Grid Computing Requirement Guideline

Grid Computing Industrial Guidelines
Standardization Committee

in AIST/GTRC and INSTAC

Committee Members

- Leader
  - Prof. Yoshio Oyanagi, Kogakuin Univ.
- Vendor
  - Fujitsu, Hitachi, IBM, NEC, Oracle, Toshiba Solution
- Integrator
  - SCS, NS Solutions
- User firm
  - Mazda (Auto), Novartis (Pharma), Kajima (Const.), First Riding Technology (Data Center)
- Academic and Government
  - AIST, Kogakuin Univ., RIKEN, NII
  - METI, INSTAC(JSA)

JSA: Japanese Standards Association
INSTAC: Information Technology Research and Standardization Center

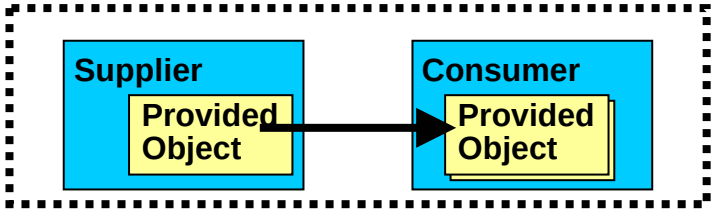
Outputs

- Modeling of Grid Systems
  - Players of Grid Systems (Supplier /Consumer)
  - Provided Objects in Grid Systems
  - Relationship between Roll of players and Provided Objects
  - Phase Transition of Provided objects
  - Management of Grid Systems
- Examples of Grid Systems and the requirements
  - In-house technical computing grid (Computing grid)
  - In-house technical computing grid (PC grid)
  - Academic collaborative grid (Computing grid)
  - Commercial data center grid (Business computing grid)
  - Commercial data center grid (Commercial storage service)
- Requirement Guideline

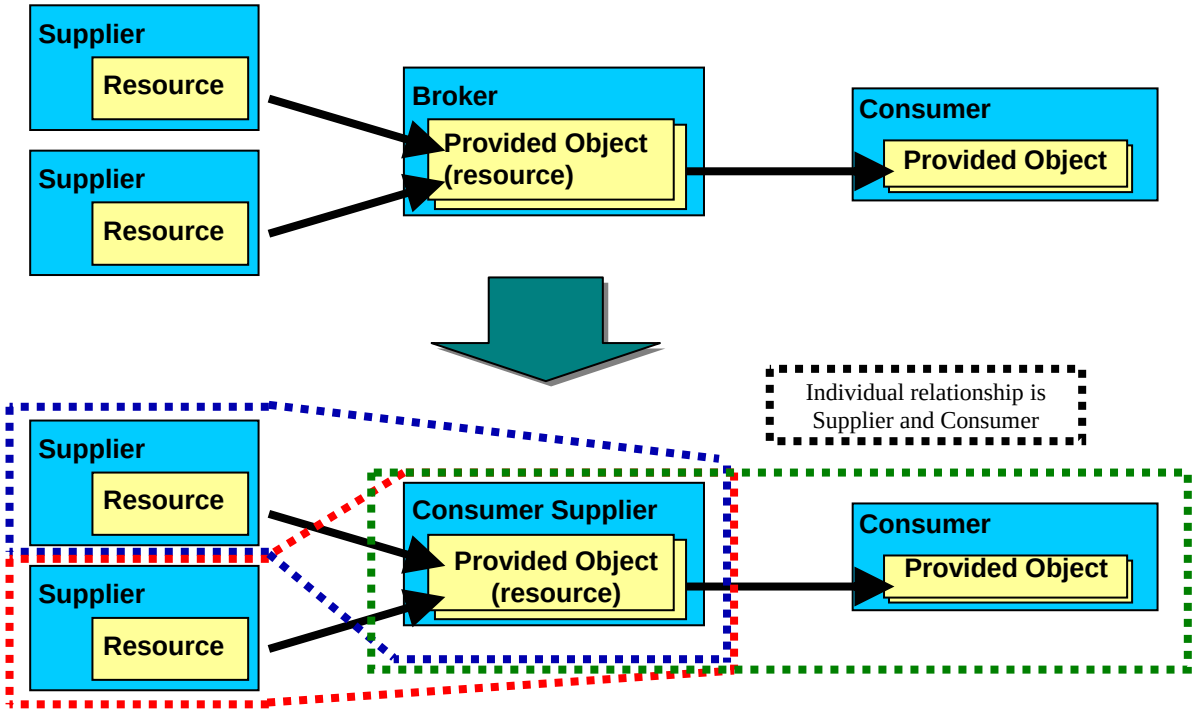
  (Now we are developing it)

