PRAGMA, network and OGF Network Services Interface - network as a manageable resource -

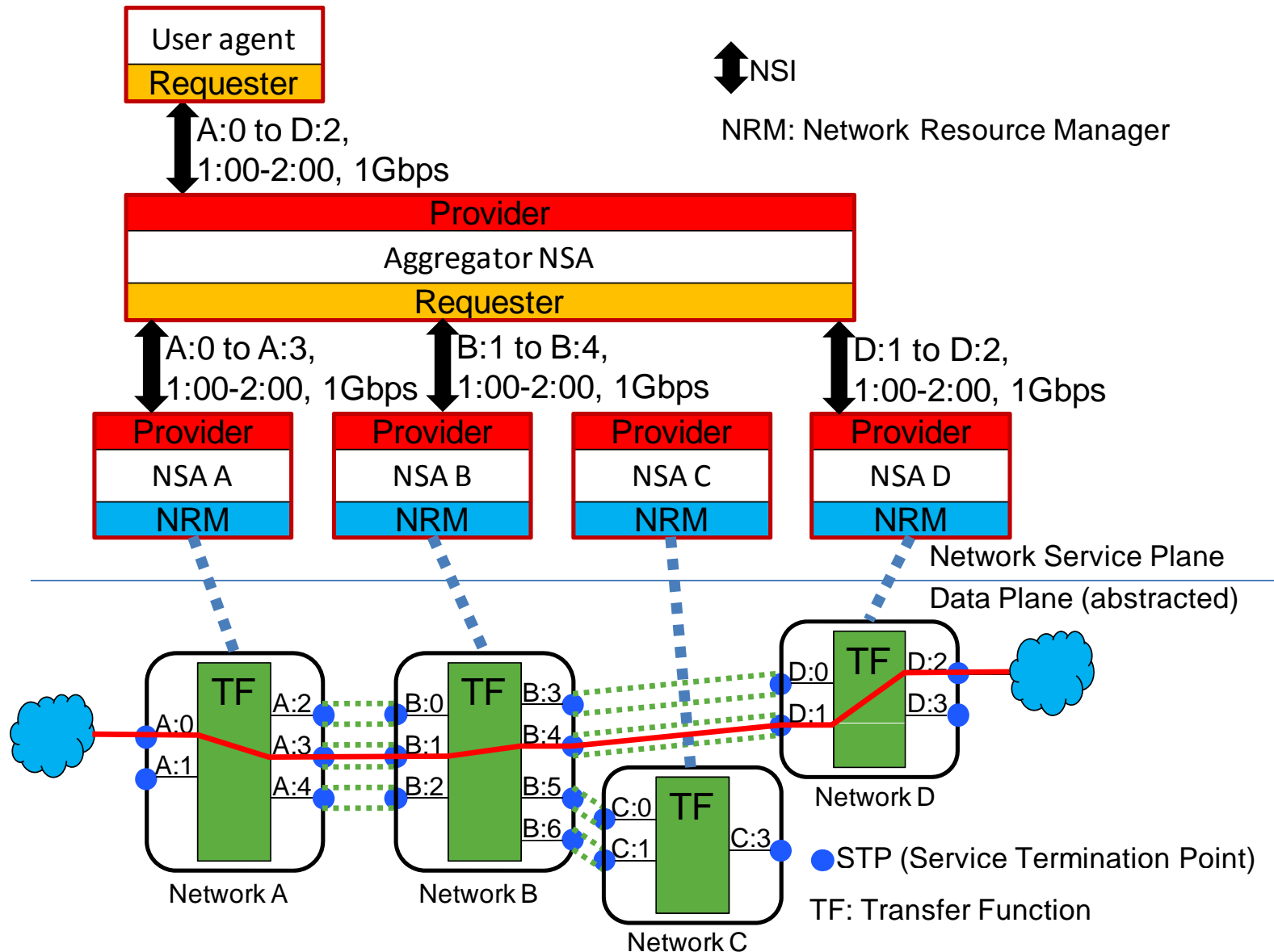Tomohiro Kudoh (AIST)

Networks in Clouds & Grids

- Networks are often been taken for granted by Clouds and Grids

- Longer distances may require using more than one provider

- Multi-provider network should be just another resource – easy integration with scheduling of computing/storage resources

Activities to make network a manageable resource are on-going

Network Services Interface (NSI)

- Is being defined at OGF(Open Grid Forum) NSI-WG

- An open standard for dynamic circuit service interoperability

  - A simple API to support connectivity management

  - Dynamic assignment of bandwidth, VLAN ids etc.

