Building Cyber-Physical Sensing Infrastructure based on Service-Controlled Networking

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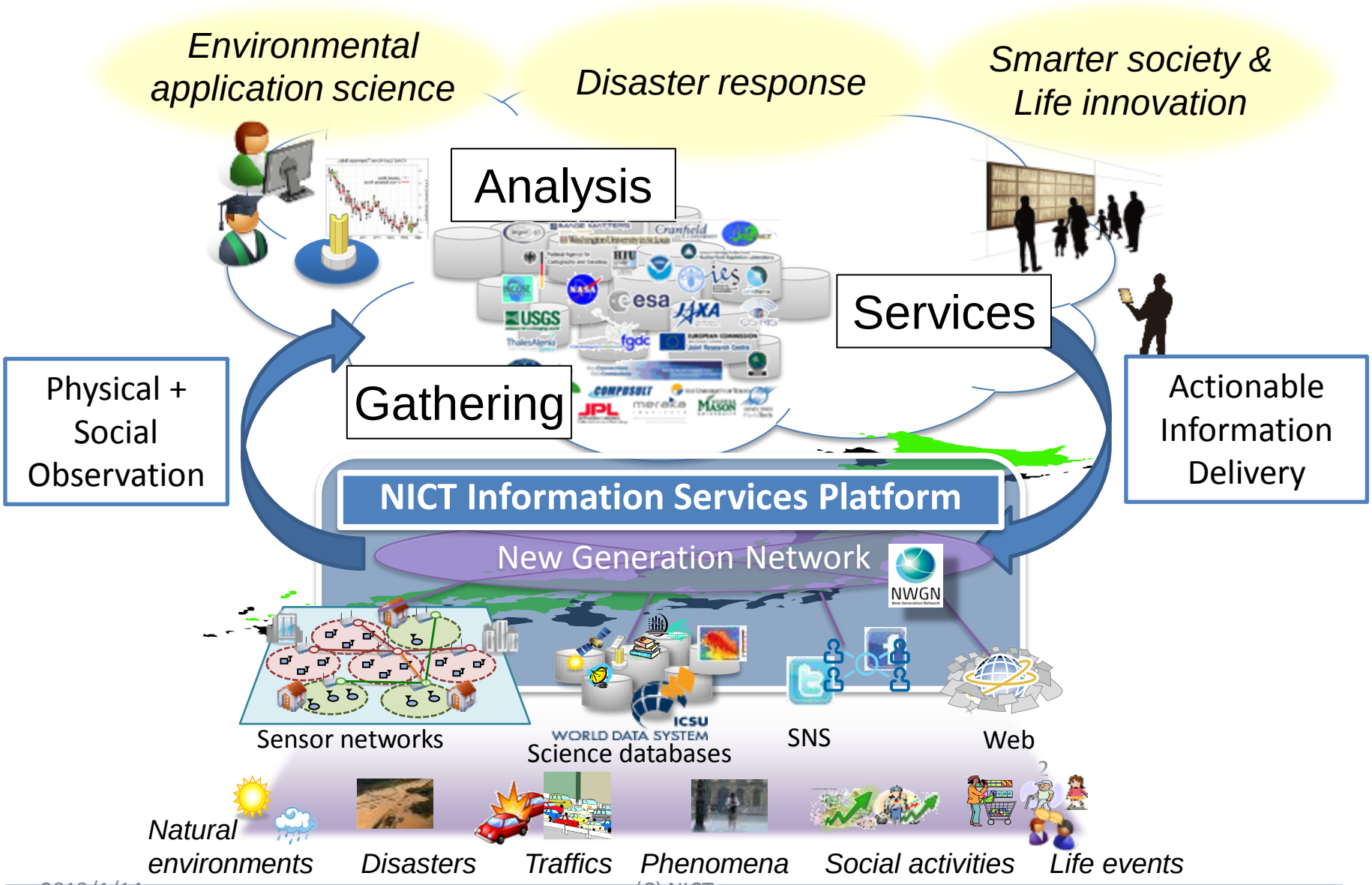
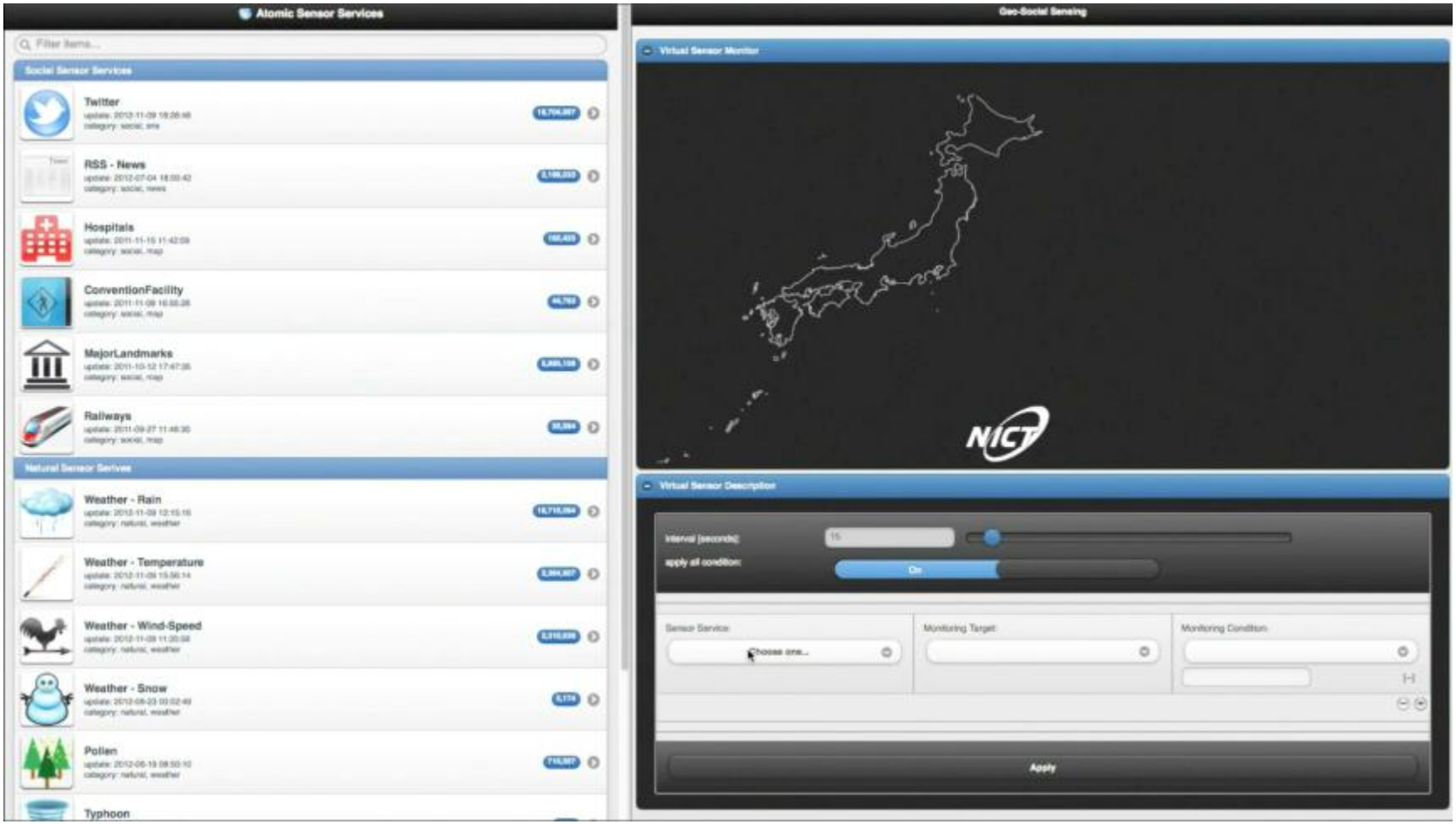
ICT Platform Knowledge Launguage Grid

