 3D Virtual space Comm. might be the one.
- Demo on CCNC2009

“Nat Free 3D Video Conf.”



Group management on 3D space

- "SAMTK Group Server" with Group Manager
  - Currently only supports "**Static**" group management

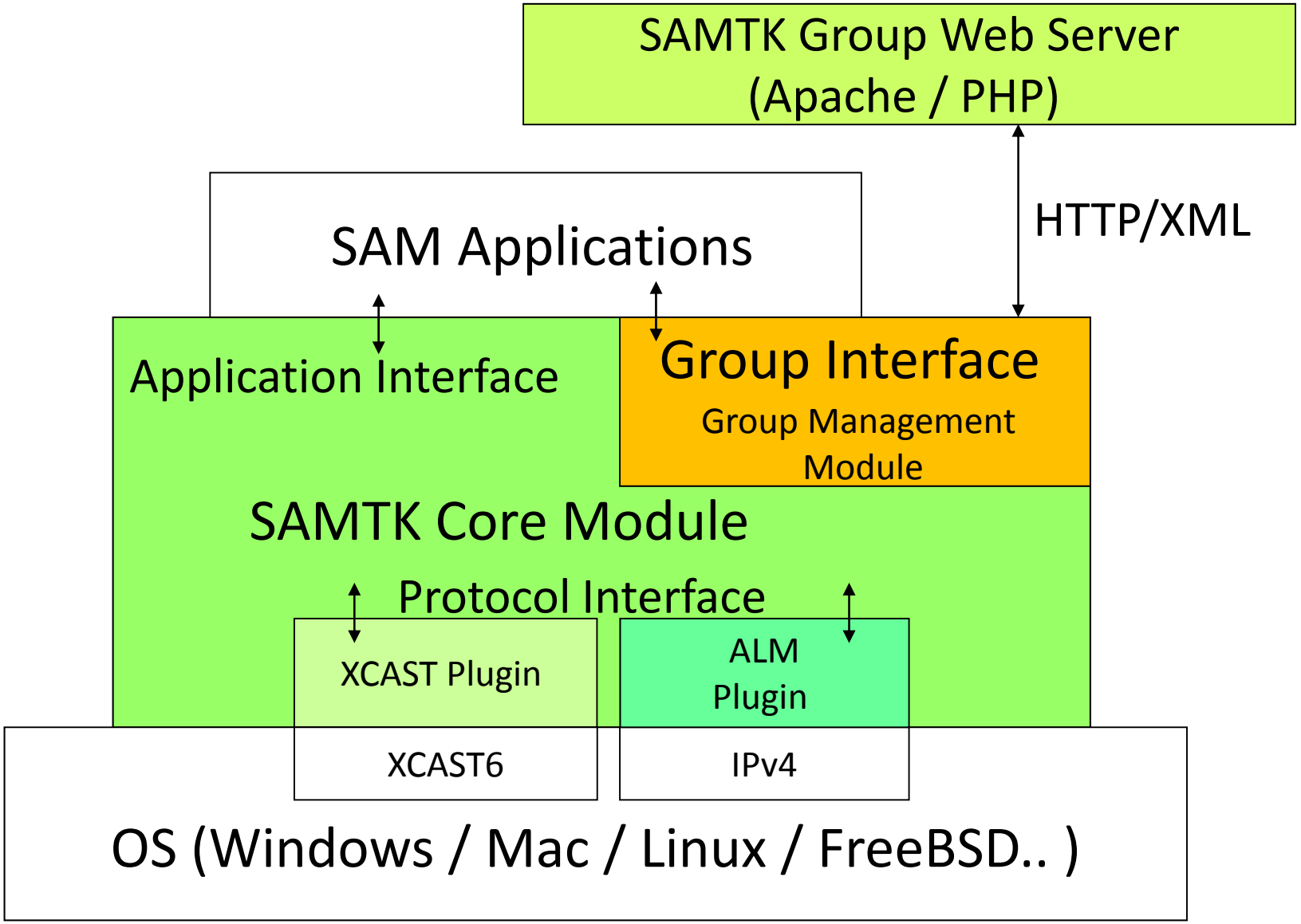
- We want "**Dynamic**" change of the member through the 'Position' and 'Orientation' of the each client.
  - It is now not a simple "Group".

