

Inter-cloud computing: Use cases and requirements *lessons learned 3.11*

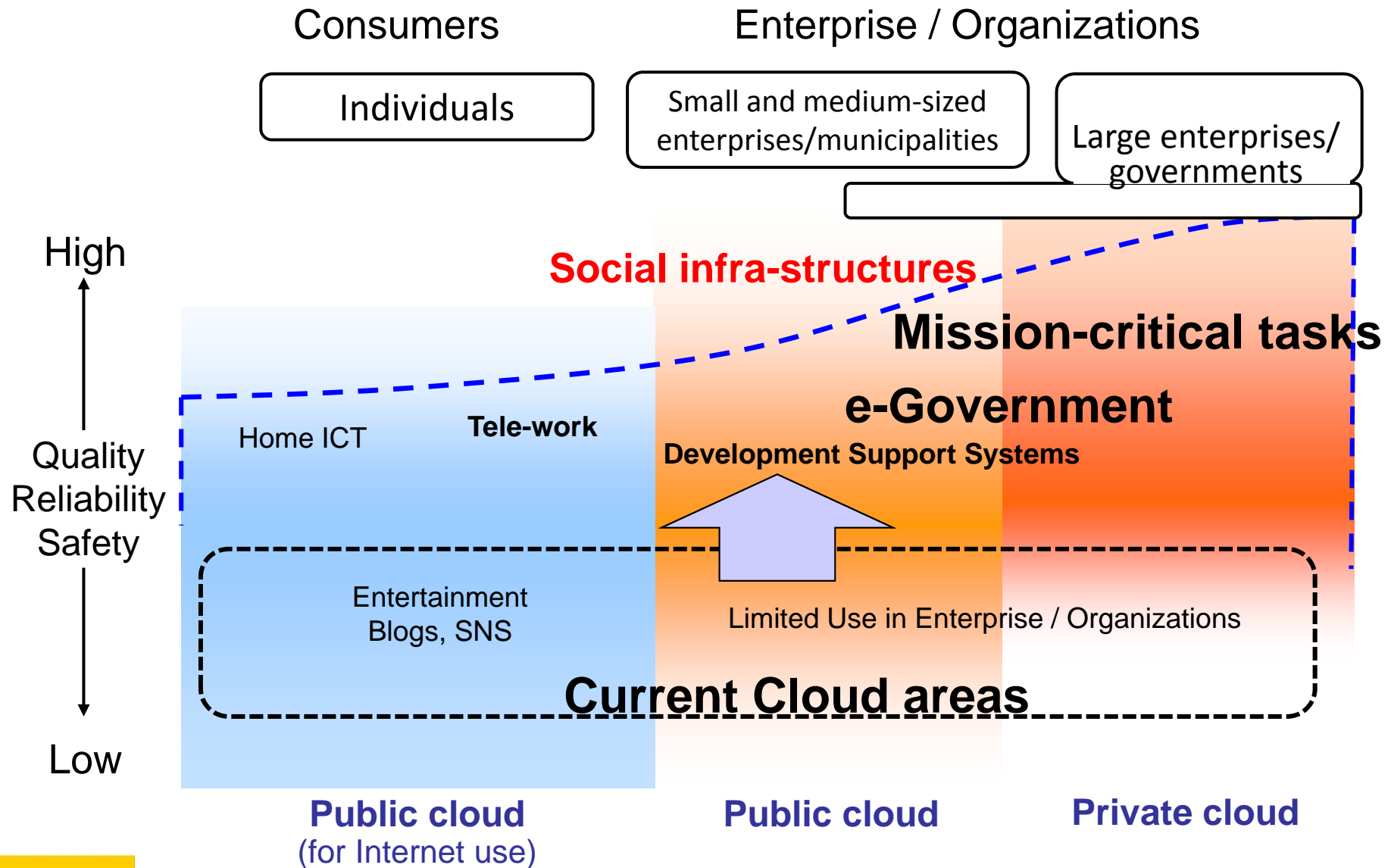
Oct 12, 2011

Global Inter-Cloud Technology Forum (GICTF)

Institute of Information Security (IISEC)

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Secure cloud computing is promising



Why we focus on Inter-Cloud computing?

