

# Direction of Local Government ICT to Overcome the Great East Japan Earthquake

March 2012

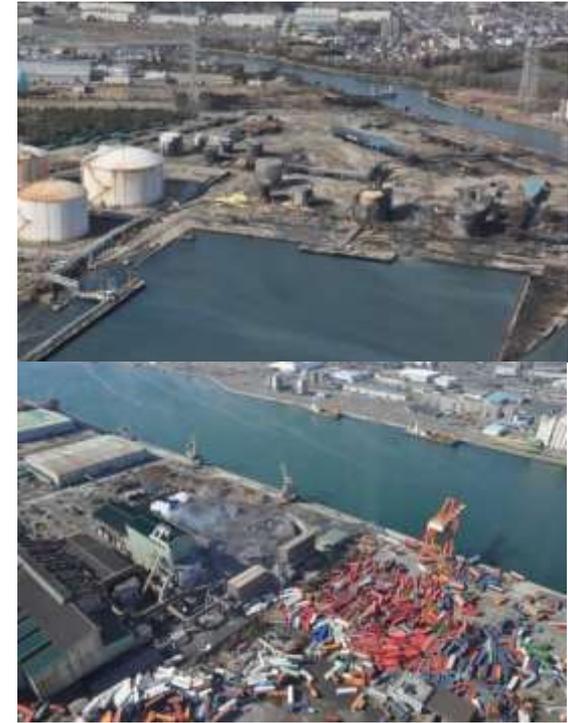
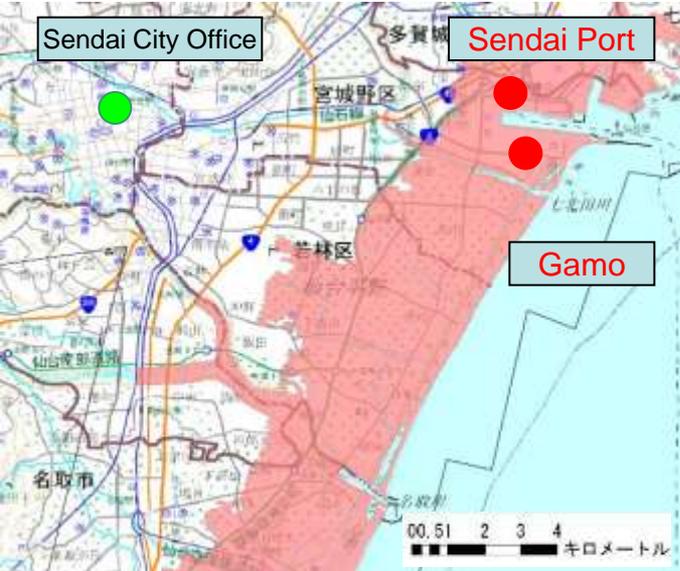
Sendai City Information Policy  
Department

(March 2012)

	Great East Japan Earthquake (2011)	Sumatra Earthquake (2004)
Size of earthquake	M9. 0	M9. 1
Area covered by tsunami	561 km <sup>2</sup>	—
Number of deaths or missing	Approximately 19 , 000	Approximately 300 , 000
Totally or partially destroyed houses	approximately 370, 000	—
Cost of damage	approximately 210 billion U.S. dollars	approximately 8 billion U.S. dollars

## 2. Damage situation in Sendai City (1)

Near Sendai Port



 Area covered by tsunami

Near Gamo in Miyagino Ward



## 2. Damage situation in Sendai City (2)

Arahama in Wakabayashi Ward



Area covered by tsunami

Near Okada in Miyagino Ward



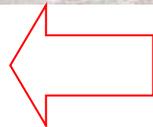
# 3. Damage situation in Sendai City(1)

## Minami-Gamo Sewerage Treatment Plant in normal times

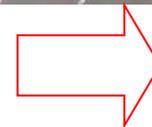
Position of view from photograph on next slide



Sea



Land



# 3. Damage situation in Sendai City (2)

## Day of the earthquake



Sea ←

→ Land

## 3. Damage situation in Sendai City (3)

### 3. 1 Information systems situation

#### 3. 1. 1 Operations information systems situation

##### (1) Directly after the quake

No damage such as the falling over of information system servers.

As it was unclear as to how long power outages would continue, each system was temporarily shut down.

##### (2) March 13

Resumption of office LAN operations such as groupware.

##### (3) March 17

Resumption of online services such as citizen registration and tax operation systems.

#### 3. 1. 2 Sendai City official website

(1) Network with Tokyo was suspended directly after the quake, a temporary server was set up in Tokyo and a makeshift site started. (March 11, 10pm)

(2) Official website restored on about March 15.