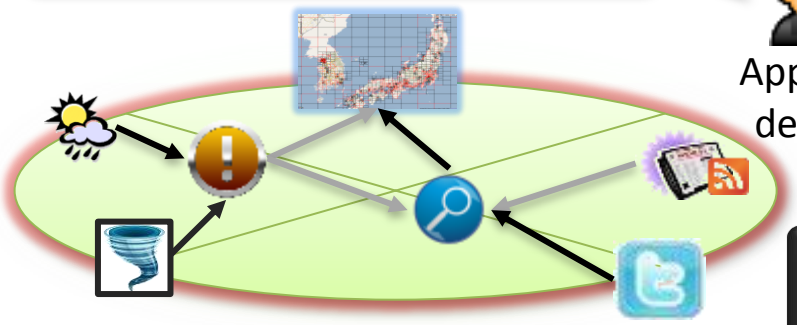


SCN Demo video: Geo-Social Sensing(GSS) App



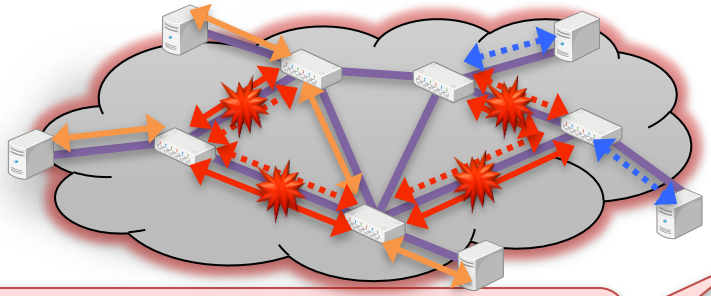
GSS App Issues

Agile development of sensor apps regardless of network capability



Application developer

Increasing gap seriously damages sustainability



Unexpected changes of networks

- Suffer from unforeseen traffics
- Hard to follow ad-hoc changes of sensor app's requirements

Network administrator

Our solution

- On-demand configuration of networks in response to dynamic collaborations of sensing information services