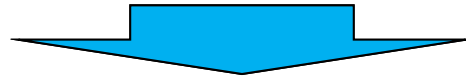
Secure cloud computing for Lifeline Services

1. Various Quality requirements

- ✓ Availability (even in emergency situation), Latency, Bandwidth, Security, Cost, Green

2. Various Functional requirements

- ✓ To increase user benefits, quick delivery, etc.

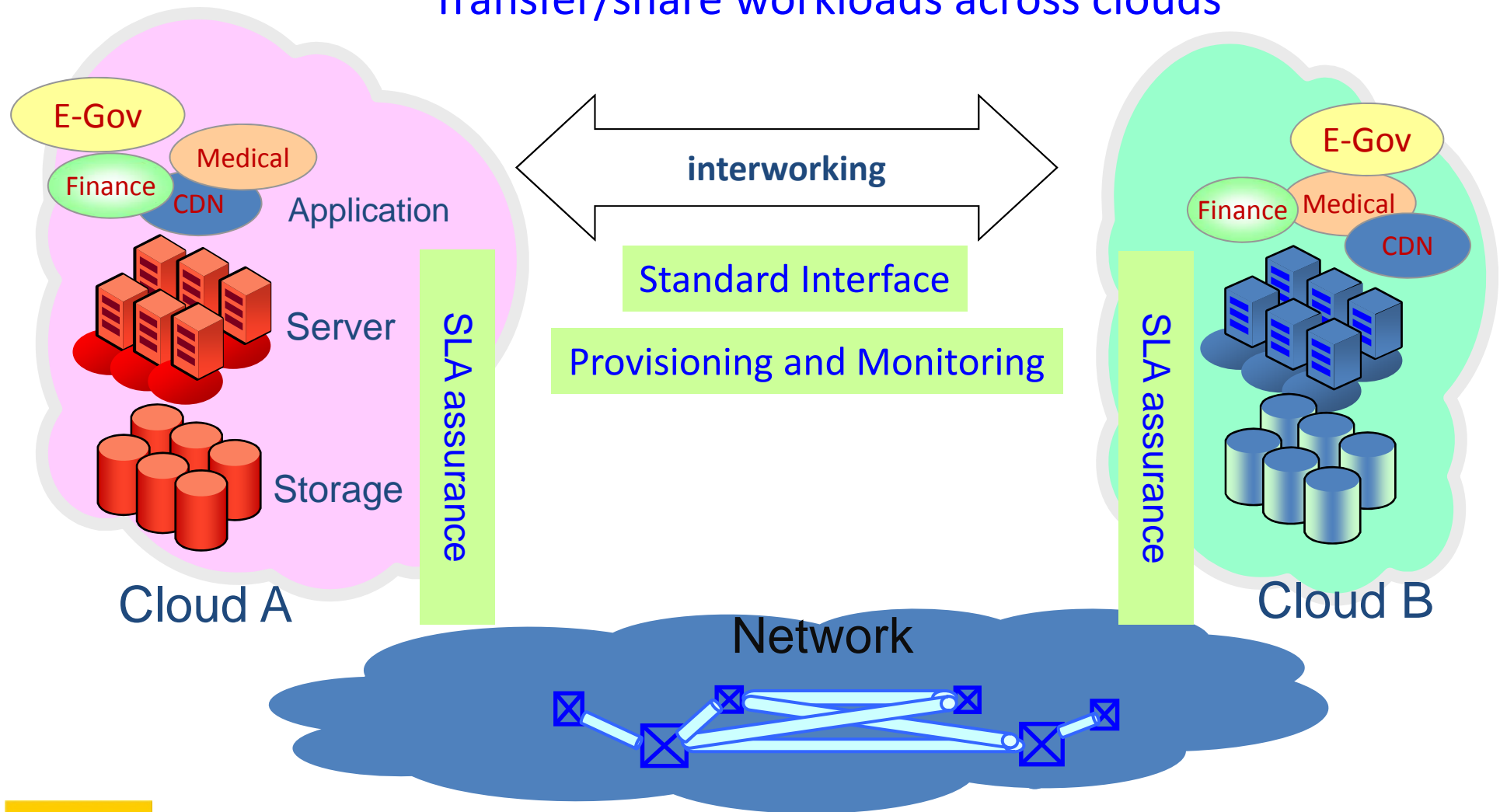


Can “single cloud” satisfy everything?

“Inter-Cloud computing” technologies is promising.

