

Intermediate Report on Maintaining Communications Capabilities during Major Natural Disasters and other Emergency Situations

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Structure of the Intermediate Report ②

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Action Plan

Each item below is classified either as:

- Issue to be addressed immediately by the various parties (national government, local governments, telecommunications operators, etc.) in response to the findings of the Study Group; or
- Issue requiring further deliberation by the Study Group.

1. Ensuring voice call capability

In the Great East Japan Earthquake

- Mobile phone traffic greatly exceeded the design capacity of exchanges. As a result, up to 70% - 95% of voice calls were subject to restrictions.
- Many operators spoke of difficulties in placing high-priority calls during the disaster.

Future issues to be addressed

- Upgrade the design capacity of facilities such as switches to improve overall communication capacity Operators Further deliberation by Study Group
- Ensure that high-priority calls can get through in disaster situations Further deliberation by Study Group
- Consider new formats designed to enable more voice calls
 - Introduce time limits on calls Further deliberation by Study Group
 - Reduce call quality on telephone calls to a certain degree Further deliberation by Study Group

2. Expanding/improving means of communication other than voice calls

In the Great East Japan Earthquake

- Packet communications such as e-mail were more successful than voice calls. This was because packet communication was either free from restriction or, in the case of NTT DoCoMo, the restrictions were only temporary and applicable to no more than 30% of transmissions.

→ In addition to boosting voice call capacity of equipment, congestion can be alleviated through the following comprehensive measures.

Future issues to be addressed

● More advanced disaster message services

- Immediately commence in-depth discussions among operators to enable linked searching of disaster message services National government, operators

● Voice services that do not use the conventional telephone network

- Immediately launch specific initiatives designed to promote collaboration between operators on services that allow voice messages to be converted to sound files by the user terminal and then transmitted over data networks

National government, operators

- Consider encouragement of use of IP phones, development of wireless LAN, and SMS transmission over data networks in emergency situations Operators

● Alleviating delays in transmission of mobile phone e-mail

- Boost mobile phone e-mail server capacity Operators
- Investigate ways to reduce delays in transmission of mobile phone e-mail Further deliberation by Study Group

● Providing simplified mobile terminals for the elderly Operators

3. Keeping users informed of available means of communication during emergency

In the Great East Japan Earthquake

Future issues to be addressed

- Concentrated usage of everyday means of communication was a significant cause of congestion.

● Effective information distribution using mobile phone e-mail emergency updates and broadcast media

- Discourage unnecessary and non-urgent telephone calls at times of disaster in order to alleviate congestion End users
- Use education and promotion to raise awareness of useful alternatives to voice calls at times of congestion (including means of communication and specific usage methods) End users
- Encourage greater use of automated voice-guided disaster message services to alleviate congestion Operators
- Make greater use of mobile phone e-mail emergency updates, television and radio during disasters

National government, operators

● Collaboration between the national government and operators to promote sharing and dissemination of congestion data and updates on communication restrictions

- Consider forms of mutual collaboration between the national government and operators designed to enable sharing of congestion data and updates on communication restrictions and effective dissemination of shared information

Further deliberation by Study Group

● Ongoing programs to improve awareness of means of communications that are available at times of disaster

- Use ongoing education and promotional programs to raise awareness of the importance of avoiding unnecessary and non-urgent telephone calls at times of disaster and using alternatives to voice calls

National government, operators

4. Designing robust networks to cope with congestion

Future
issues to be
addressed

- **Development and validation of new forms of technology with the ability accommodate congestion**
 - Development and validation of new forms of technology with the ability to accommodate congestion, such as: technology to enable flexible allocation of network processing resources to services and/or areas of greatest need during times of congestion; technology for utilizing various different communication lines to ensure uninterrupted communications; and high-volume data storage technology. National government, etc.

