D2-02 04

Application of the Disaster Recovery Support System for Disaster Recovery and Business Continuity

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Characteristics of Our Service Area

- Large numbers of remote islands and internal combustion power stations

- Many mountains and volcanoes

- Warm climate with frequent typhoons during the summer and fall

Service area
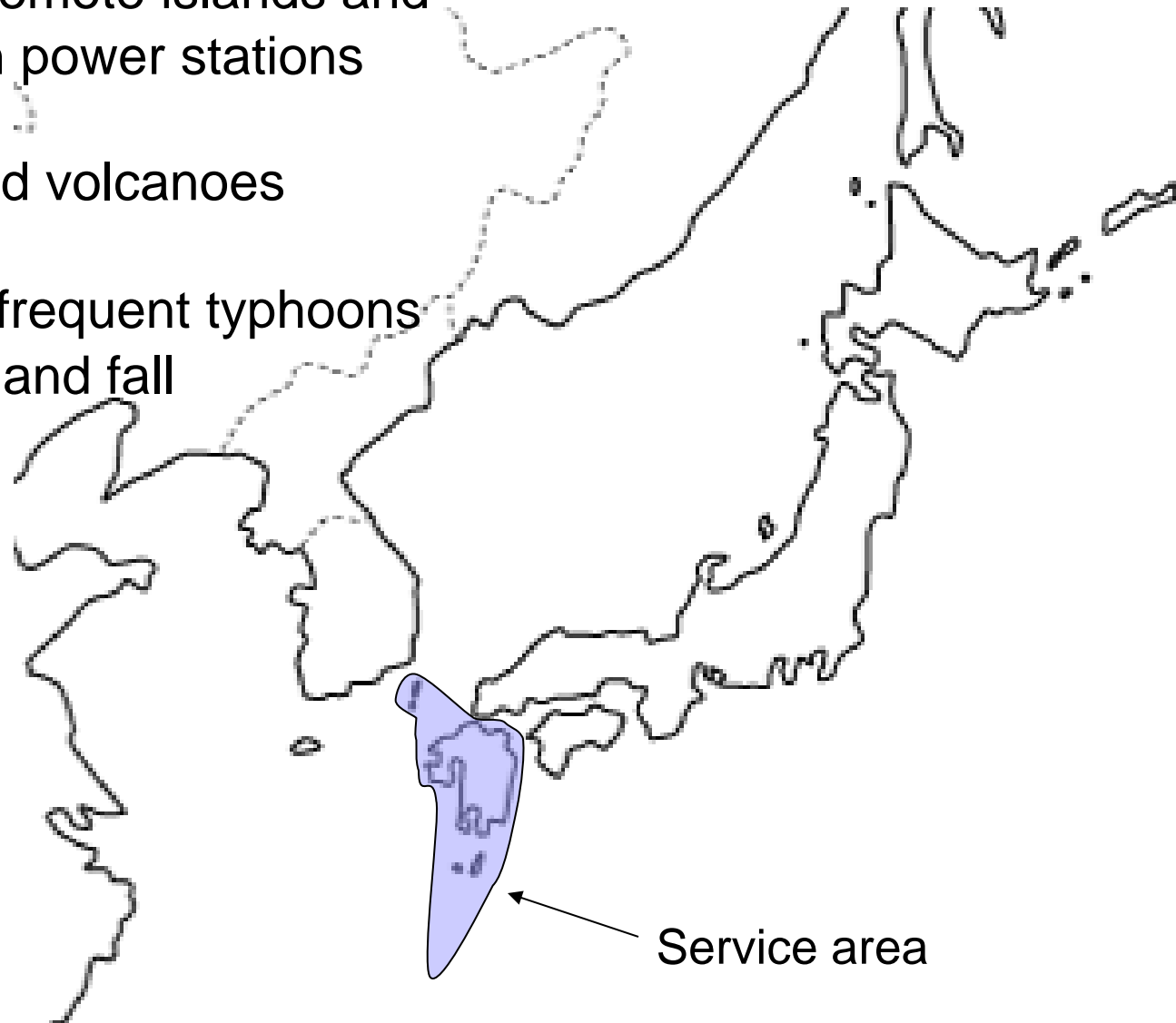
Issues pertaining to the Sharing of Power Station Information in the Event of Disasters

- In the event of an unprecedented large-scale disaster, vast amounts of information will be generated and this may result in erroneous information and delays in sharing of information.