Inter-cloud Computing

On-demand reassignment of cloud resources
 Transfer/share workloads across clouds



Communication facilities were the worst affected



①基地局設備 (宮城県 松島野蒜設置)



②伝送設備 (岩手県 野田村設置)



③基地局設備 (宮城県 石巻緑町設置)



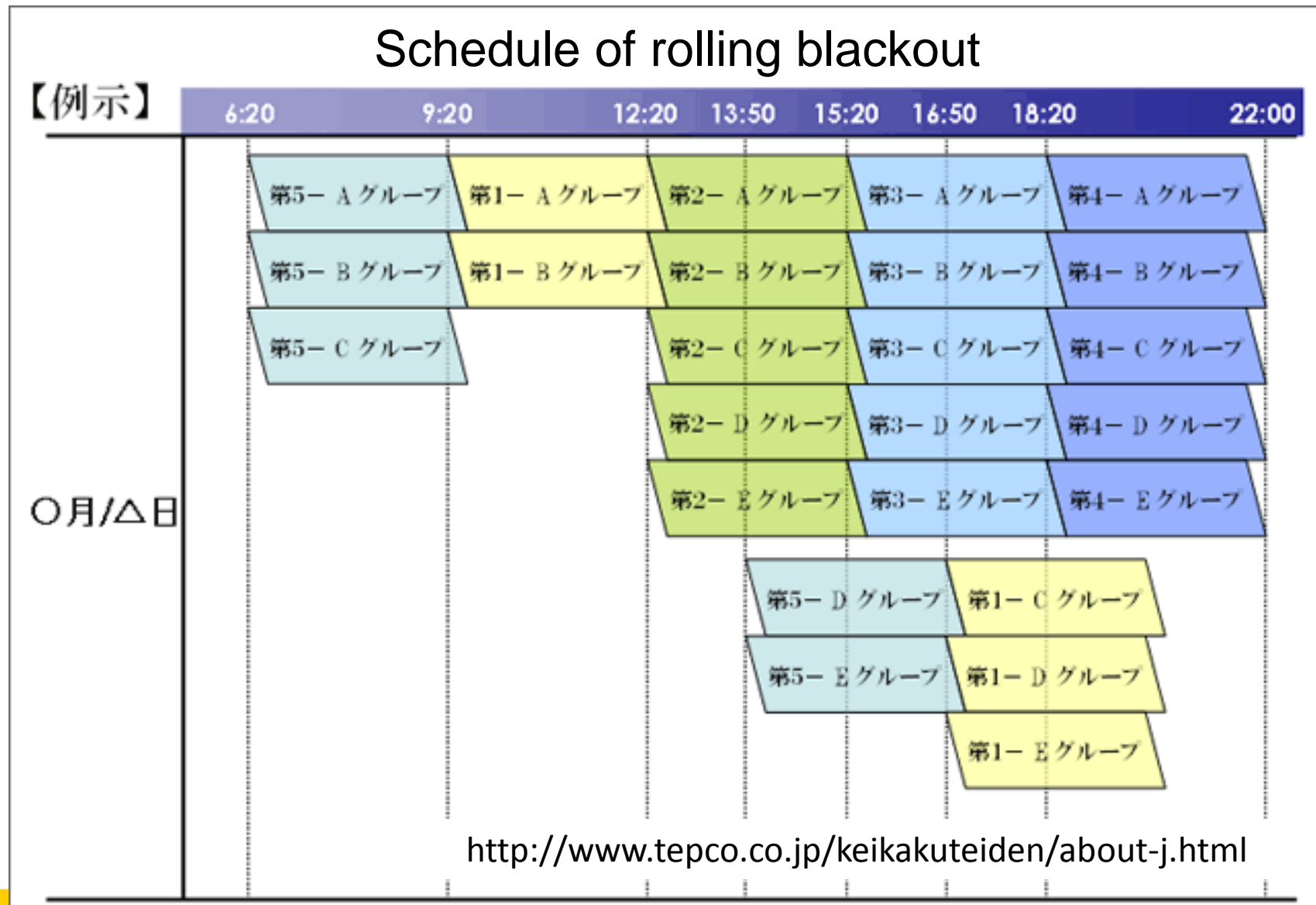
④ドコモショップ (宮城県 石巻東店)

Communication facilities were the worst affected

- Transmission lines: 90 routes were cut off
- 18 buildings were fully destroyed, and 23 buildings were flooded
- 65000 telephone poles were destroyed by the flood