  - Global reach: multi-provider enabled solution

NSI architecture and connection service (CS)

NSI

NRM: Network Resource Manager

User agent
Requester

A:0 to D:2,
1:00-2:00, 1Gbps

Provider
Aggregator NSA
Requester

A:0 to A:3,
1:00-2:00, 1Gbps

B:1 to B:4,
1:00-2:00, 1Gbps

D:1 to D:2,
1:00-2:00, 1Gbps

Provider	Provider	Provider	Provider
NSA A	NSA B	NSA C	NSA D
NRM	NRM	NRM	NRM

Network Service Plane
Data Plane (abstracted)

TF

TF

TF

TF

A:0
A:1
A:2
A:3
A:4

B:0
B:1
B:2
B:3
B:4
B:5
B:6

C:0
C:1
C:3

D:0
D:1
D:2
D:3

Network A

Network B

Network C

Network D

STP (Service Termination Point)
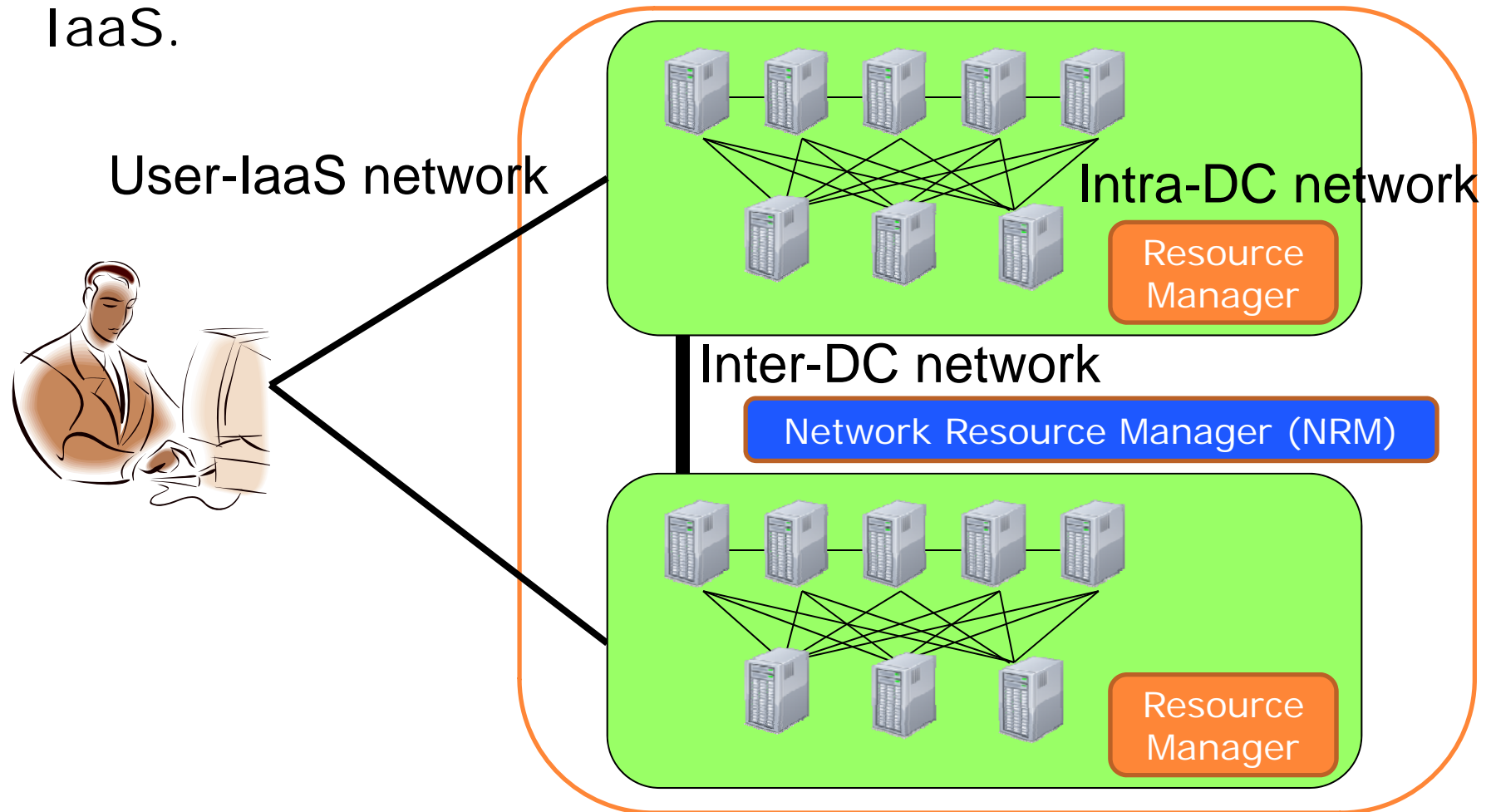
TF: Transfer Function

