

Use Cases of Cyber-Physical Data Cloud Computing

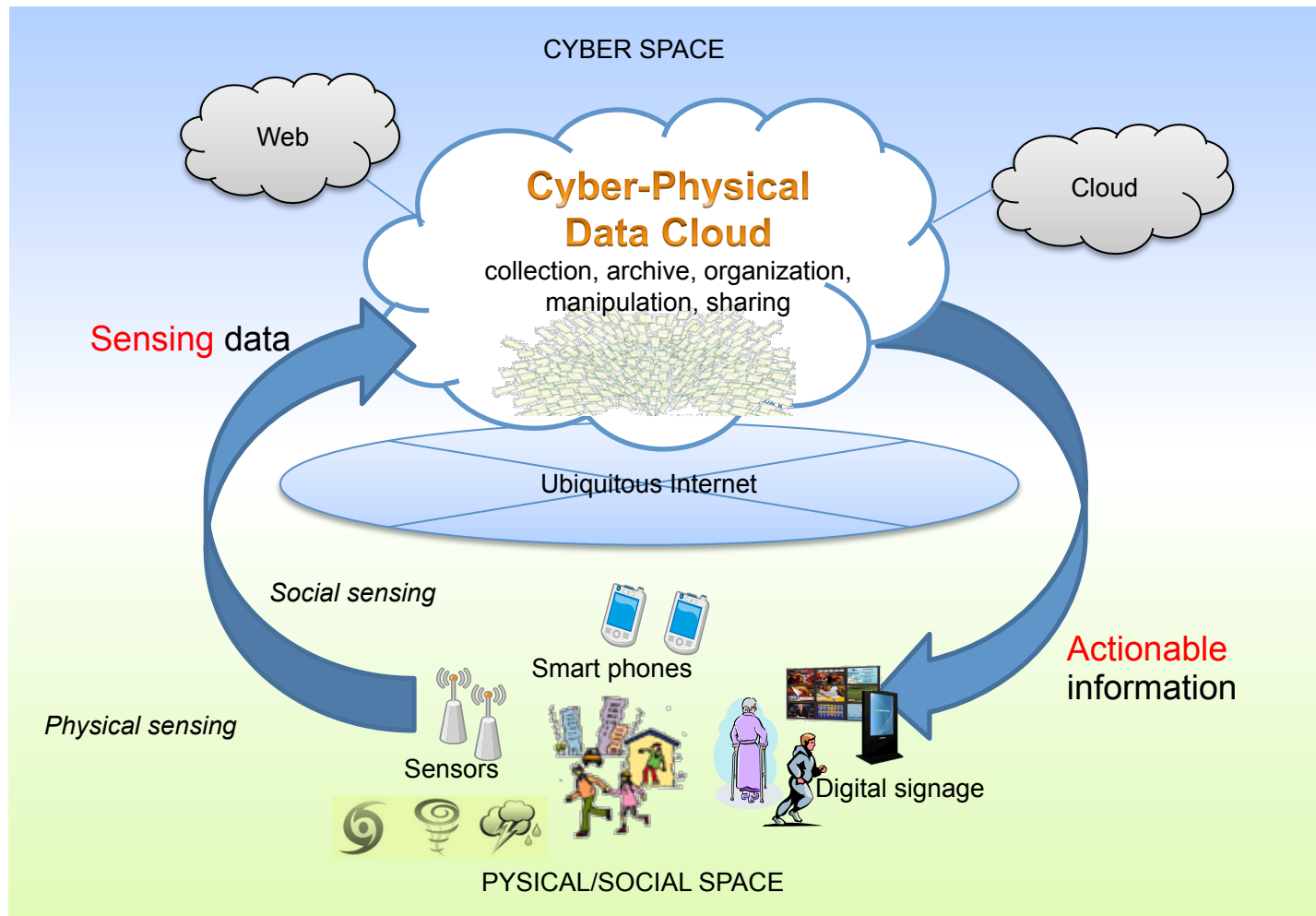
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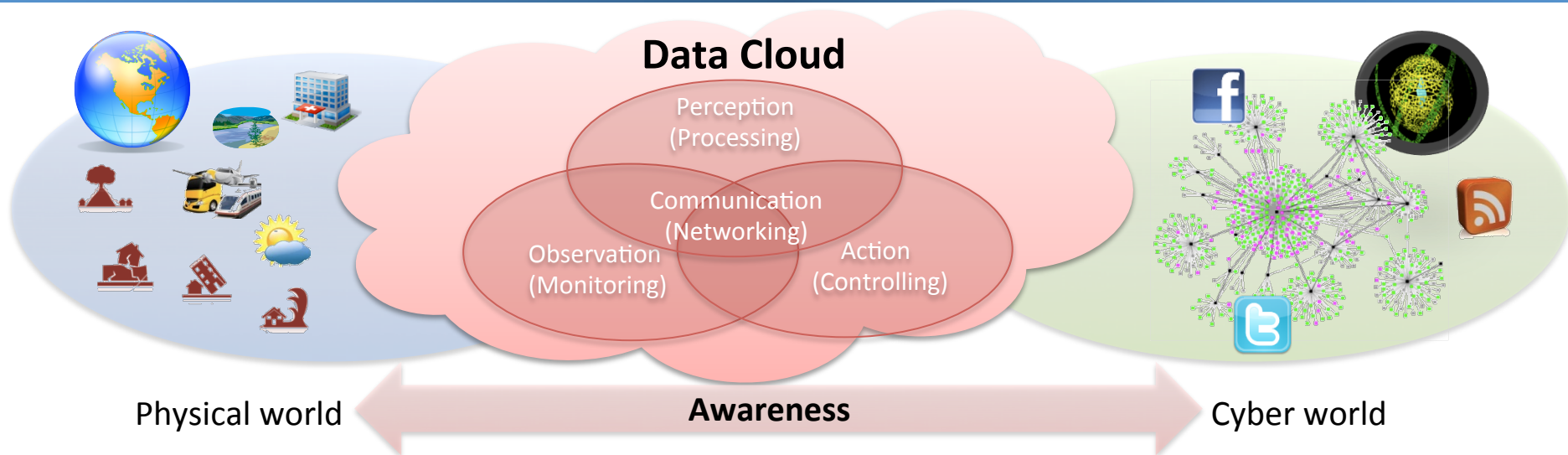
Information Services Platform Laboratory
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Cyber-Physical Data Cloud Computing