Players of Grid Systems

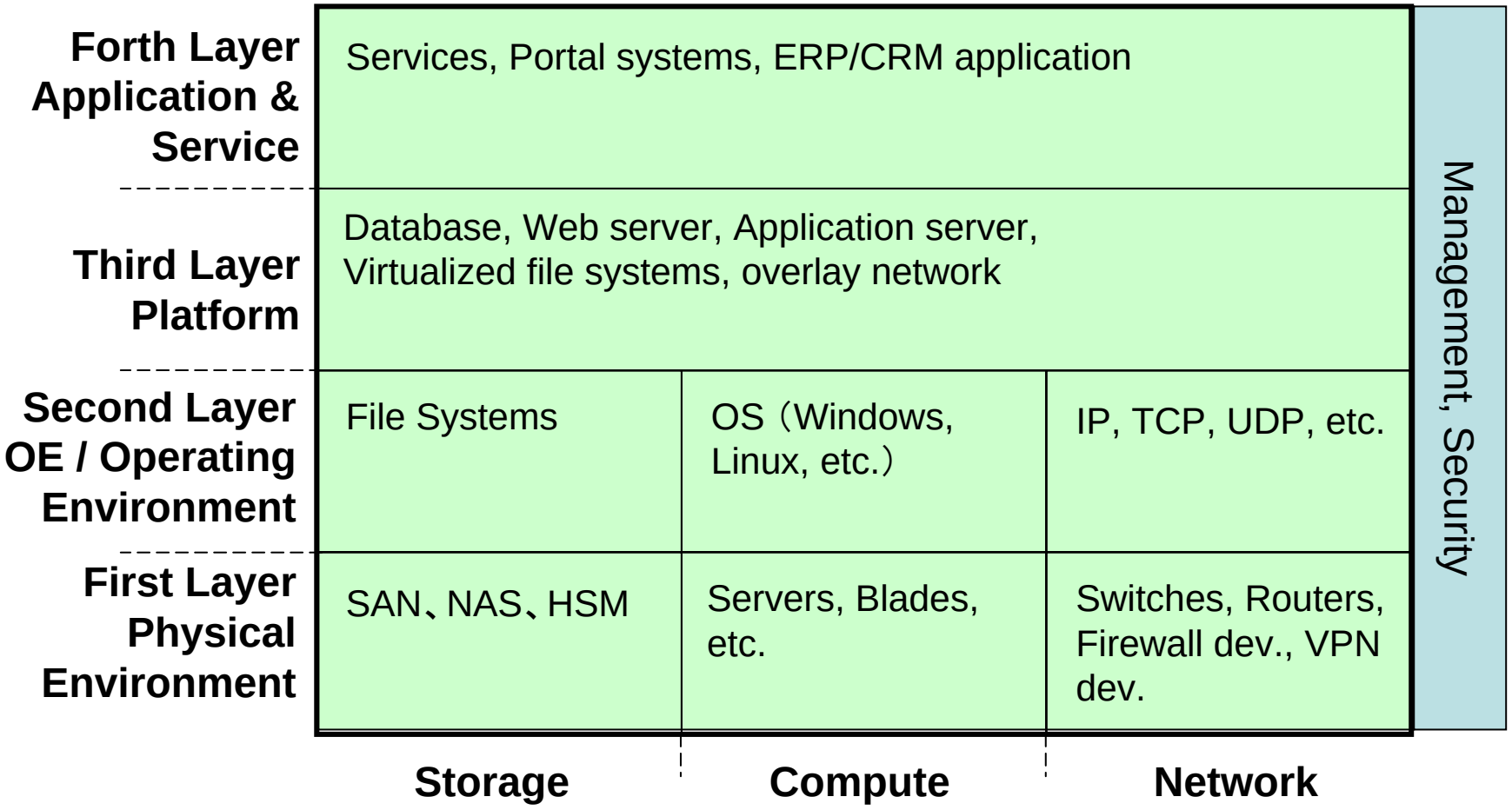
- Supplier and Consumer



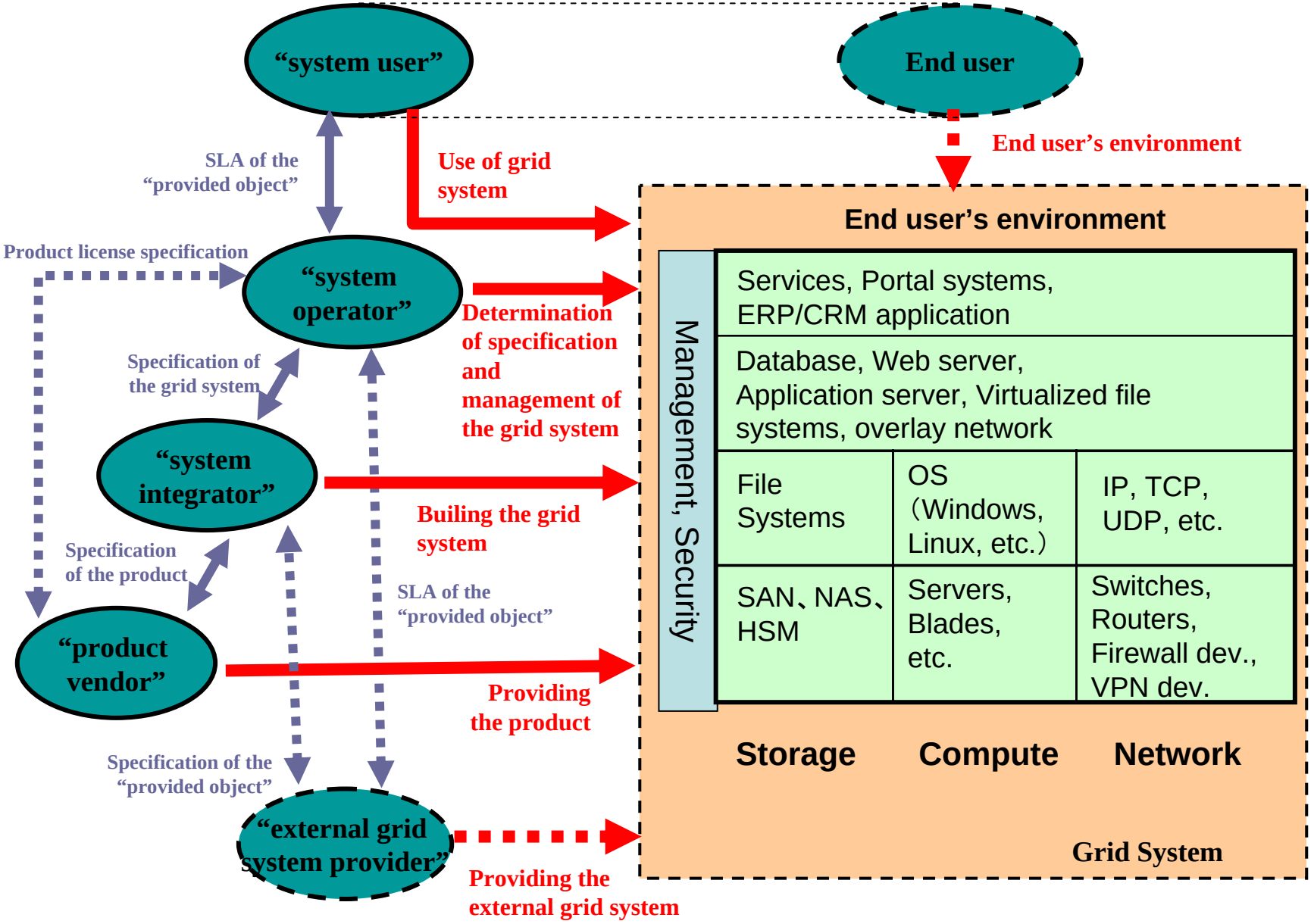
- Broker (Mediator) = Consumer & Supplier



Provided Objects in Grid System



Role of the player and Provided object



Role of players

”system user”

- User (or organization) who uses the grid system provided by “system operator”

”system operator”

- Provider who provide the grid system to “system user”

“**system integrator”**

- Integrator who build the grid system according to the specification created by “system operator”

“product vendor”

- Vendor who provide products which is required to build the grid system

“external grid system provider”

- The grid system may include an external grid system operated by other organization. “system operator” who provides the external grid system

“end user”

- User who uses the forth layer of the grid system and who do not provide anything to other users