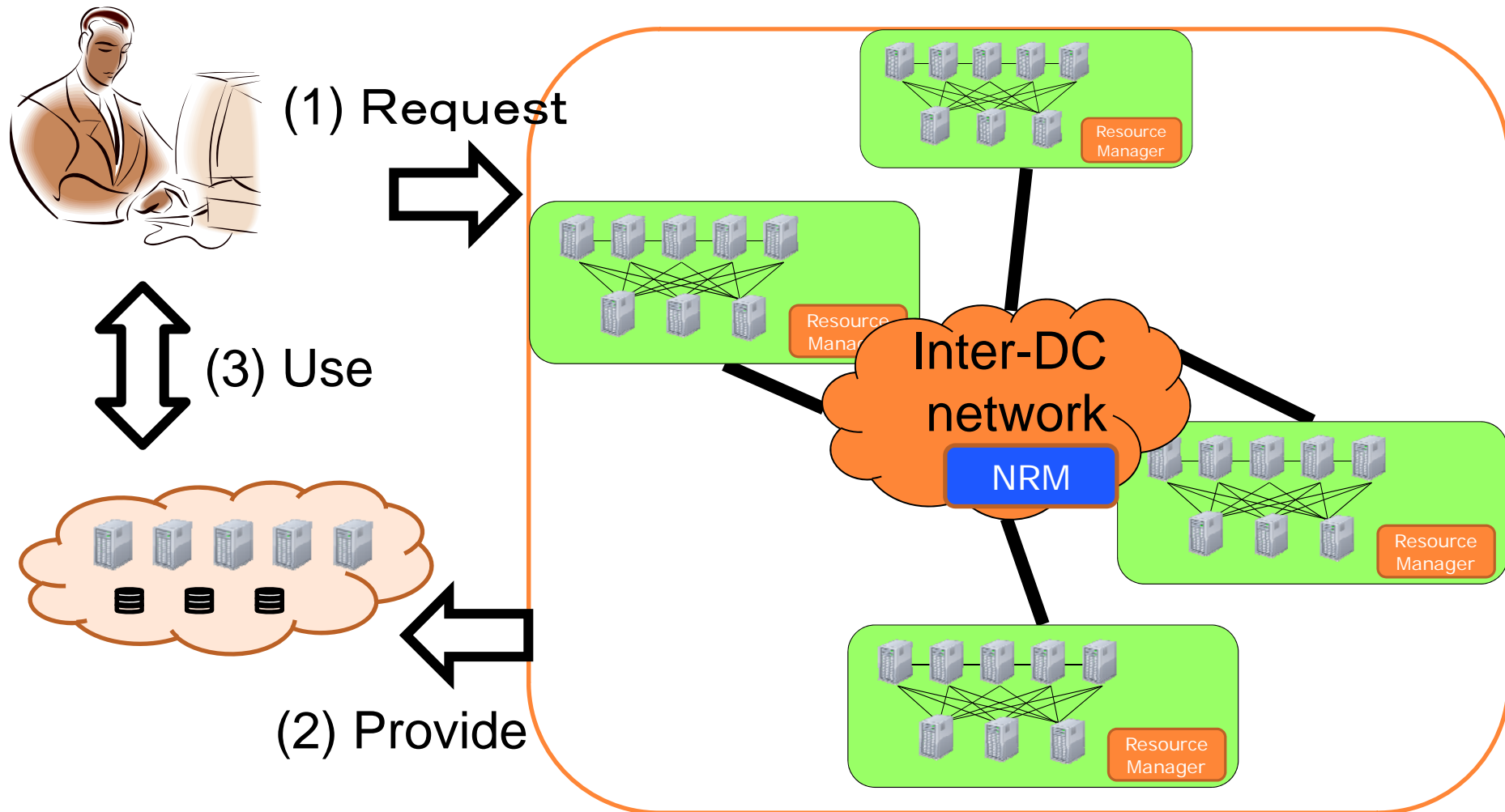# Current status and future plan of NSI

- CS protocol v1.0draft, which enables provisioning of simple inter-provider connection, has been defined.
- At GLIF2011, a "plugfest" (protocol interoperability testing) took place (Rio de Janeiro, Sep.13)
    - OpenNSA (NORUnet)
    - AutoBAHN (GEANT)
    - DRAC (SURFnet)
    - G-LAMBDA (AIST)
    - G-LAMBDA (KDDI Labs)
    - OSCARS (ESnet)
    - DynamicKL (KISTI)
- V1.0 will be published by the end of this year
- V2.0 with advanced features is expected to be drafted in early next year
- Commitment by providers to become NSI compliant
    - Including JGN-X

Data intensive Cloud and network

🌐 For data intensive services, chunks of data are moved (copied) between IaaS and user, and inside IaaS.