New 3D Virtual Space App

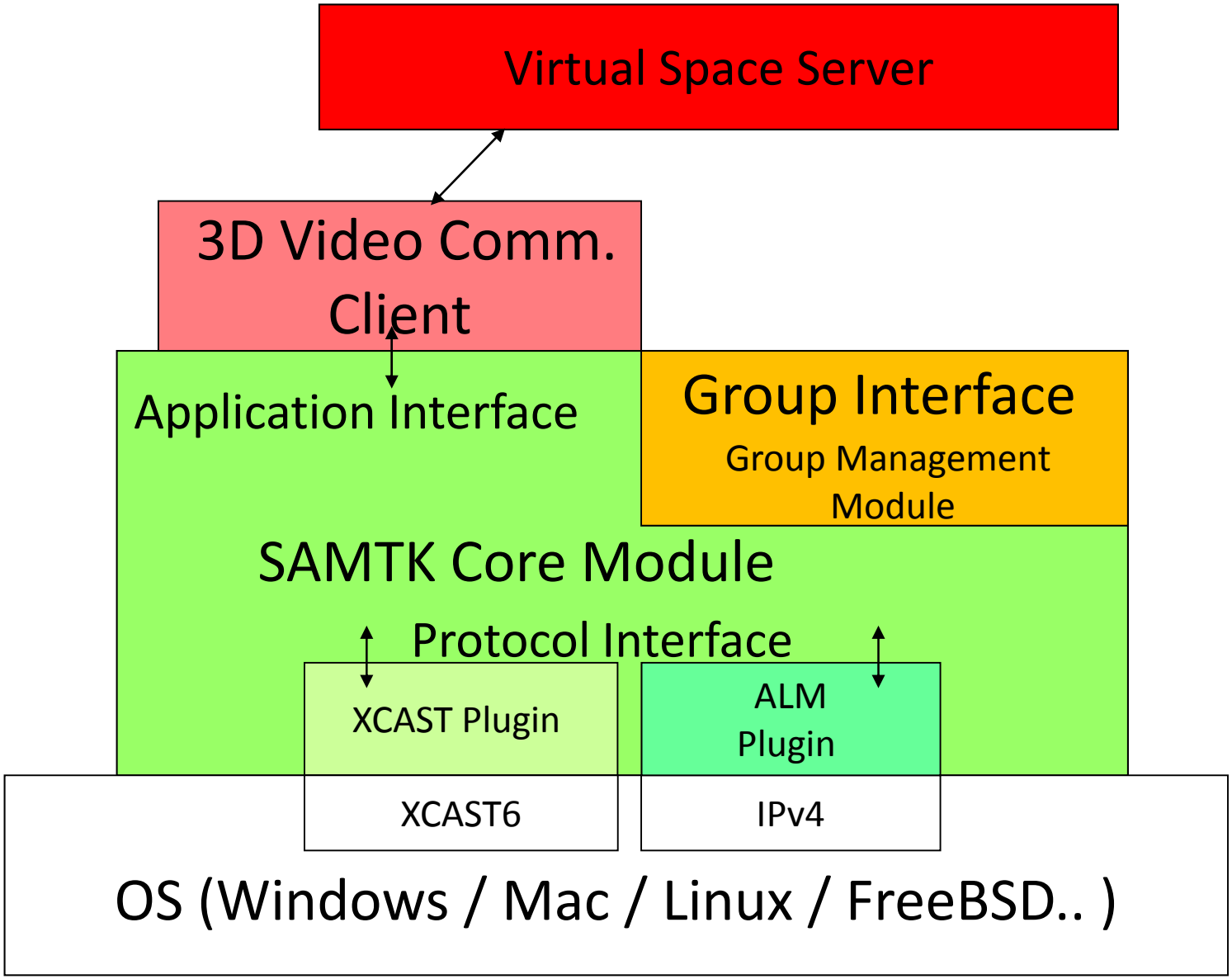
- Develop a Virtual Space Server (tcp-connected)
  - Space server “Dynamically” form the destination members.
  - Classify the ‘Visible’ and ‘Audible’ members.