## 3. Damage situation in Sendai City (4)

### 3. 2 Response to operations created by the disaster

- (1) Authorities were busily occupied with emergencies and lifesaving, gathering information and contact coordination, evacuation center establishment, management and distribution of supplies, and emergency measures for infrastructure and public facilities.
- (2) After about one week, in order to deal with the great amount of work that arose such as issuing damage certificates etc., investigations into the introduction of an information system began.
- (3) Conforming to the actual state of a city designated by ordinance, in response to not having a single information system to cover all the operations, and with each related division being inundated with operations, a simple to use system that could be used immediately was created through repairing existing systems and simple development.
- (4) Currently, Sendai City as a whole, in order to provide continual and thorough support to the victims, support systems are being developed.

# 4. Cooperation between local governments in the disaster area

## 4. 1 Details

In order to receive rapid support from support groups and businesses etc. to meet the needs of local governments, horizontal networks between local governments in the disaster area have been constructed, setting recovery and restoration as their goal.

Sendai City and Miyagi Prefecture have called out to local governments centered in Iwate, Miyagi and Fukushima. At present there are 43 local governments participating.

This has been brought up as a subject for support in the Ministry of Internal Affairs and Telecommunications Information and Communications Advisory Council's "Information and Communications Policy Toward the Realization of an Intelligent Telecommunications Society" mid-term report (July 25, 2011).

## 4. 2 Designation

「ICT Section Network for Local Authorities in the Great East Japan  
Earthquake disaster-stricken area」

Abbreviation ISN (taken from the English title)

## 4. 3 Activities

① Present a total of about 400 computers, donated by companies, to 5 cities and 4 towns such as Rikuzen Takata City and Yamada Town, and support the restoration of local government functions and promotion of victim support operations.

② On November 24 the "Great East Japan Earthquake and Local Government ICT" open seminar was held in Sendai City, with representatives from 7 local governments telling what problems arose and how they were solved, providing examples that can be used as reference for the future advancement of local government ICT, including those in the disaster region. The content of the seminar has been released at the following URL.

[http://www.city.sendai.jp/shisei/1202080\\_1984.html](http://www.city.sendai.jp/shisei/1202080_1984.html)

## 5. Example of report at the ISN seminar (1)

Yamada Town 1 Entire town is swamped by the tsunami (immediately before the backwash)