- Centralized management of detailed and accurate disaster-related information and real-time sharing of such information will be required.

Occurrence of a large-scale disaster	⟹	Collection of vast amounts of information
Confusion resulting in delays in disaster recovery	⟸	Delayed information sharing and erroneous information

Centralized management of detailed and accurate disaster-related information and real-time sharing of such information

Application of Two New Systems designed for Disaster Recovery Support
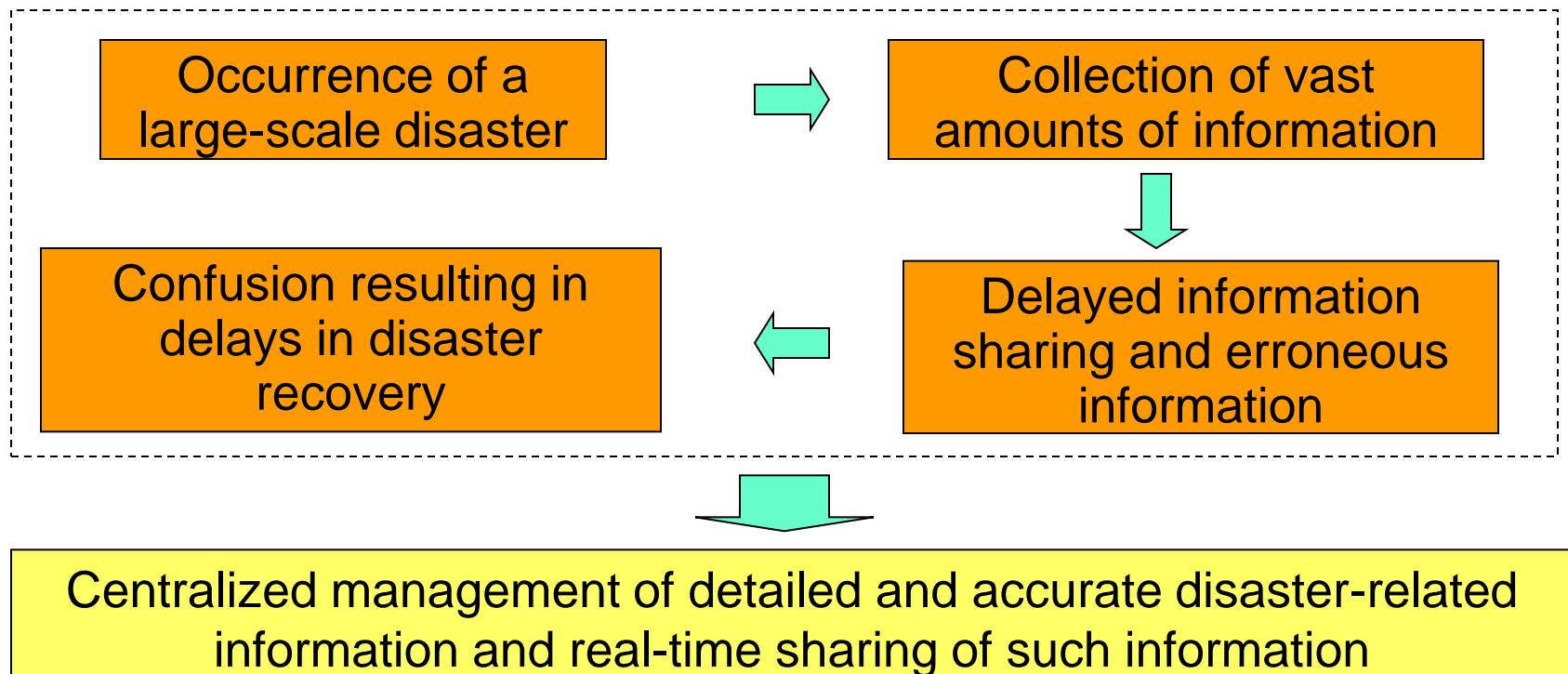
- The "Disaster Information Sharing System" and "Disaster Recovery Support System" were developed to centrally manage and share detailed and accurate disaster-related information in real time.