- Virtual Server do not transfer media streams
- May supports 1000~ clients.
  - Not really tested yet…

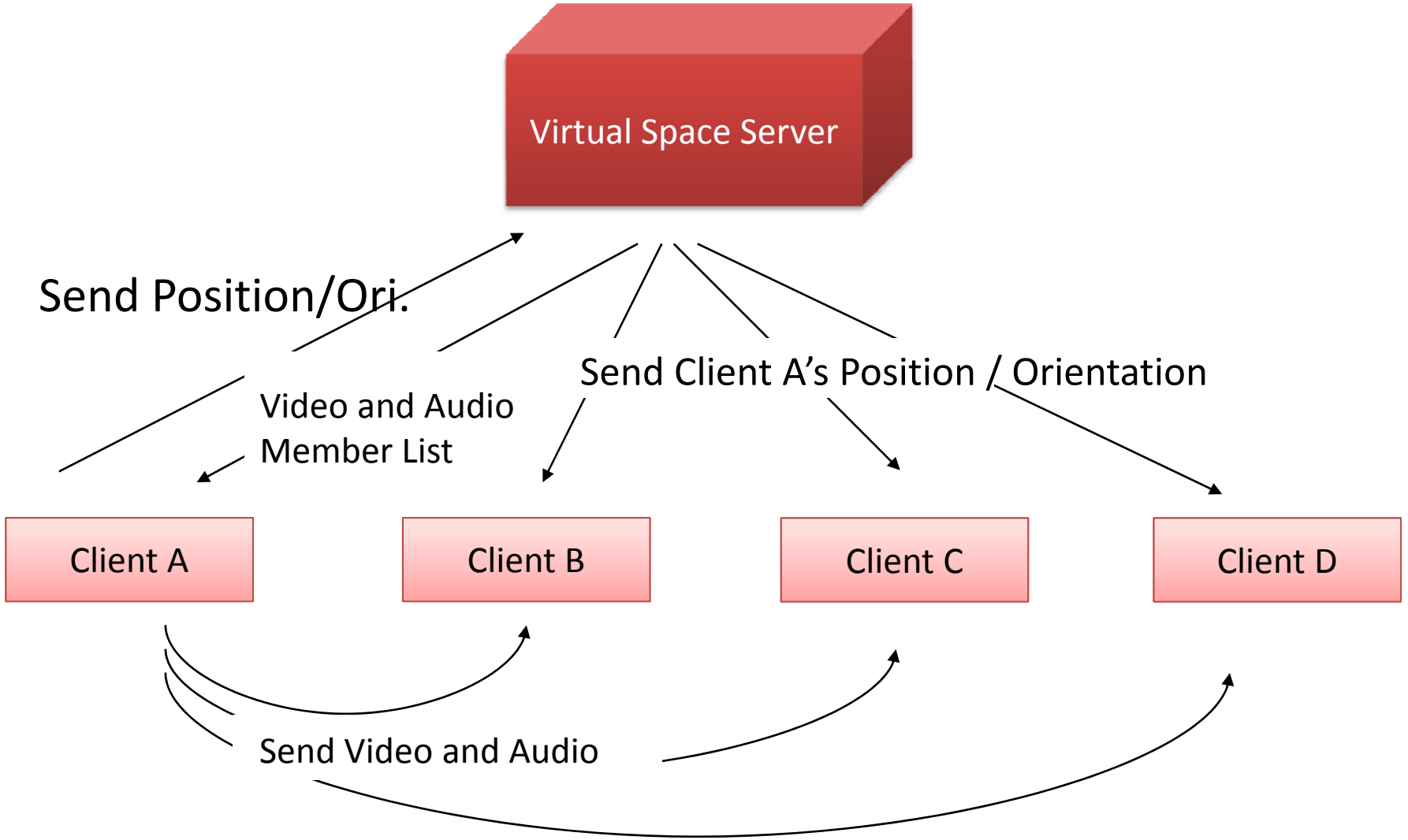
SAMTK Architecture



New 3D Video Comm. Architecture

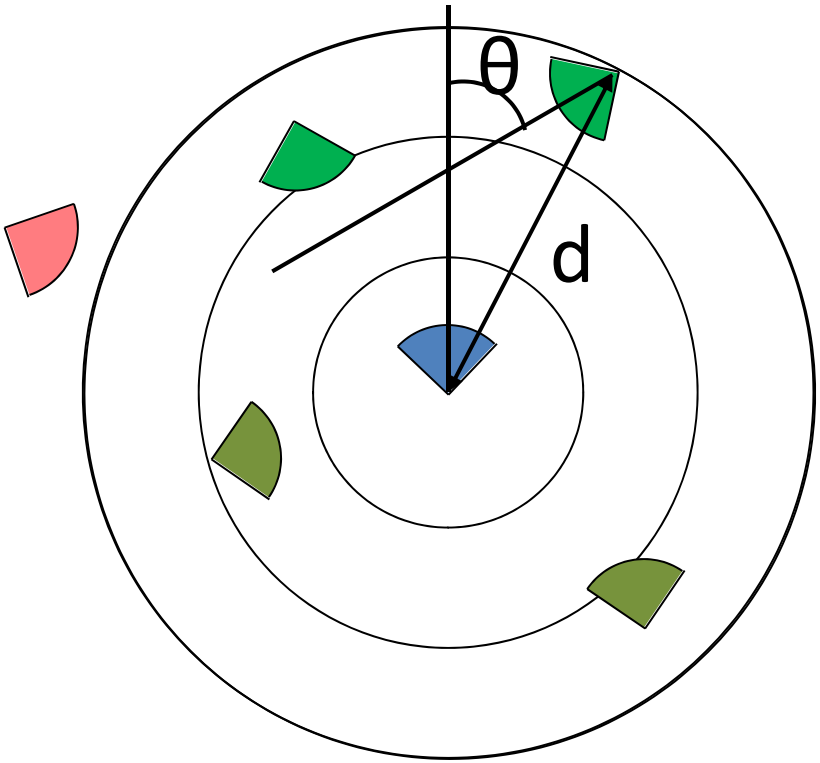


