# New Horizons on Campus ICT Infrastructure

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# Objectives of this Session

- Observations on University IT Infrastructures
- BKMs from Enterprise IT & Telco
- Recommendations
- Intel Software Group

# About me…

- Working in IT & Telecom industry for 12 years
- A PhD candidate working on his thesis
- A frequent university campus visitor

# An Outlook

- Digital Campus installations started early 90’s
- Science and technology information systems installed first
- Student affairs/HR automation, student labs, Web portals and user applications
- Campus backbones and integration
- Mobility support
- e-Learning environments
- HPC clusters/Grid

# University IT Infrastructure Grouping

- Server farm
- Office Automation and Desktop applications
- Campus network
- Web portal and User applications
- Main IT room / control centre
- Wireless communications
- Campus backbone & cabling
- IT security
- Telephony and Unified messaging system (UMS)
- Public facilities - Kiosks and Displays
- Digital Surveillance

# Differences from Enterprise IT Systems

## IT Systems

| | Campus | Company |
|---|---|---|
| Ultimate goal | To create knowledge value | To create economical value(profits) |
| Focus of information | Knowledge | Capital, Material flow |
| Key resource bank | Educational resource bank | Client and product resource bank |
| Typical systems | E-learning,E-campus | ERP/MRP/CRM |
| Main source of alteration | Teaching patterns | Marketing/production patterns |
| Relevant IT theories | Few | ERP/BPM/ValueChain, etc. |
| Time relativity | Each semester as a cycle; system load varying periodically. | Relatively stable |

# Differences from Enterprise IT Systems

## IT Departments

| | Campus | Company |
|---|---|---|
| Service recipients | Teachers and students. | Employees |
| Capital investment | More attention to network construction, less to the application system construction. | More attention to the application system construction |
| Time relativity | Each semester as a cycle; work pressure and personnel alteration varying periodically. | Relatively stable |
| Cultural atmosphere | Campus culture characterized by freedom and open-mindedness | Company culture characterized by discipline and efficiency |

# Differences from Enterprise IT Systems

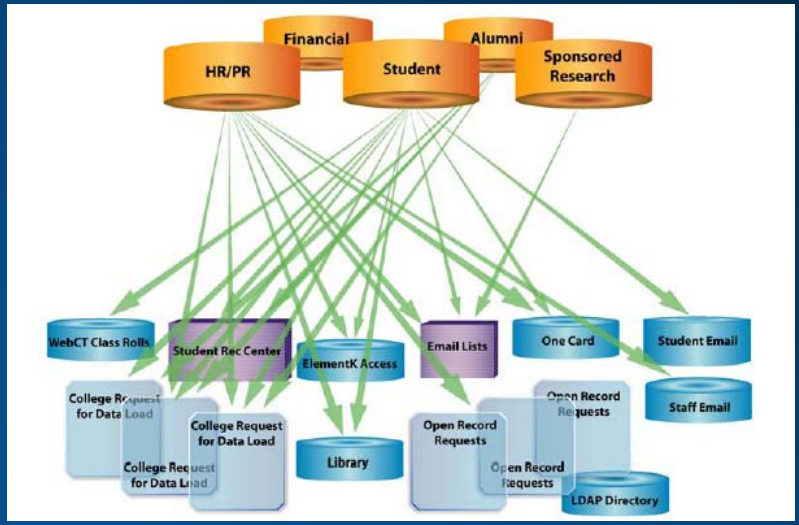
## Organizational Characteristics

| | Campus | Company |
|---|---|---|
| Relation between departments | Relatively independent; loosely-connected | Closely connected |
| Number of personnel | Usually a lot, some with an enrollment of 60,000 students[7] | From very few to a great many |
| Knowledge structure | Many experts at computer in different departments | Few experts at computer in other departments |
| Personnel mobility | Noticeable periodical mobility (such as freshmen coming to and graduates leaving the school) | No noticeable periodical mobility |