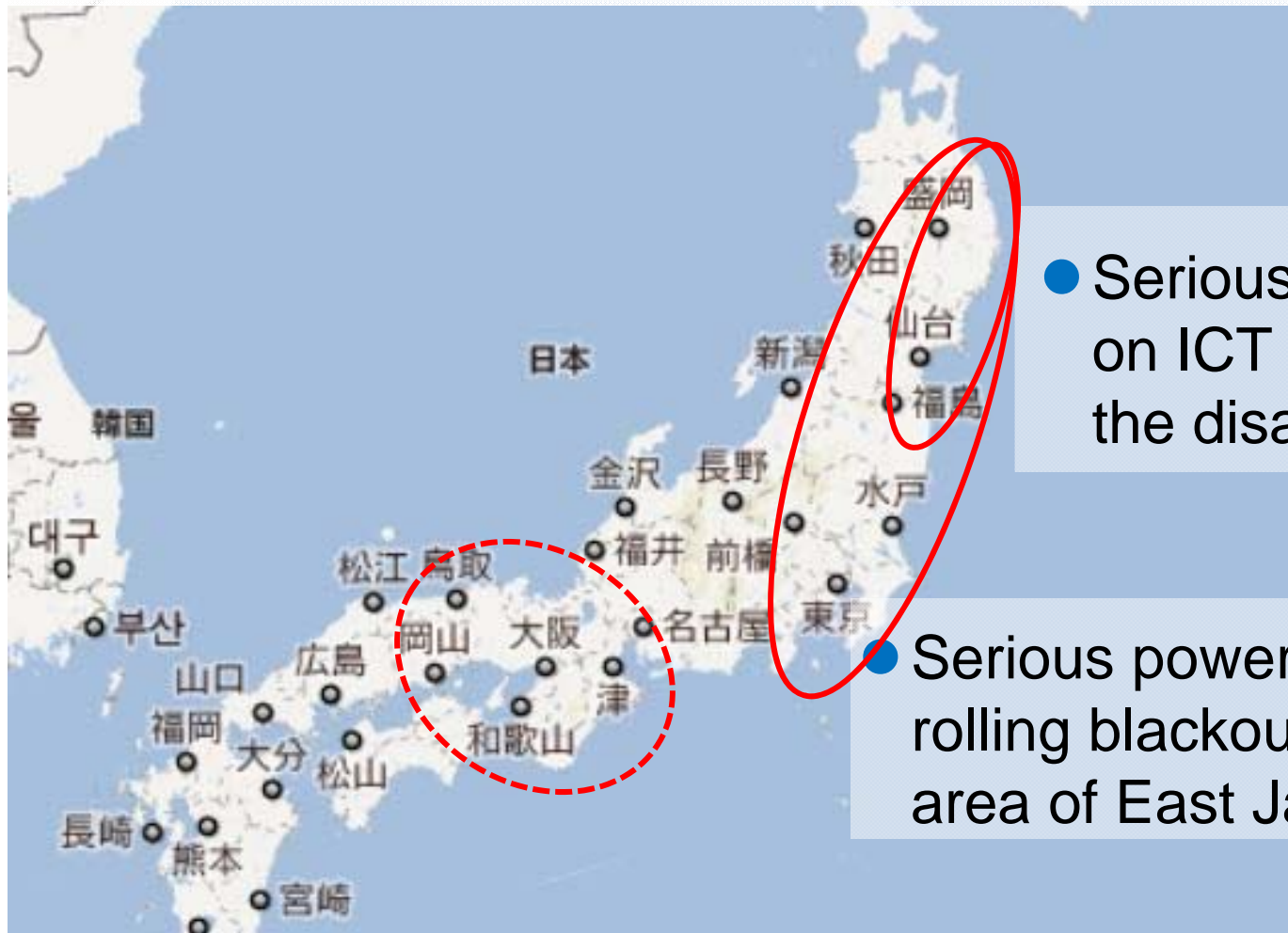


Rolling Blackout



Lessons learned : The East Japan Earthquake

Flexibly reassigning resources among cloud providers and network providers on a global scale