3D Video Comm. Architecture



Classification of destinations in 3D

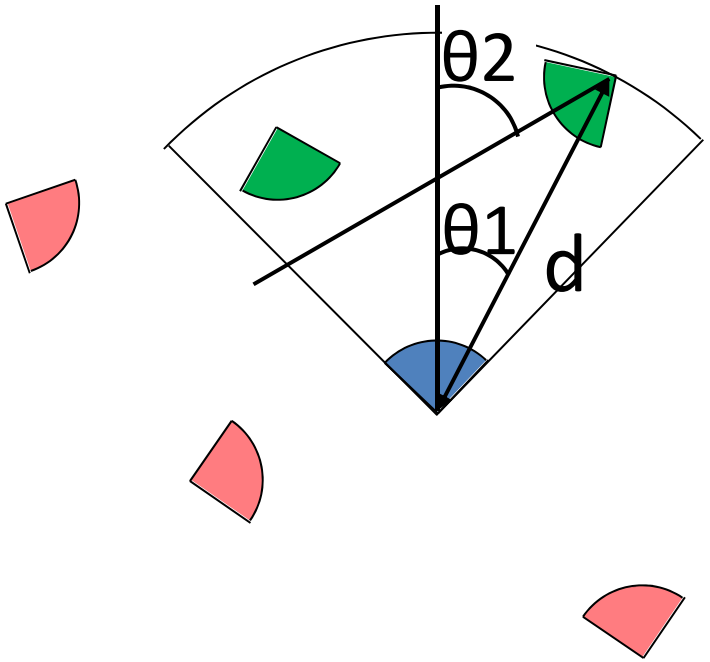
Classification of Audio



Distance d controls volume

Orientation θ also controls volume
(if θ > 180 , less volume)