# University ICT Systems & Processes Reality

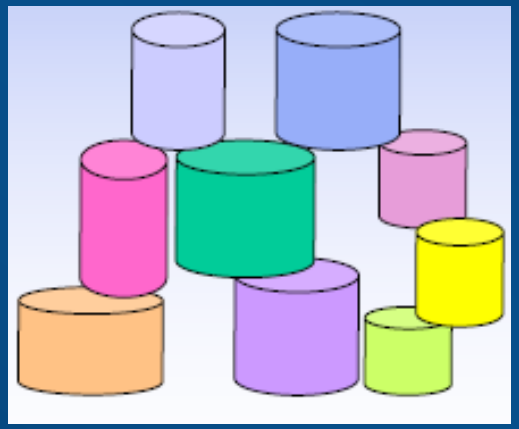
- Incompatible systems with weak levels of integration
- Fragmented data
- Fragmented processes and ownership
- Lacking in functionality

**Systems**




- Weak customer service
- Slow new service introduction
- Poor economies of scale
- High man-power costs

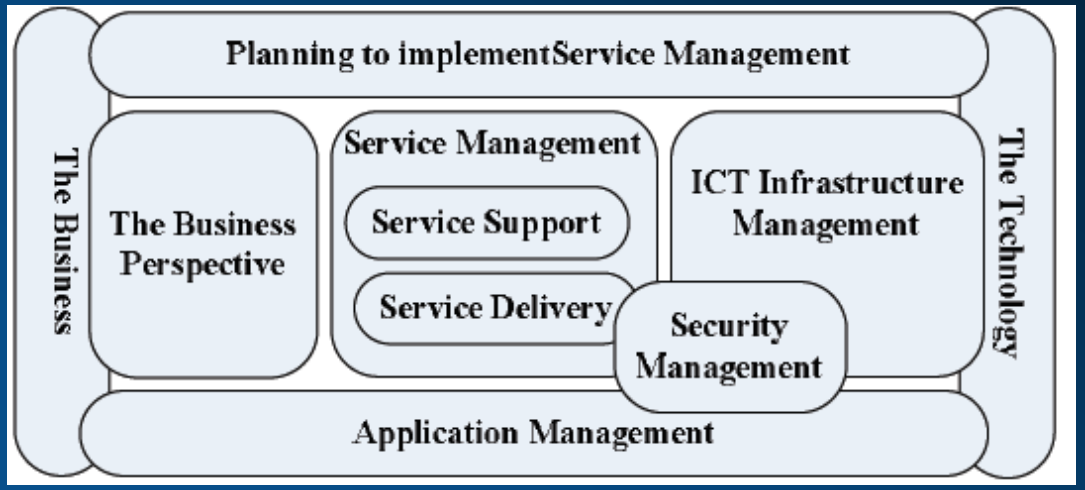
**Processes**



# What we need?

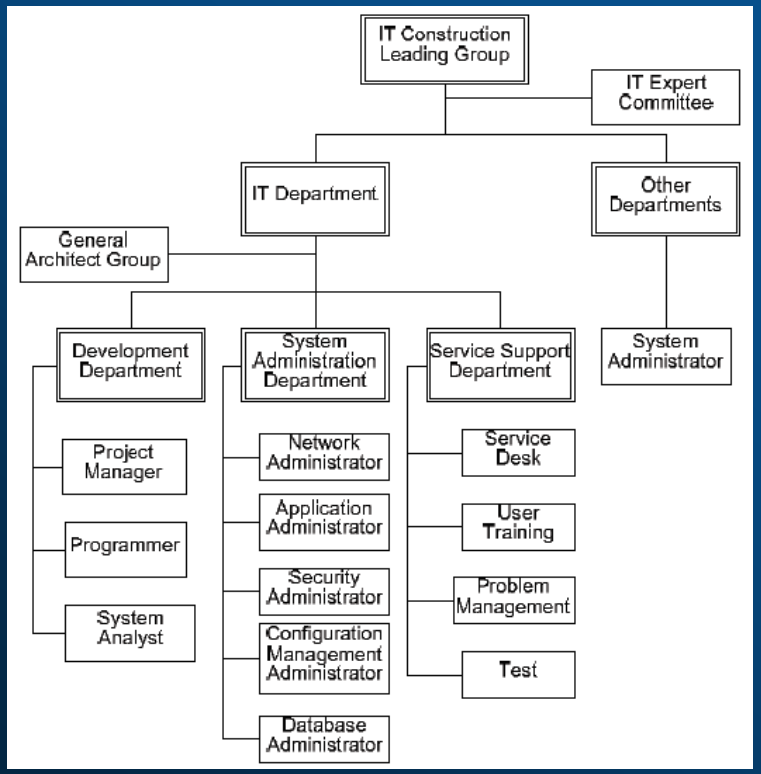
- A framework for delivering highly flexible, low cost operations for:
  - Processes
  - Data architecture and information models
  - Integration architecture