## 5. Example of report at the ISN seminar (2)

### Yamada Town 2 Large scale fires occurred



## 5. Example of report at the ISN seminar (3)

### Yamada Town 3 Morning of March 12



## 5. Example of report at the ISN seminar (4)

Yamada Town 4 Safety conformation in the public office hall



## 5. Example of report at the ISN seminar (5)

Rikuzen Takata City1 Damaged government buildings



## 5. Example of report at the ISN seminar (6)

Rikuzen Takata City2 Damaged server room



## 5. Example of report at the ISN seminar (7)

Ishinomaki City1 Evacuation route in front of the city office



## 5. Example of report at the ISN seminar (8)

Ishinomaki City2 Base-isolated floor and cables

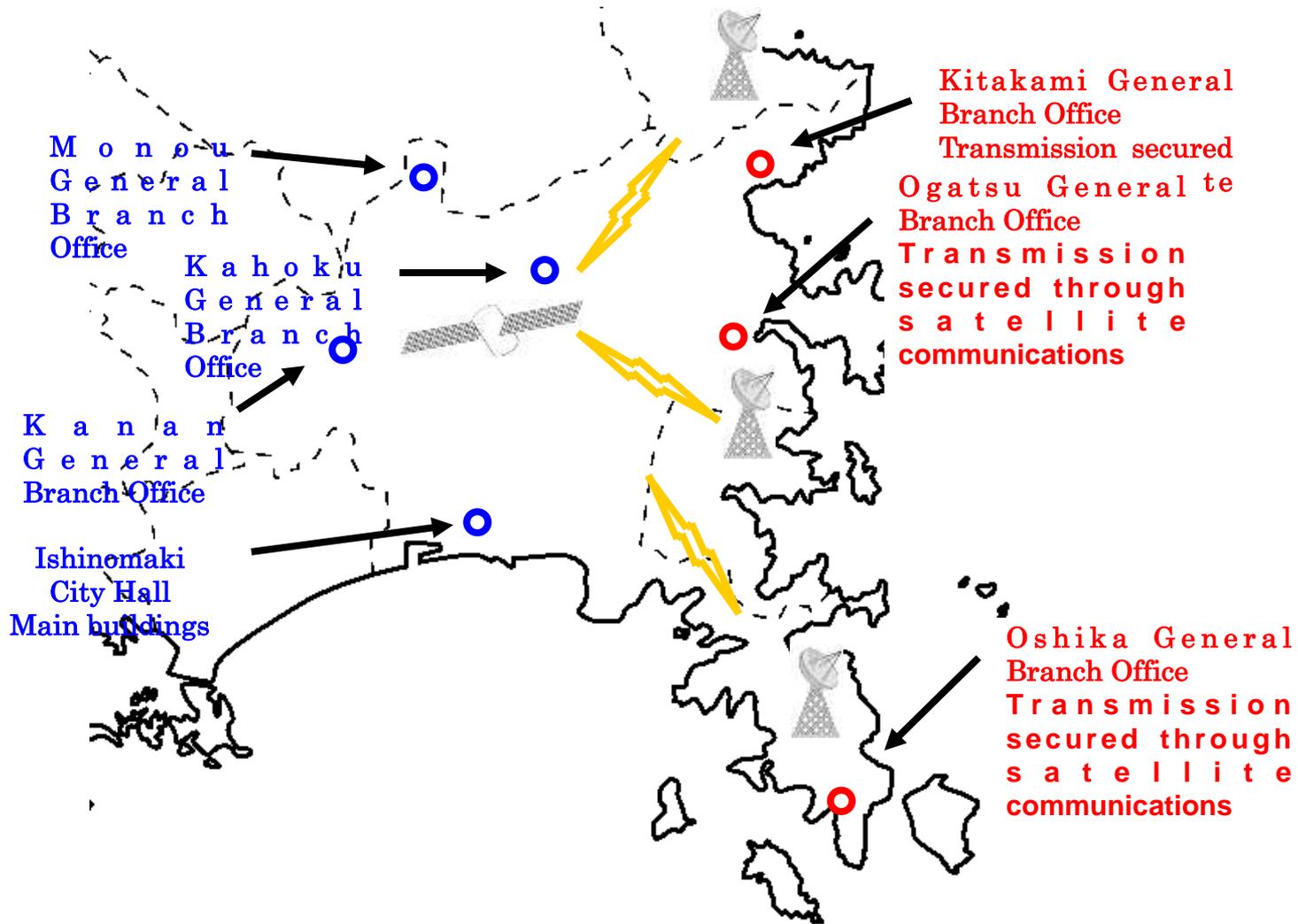


## 5. Example of report at the ISN seminar (9)

Ishinomaki City3 Damaged Kitakami General Branch Office



# 5. Example of report at the ISN seminar (10)



In Ishinomaki City, government buildings and communications equipment communicated with the 3 general offices that were washed away via communications satellite. In this example, 2 months were required for restoration, however, if this type of system is developed in advance as a system that can be deployed rapidly, it is thought that restoration can be achieved in a very short time. It is also thought that the acceleration of the speed in which data is transmitted through satellites is a necessary item of development.

## 6. Direction of local government ICT policy for overcoming the Great East Japan Earthquake

### Local government ICT policy direction

1. Measures toward clouds  
Improve administration efficiency, lower costs and increase convenience
2. Measures toward a common number system  
Increase convenience such as improving online applications etc.
3. Improve literacy  
School education, lifelong learning
4. Support new industry development and improvement of existing industries



### Issues leading from the Great East Japan Earthquake

1. Remarkable decline in local government functions
2. Transformation of key local government foundations
3. Rapid increase in local government restoration operations
4. Long-term loss of power and communications networks



### Local government ICT policy direction aimed at improving disaster response capability

1. Maximize use of clouds  
Measures toward continuing existing operations, preserving data and disaster response operations
2. Improvement of provision of information to victims  
In principle, have ICT used by everyone
3. Maintain regional and community bonds using ICT  
Community building in temporary housing, restoration housing and evacuation areas
4. Power supplies with strong disaster resistance, secure communications networks  
Improve independent power generation equipment, duplicate communications networks
5. Policy for planning measures to respond to large-scale disasters (next-generation BCP)  
Response plan where local governments can demonstrate those functions even in the event of a disaster on the scale of the Great East Japan Earthquake

# 7. Division of roles between national and local governments

## Issues leading from the Great East Japan Earthquake

1. Remarkable decline in local government functions
2. Transformation of key local government foundations
3. Rapid increase in local government restoration operations
4. Long-term loss of power and communications networks



National government ICT policy direction aimed at improving disaster response capability