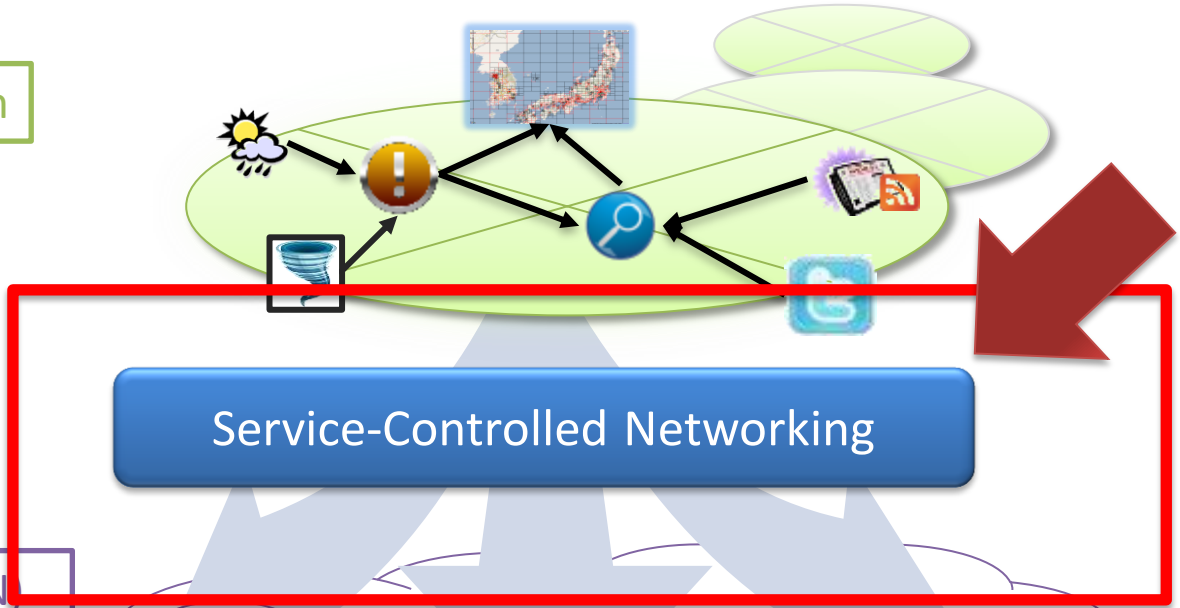
CPSenS service collaboration

- Service discovery
- Message exchange
- Status monitoring

Middleware

Programmable network (SDN)