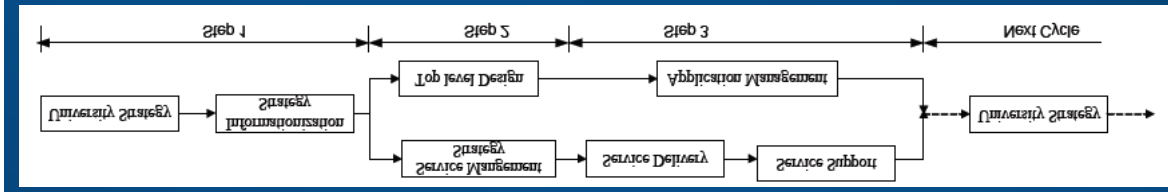
# ITIL Framework




ITIL Framework

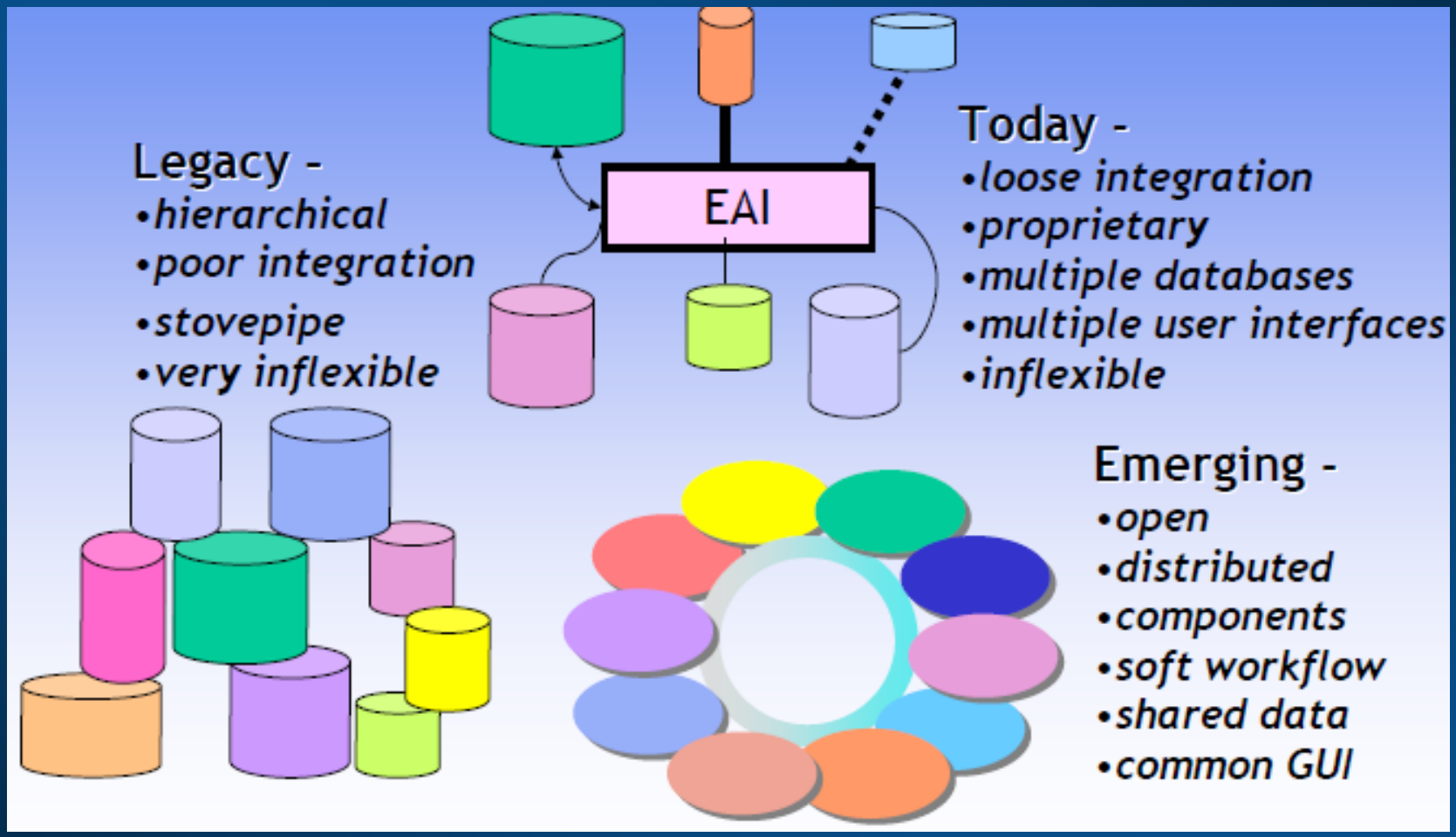
## Organizational Model



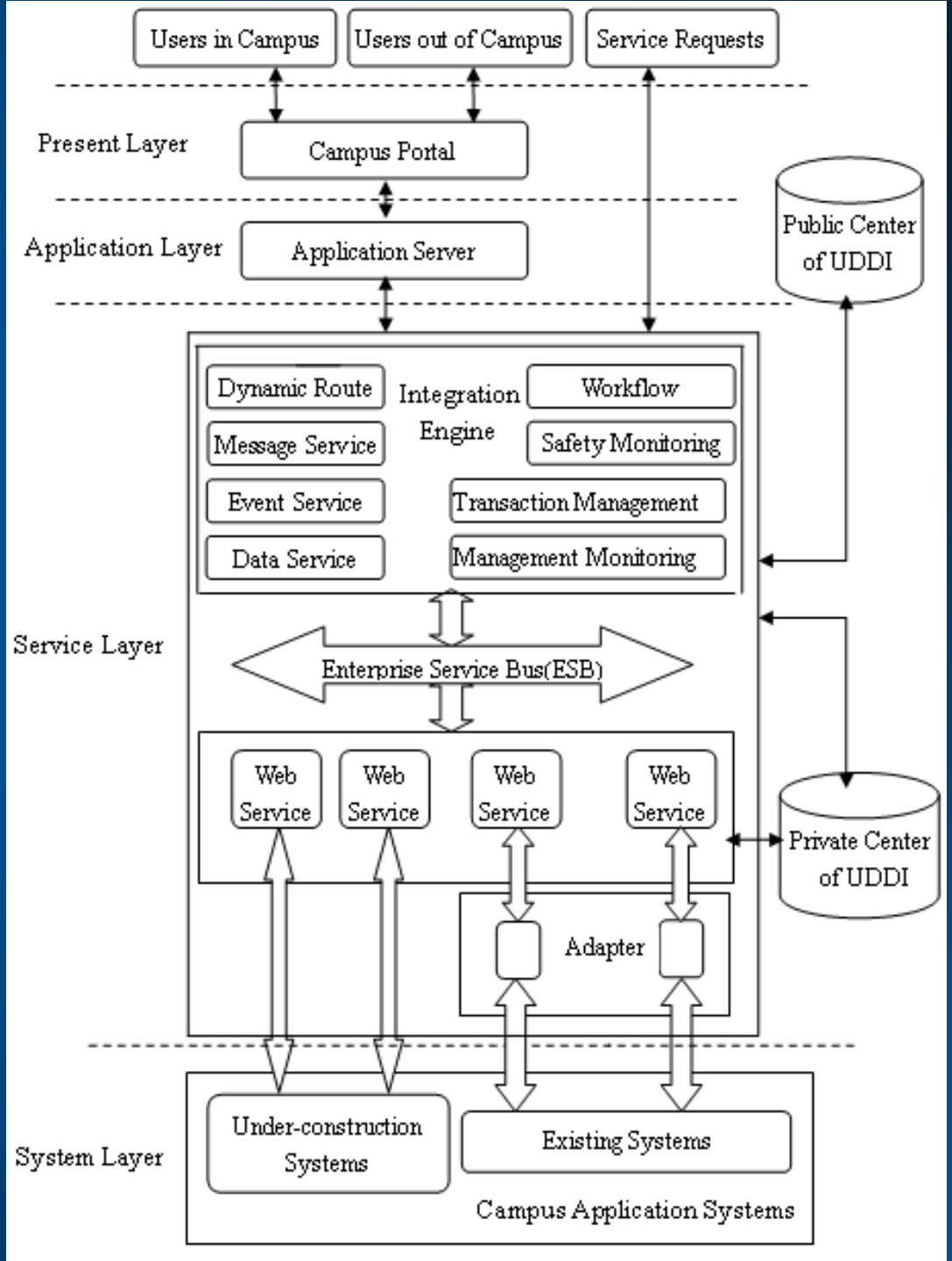
Process Model