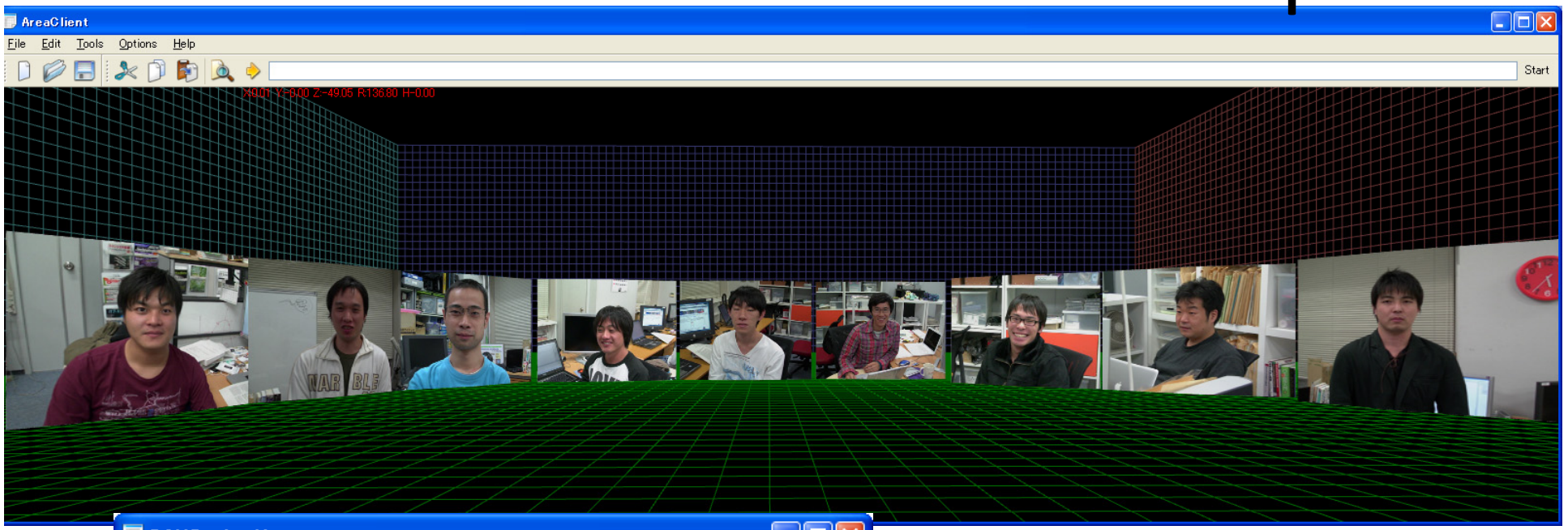
Classification of Video

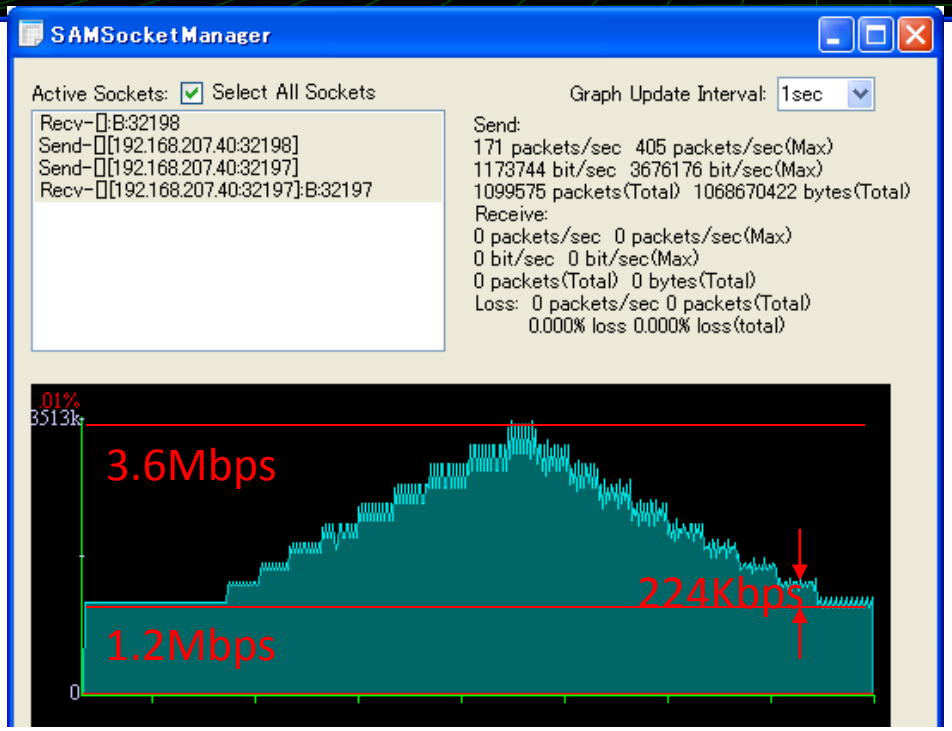


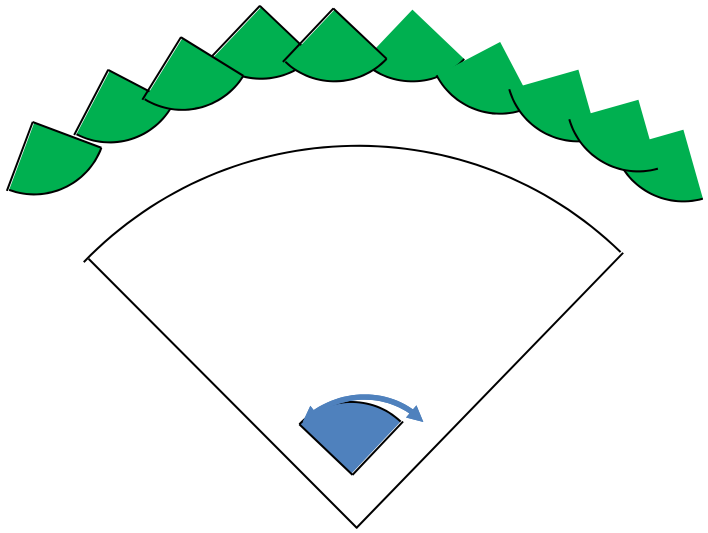
Distance d controls frame rate.

Limit the destination member
by θ1 < 45 and θ2 < 90

Evaluation of the Current Impl.