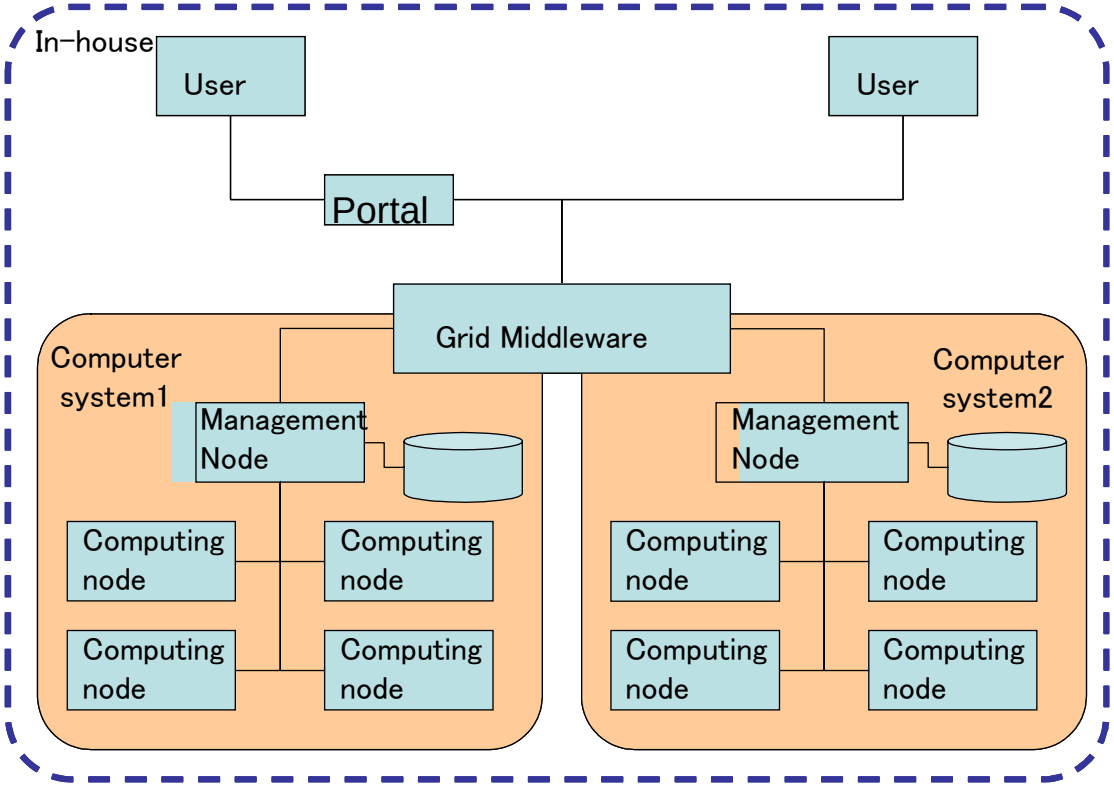
Examples of
Grid systems and requirements

Examples of Grid systems

- In-house technical computing grid (Computing grid)
- In-house technical computing grid (PC grid)
- Academic collaborative grid (Computing grid)
- Commercial data center grid (Business computing grid)
- Commercial data center grid (Commercial storage service)

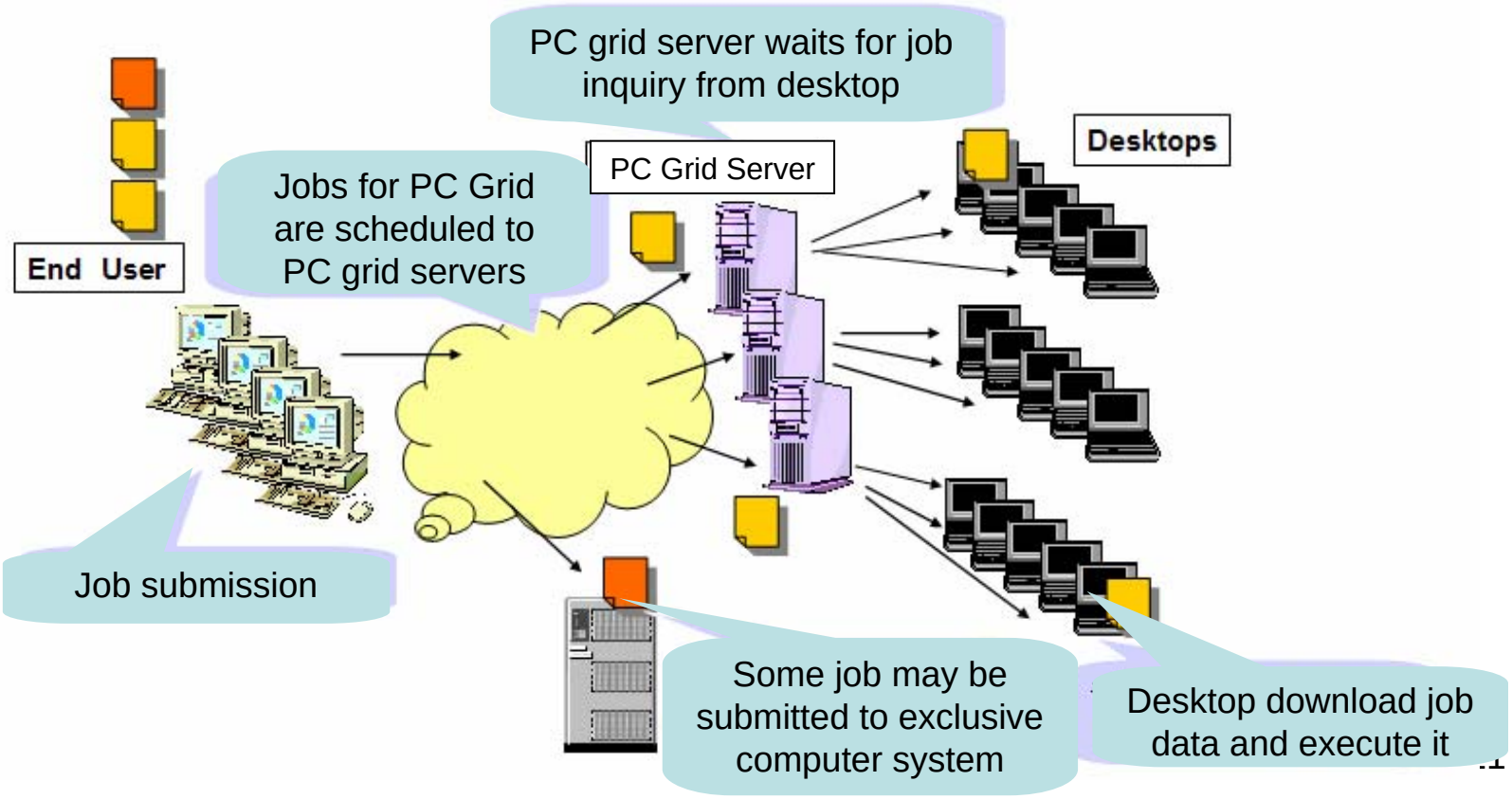
In-house technical computing grid (Computing grid)