Goals

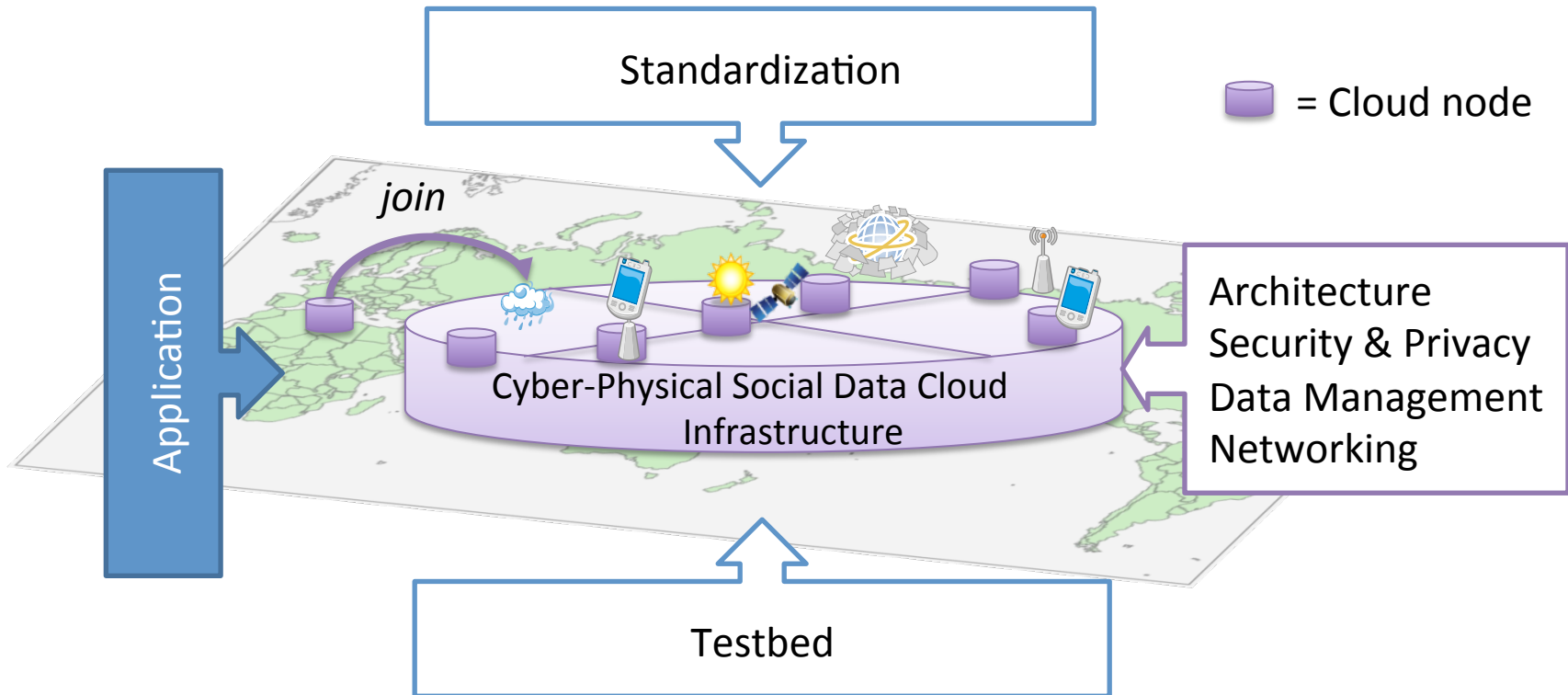


- **Real-world Awareness Computing**

- Intelligent cloud computing to autonomously support useful (data/information/knowledge) services by being aware of relationships between elements(objects, events, situations) in the real world
- (Near) real-time interacting with the physical world
 - Observation: to monitor processes in physical world
 - Perception: to analysis information/situation
 - Communication: to share information/situation
 - Action: to control physical elements directly or indirectly

Cyber-Physical Social Data Cloud Infrastructure

- NIST & NICT Collaboration Project
R&D of a cloud platform specialized for collecting, archiving, organizing, manipulating, and sharing very large (big) cyber-physical social data