# Technology Model - 1

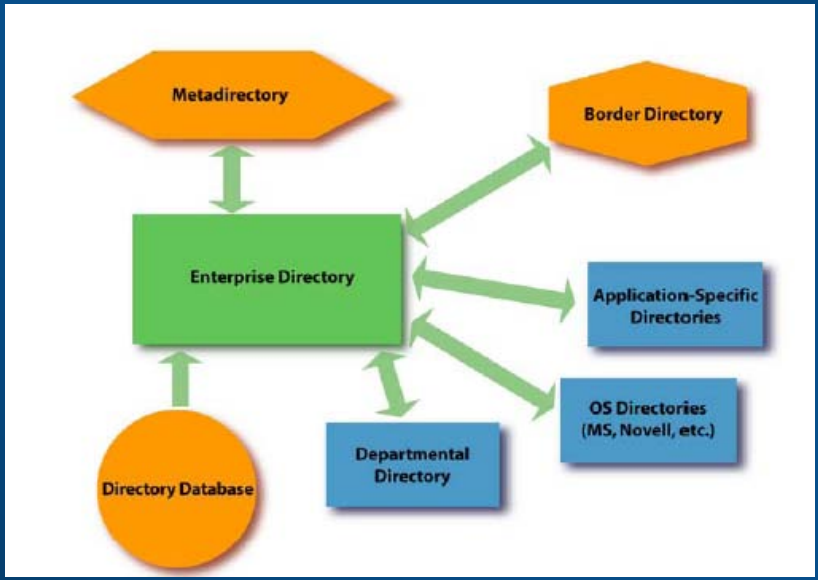



Towards Tighter Integration

# Campus Application Integration Framework based on SOA

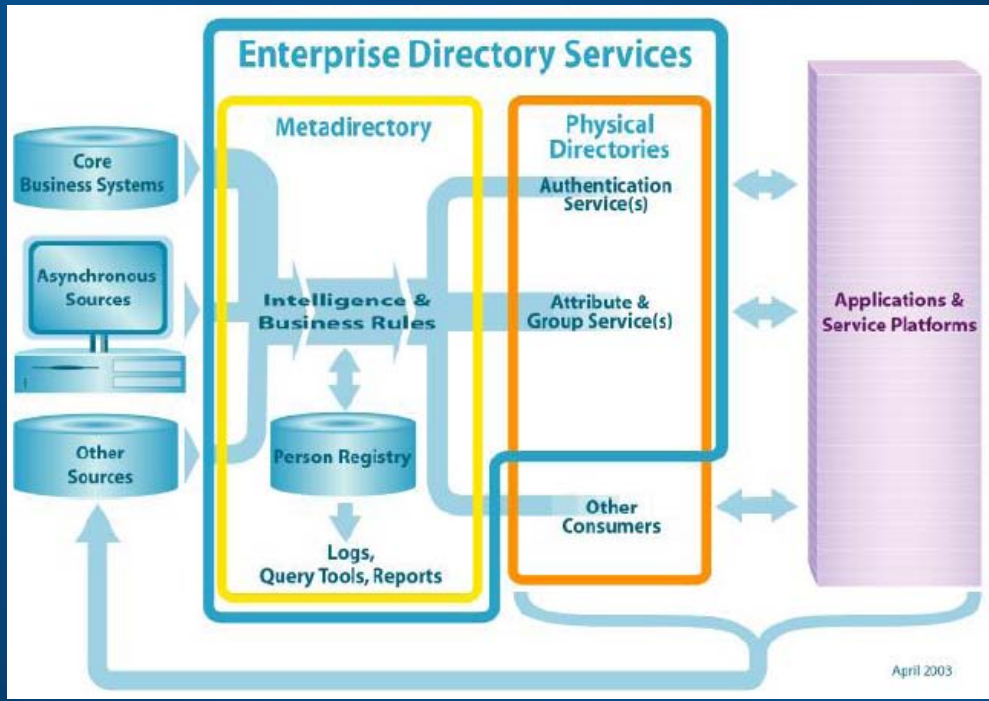


# Technology Model - 2




An Ideal Information Model & Data Architecture