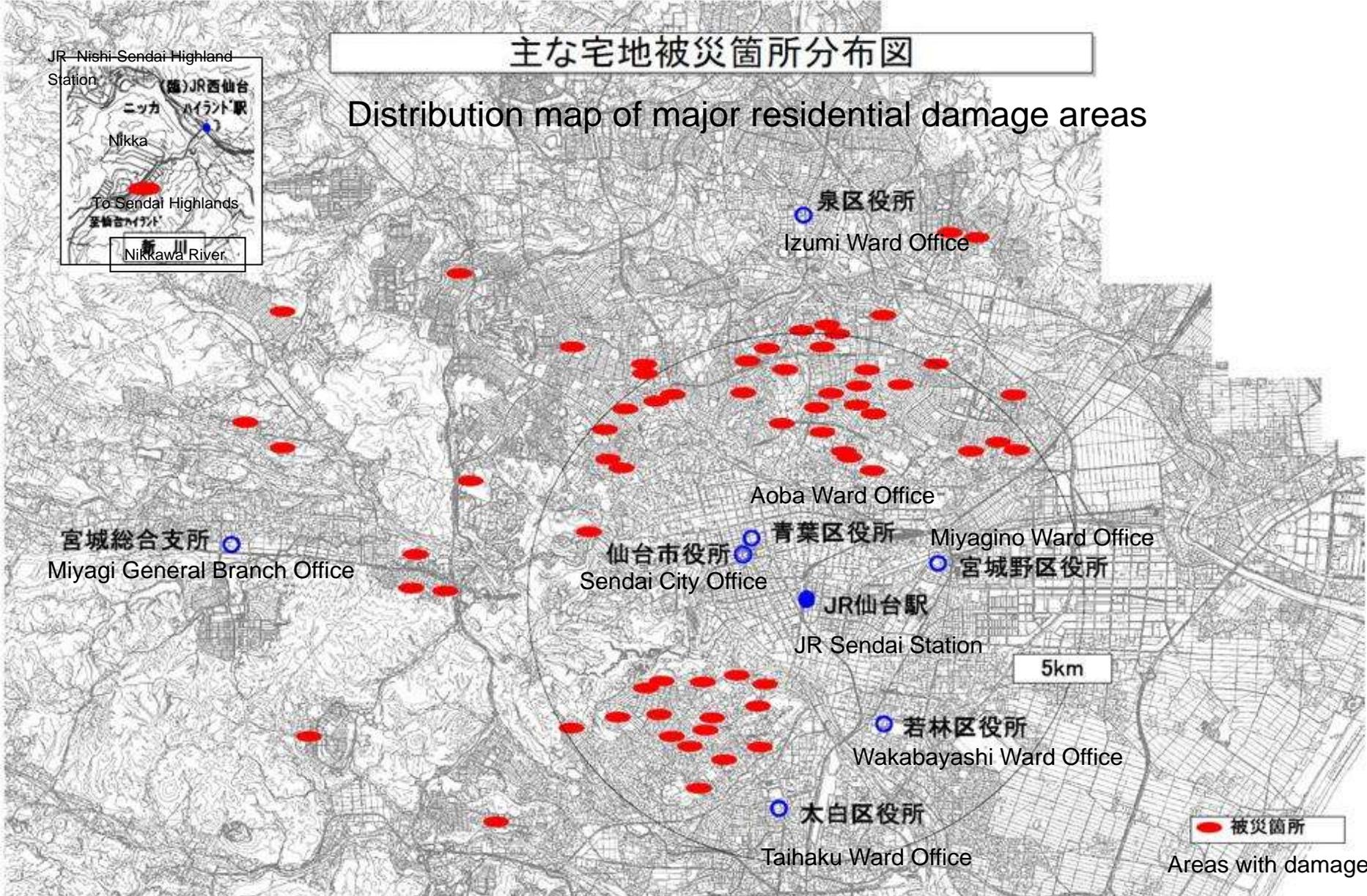
1. Develop framework to urgently restore local government functions
2. Develop emergency communications networks within the disaster area and cloud and internet emergency communications networks framework
3. Support cloud use for local government restoration operations
4. Improve reliability of disaster resistance of fixed and mobile phone networks etc.

Local government ICT policy direction aimed at improving disaster response capability

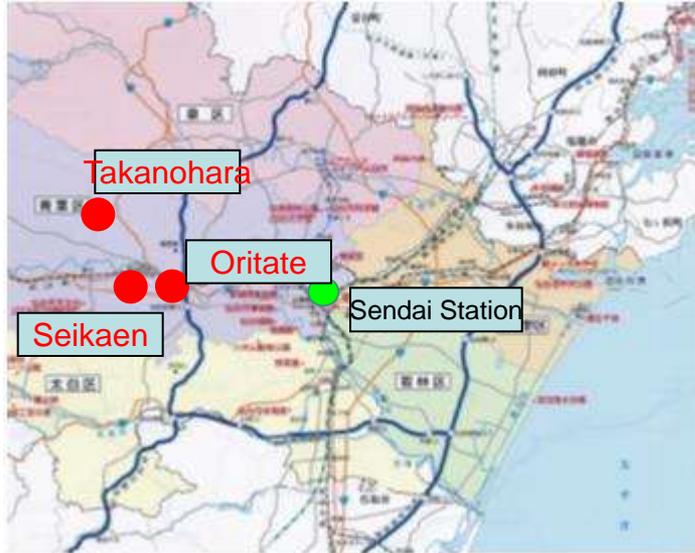
1. Maximize use of clouds
2. Provision of timely information to victims based on their needs
3. Maintain regional communities and bonds using ICT
4. Securing power supplies
5. Set policy plans for ICT that can overcome disasters the scale of the Great East Japan Earthquake

## Appendix

- 1 Damage situation in Sendai City
- 2 ICT Section Network for Local Authorities in the Great East Japan Earthquake disaster-stricken area (ISN)
- 3 Direction of local authority ICT policy to overcome the Great East Japan Earthquake
- 4 Division of roles between national and local governments