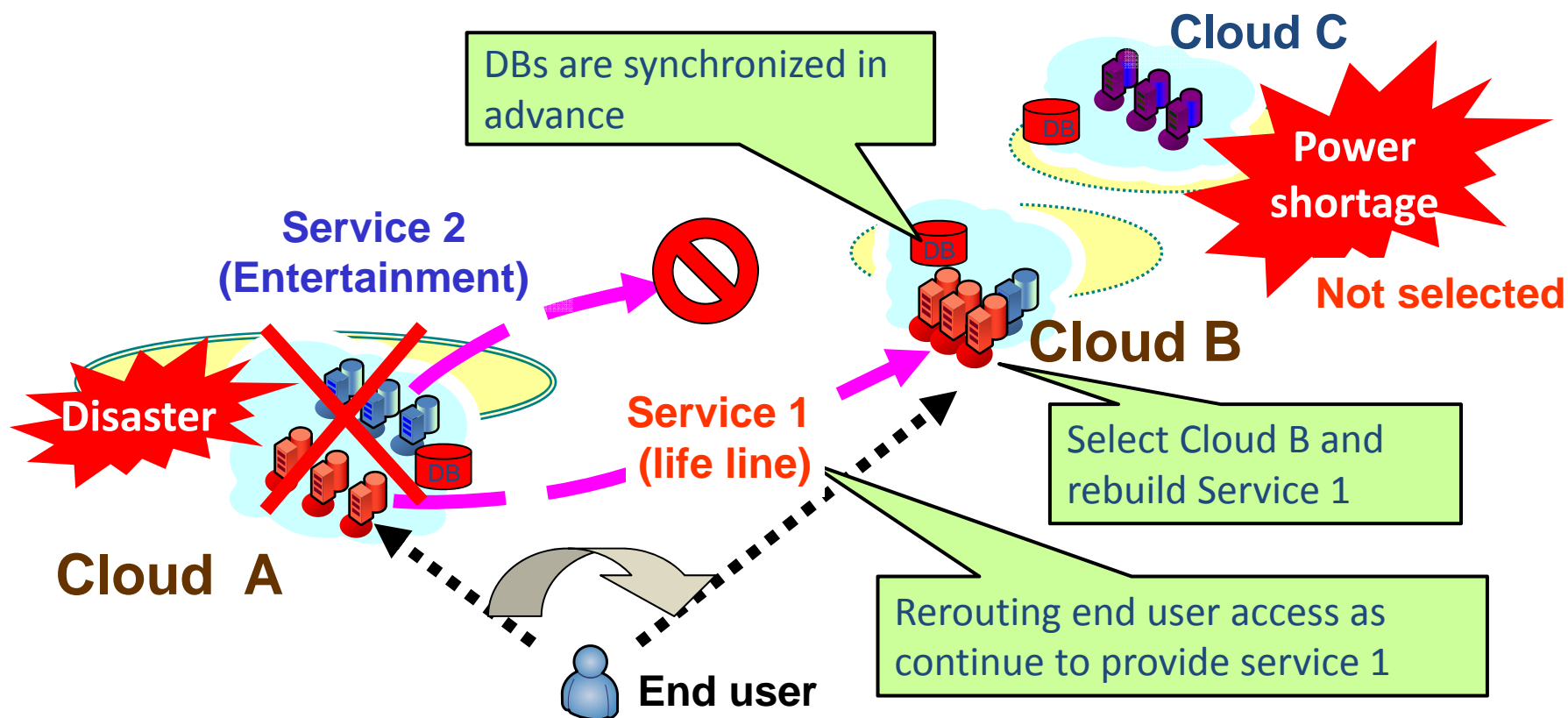


● Serious damage on ICT facilities in the disaster area

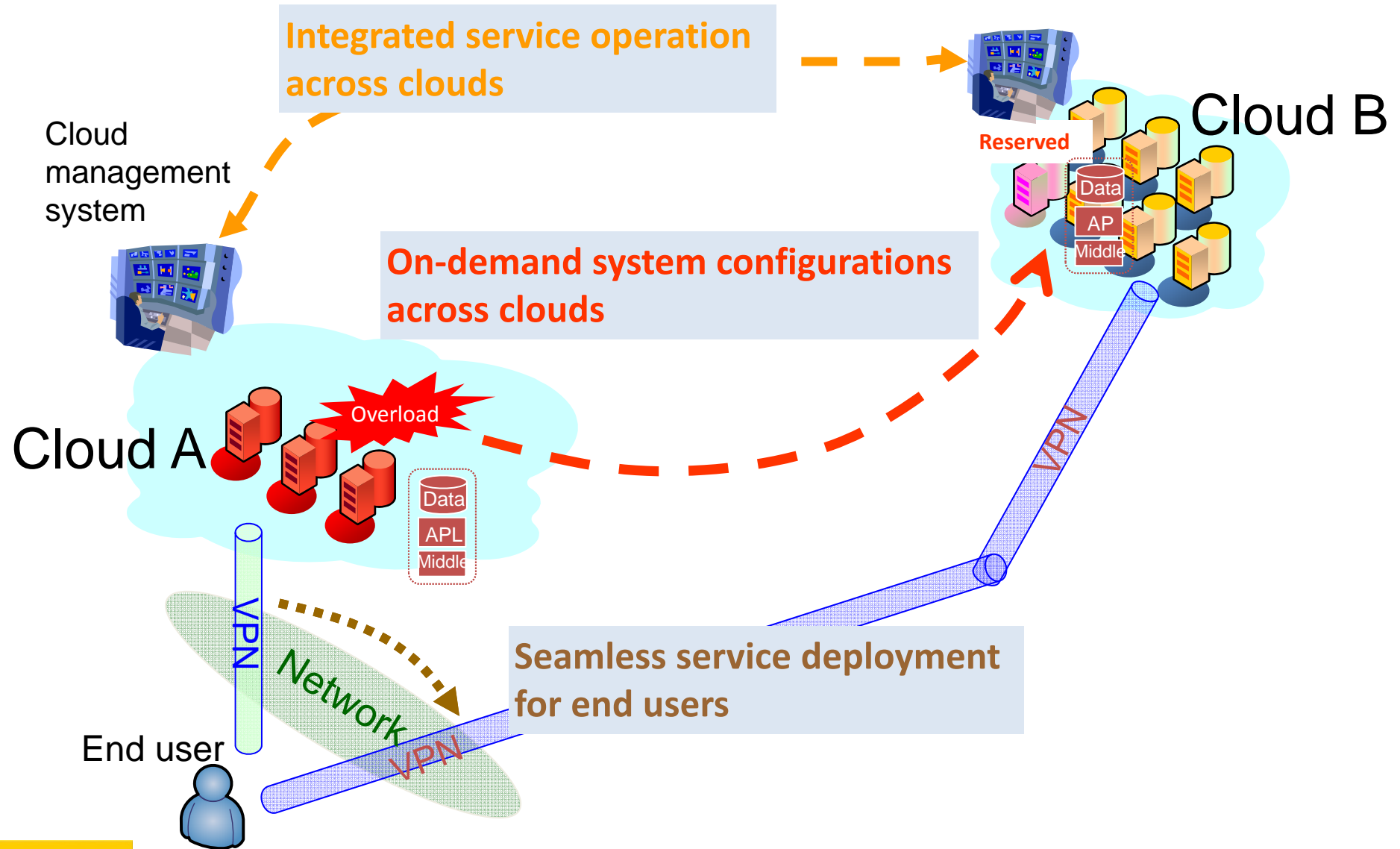
● Serious power shortage / rolling blackout in wide area of East Japan

Use case: Disaster recovery

Finding and selecting available cloud resources among clouds in other areas, then *dynamically* rebuilding cloud services in the event of a disaster or a large-scale failure



Requirements for inter-cloud computing



[On demand system configuration across clouds]

- Search for available resources across clouds
- Rebuild cloud services in heterogeneous environment (different machine specs, different OS and different hypervisor)
- Reconfigure networks (network within datacenter and network between datacenters) dynamically

[Integrated service operation across clouds]

- SLA and policy negotiations among clouds
- Centralized monitoring and auditing of services across clouds

[Seamless service deployment for end users]

- Automatic rerouting / distributing user access
- Mutually exchanging information for tenant / end-user authentication across clouds

Global Inter-Cloud Technology Forum **GICTF**

- Promote international standardization of “inter-cloud” interface through industry-academia-government collaboration **and cooperation with standards bodies**



GICTF Main activities

- Identify technical needs for secure “inter-cloud technology”
- The first white paper “*Use case and functional requirements for Inter-Cloud Computing*” Aug 2010
- **Draft interfaces for Inter-Cloud computing (2011 4Q)**
- **Requirements for network virtualization in Inter-Cloud computing(2011 4Q)**
- Raise awareness of users both in industry, government and communities