User-IaaS network

Intra-DC network

Resource Manager

Inter-DC network

Network Resource Manager (NRM)

Resource Manager

Multi-domain cloud

(1) Request

(3) Use

(2) Provide

Inter-DC network

NRM

Resource Manager

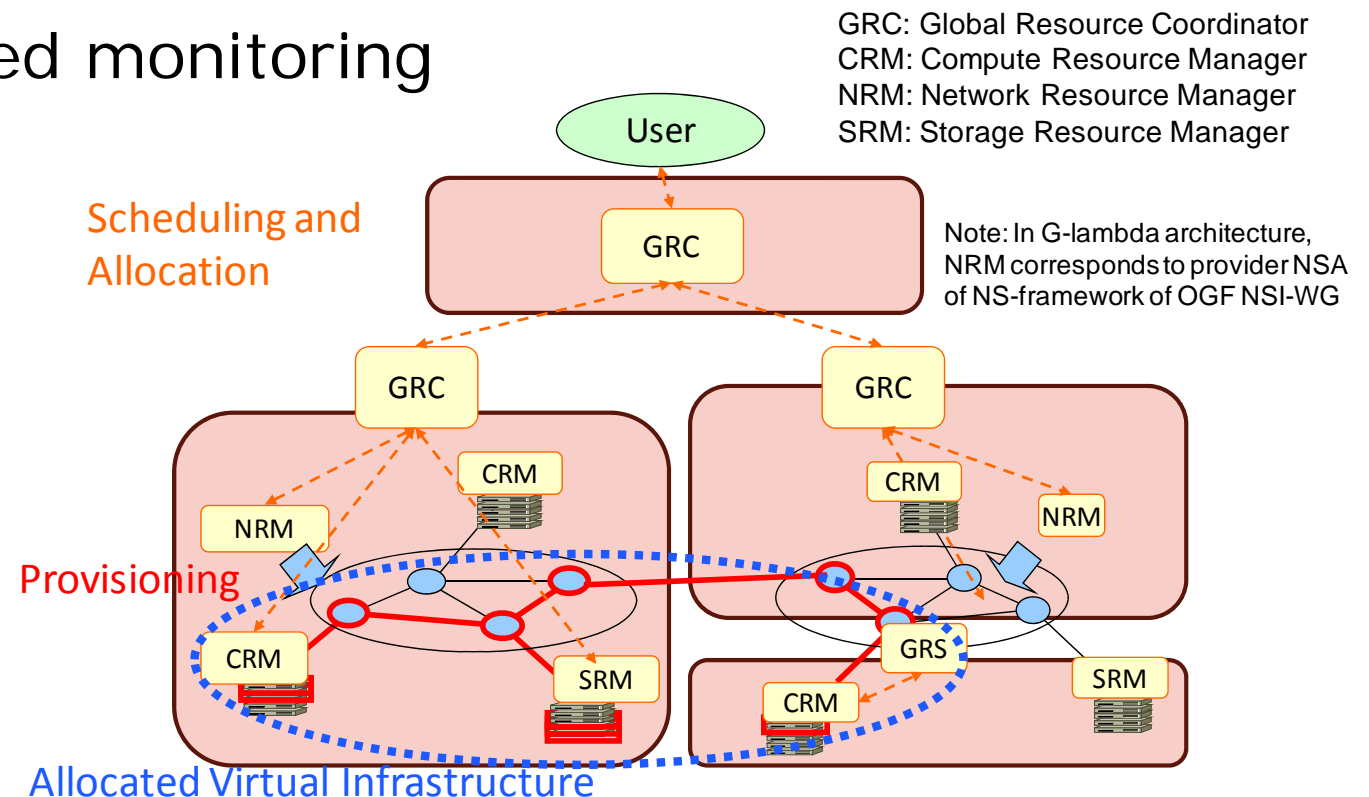# AIST has developed GridARS system

- A unified management system of compute, storage and network resources
  - ▶ Scheduling, allocation
  - ▶ Application execution environment set-up
  - ▶ Policy-based monitoring
- Will use NSI

GRC: Global Resource Coordinator
CRM: Compute Resource Manager
NRM: Network Resource Manager
SRM: Storage Resource Manager

Scheduling and Allocation

Note: In G-lambda architecture, NRM corresponds to provider NSA of NS-framework of OGF NSI-WG

User

GRC

GRC   GRC

CRM   CRM

NRM   NRM

Provisioning

CRM   GRS   SRM

SRM   CRM

Allocated Virtual Infrastructure

Summary - PRAGMA and networking -

- PRAGMA has been a community which provides/uses distributed IT infrastructure
- Now, it's time to consider network as a manageable resource
    - Dynamic provisioning of stable, guaranteed performance network

    - Stable guaranteed performance distributed IT infrastructure
- Need to cooperate with network providers
    - GLIF and NSI-enabled networks
    - Chicken and egg:
        - no application -> no service -> no application -> ...
- Move from IT to ICT ?

NSI BOF at SC11

- 5:30pm – 7:00pm, Nov. 16 (Wednesday)