- A company owns and integrates computer systems those are exclusively used for the technical computing



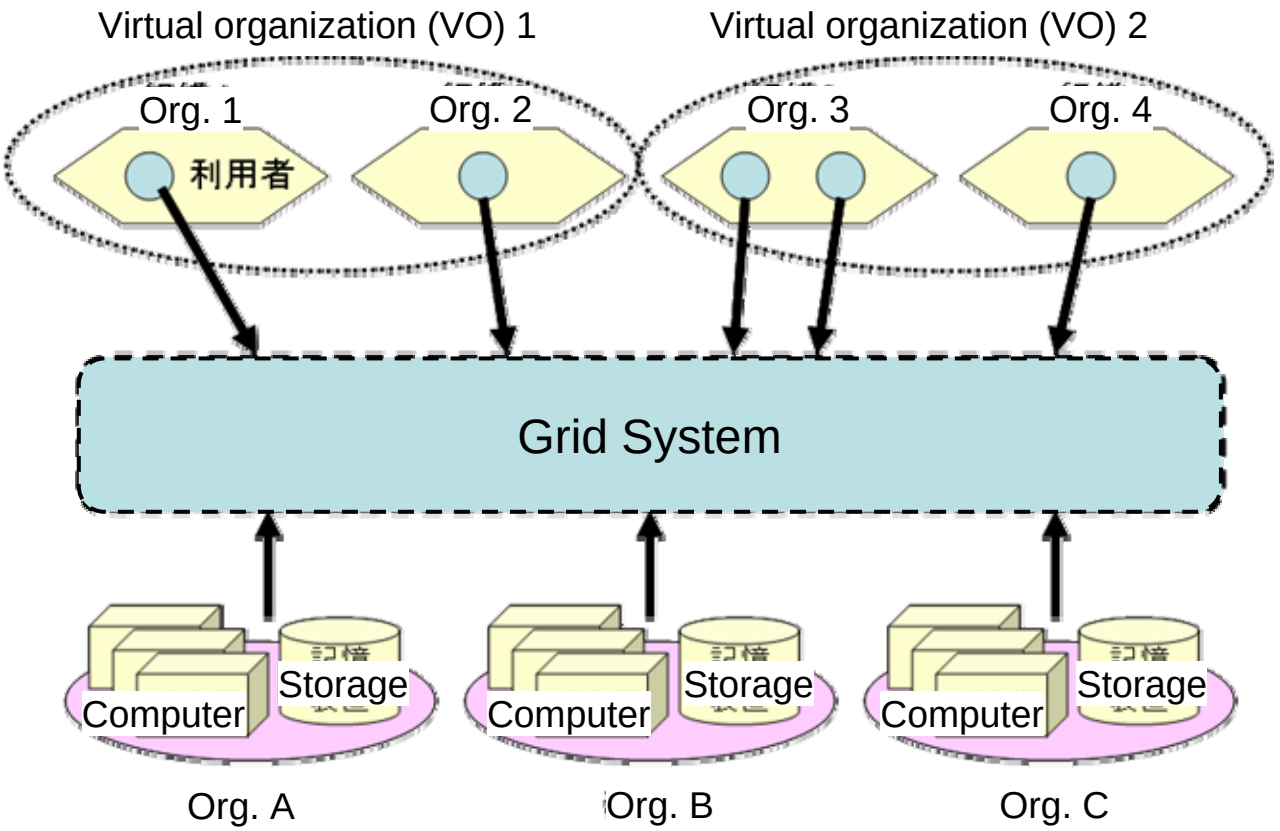
In-house technical computing grid (PC grid)