## Aoba Ward Takanohara



## Aoba Ward Seikaen



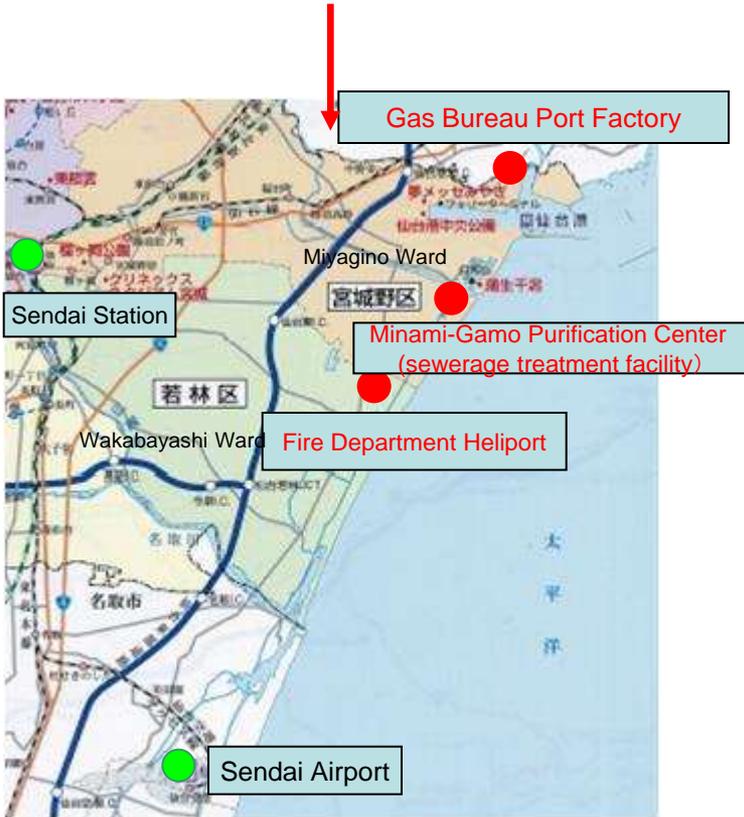
## Aoba Ward Oritate



## Gas Bureau Port Factory



## Minami-Gamo Purification Center

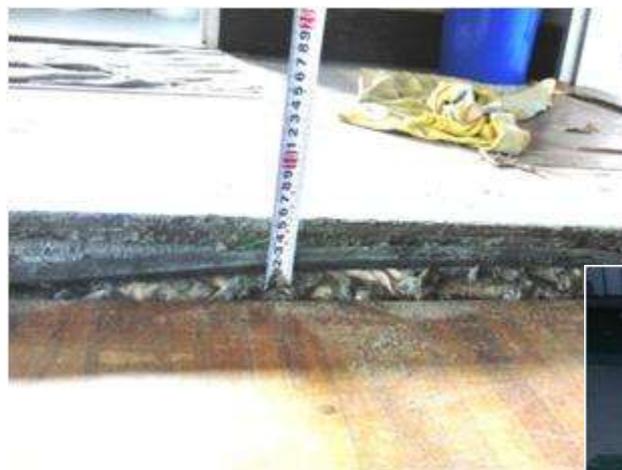
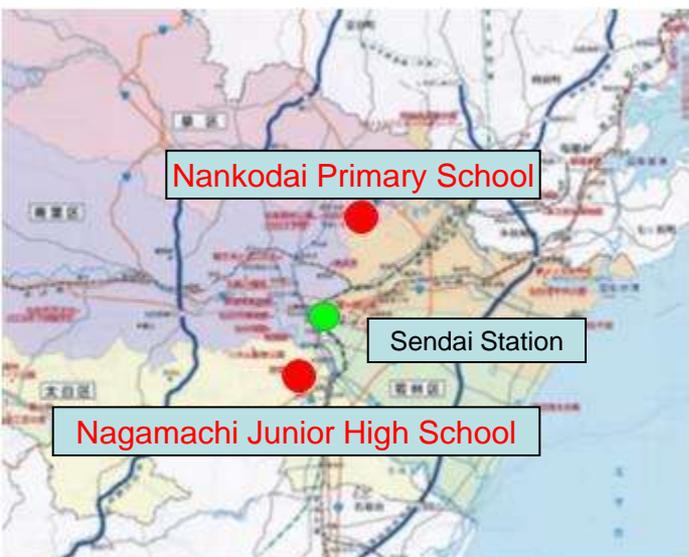


## Fire Department Heliport



# Appendix 1 (4)

## Primary・Junior High Schools



Nankodai Primary School



Nagamachi Junior High School



For more detailed information on damage in the city, please visit  
<http://www.city.sendai.jp/soumu/kouhou/bousai/0311jishin/higaizyoukyou.pdf>

## ICT Section Network for Local Authorities in the Great East Japan Earthquake disaster stricken areas (ISN)

After the Great East Japan Earthquake there was a demand for the supply systems and computers lost by local governments in the disaster and for computers to be used in the large amount of new operations that appeared.

