Application-Oriented Platform
For Network Operation & Management

NICT Tohoku Research Center

National Institute of
Information and
Communications
Technology

JGNⅡ

1.Introduction

Application-Oriented Platform for Network Operation & Management
- Platform technology that provides high-level network information -
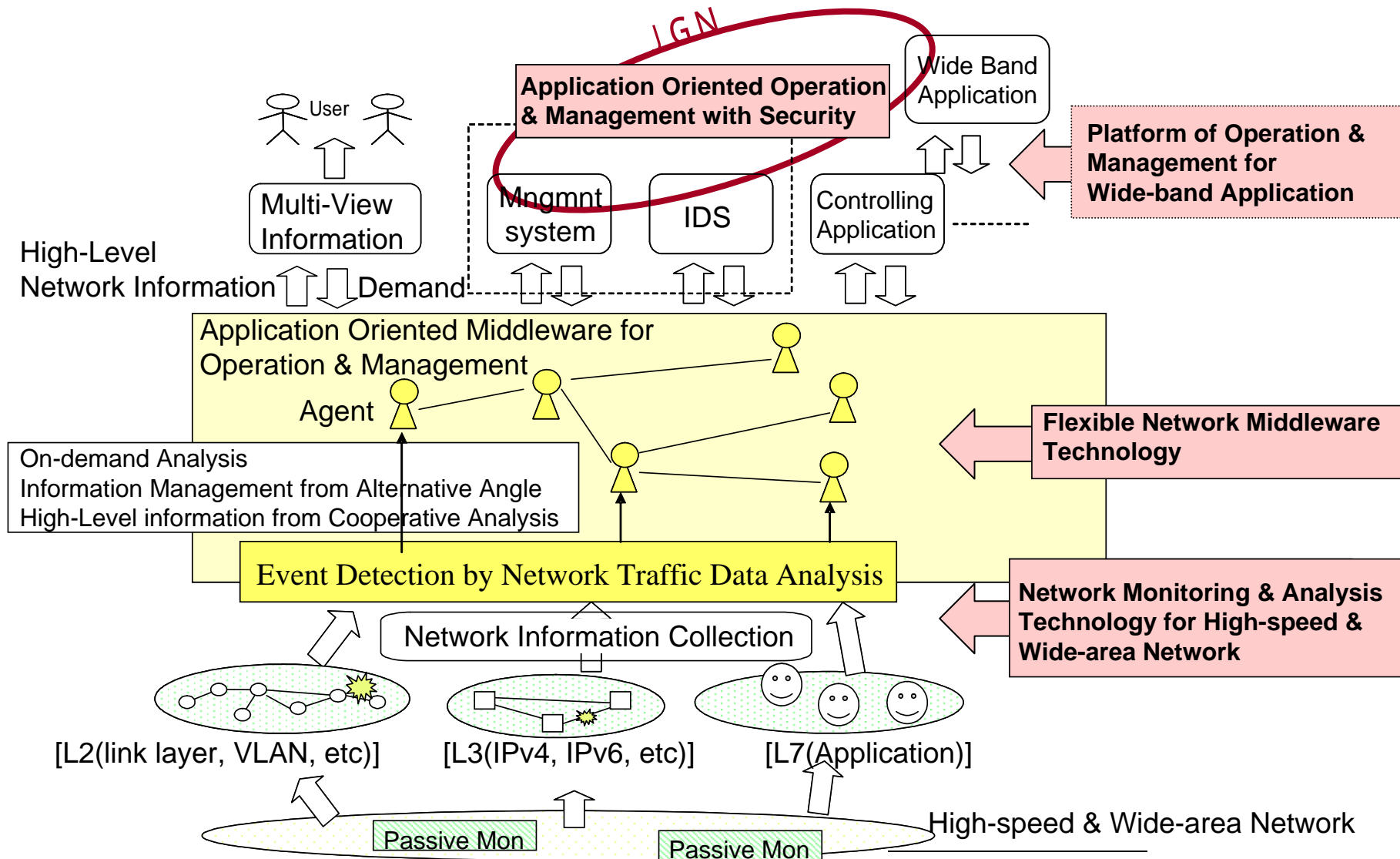
NICT Tohoku RC Reserchers

Director: Hideaki Sone (Tohoku University)
  Advisor: Norio Shiratori (Tohoku University)
  Researcher: Kazuhide Koide

1 Network Monitoring & Analysis Technology for High-speed & Wide-area Network

Takuo Suganuma, Glenn Mansfield Keeni (Cyber Solutions), Gen Kitagata (Tohoku University), Kazuhide Koide

2 Application Oriented Operation & Management with Security

Hideaki Sone (Tohoku University),
Shunichiro Wakiyama, Hironori Kanno (Sendai National College of Technology)

3 Flexible Network Middleware Technology

Tetsuo Kinoshita, Toru Abe (Tohoku University), Kenji Sugawara (Chiba Institute of Technology), etc.