GICTF Membership

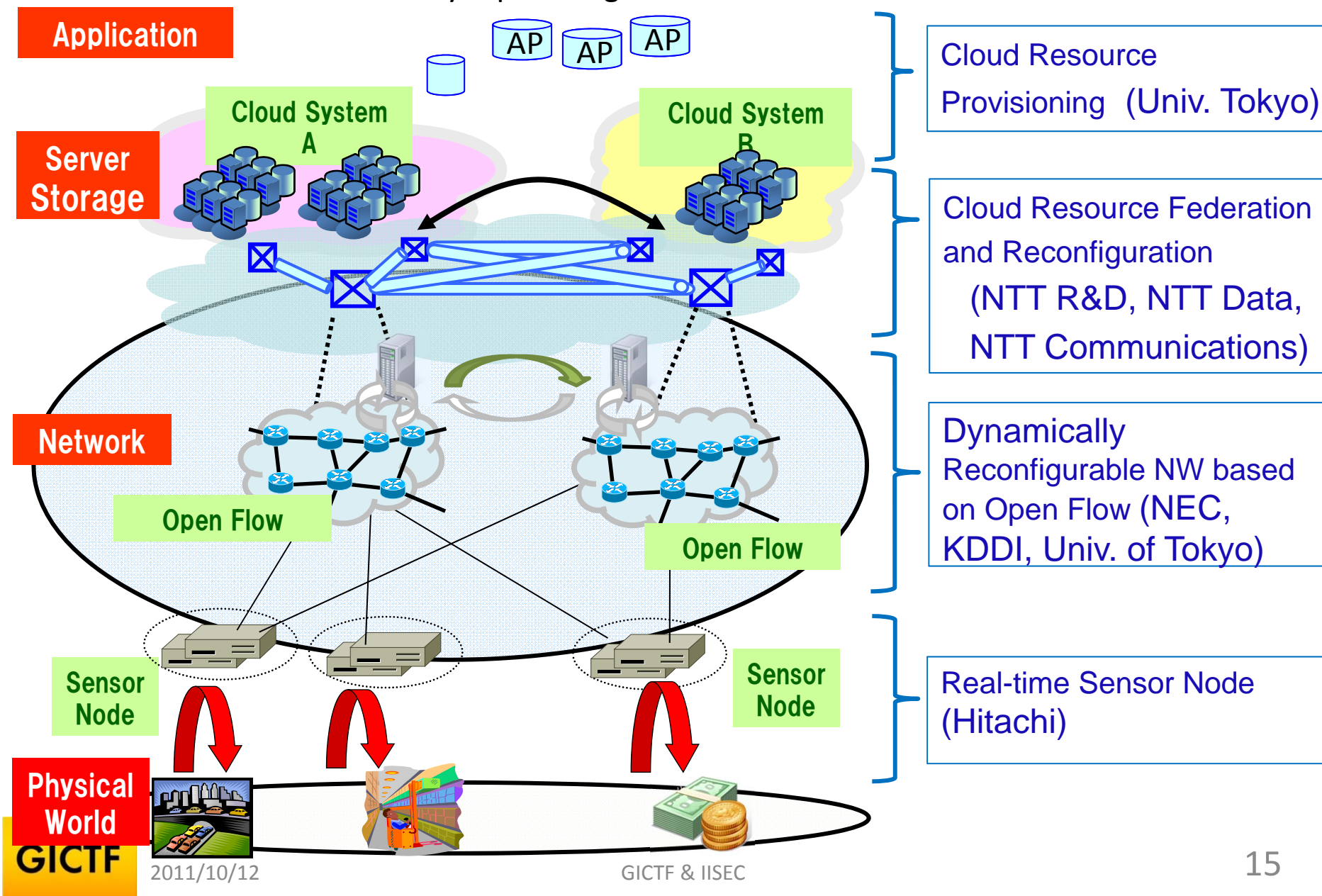
(as of September 2011)

- **78** enterprises: NTT, KDDI, NEC, Hitachi, Fujitsu, Toshiba Solution, Microsoft, IBM, Oracle, Cisco, BIGLOBE, IJ and others
- Independent administrative institution, National laboratory
- University professors, etc.
- Ministry of Internal Affairs and Communications of Japan (Observer)
- Ministry of Economy, Trade and Industry (Observer)

Highly Reliable Inter-Cloud Systems R&D project

funded by Japanese government

<2009 - 2011: total 20M\$>



DISCUSSION TOWARDS GLOBAL
COLLABORATION IS VERY IMPORTANT!