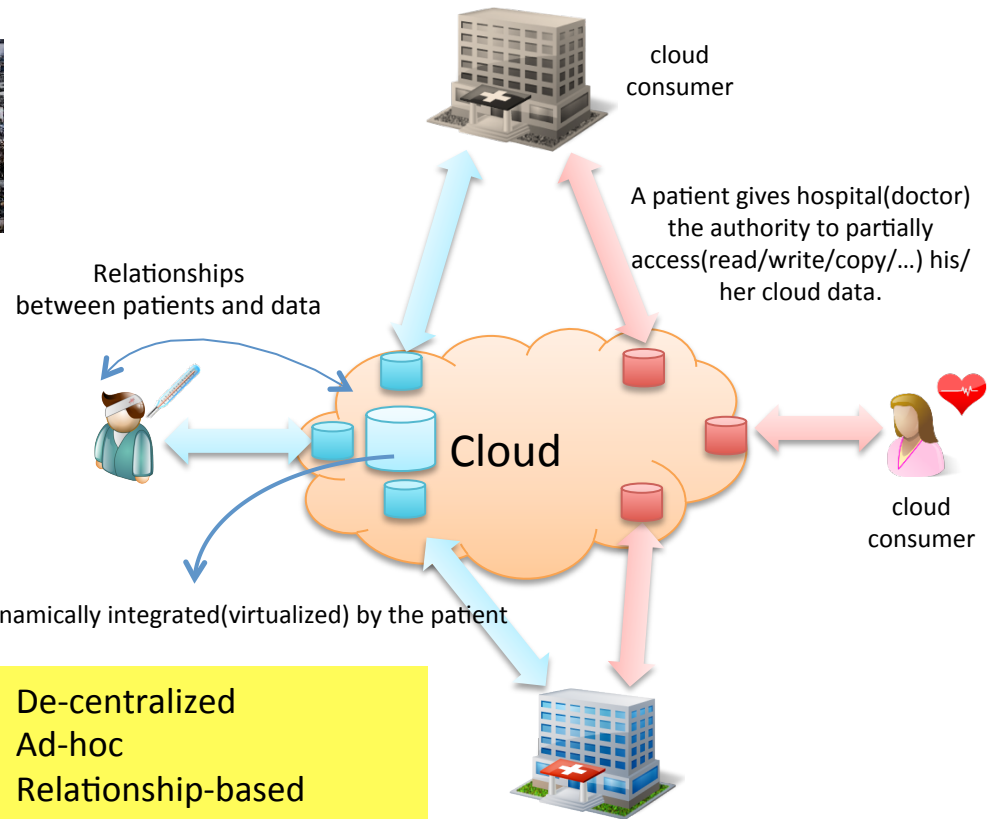


Cyber-Physical Data Cloud Applications

- Topics
 - Smarter Healthcare
 - Smarter Disaster Information
 - Smart City
 - Social Life Networks
- **Passim Situation-aware Applications**
 - **De-centralized**
 - **Ad-hoc**
 - **Relationship-based**
 - **Level of measurement**