4 Platform of Operation & Management for Wide-band Application

Yoshitaka Shibata, Koji Hashimoto (Iwate Prefectural University), etc.

Multi-point Bi-directional Video Delivering System

Objective

- Realizing multi-point bi-directional video delivering network
  - Effective delivering of video stream
  - QoS about the quality of the video
  - High convenience / Low management cost

Approach

- Overlay technology (ALM)
- Architecture:
  - Splitter Node : Video deliver, relay
  - Node Manager :
    Destination Management,
    Configuration management
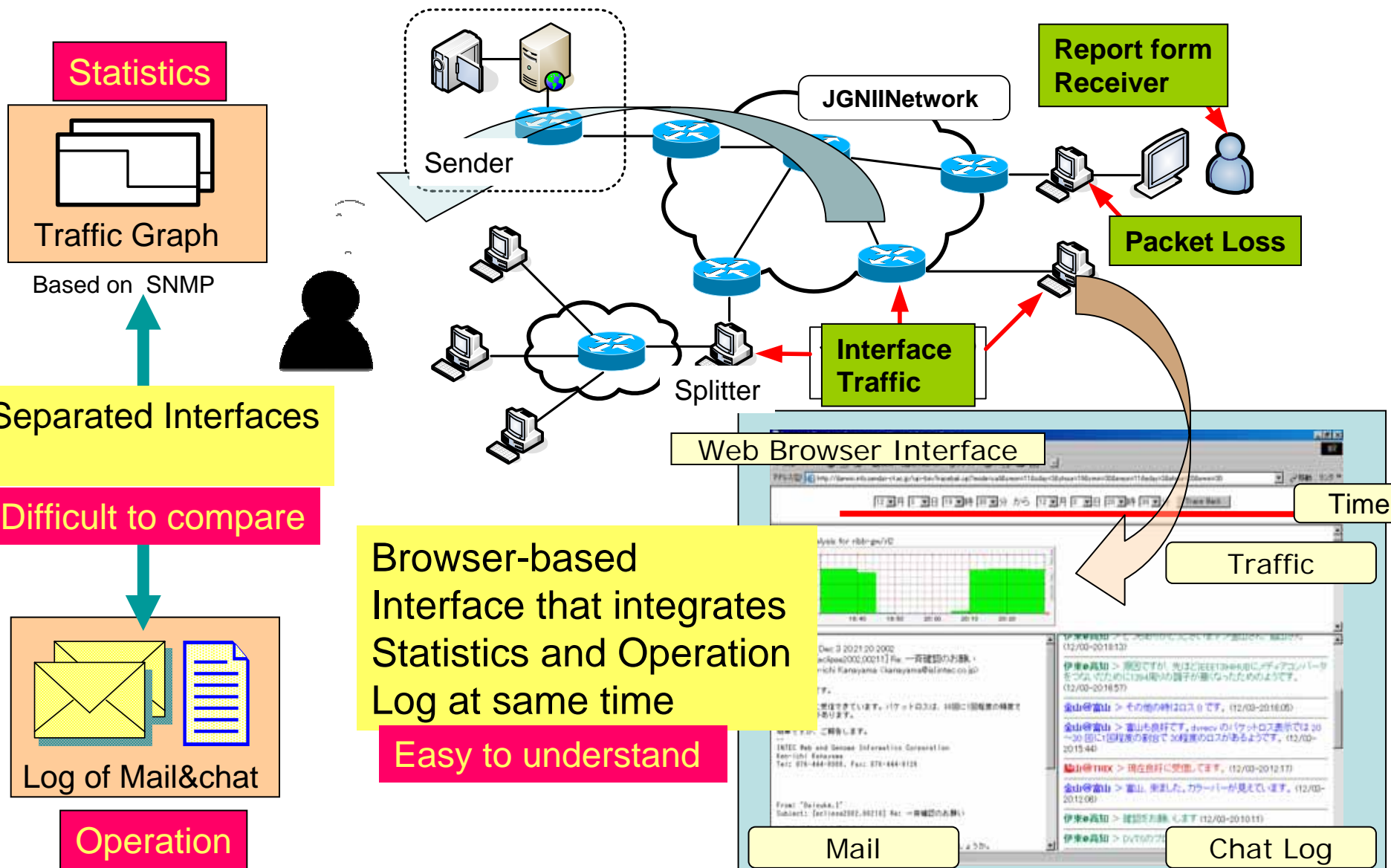- Implementation and Evaluation on DV (Digital Video) delivering system
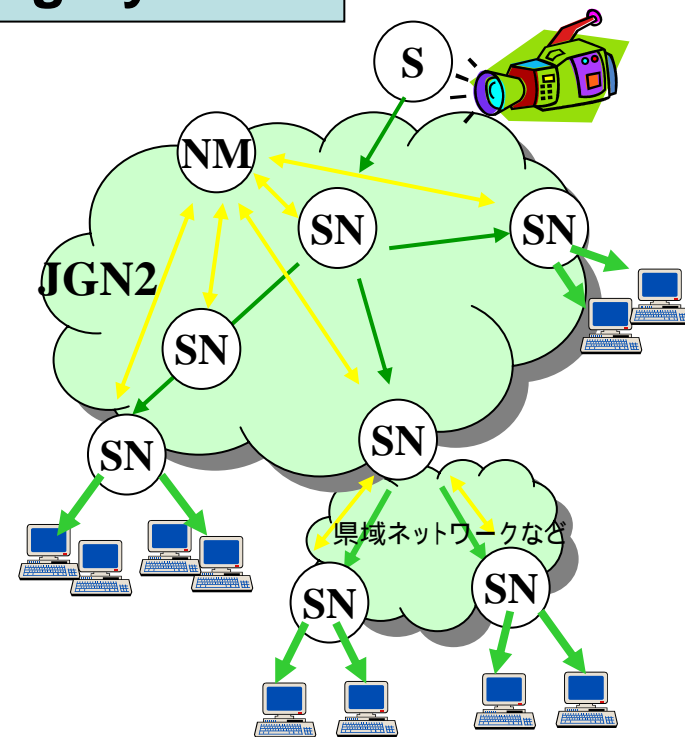
S: Sender
SN: Splitter Node
NM: Node Manager