Minimizing disruption to communications in the event of damage to base and/or relay stations ①

1. Emergency repairs to damaged communication equipment

In the Great East Japan Earthquake

- In total, 29,000 mobile phone and PHS base stations and 385 communication buildings (NTT East) were rendered inoperable.
- According to NTT East, some 6,300 km of overhead cabling in coastal regions was either damaged or washed away; 90 relay transmission routes were cut; and 65,000 telephone poles in coast regions were broken or washed away.
- Since NTT East transmission lines are also used as entrance circuits for transmission between base stations and exchanges operated by other parties such as mobile operators, the damage also impacted on services provided by these other parties.
- Emergency repairs to base stations undertaken by mobile operators included enlarging the coverage zones of existing base stations, and installing mobile base stations and small base stations (femtocells). NTT East installed outdoor line drop boxes and used lines taken from other stations in adjacent buildings.
- Emergency repairs to transmission routes involved removal of rubble, installation of telephone poles and stringing of cables by NTT East, and reconfiguration of entrance circuits using satellite lines and fixed micro circuits by mobile operators.
- Even when the necessary materials, personnel and fuel supplies were available, emergency repairs to damaged communications equipment were often delayed by difficulties in securing transportation and access routes due to factors such as impassable roads and traffic restrictions.

Future issues to be addressed

- **Emergency repairs to base stations and central offices**
- **Emergency repairs to transmission routes**
 - Consider the implications of the recent disaster for emergency repairs, particularly with respect to deployment of more mobile base stations while sharing best practice approaches to the restoration of damaged communications equipment
- **Collaboration between operators and shared usage of networks at times of emergency**
 - Consider feasibility of roaming arrangements between mobile operators (including roaming arrangements limited to emergency information) at times of emergency
- **Information sharing and collaboration between government bodies and infrastructure bodies**
 - Consider information sharing and collaboration between government bodies, infrastructure bodies and the relevant operators in the area of securing means of transportation and access routes for materials, personnel and fuel supplies needed for emergency repair work

Operators

Further deliberation by Study Group

Further deliberation by Study Group

Minimizing disruption to communications in the event of damage to base and/or relay stations ②

2. Providing communications capability to disaster-affected regions and evacuation centers

In the Great East Japan Earthquake

- Operators made active efforts to service the communication needs of disaster-affected regions and evacuation centers, by distributing mobile phone terminals and mobile satellite terminals on loan for free, distributing MCA radio units on loan for free, installing special public phones, and providing free internet connection services and allowing free access to public wireless LAN areas at locations such as evacuation centers.

Future issues to be addressed

● Procurement and provision of means of communication over time following a disaster

- Consider the communication needs of disaster-affected regions and evacuation centers, in particular, how these needs change over time following a disaster, while also sharing best-practice initiatives from the Great East Japan Earthquake

National government, operators

- Consider forms of collaboration with national and local governments to facilitate optimum matching between the needs of disaster-affected regions and operator supply

National government, operators

● Equipping sites such as evacuation centers with effective communications capabilities prior to the event

- Consider ways of equipping sites such as evacuation centers with communications capabilities, such as: promoting the use of mobile satellite phones; boosting the speed and capacity of satellite internet services; coordinating the deployment of public telephones, wireless LANs and satellite terminals at disaster prevention centers; and ensuring prompt distribution of equipment such as mobile satellite terminals (primarily by the national government).

Further deliberation by Study Group

- Consider installation and maintenance of Type I public telephones in the context of universal service provision

National government, etc.

- Design and deployment of disaster-proof radio systems, etc. in regional planning

National government, etc.

- Provision of power supplies independent of the power grid at sites envisaged as evacuation centers

Further deliberation by Study Group

Minimizing disruption to communications in the event of damage to base and/or relay stations ③

3. Ensuring stability of power supplies

In the Great East Japan Earthquake

- Power outages were prolonged and wide-ranging. As a result, in many cases communications equipment that had escaped damage was often unable to continue providing service due to lack of power once batteries or fuel supplies for on-site power generators had been exhausted.