- Node search
- Path configuration
- QoS overlay

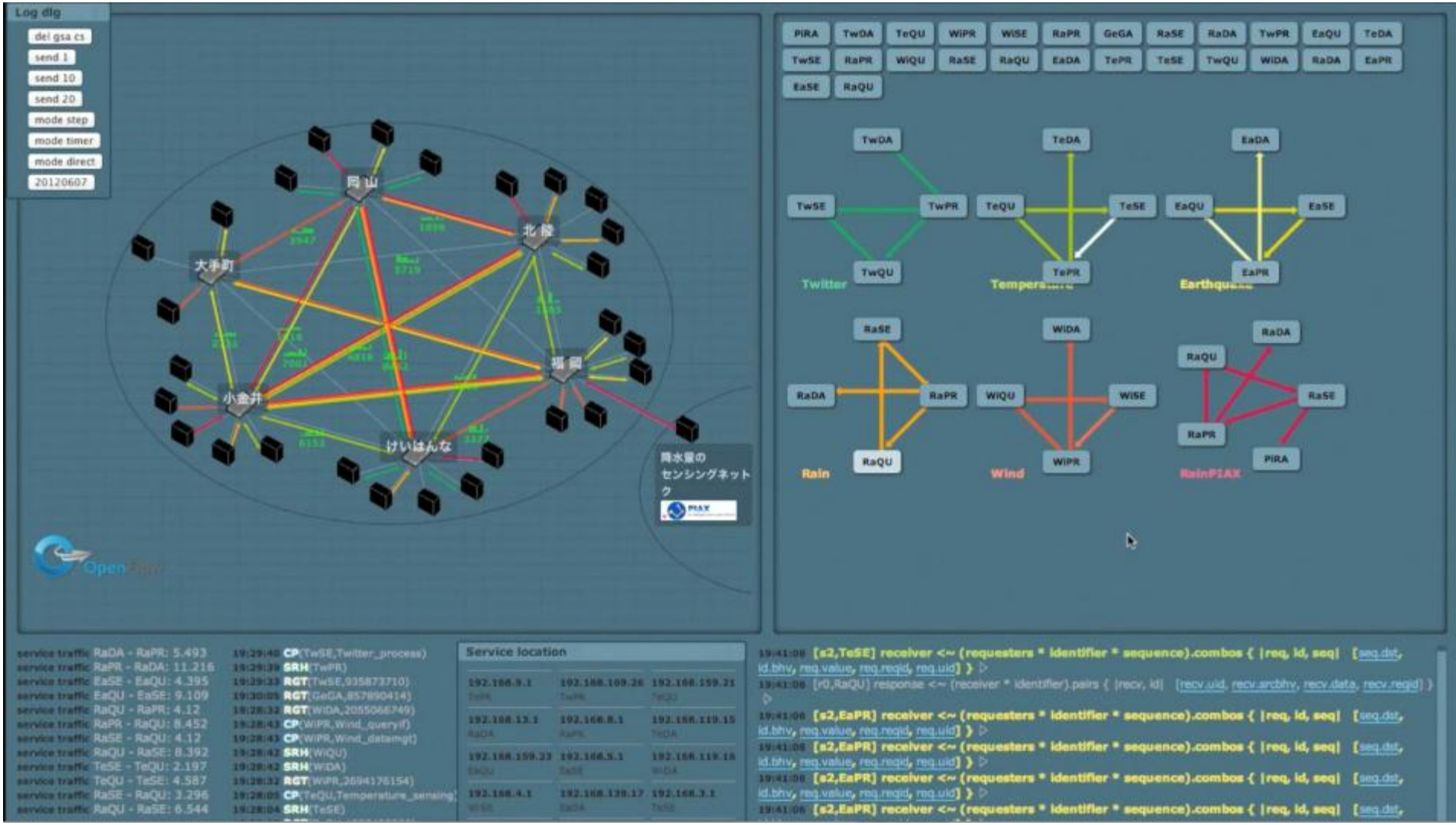


Tentative connections between service nodes

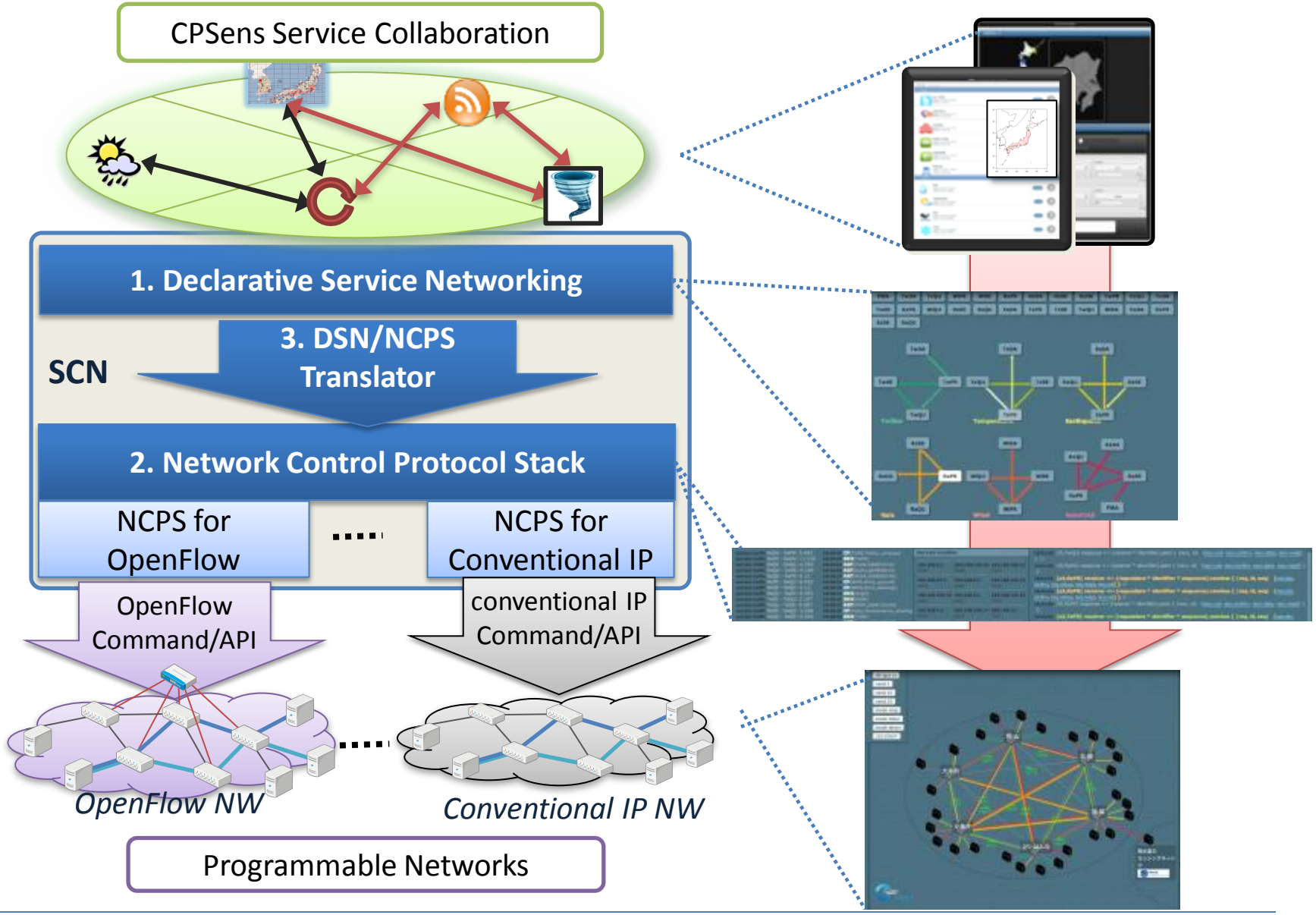
Flow configuration for data-intensive communication