- A company involves idle CPU cycle of PC or CAD workstation to the grid system for technical computing

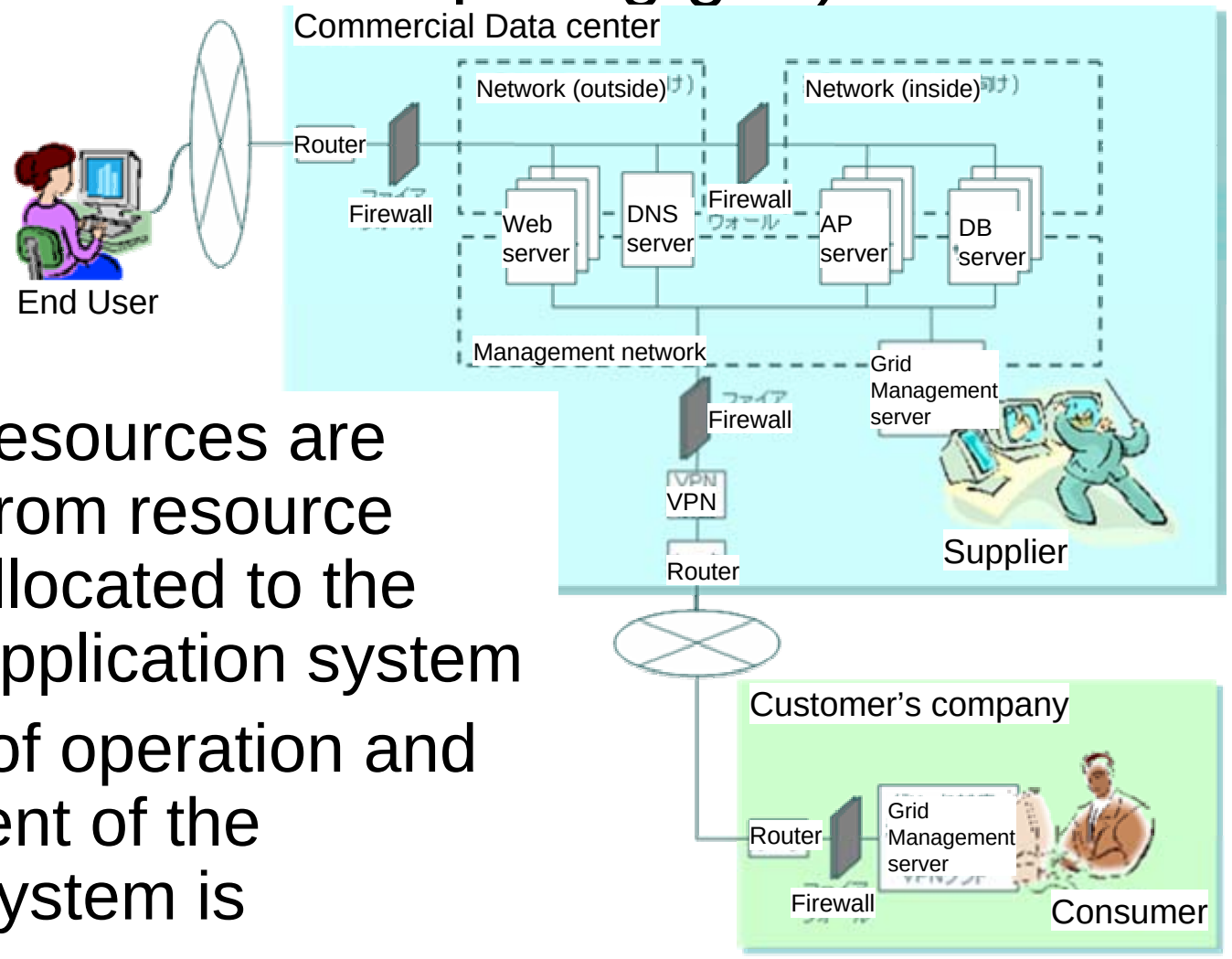


Academic collaborative grid (Computing grid)

- Multiple Universities and Laboratories provide and share the resource (computer system and data) for the sake of academic collaboration