Collection and Integration of Operation Info. and Statistical Info.

Statistics

Traffic Graph

Based on SNMP

Separated Interfaces

Difficult to compare

Log of Mail&chat

Operation

JGNIINetwork

Report form Receiver

Sender

Packet Loss

Splitter

Interface Traffic

Web Browser Interface

Browser-based Interface that integrates Statistics and Operation Log at same time

Easy to understand

Time

Traffic

Mail

Chat Log

- ■ Amount of Network Information : **Quite massive**
  - – **It is impossible to monitor and analyze in detail all those data equally**
  - – **Need to extract important part from massive data and make effective analysis**
- ■ **Definition of "Event"** from network monitoring result
  -> **Event-driven network analyses software**

- ■ Result
  - – **Developing Network Event Detection Model(Ver.0.5)**
  - – **Experiment for real traffic data**
  - – **Developing "Top-N Traffic Analysis Assistant System"**
  - – **It enables to assist effective detection of anomalous traffic (WINNY, etc)**
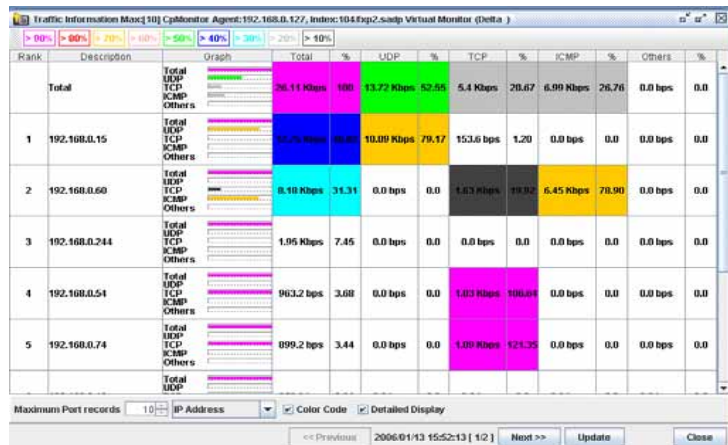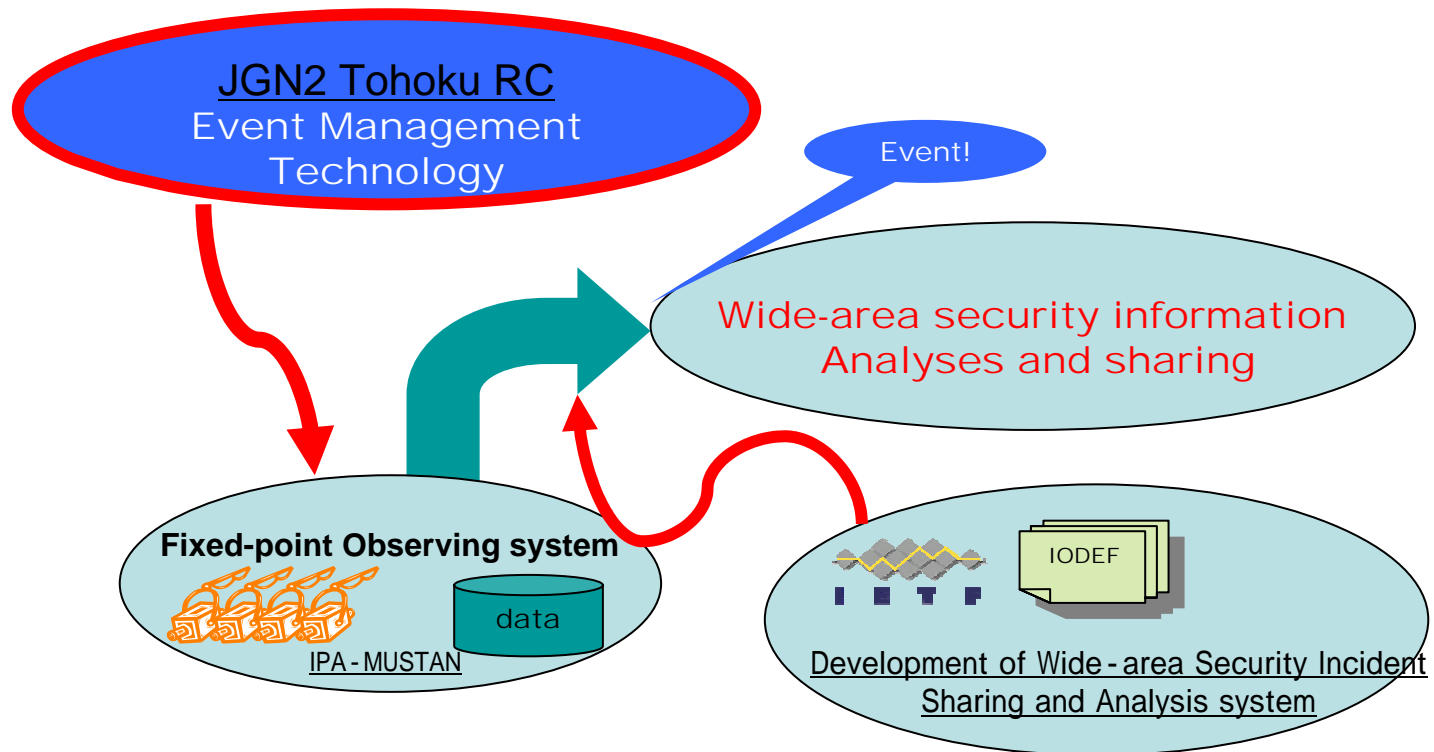
Top-N traffic sources/consumers with Protocol-wise details
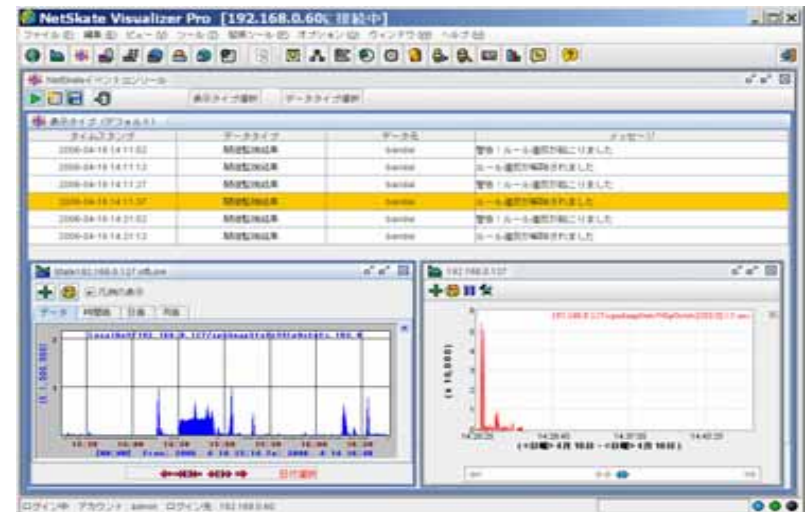
Events displayed on
Integrated **C**onsole for **E**vents (ICE)