Overlays for individual application QoS

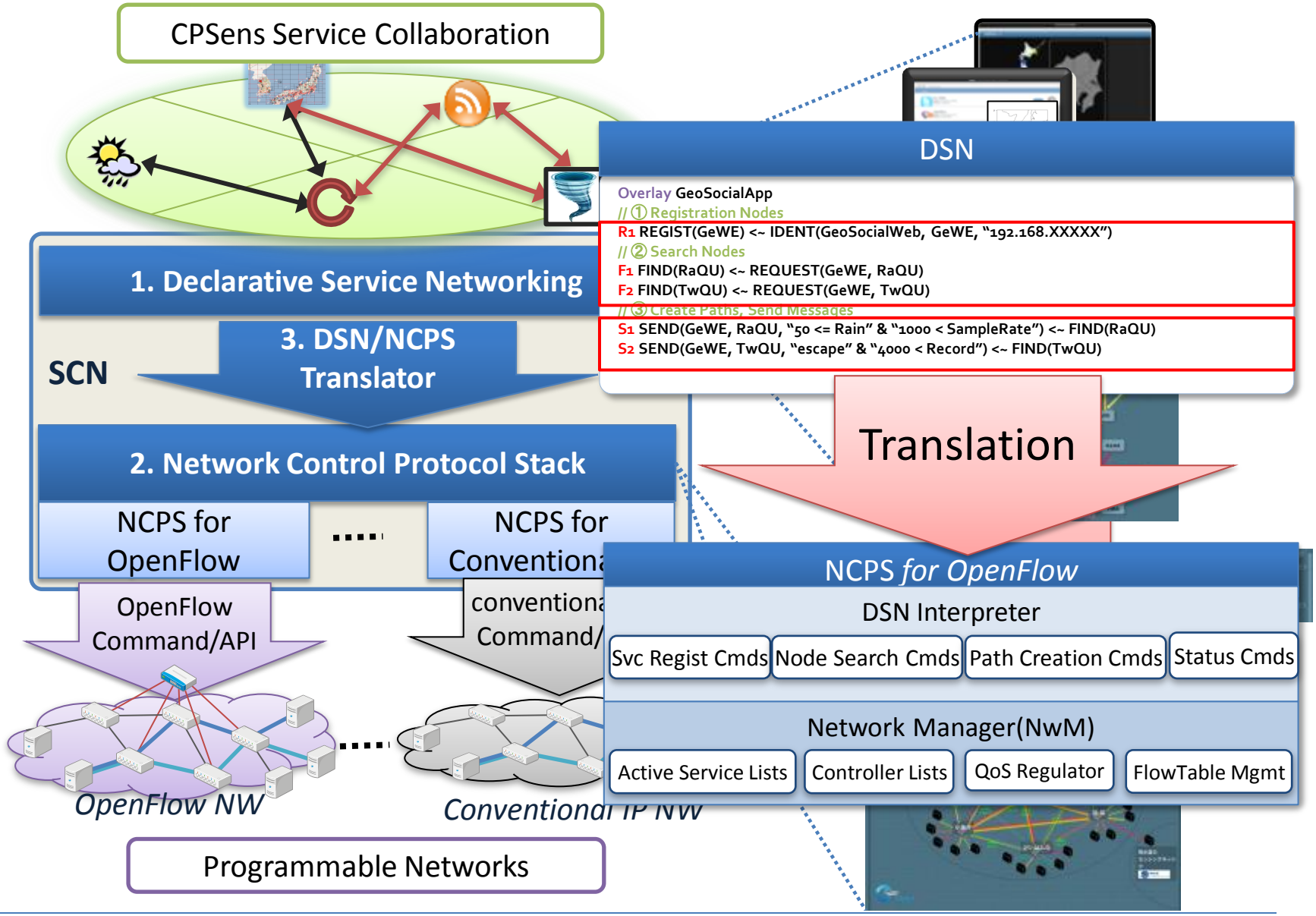
SCN Demo video: Reconfiguration of Network