On the other hand, we received many offers of support from ICT (information communications technology) related companies and groups, but there was a situation where local governments in need of such support hadn't received that information. Under these circumstances, information sharing between local governments in the disaster area is believed to be linked to the recovery of the disaster areas and support for the affected citizens, so the ICT Section Network for Local Authorities in the Great East Japan Earthquake disaster stricken areas has been established, with Sendai City and Miyagi Prefecture taking the lead, as a place for information sharing between ICT officials of the affected areas, and is conducting the following activities.

#ISN: Abbreviation of ICT Section Network for Local Authorities in the Great East Japan Earthquake disaster stricken areas using letters from the English title

1. Date of establishment May 19, 2011

2. Participating local governments

Localities in Iwate, Miyagi and Fukushima Prefectures that received damage from the disaster are being invited to participate. Also, local governments that have offered their support are also participating.

#Participating local governments: 43 As shown in the table

3. Activity content

Start up a bulletin board for information sharing on the internet and share information related to victim support operations. As a result of the information sharing, a total over 400 computers donated by companies have been provided to Rikuzen Takata City, Kesenuma City, Natori City, Shiogama City, Tagajo City, Iwaizumi town, Matsushima town, and Namie town, supporting the recovery of local government functions and victim support operations promotion.

On November 24 in Sendai City, a public seminar "Great East Japan Earthquake and Local Government ICT" was held with ISN officials from participating local governments explaining what kind of problems arose and how they were solved, and provided examples that can be used as references for promoting local government ICT, including the disaster areas, in the future. About 240 people from around the country took part with many providing useful opinions.

In the future, in order to promote recovery in the disaster areas through ICT, we would like to, as well as deepen cooperation among local governments, continue of information transmission and provide opinions on how to use ICT in times of disaster based on the experience from this tragedy, and contribute to the building of next generation towns that have strong disaster resistance through the use of ICT by local governments nationwide and companies.

4. Businesses and groups offering support (in order of Japanese syllabary)

IO Data Equipment, Toshiba, Nihon Denki, Microsoft Japan, NTT East, Fujitsu, UQ Communications etc.

5. Executive office

Sendai City Information Policy Section (representative: Masako Hara) email:

kik002070@city.sendai.jp

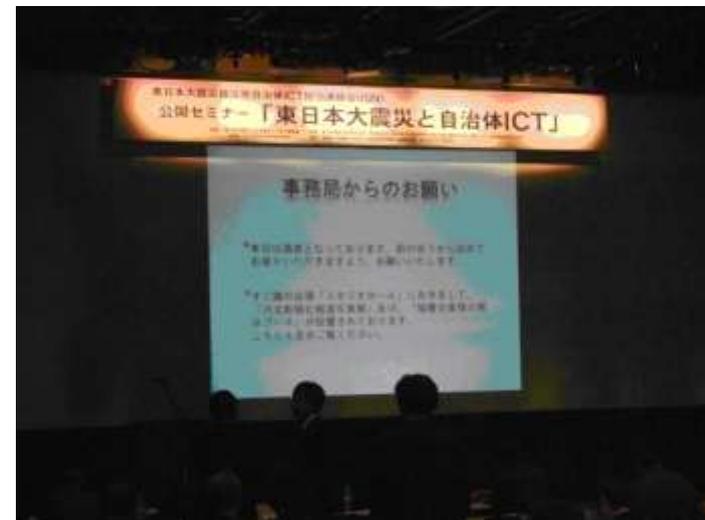
## ICT Section Network for Local Authorities in the Great East Japan Earthquake disaster stricken areas Participating local governments

No.	Classification	Locality Name	No.	Classification	Locality Name
1	Prefecture	Miyagi Prefecture	31	Miyagi Prefecture	Onnagawa town
2		Iwate Prefecture	32		Osato town
3		Fukushima Prefecture	33	Fukushima Prefecture	Koriyama City
4	Yamagata Prefecture	34	Sukagawa City		
5	Aomori Prefecture	Hachinohe City	35		Soma City
6	Iwate Prefecture	Miyako City	36		Date City
7		Ofunato City	37	Kunimi town	
8		Kuji City	38	Inawashiro town	
9		Rikuzen Takata City	39	Ono town	
10		Otsuchi town	40	Namie town	
11		Yamada Town	41	Shinchi town	
12		Iwaizumi town	42	Aichi Prefecture	Nagoya City
13	Tanohata village	43	Fukuoka Prefecture	Fukuoka City	
14	Miyagi Prefecture	Sendai City			
15		Ishinomaki City			
16		Shiogama City			
17		Kesenuma City			
18		Natori City			
19		Tagajo City			
20		Iwanuma City			
21		Tome City			
22		Kurihara City			
23		Higashi-Matsushima City			
24		Ogawara town			
25		Murata town			
26		Shibata town			
27		Kawasaki town			
28		Yamamoto town			
29		Matsushima town			
30		Kami town			