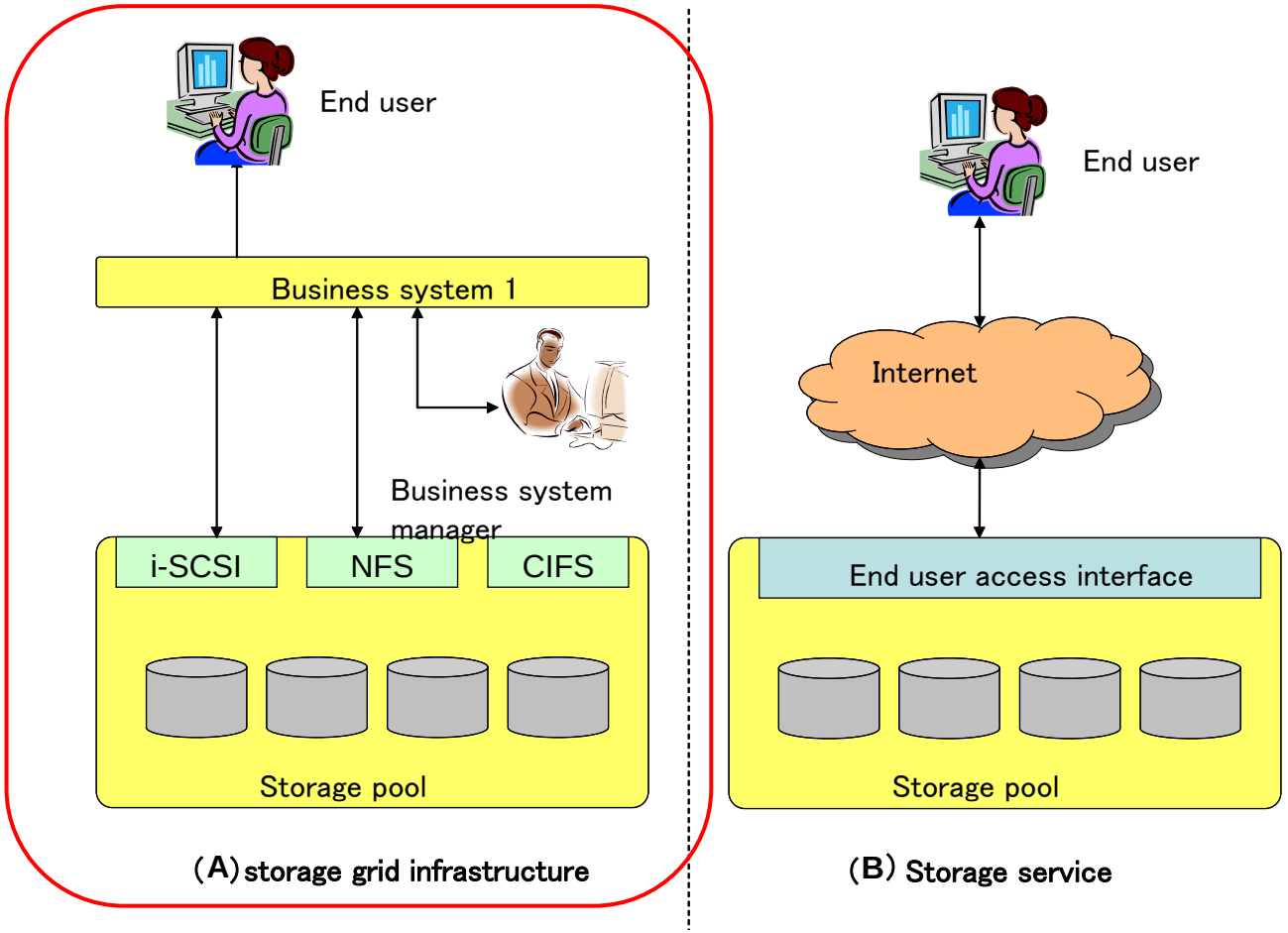
Commercial data center grid (Business computing grid)



- Required resources are extracted from resource pool and allocated to the business application system
- Efficiency of operation and management of the business system is improved