Future issues to be addressed

- **Securing emergency power supplies (including fuel supplies) for communications equipment tailored to equipment scale and type**
 - Consider approaches to securing emergency power supplies for communications equipment tailored to the scale and type of the equipment **Further deliberation by Study Group**
 - Consider approaches for ensuring prompt and consistent fuel supplies for on-site power generators, for instance, through collaboration with relevant agencies **Further deliberation by Study Group**
 - Design base stations with the capacity to continue operating during power outages, extend battery life, increase the number of mobile power supply trucks **Operators**
- **Educate users on which types of fixed telephone terminals can be used during power outages, promote terminals with built-in batteries** **Operators**
- **Encourage manufacturers to design power-saving communications equipment and terminals as well as lighter batteries with longer battery life** **Operators**

Minimizing disruption to communications in the event of damage to base and/or relay stations ④

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4. Providing emergency updates and disaster damage reports

In the Great East Japan Earthquake

- There was a need to provide a variety of different types of information in the appropriate way at the appropriate time, including emergency updates (especially earthquake and tsunami reports), reports of disruption and/or restoration of “lifeline” services (power, gas, roads, etc.), and information about local services (shops, government services, etc.)
- With over 10,000 persons missing, communications infrastructure was expected to provide more advanced means for confirming the whereabouts of individuals.

Future issues to be addressed

- **Effective use of emergency updates via mobile phone e-mail**
 - Immediately commence in-depth discussions (on issues such as utilization of the “public information commons”) with a view to promoting collaboration among related parties on emergency updates via mobile phone e-mail, considering also the diversification of information to be provided (i.e., incorporating information other than the tsunami warnings and other warnings that are currently provided) in line with the wishes of local governments and other relevant parties **Operators**
- **Expansion/improvement of restoration “area maps”**
 - Expand and improve the “area maps” that show the progress of restoration work, by reducing the time taken to generate maps after a disaster, expanding the range of information provided, improving the visibility of the maps and increasing the frequency of updates **Operators**
- **More advanced services for confirming the whereabouts of individuals (e.g., using positioning data from mobile phones)**
 - The use of positioning data from mobile phones for confirming the whereabouts of individuals poses issues with respect to secrecy of communication, personal data, and privacy. While giving due consideration to these issues, operators should consider specific services, with active support from the national government **National government, operators**
- **Considering information literacy in providing information to simplified terminals for elderly persons and other groups**
 - Education and promotional campaigns on effective modes of communication in times of disaster that take into consideration individual discrepancies in information literacy, designed to assist people in accessing the information they need during a disaster using a variety of different modes of communication **Users**

1. Improving the disaster resilience of networks

In the Great East Japan Earthquake

- The extent of damage exceeded all previous expectations, in terms of the size of the area affected, the damage and/or total destruction of telecommunication office by the tsunami, and the disruption to services due to prolonged power outages.

Future issues to be addressed

● Boosting network safety and reliability

- Consider approaches to boosting network safety and reliability, including consideration of technical standards

Further deliberation by Study Group

● Promoting the introduction of common ducts by local governments

Further deliberation by Study Group

● Coordinating infrastructure development with rebuilding programs in disaster-affected regions

- Redevelop key facilities in disaster-affected regions in line with rebuilding programs with a view to securing communications infrastructure in a variety of forms in order to improve disaster resilience

Further deliberation by Study Group

● Research and development on boosting network disaster resilience

- Develop technology to enable rapid deployment of networks (for instance, using advanced portable radio base stations) when communications infrastructure has been damaged in a natural disaster, so that services can be quickly restored to disaster-affected regions, local government offices, evacuation centers, hospitals and similar facilities

National government, etc.

- Develop systems based on radio systems such as mobile phones and wireless LANs that enable transmission of accurate emergency updates such as tsunami warnings in disaster-affected regions, and conducting validation trials in disaster-affected regions

National government, etc.

- Develop power control systems designed to enable continuous operation of communications infrastructure

National government, etc.