Georgia State Univ. Info. Model

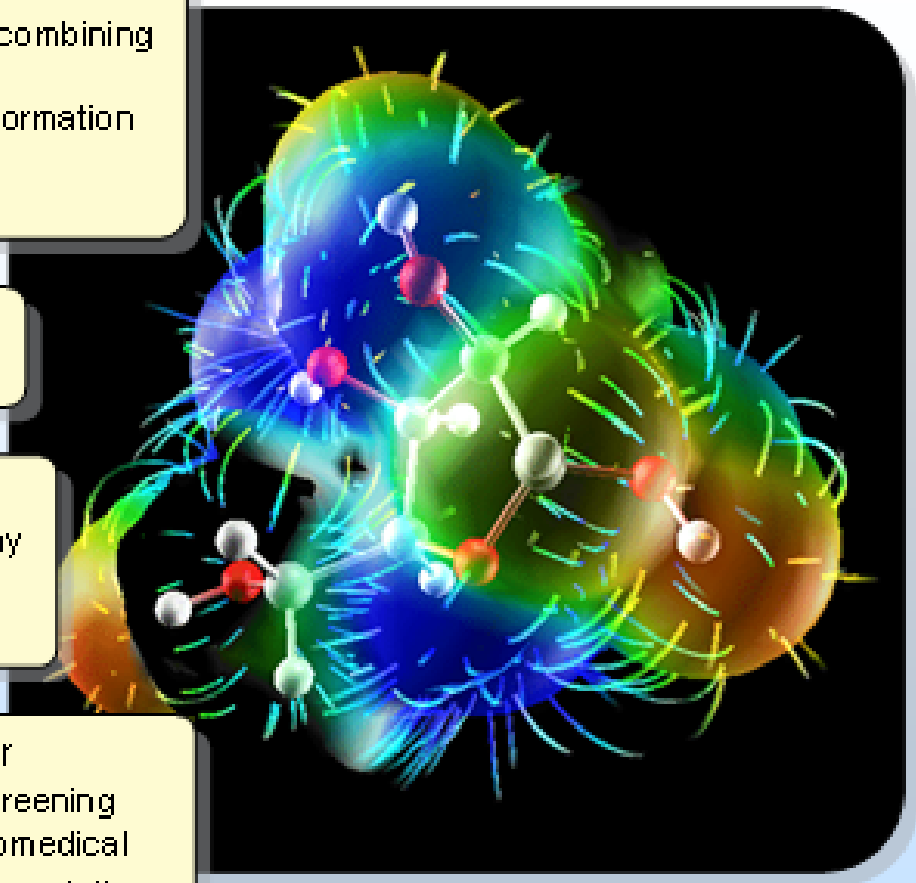


# Additional Recommendations

- Use COTS
- Build server farms as internal clouds
- Manageable clients
- Support Mobility
  - Structured, manageable WiFi (802.16n) networks
  - Power plugs for mobile users
  - Seamless – secure  “outside campus” services
- Social collaboration services
- Empower users to develop new content/services/ applications (i.e. internal marketplaces)