## Recovery effort



Laptop computers sent to the temporary buildings of the Rikuzen-Takata City Office



Public seminar1



Interior of the temporary building



Public seminar2

## 1. Maximizing cloud use

### 1. 1 Events occurring from the Great East Japan Earthquake

1. Notable decline in local authority functions due to the tsunami and earthquake

- Destruction of government buildings
- Staff victims
- Loss of server data

2. Transformation of the basis of local authority existence due to the nuclear accident

- Difficulties in entering administrative areas
- Separation of administrative areas and citizens

3. Rapid increase in disaster recovery operations

- Occurrence of large amounts of similar operations in many local governments
- Gap between required supporting staff numbers and actual supporting staff numbers
- Changes in operations and necessary staff as time passed

## 1. Maximizing cloud use

### 1. 2 Issues from the Great East Japan Earthquake

#### 1. Quick resumption of existing operations

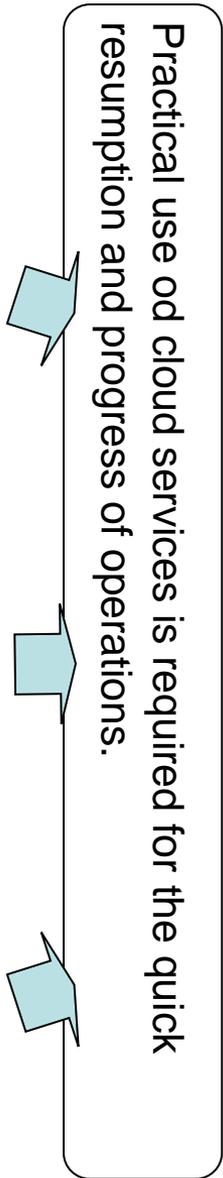
→Quick restoration of existing operation software and data while having no established space and servers

#### 2. Maintaining information reception and transmission functions, maintaining community identity

→WEB server restoration, quick start up of mirror servers

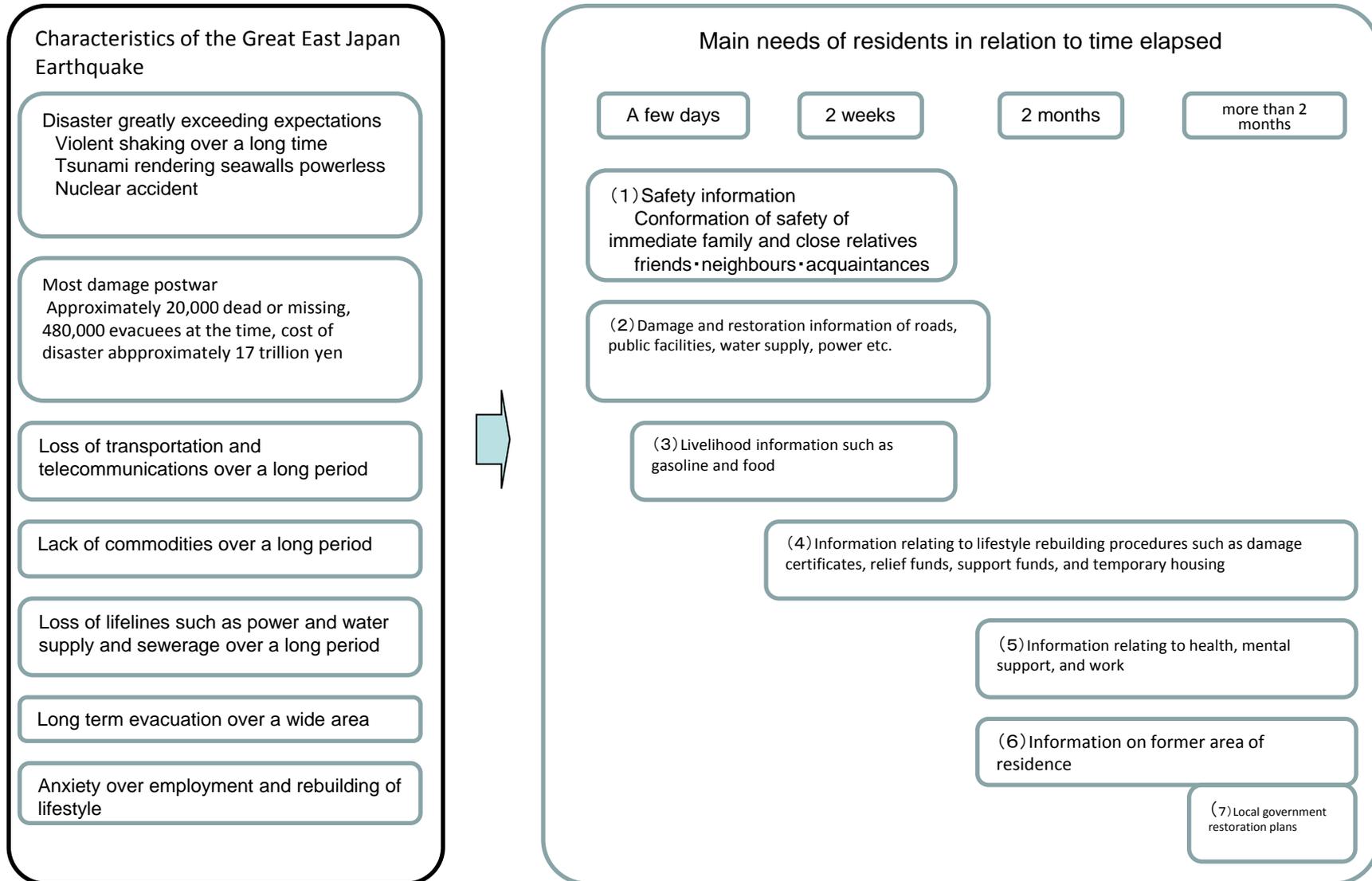
#### 3. Response toward rapid increase in disaster response operations

