Tiled Display Activity Report in Osaka Research Center

JGN2 research center, Osaka
YANG SHUO
About JGN2

JGN 2 (Japan Gigabit Network) is an open testbed network environment for research and development.

NICT (National Institute of Information and Communications Technology) expanded by collaboration of industry, academia, government, and seven own research centers for research and development.

Aim: Promoting a broad spectrum of research and development projects.
Outline of JGN2 Network

Aug. 31, 2006

Access points
Core network nodes
(Available as access points)

- 20Gbps
- 10Gbps
- 1Gbps/100Mbps
- Optical testbed

<10G>
- Hokuriku Core network node (Kanazawa)
  - Ishikawa Create Lab (Nomi-shi, Ishikawa Prefecture)

<100M>
- Toyama Institute of Information Systems (Toyama)
- Fukui Information Super Highway AP (Fukui)

<1G>
- Toho University (Sendai)
- Iwate Prefectural University (Takizawa)

<100M>
- Hachiojo Institute of Technology (Hachiojo)
- Akita Regional IX (Akita)
- Keio University Tsuruoka Town Campus (Tsuruoka)
- The University of Aizu (Aizu/Wakamatsu)

USA (Chicago)
Thailand (Bangkok)
Singapore

<10G>
- KANTO Core Network Node A (Chiyoda Ward, Tokyo)
- KANTO Core Network Node B (Chiyoda Ward, Tokyo)
- NICT Koganei Headquarters (Koganei, Tokyo)
- NICT Tsukuba Research Center (Tsukuba)
- Akabara Daibiru (Chiyoda Ward, Tokyo)
- The University of Tokyo (Bunkyo Ward, Tokyo)
- NICT Kansai Space Research Center (Kanagawa Prefecture)

<1G>
- Yokosuka Telecom Research Park (Yokosuka, Kanagawa Prefecture)

<100M>
- Utsunomiya University (Utsunomiya)
- Gunma Industrial Technology Center (Maebashi)
- Retaku University (Kashiwa)
- Hongo Campus of Waseda University (Hongo)
- Yamanashi Prefectural Open Center for R&D (Chuo)

IX: Internet eXchange
AP: Access Point
background

Last year’s research Result of JGN2
- access control technology for dynamic site corporation
- QoS control technology for large-scale data transfer

Research of basic grid technology

Visible technology under network environment
- Grid technology is important to E-science
- The platform of large-scale data processing, sharing, and making to visible is important
- Standardization is necessary through coordination and experiment with international community

theme: Grid technology is important to E-science

Correspondence method
- using Tiled display and make a internal activity with researchers at other country

Key role To next generation E-science
What is the Tiled Display

**Tiled Display**…The multi display monitors which are arranged in Tiled

**Feature**
- Large high-resolution and increased physical size
- Extend the using field of broadband network
  - cooperate with cluster computers
  - Sharing of data
  - Sharing of image

As a base of Tiled Display

**SAGE**

Use of grid, QoS technology
SAGE and Tiled Display

SAGE: Scalable Adaptive Graphics Environment (http://www.evl.uic.edu/cavern/sage/index.php) which developed by University of Illinois at Chicago. Electronic Visualization Laboratory feature

- distribute technology
- heterogeneous and scalability
- range from a single computer to the cluster computer.

Display control server
each sun workstation control two LCD displays.
SAGE Receiver receive the stream from Sail and indicate in tiled display.

Management server...control the all of system
FSManager in Management server control the all components of system.
SAGE components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Diagram Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>FreeSpace Manager</td>
<td>Control pixels streams between SAIL and SAIL Receiver and displaying positions and size of streamed images on the Tiled Display</td>
<td>①</td>
</tr>
<tr>
<td>SAIL</td>
<td>Capture application images and streams to appropriate SAGE Receivers</td>
<td>②</td>
</tr>
<tr>
<td>Sage Receiver</td>
<td>Gets multiple pixes streams, and displays streamed images on the tiled display</td>
<td>③</td>
</tr>
<tr>
<td>UiClient</td>
<td>Sends user messages to control FsManager and receiver SAGE messages, which inform users of the current status of SAGE</td>
<td>④</td>
</tr>
</tbody>
</table>
Use of visible high resolution system

Cooperation of multi point through network by grid technology
Construction of common technology of high resolution image

Various measurement equipment

remote sensing data
Calculation resource
Storage resource

Important for generation E-science
Proposal of Tiled Display by SAGE
—Cooperation of multi point—

Development of Middleware to display image by same APP in multi point at the same time

First step

VLC+SAGE system
VLC and SAGE

● VLC: VideoLAN Client
  ● media player
  various audio and video formats (MPEG-1, MPEG-2, MPEG-4, DivX, mp3, ogg, ...) as well as DVDs, VCDs, and various streaming protocols.
  ● Stream server
  It can send stream in unicast or multicast in IPv4 or IPv6 on a high-bandwidth network.
  http://www.videolan.org/

● VLC on SAGE
  ● VLC can be easily modified to pass its output to SAGE by intercepting the framebuffer that VLC creates with its output module
  http://research.calit2.net/gems/vlc_sage/VLC_SAGE.html
Local sage+vlc system

When SAGE binds a VLC module, it becomes a streaming media player.

Stream (Mpeg, avi, etc)  
VLC  
SAGE (sail)

SAGE (Sage receiver)

Worker note  Manage note
Our Works

● Build two Tiled Display Systems
  ● Location Osaka Univ.
    Toyonaka Campus (JGN2 Research Center)
    Suita Campus (IST)
  ● HW Sun Java Workstation x 11
    Display SXGA (1280x1024), 5x4 displays
  ● OS CentOS 4.x
  ● SAGE v1.4

● achievement
  ● Build a Streaming system with SAGE+VLC
  ● Work an Inter-campus connection test
  ● Work an oversea connection test (U.S., Taiwan, Thailand)

● We have a plan to demonstrate the tiled display system on SC06.
The test UCSD⇔Osaka(9/21 JST) Using VLC+SAGE

Transmission interactively and simultaneously
- bandwidth: 28M
- one way latency: 2.5s

Vlc streaming client → Vlc streaming servers
Osaka University

Vlc streaming client → Vlc streaming servers
University of California, San Diego.

High vision image from Sony HDV-c1
mpeg movie
Experiment between NCHC and Osaka Univ.

Vlc streaming server

Vlc streaming client

Vlc streaming server

Vlc streaming client

National center for high-performance computing of TaiWan (NCHC)

Osaka university
Forwarding a PRAGMA Greeting Message by Osaka Univ. President from Thailand USING JGNII TH-JP line.
Problem and future

Make a common foundation for e-science

- Resolve the difficulty setting problem and user interface problem command → GUI
- Attestation and security
  Setting by manager of each access point → single sign on
- Promotion of standardization
  Various TWD system → Achievement of cooperation through standardization
- Efficient use of network (QoS)
  Network traffic problem caused by cooperation → find and resolve the problem

The role of JGN2
Contribute to the cooperation with international related organization and the Promotion of experiment

JGN2/Osaka-U. SDSC
NECTEC NCHC
THANK YOU!