Systems designed to centrally manage and share detailed and accurate disaster-related information in real time
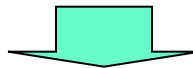
Disaster Information Sharing System

Disaster information
Damage statuses of power stations
Recovery information

Disaster Recovery Support System

Information on the transportation and delivery of materials and equipment required for disaster recovery

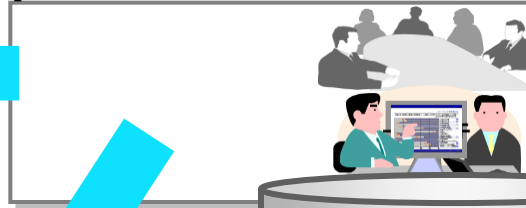# Disaster Information Sharing System

[Purpose of Development]
• To centrally manage information on details of disasters, the statuses of consequent damage to power stations and recovery planning.

• Further expediting of decision-making processes related to crucial matters such as high-level management decisions
• Prompt provision of information to customers and quick reporting to national and local governments and other entities outside the company
• Speedy disaster recovery

[National and Local Governments]

[Disaster Countermeasures Headquarters]

Accurate overall control based on precise information

Report

Quick and accurate reporting

Disaster Information Sharing System

Speedy disaster recovery

[Power Station]

Disaster

[Power Station]

Support

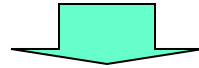Provision of Support according to instructions from the Head Office
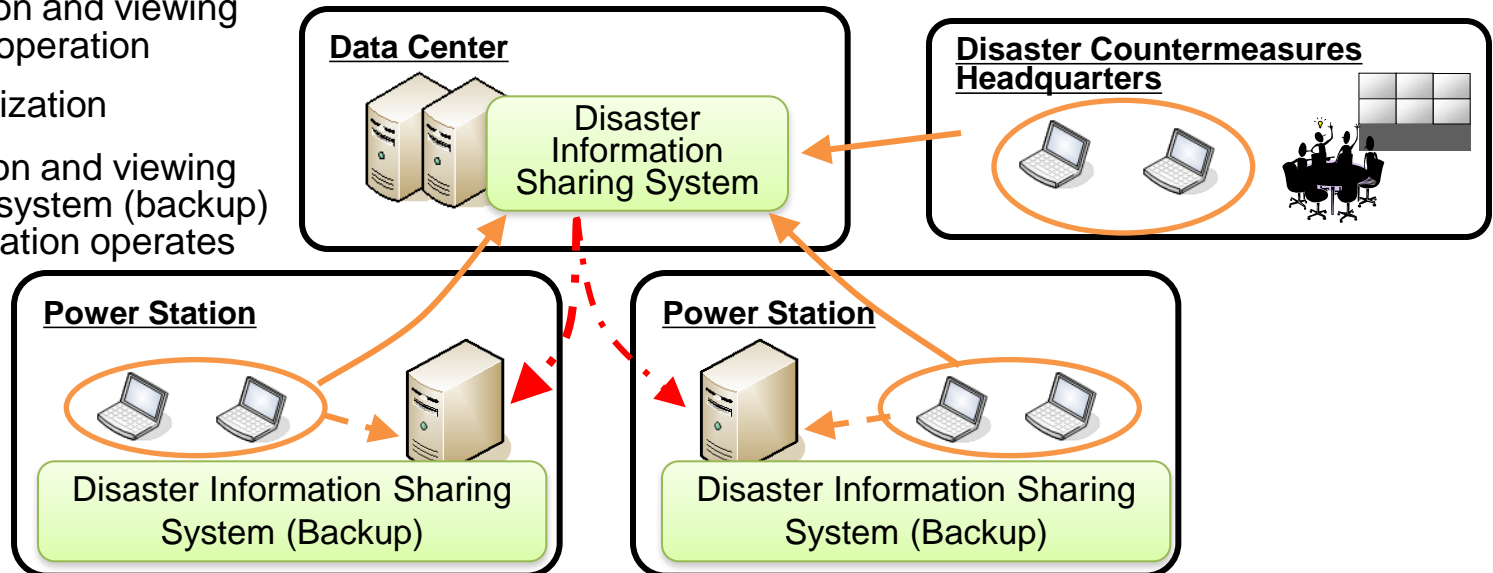
Disaster Information Sharing System