# e-Science

- Data sharing and integration
  - Life sciences, sharing standard data-sets, combining collaborative data-sets
  - Medical informatics, integrating hospital information systems for better care and better science
  - Sciences, high-energy physics
- Simulation-based science and engineering
  - Earthquake simulation
- Capability computing
  - Life sciences, molecular modeling, tomography
  - Engineering, materials science
  - Sciences, astronomy, physics
- High-throughput, capacity computing for
  - Life sciences: BLAST, CHARMM, drug screening
  - Engineering: aircraft design, materials, biomedical
  - Sciences: high-energy physics, economic modeling



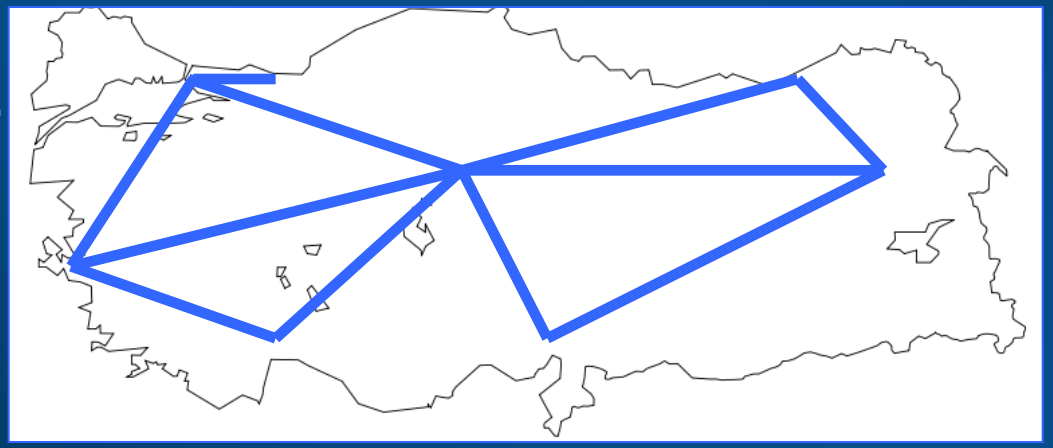
Source: Hiro Kishimoto GGF17 Keynote May 2006