■ **Next Works**
  – Analyses and Visualization of Network Event
 – **Development of "Event-tracing system" in Wide-area Network**

4. Middleware Technology
- Flexible Network Middleware Technology -

♦ **Objective: Development of New Layer that works above transport-layer**

  ♦ FNM (Flexible Network Middleware) based Agent oriented Architecture

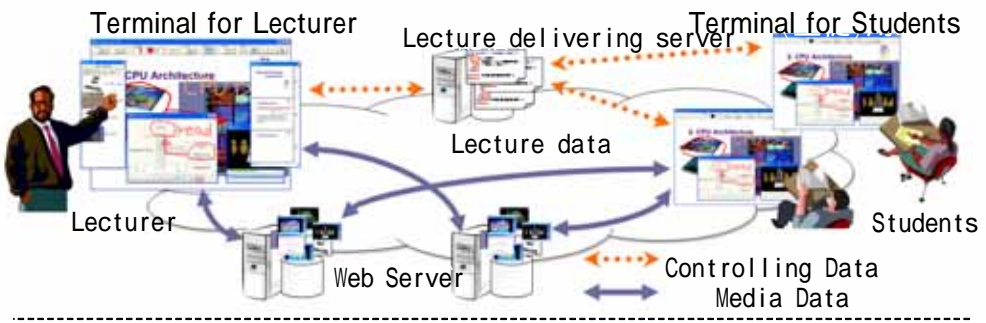 ♦ Development of FNM Agent type Middleware (FNM/A)

■ Result
  – **Middleware-level Bi-directional Multipoint-to-Multipoint Multicast Tree Calculation**
  – **Improvement in Agent system development environment for JGN-II**
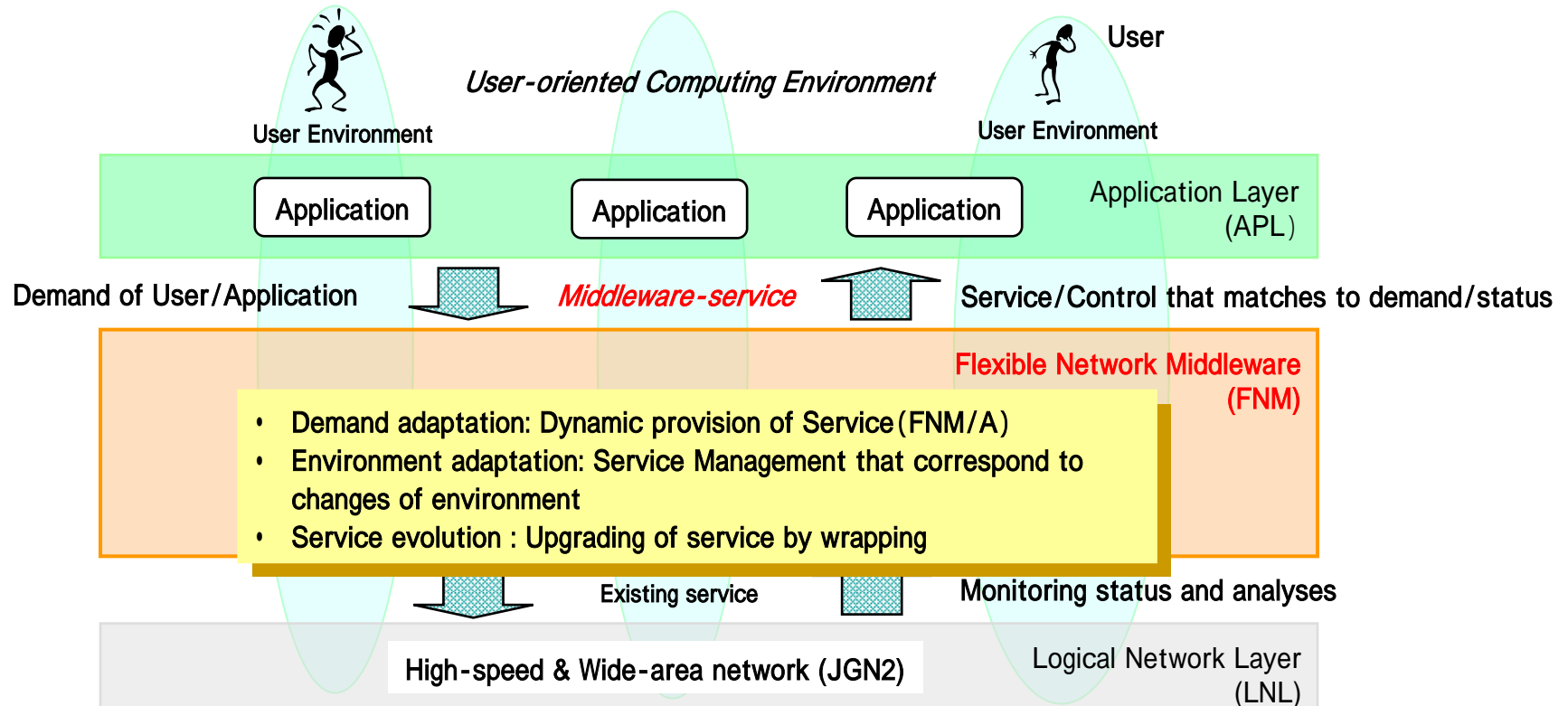
[Objective] Solving realistic problems for developing platform of operation & management for wide-band Application
  [Ex.] Multimedia Remote Lecture by using IMPRESSION and MidField System
[Problem] Difficulties in operation (High-skill operators will be needed to use)