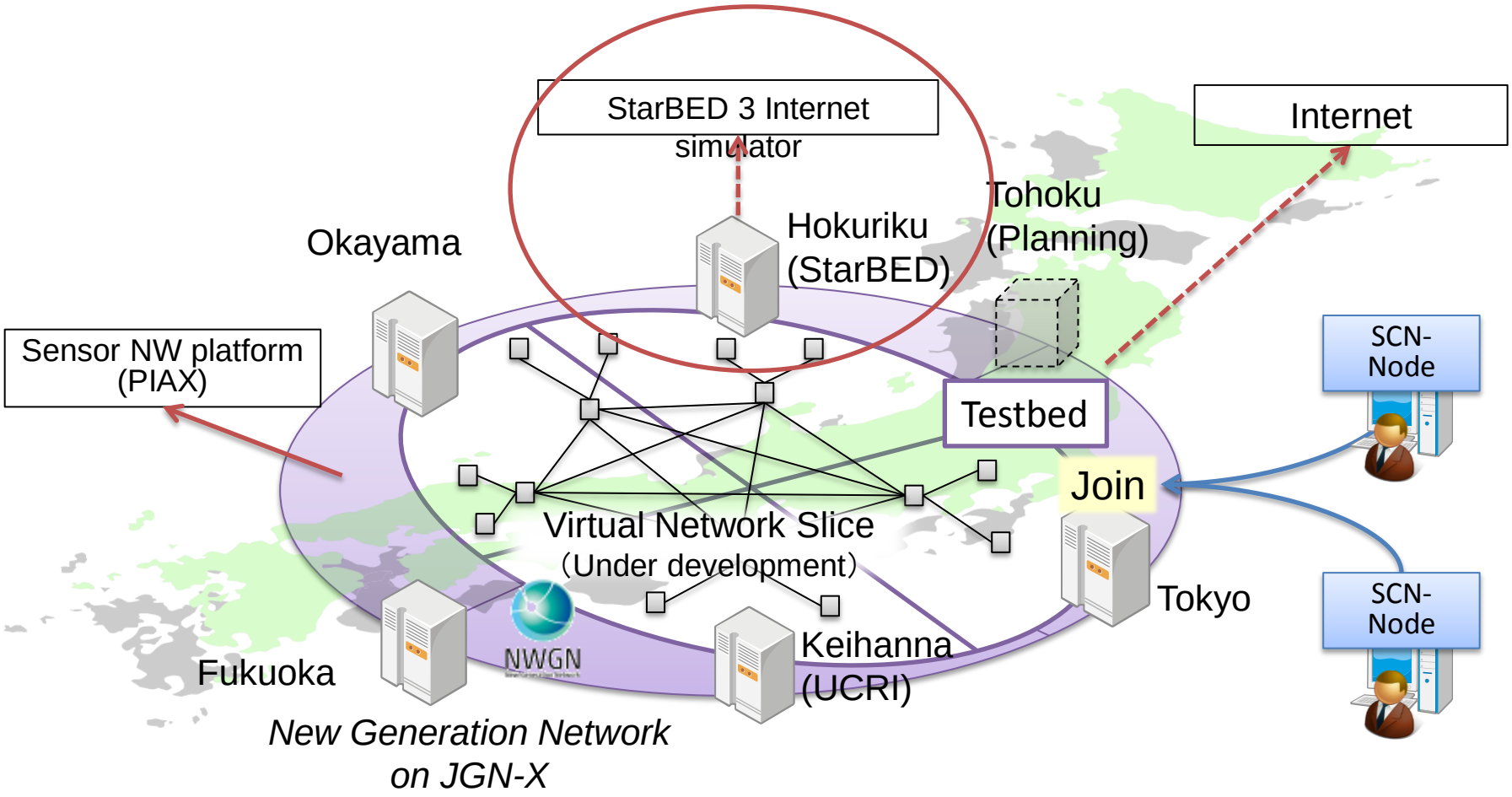
SCN Architecture



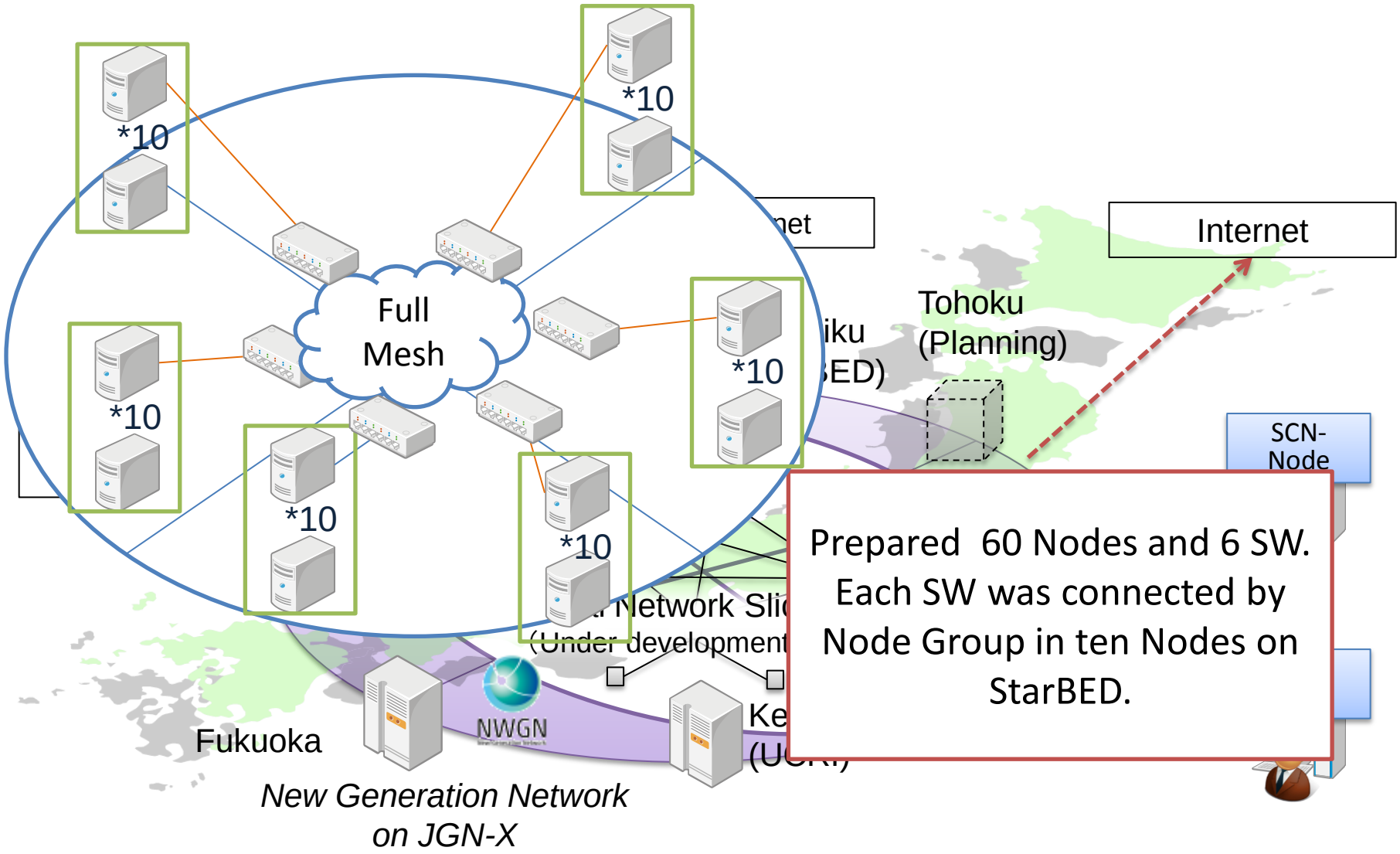
SCN Architecture



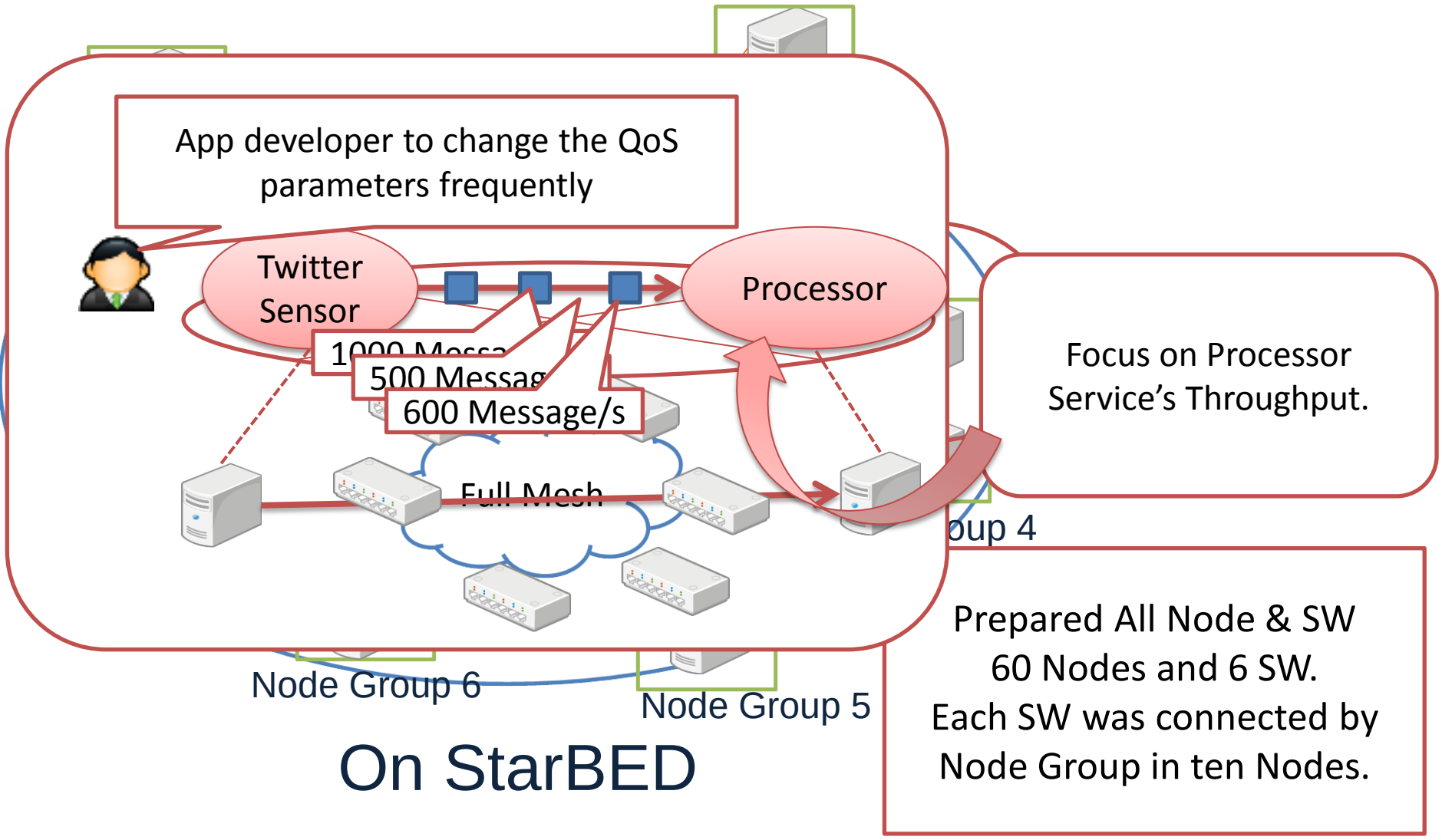
Knowledge-Language Grid Testbed



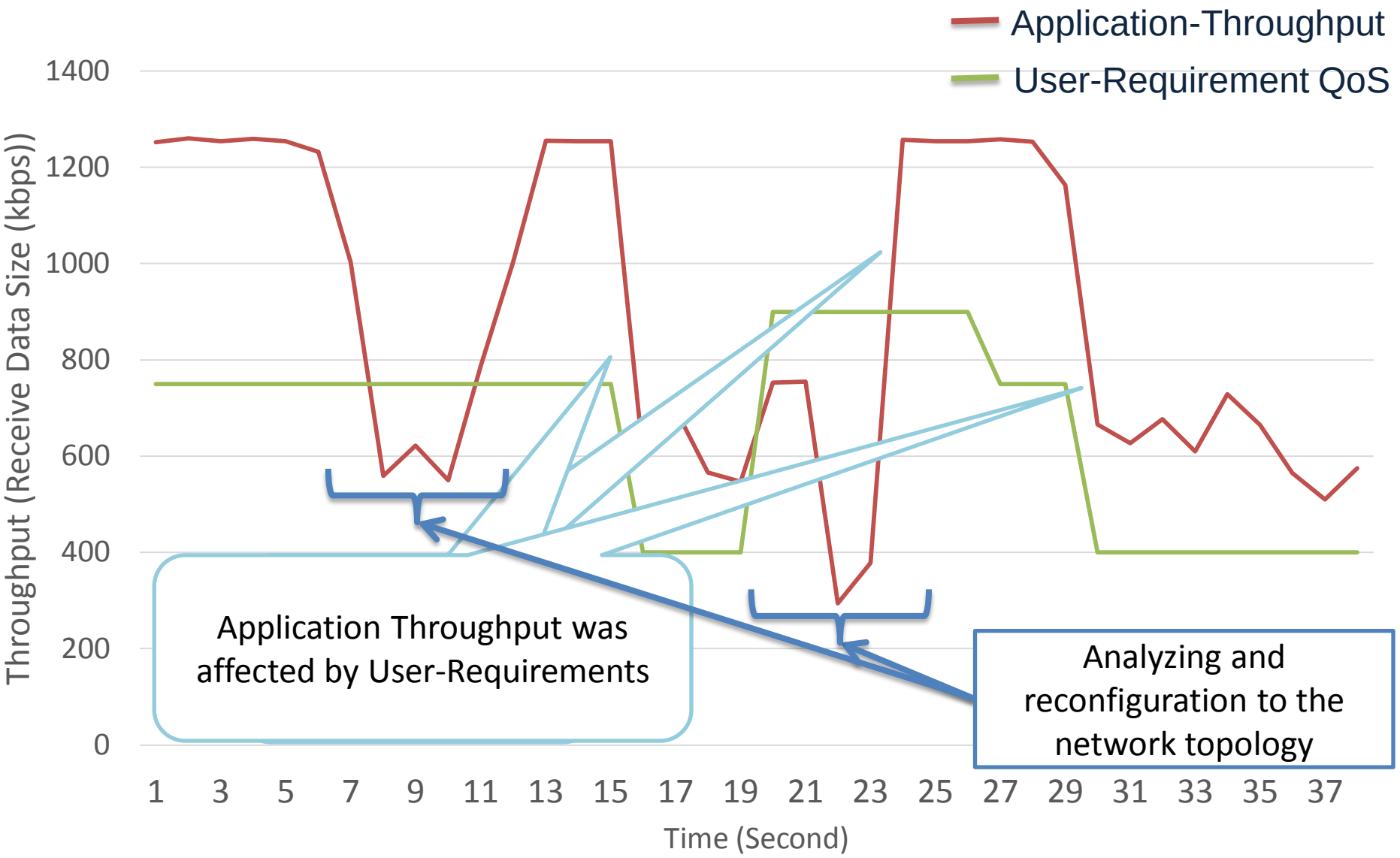
Knowledge-Language Grid Testbed



Experiment Environment

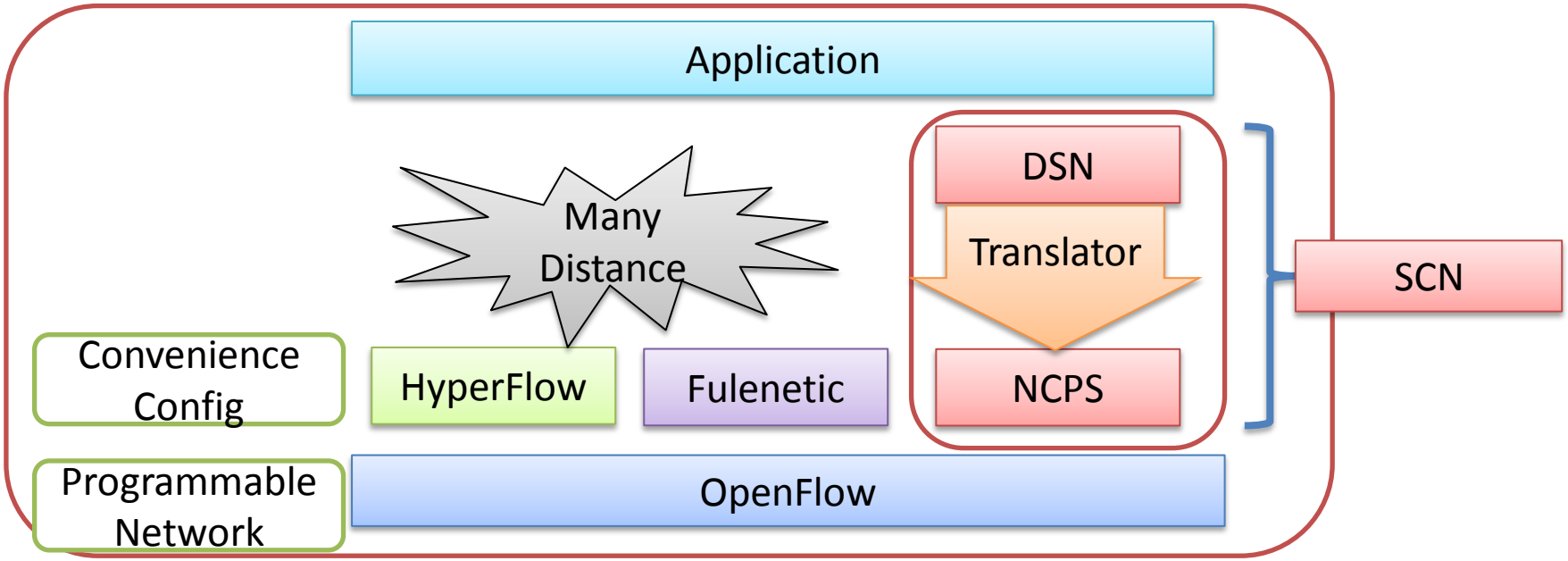


Performance Consideration



Conventional Studies

- High-level Language of OpenFlow.
  - HyperFlow@University of Tronto
  - Frenetic@Princeton University



Conclusion & Future Work

- Defined the description method of the application demand. = DSN
- Building the organization reconstruct of the networks of the application demand. = NCPS
- Building the function to convert the networks QoS from the application demand. = Translator

- Future Work
  - Expanding SCN to Multi-Domain Networks.
  - Expanding DSN to have detailed descriptions.
  - Building to the arbitration function for multi-user requirement

- Thank you for your attentions.