2. Setting up systems and structures for responding to disaster

Future
issues to be
addressed

- **Validation/review of disaster response systems by related operators**
 - Related operators to validate their own disaster response structures (business continuity plans, disaster response manuals, etc.) and review these as appropriate **Operators**
- **Framework for information sharing and dissemination involving national and local governments and related operators**
 - Consider models of information sharing and dissemination (including an emergency communication council) among national and local governments and related operators designed to promote responses to congestion during disasters and rapid restoration responses **National government, operators**

1. Minimizing disruptions to internet access

In the Great East Japan Earthquake

- Notwithstanding high traffic levels on the websites of certain government bodies and infrastructure agencies such as power companies that created access difficulties, overall availability of access to the internet, via both fixed and mobile networks, was relatively stable.
- Information sharing in real time via social media services was extensively used to check on the whereabouts of individuals. In addition, various different types of data were combined to create value-added information services, such as road access updates combining mapping data with evacuation center search functionality.
- Evacuation center administrative tools based on cloud services were provided.

Future issues to be addressed

● Minimizing disruptions to internet access

- Boost line capacity to a level designed to accommodate large-scale disasters **Operators** **Further deliberation by Study Group**
- Consider ways to reduce delays with mobile phone emails **Operators** **Further deliberation by Study Group**
- Consider traffic control regimes designed to preserve the overall integrity of communications **Further deliberation by Study Group**
- Consider strategies for strengthening the disaster resilience of ISPs **Further deliberation by Study Group**
- Consider strategies for securing fuel supplies, for instance, through collaboration between related organizations **Further deliberation by Study Group**
- Install internet access environments at evacuation and similar sites in readiness for disaster **National government, etc.**
- As far as practicable, ensure that internet connectivity is restored in conjunction with voice call services at evacuation centers and similar sites **National government, operators**
- Provide alternative forms of internet access using mobile base stations and satellite lines **Operators**

● Building of Internet networks

- Build internet networks with disaster resilience capable of withstanding, for instance, major damage in the Tokyo metropolitan area **Further deliberation by Study Group**

2. Using the internet more effectively

In the Great East Japan Earthquake

- The internet was used to share a variety of forms of disaster-related information.
- Information sharing was extensive and widespread, and social media services allowed information to be exchanged in real time.
- Value-added information services were created by combining various different types of information over networks.

Future issues to be addressed

● Information sharing over the internet

- Consider standardization of formats and other issues in relation to how information is provided by government agencies and public bodies Further deliberation by Study Group
- Information sharing between portal site operators operators

● Use of social media services

Further deliberation by Study Group

- Consider use of social media services by government agencies and public bodies

● Utilization of mirror sites

- Consider effective utilization of mirror sites by government agencies and public bodies

Further deliberation by Study Group

● Information gap considerations

Further deliberation by Study Group

● Effective usage of the internet

- Collect and publish instances of internet usage during the Great East Japan Earthquake and consider extensive sharing

National government, operator

3. Utilizing cloud services

In the Great East Japan Earthquake

- Cloud services were provided for the purpose of supporting administrative management by local governments and other organizations that had suffered damage.
- Backup data of resident information saved over the network by prefectural governments was used to enable prompt restoration of and avoid disruption to the operation of local governments and residents' information network systems.

Future issues to be addressed

- **Greater usage of cloud services**
 - Promote greater use of local government clouds National government, etc.
- **Collaboration among cloud service operators**
 - Consider cloud service information disclosure pertaining to disaster resilience Further deliberation by Study Group
 - Pursue research and development on boosting the reliability of cloud services, for instance through flexible allocation of resources among multiple clouds, and consider collaboration among cloud service operators with a view to harnessing the associated research and development outcomes National government, etc.

4. Building collaborative frameworks among communication operators to prepare for disaster

In the Great East Japan Earthquake

- While ISPs sought to share information in order to avoid increases in congestion, each individual ISP tended to implement congestion prevention strategies based on its own information sources. This caused traffic to concentrate around uncongested lines and circuits, and may have had the unintended consequence of actually increasing congestion.

Future issues to be addressed

- **Collaboration among operators to improve communication capacity at times of disaster**
 - Consider ways to promote collaboration among carriers, such as information sharing and a central coordinating point for collaboration **Operators**
 - Pursue research and development on efficient and responsive allocation of communication resources between different communication services **National government, etc.**
- **Collaboration on disaster message and other services**
 - Commence in-depth discussions among related operators designed to enable cross-searching between different disaster message services **National government, operators**