# e-Science Recommendations

- University Cluster

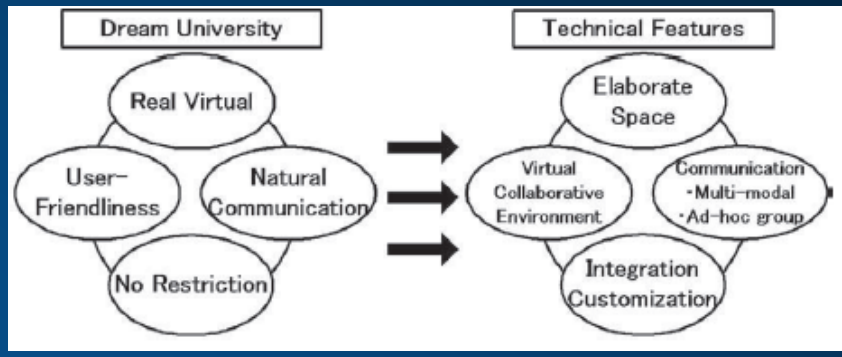
- Deskside Clusters for research groups

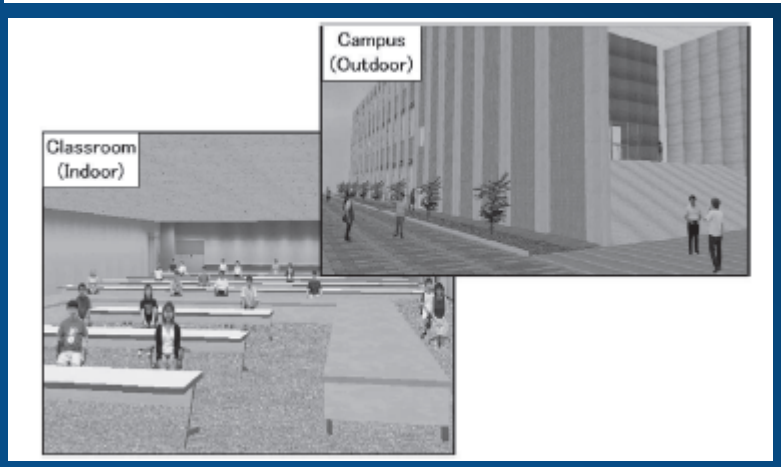
- Grid Infrastructure collaborating with other universities
  - Internet-2 like network

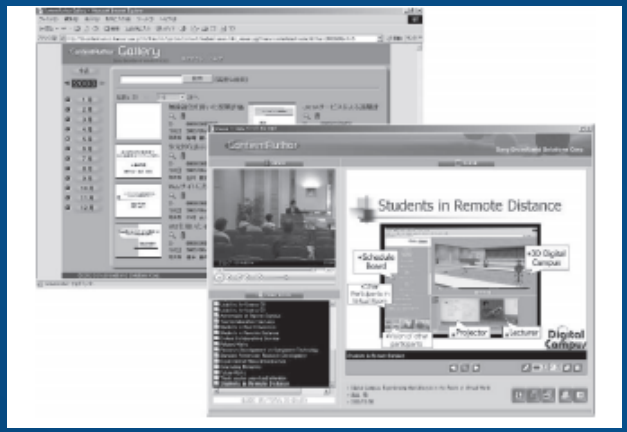


# Towards “Digital Campus” – A Dream University

A multipurpose Digital Campus facilitating for a better e-Learning environment by Kansai University




- Unified spaces of both virtual and real
  - Visualisation of resources via Web3D
- Metamodel to utilize resources over the Internet
  - Contents retrieval and integration from multiple resources, data storage according to location information, and its utilization
- Campus amenity and educational contents among individuals
  - Avatar appearance, objects and links allocation

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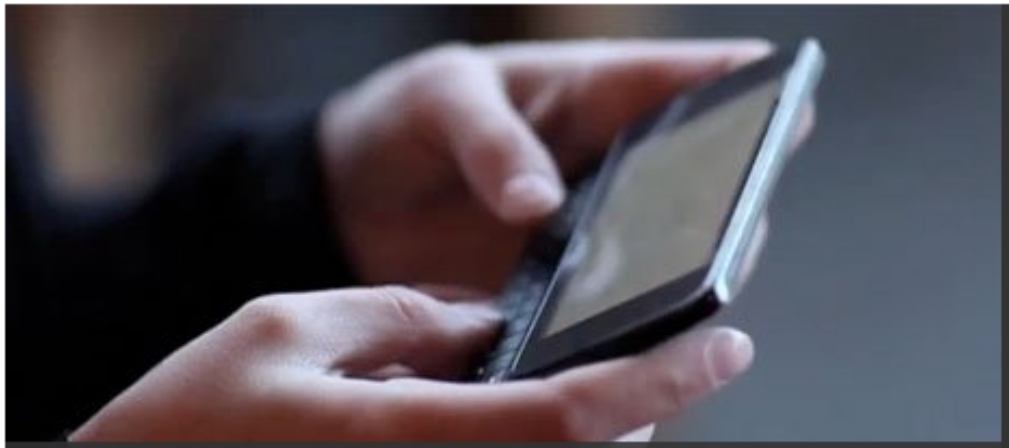

The Big Merge: A message from the MeeGo Technical Steering Group

An interview with Imad Sousou and Valtteri Halla

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# Thank You!