[System Configuration]

• Information processing equipment such as servers at the Data Center

• Data backup environment at power stations

• Synchronization with the Data Center whenever required to update data in the backup environment

Individual power stations can independently continue to use the system even if a failure occurs in main system of the Data Center or networks.

→ : Data registration and viewing during normal operation

▶ : Data synchronization

→ : Data registration and viewing when only the system (backup) at the power station operates

Data Center

Disaster Information Sharing System

Disaster Countermeasures Headquarters

Power Station

Disaster Information Sharing System (Backup)

Power Station

Disaster Information Sharing System (Backup)

Disaster Information Sharing System

[System Functions]

• Registering and viewing
  Disaster status /Details of the resulting operating statuses of power supply facilities /Disaster response systems for recovery /Damage information and recovery plans for power supply /Facilities and details of the status of response according to recovery plans.

• Managing the history of the statuses of response to customers as well as national and local governments.

• Linking data with the company-wide disaster information sharing system to enable the sharing of information throughout the entire company as well as with system users at power stations.
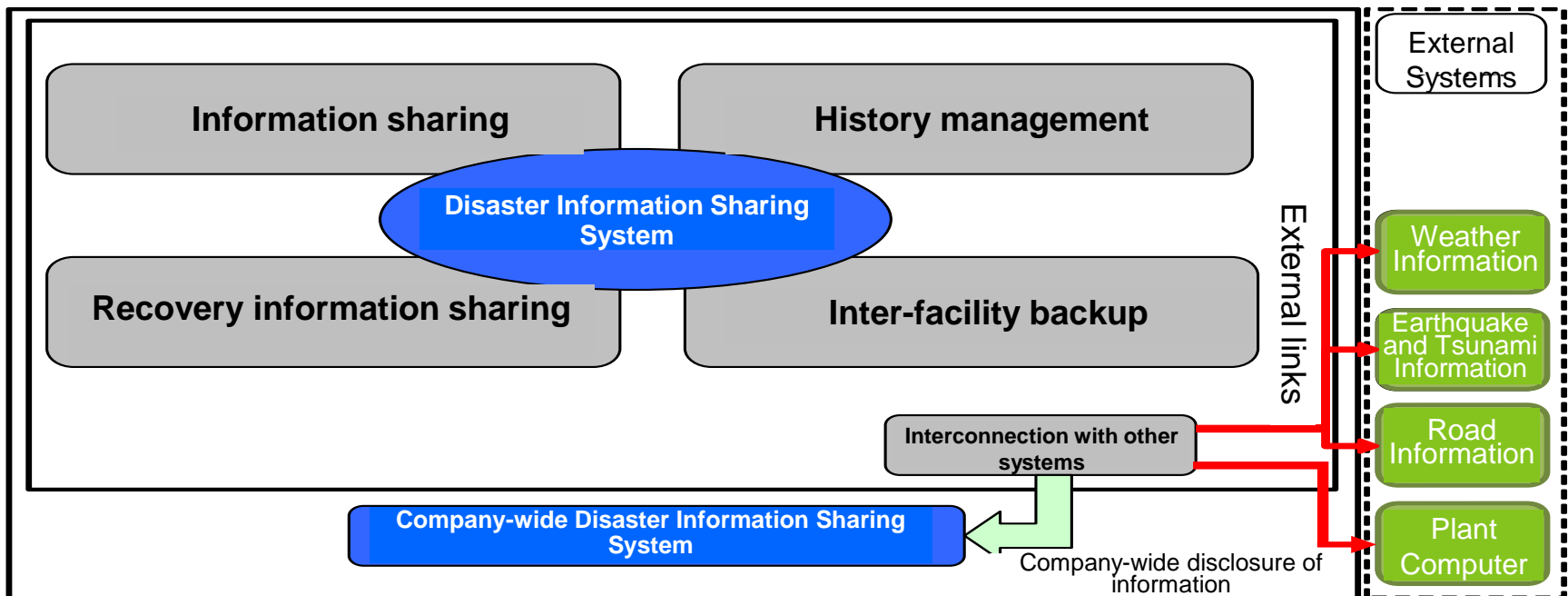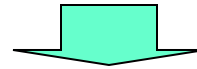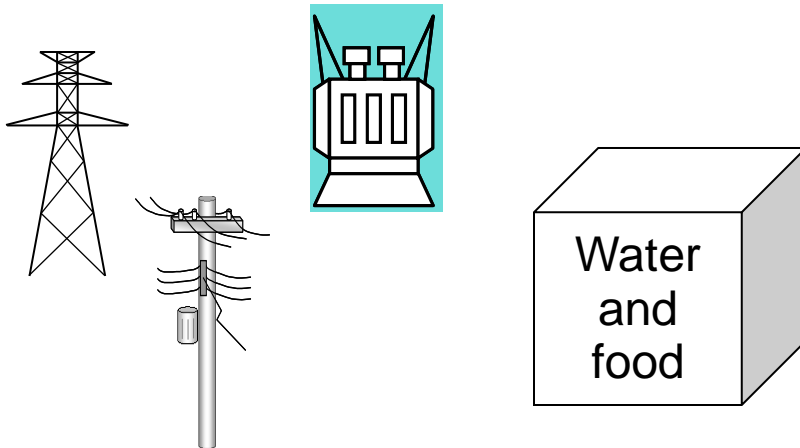
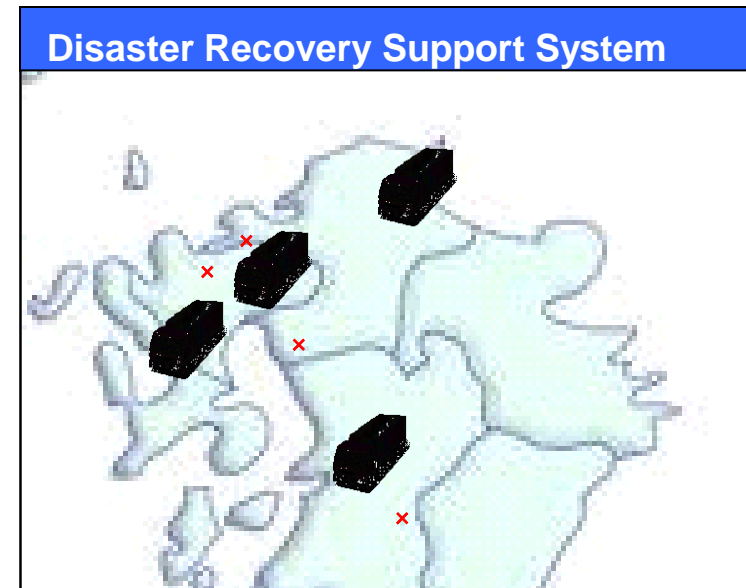# Disaster Recovery Support System

[Purpose of Development]
• To centrally manage information on the transportation and delivery of disaster recovery support materials and equipment required for recovery efforts.