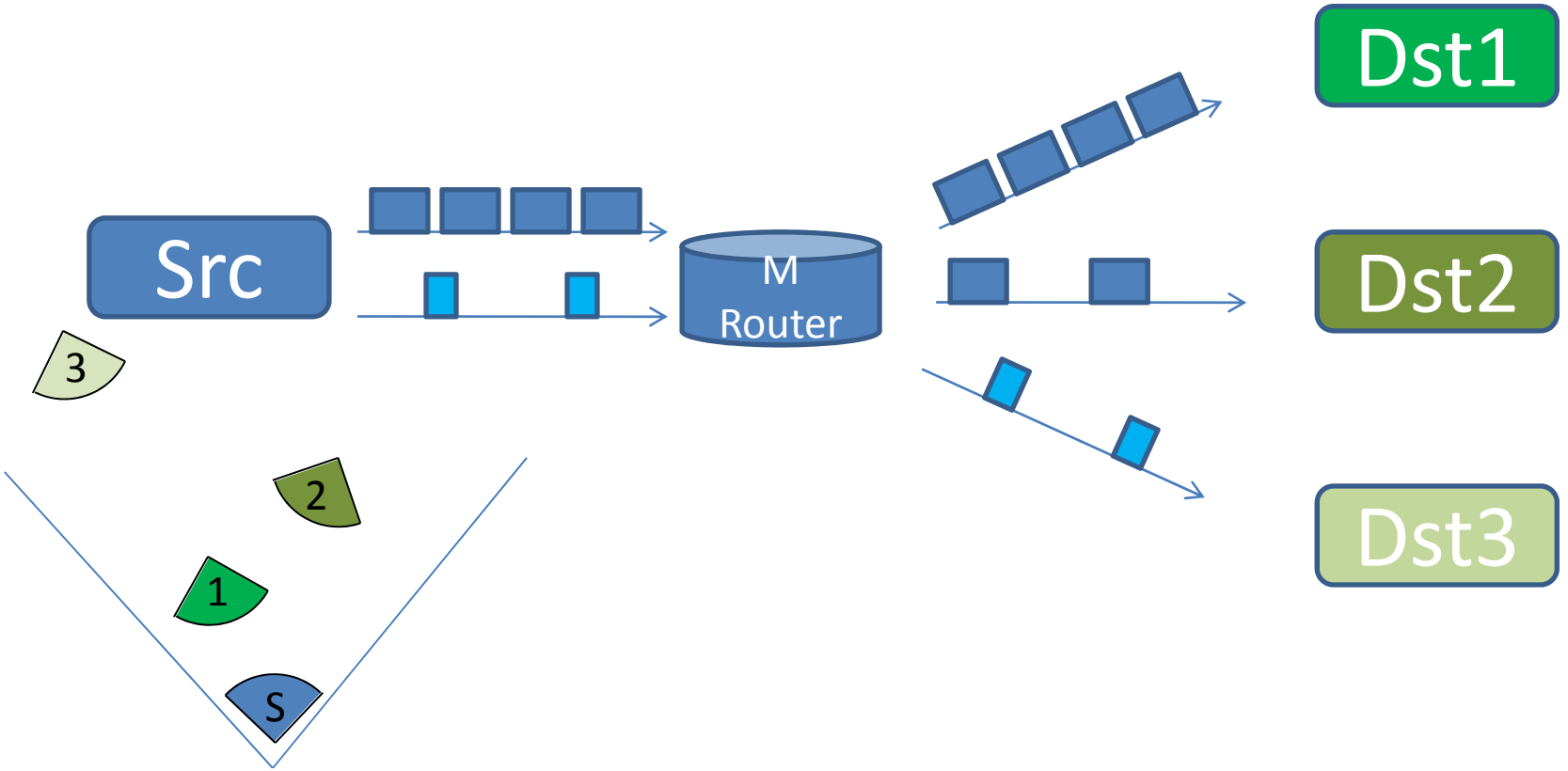




Current Implementation uses just Multi-Unicast

Classifying Destinations

- Audio -> volume / compression rate
- Video -> frame rate / compression rate



Conclusion

- Development of “Killer App” for SGM.
  3D Virtual Space Video Comm.

- Dynamic configuration of “Destinations” through 3D Virtual Space positioning.
  - Can reduce the bandwidth of media stream.

- By dividing “Destination Control” with media stream, the server can handle 1000~ clients.

Future Works

- Currently, we only control destinations, audio volume and video quality through the “Position” and ”Orientation”.
- We need to figure out the receiver’s side of bandwidth / congestion.

- SICC (Sender initiated Congestion Control) may one of the solutions.