 - **Autonomous**

Use Cases (1)

- Healthcare data publishing & sharing

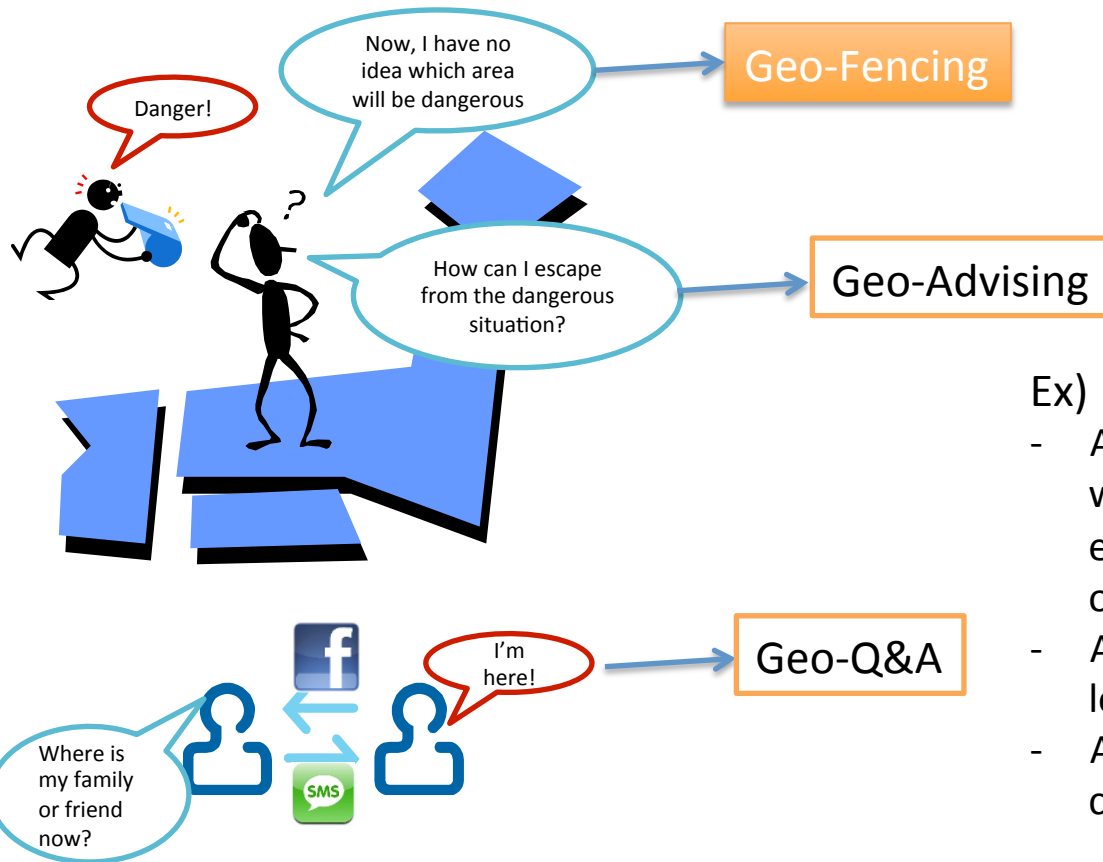


- <Problems>
- 1) Reserved sharing
 - 2) Global schema
 - 3) Static systems
 - 4) Private-Public data control

- De-centralized
Ad-hoc
Relationship-based
Level of measurement
Autonomous

Use Cases (2)