• Speedy disaster recovery realized by giving instructions on transportation and distribution routes and sharing information on the transportation and distribution statuses

Water and food

Materials required for equipment restoration and livelihood support

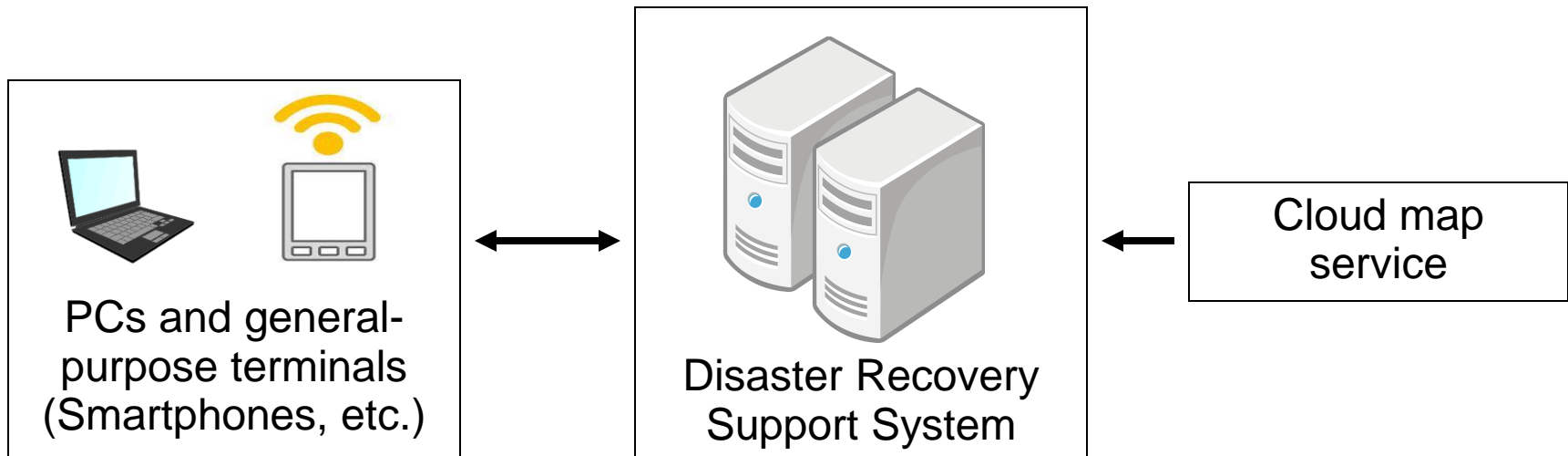**Disaster Recovery Support System**

Checking of the transportation and distribution statuses, etc.

Disaster Recovery Support System

[System Configuration]

- General-purpose terminals (multi-device) such as tablets and smartphones to register and view information to respond to emergencies

- General-purpose smartphones to transmit information on the positions of vehicles to eliminate the need to mount dedicated terminals in vehicles

- Cloud map services in the public environment to enable the real-time use of the latest map information

PCs and general-purpose terminals (Smartphones, etc.)