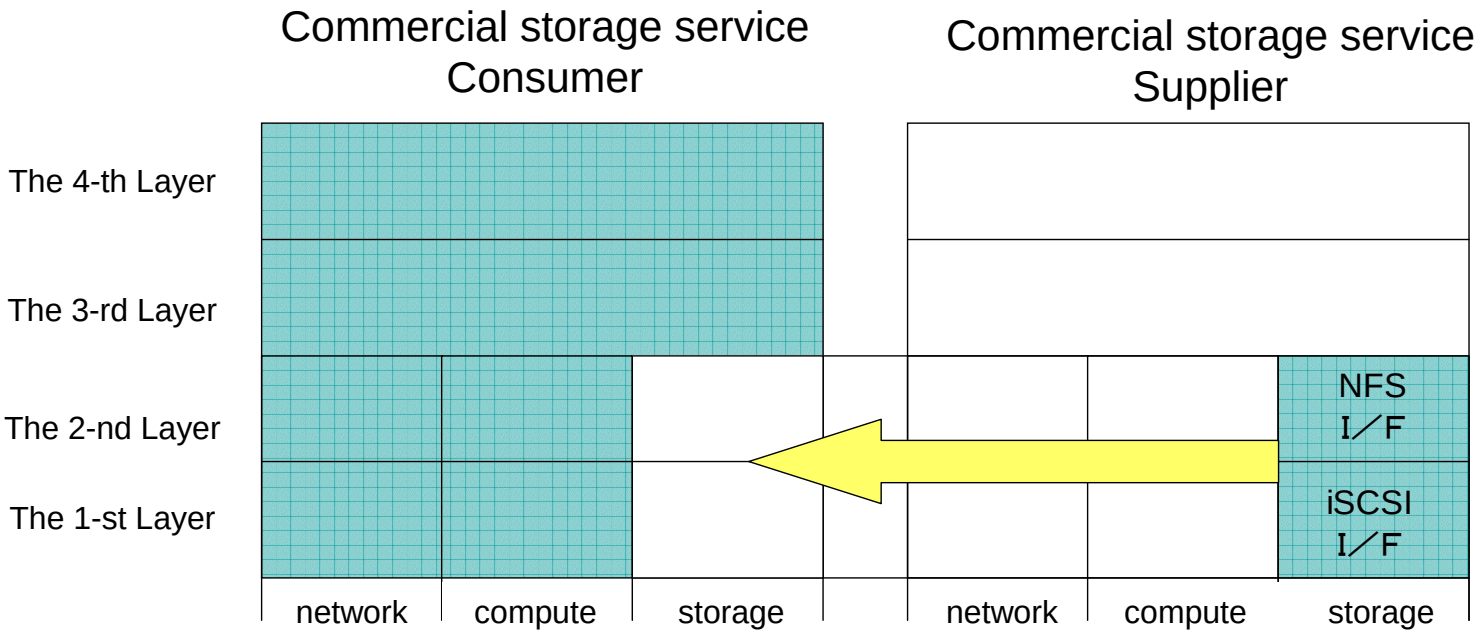
Commercial data center grid (Commercial storage service)

- Required resources are extracted from storage resource pool and allocated to the business application system



Provided object in commercial storage service

- The environment for the 2nd layer of storage is provided by commercial data center



The 4-th layer: DBMS client tool, User Interface, shell, browser
The 3-rd layer: DBMS, Gfarm, Web server, etc…
The 2-nd layer: ufs, NTFS, NFS, CIFS, a part of OS kernel
The 1-st layer: iSCSI

Example of description of requirements

“System User”

- Information of Provided object
  - Information of "provided object", such as configuration and performance, is informed to "system user".
  - Usage record of "system user" is informed to the "system user" and is not informed to the other "system user".
- Use of Provided object
  - Unified interface to "provided object" is provided.
  - Status of the Application/Service which "system user" uses is informed to the "system user"
- Security
  - Single Sign on is available to the multiple "provided objects"

“System Operator”

- Management of the system
  - "system operator" can monitor the status of "provided object" through the easy interface
  - "provided object" is operated through the unified interface
- Information of Provided object
  - Usage record of "system user" is obtained by "system operator".
- Management of the application/service
  - "system operator" can start (and stop) the application/service
  - Multiple applications/services which runs on the same resource (server) do not affect each other
  - Applications/services of "system users" can be prioritized
- Security
  - Application program and data is protected from other "system users"

Requirement Guideline for Grid Systems

Sample description of the requirement for typical grid systems

This part is the “requirements Guideline”

Category	Issues	Requirement	In-house technical computing grid	Academic collaborative computing	etc.
User's point of view	Information of Provided object	Information of ″provided object″, such as configuration and performance, is informed to ″system user″.	necessary	necessary	
		Usage record of ″system user″ is informed to the ″system user″ and is not informed to the other ″system user″.	necessary	necessary	
	Use of Provided object	Unified interface to ″provided object″ is provided.	necessary	necessary	
		Status of the Application/Service which ″system user″ uses is informed to the ″system user″	necessary	necessary	
		:			
	Security	Single Sign on is available to the multiple ″provided objects″	preferable	preferable	
Operator's point of view	Management of the system	″system operator″ can monitor the status of ″provided object″ through the easy interface	necessary	necessary	
		″provided object″ is operated through the unified interface	necessary	necessary	
		:			
	Information of Provided object	Usage record of ″system user″ is obtained by ″system operator″.	necessary	necessary	
		:			
	Management of the application/service	″system operator″ can start (and stop) the application/service	necessary	necessary	
		Multiple applications/services which runs on the same resource (server) do not affect each other	necessary	necessary	
		Applications/services of ″system users″ can be prioritized	necessary	necessary	
	Security	Application program and data is protected from other ″system users″	necessary	necessary	
		Unified ID management is done	preferable	preferable	
		User certificate issued by policy managed CA is used	N/A	necessary	
	Network	Bandwidth of the network between ″end user″ and ″provided object″ is enough high	necessary	necessary	