- Awarable Location-based Service



<Problems>

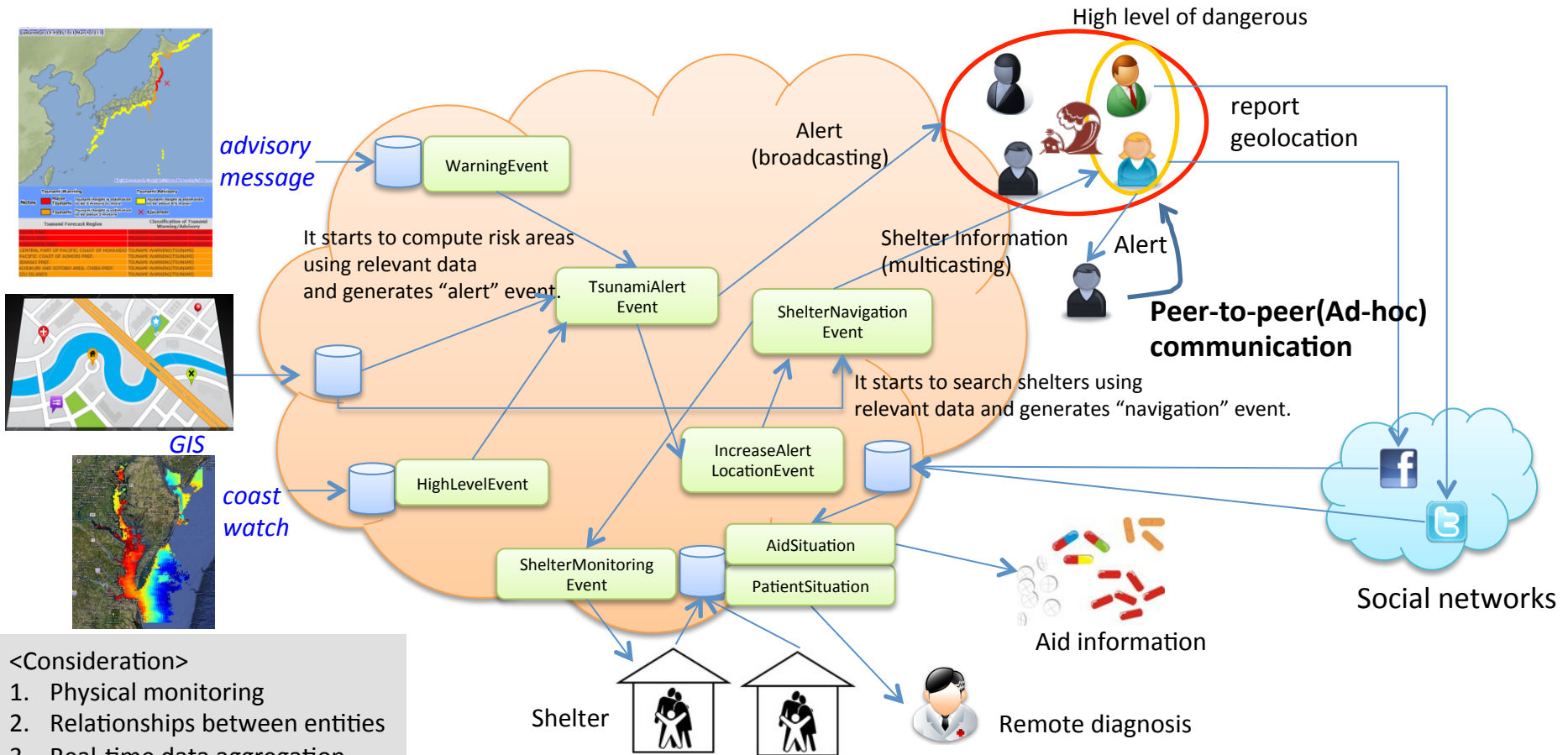
- 1) Monitoring users' location
- 2) Request/Response activity
- 3) New data(service) adaptation
- 4) Manually publish/share data
- 5) Private-Public data control

Ex)

- Automatically "check-in" subscribers when they enter a (disaster approaching/event/favorite) place. No action outside of the place.
- Automatically and partially "share" my location
- Autonomous service discovery and composition depending on the situations

Use Cases (2)

- Globally monitoring and locally fencing (safe and rapid evacuation)



- <Consideration>
1. Physical monitoring
 2. Relationships between entities
 3. Real-time data aggregation
 4. Situation analysis
 5. ...

*Japan experience: the shelter assessment system was up and running **two weeks** after the disaster.