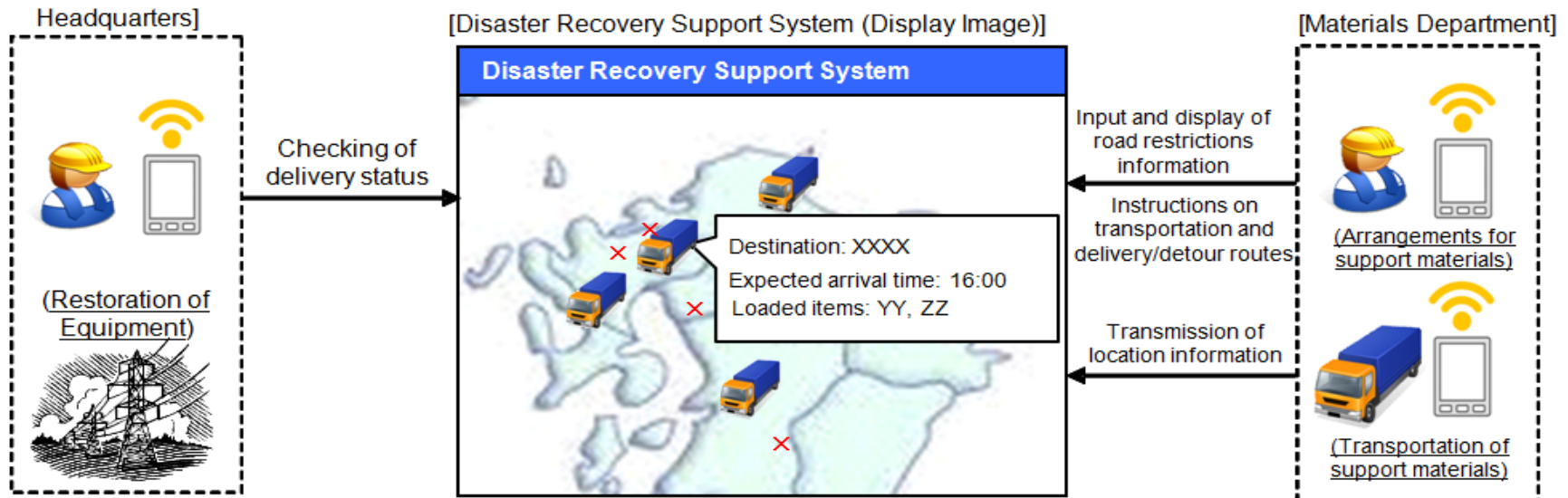Disaster Recovery Support System

Cloud map service

Disaster Recovery Support System

[System Functions]
- Accessing the system through different types of terminals.
- Providing Information on
  - The positions of vehicles transporting recovery support materials on a map in the event of a disaster.
  - The types and quantities of materials loaded on the above vehicles
  - The expected times of arrival at destinations.
  - Routes to the destinations of the above vehicles on a map.
  - Damage to roads (e.g., road closures, congestion) on routes to the destinations of the above vehicles on a map.
- Giving instructions on detour routes to drivers of vehicles transporting materials in the event that damage to roads on routes have rendered roads impassable.

[Disaster Countermeasures Headquarters]

Checking of delivery status

[Disaster Recovery Support System (Display Image)]

Disaster Recovery Support System

Destination: XXXX
Expected arrival time: 16:00
Loaded items: YY, ZZ

(Restoration of Equipment)

[Materials Department]

Input and display of road restrictions information

Instructions on transportation and delivery/detour routes

Transmission of location information

(Arrangements for support materials)

(Transportation of support materials)

Conclusion

The introduction of these systems has enabled realization of speedy disaster recovery through centralized management of information on the statuses of damage and recovery even in the event that power supply facilities sustain serious, extensive damage caused by an unexpected, unprecedented large-scale disaster.

In order to fulfill the mission of electric power companies of ensuring a safe and stable supply of the lifeline of electricity, we intend to put these systems to use in large-scale disaster response drills envisaging a wide range of events to identify and resolve problems with the goal of being prepared to respond quickly to disasters, thereby realizing early recovery.

Q2-15 The paper mentions that the location of vehicles is provided in real time by using mobile terminals, such as smartphones and tablets. If, during a disaster, cell phone networks become unavailable for certain regions, is there an alternate mean of communication?

(Answer)
General-purpose terminals cannot be used to access the system in regions where no cell phone networks are available.
However, means such as satellite phones or in-vehicle wireless can be used to share information with locations where the system can be accessed.

Q2-16 In the Disaster Information System, in the "Recovery Information Sharing" function, all information is inserted manually or is there any integration with existing monitoring systems?

(Answer)
Some monitoring information is linked with the Disaster Information Sharing System and some requires manual input. For example, all recovery information needs to be input manually.

ALL: Privately owned telecommunication systems have proven to be more reliable during a disaster than third-party networks? If that statement is true, what do you believe to be the reason for that? Or is it the other way around?

(Answer)
  Private network can design diversity and redundancy depending on a use in comparison with third-party networks.
  Specifically, it is superior with an aspect to be able to control the reliability at the time of the disaster including the construction of the backup route and the assignment of the restoration order.
  In addition, a law requires the establishing of authority of electricity preservation telephone between the important bases. (interpretation of the Technical Standards of Electric Installation)