Terminal for Lecturer
Lecture delivering server
Terminal for Students
Lecture data
Lecturer
Students
Web Server
Controlling Data
Media Data

Terminal
IMPRESSION
IMPRESSION
MidField Remote Commander
MidField Remote Command Protocol
Terminal for Participants
IMPRESSION
MidField System
Command Acceptor
Command Acceptor
Command Acceptor
Interconnected Computer Networks (IPv4,IPv6)

IMPRESSION
Interactive Lecture System that enables to use multimedia lecture materials interactively based on Double-Loop Model.

MidField System
Multipoint Bidirectional Communication system which has trans-coding function and session management function that is needed in the multi-format environment of audio/video.
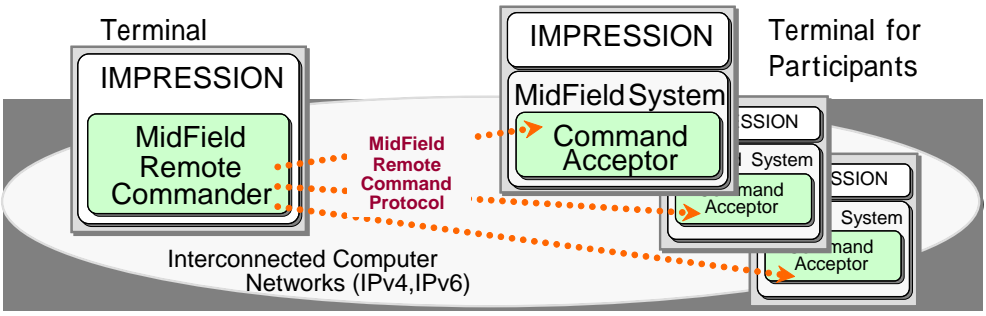
Fig. IMPRESSION & MidField System that have function for supporting wide-band application operation & management
  - MidField Remote Commander (at Lecturer Terminal)
  - Command Acceptor (at Participants Terminal)
  They realize remote controlling function that is needed for easy operation & management of wide-band application

■ Contribution:

– Promotion of JGN2 utilization

■ Technical advice to regional users

■ Contribution to many video delivering activities

■ Hosting of Symposium, Workshop, etc..

– Deployment of JGN2 utilization technology

■ JGN2 Technical Seminar

– Education to engineers from regional companies

■ Demonstration of many types of regional access technology

– CATV, B-Flets, Sharing of leased line

■JGN2 Workshop
- – 2005 May, Sendai
    - ■ICT promoting fair 2005 in Tohoku
- – Research Topic of Tohoku RC + Other areas
    - ■Management & Operation of Regional ICT Network

■8th JGN2 Workshop
- – 2006 Oct. , Morioka
    - ■**Improving broadband network application and middle-ware**
- – Tohoku RC Seminar
    - ■Tohoku JGN2 Workshop in Iwate　2005 Oct.
    - ■Tohoku JGN2 RC Seminar　2006 Feb.