→Manualize simple operations by introducing SaaS, provide prior training



Practical use of cloud services is required for the quick resumption and progress of operations.

## 2. 1 Timely provision of information to disaster-affected people



## 2. 2 Information needs and issues of evacuees

### (1) Safety information

- ① The reliability of the emergency message number and mail, said to be strong in disasters, was not high when need most in the 1-2 days immediately after the disaster.  
→ Clearly define the service level of the emergency message number and mail directly after the disaster and create a service system to meet that level.
- ② Google Person Finder, prefectural police websites, newspapers and television broadcasts, and local government websites were put to use.  
→ Create a framework in which information from each source can be gathered.

### (2) Information on damage to infrastructure and restoration situation

- ① Newspapers and television broadcasts, and local government and business websites were put to use. There were also examples of a rapid increase in access to websites for gas restoration information.
- ② Websites are effective in providing reliable and accurate information over a wide area.  
→ Create a website that can continue to operate when disaster strikes.  
→ Practical use of mirror sites when access suddenly increases  
→ Practical use of mail distribution and area mail

### (3) Lifestyle information

Newspapers and television broadcasts were used for information on shops that were open. Word of mouth and internet information was used.  
→ Find out how reliable and accurate information was gathered and whether it can be conveyed or not. → Practical use of social media

### (4) Administrative information

- ① Newspapers and television broadcasts, and local government websites were put to use to convey administrative information regarding lifestyle rebuilding support and procedures. In evacuation centers information was provided by distributing materials and posting paper bulletins.
- ② To make use of this information, consultation operations such as interviews and telephoning are indispensable.  
→ Improve information provision and individual consultations. Faster processing.

### (5) Providing information to evacuees in other areas

Local government websites, use of mail distribution, and use of evacuee information systems

## 3. Maintaining local communities and bonds through ICT use

### Current situation

1. Loss of regional society, loss of support, victims sense of loss and mental burden is extremely large.
2. Local governments in coastal areas of the three prefectures have mainly declining populations. On the Sanriku Coast, jobs and public services have been lost and there are areas where the population is declining at an extremely rapid pace.
3. In the area centered around Sendai, there is a trend of population growth with people coming in from other disaster areas.
4. Number of people moving into private temporary housing has exceeded expectations.
5. Due to the nuclear accident, Fukushima Prefecture is experiencing the greatest decline in population of the three prefectures. There are also whole towns that have been evacuated.
6. Due to the effects of the nuclear accident, districts with differing evacuation methods inside a single town are appearing. Both local authorities and citizens are agonizing over how to deal with the situation.

## 3. Maintaining local communities and bonds through ICT use

### Issues

1. Loss of regional society, loss of support, high sense of loss among victims, lack of clarity on where to request mental support.
2. Much easier to become isolated in private rental temporary housing than constructed temporary housing.
3. More difficult to acquire information in private rental temporary housing.
4. Difficult to acquire information on former residence when living in far away temporary housing.
5. Especially in Fukushima Prefecture, depending on the town, it is unclear when evacuees can return home.
6. Because the circumstances behind the victims is different, sense of awareness is also different.



### Countermeasures

1. At present it is possible to use each service, provide information and enhance exchanges.
2. To restart local communities, not only is a strengthening of communication through ICT required, but also general involvement.

## 4. Prerequisite conditions of next-generation BCP

### Local government BCP issues until now

1. Low awareness of need
2. Only planning in the ICT sector  
(No linking with disaster prevention planning)
3. Lack of staff with policy decision experience
4. Few practical examples in actual disasters.



### Post Great East Japan Earthquake issues

1. Collapse of existing prerequisites
  - No government buildings. No support. No information.
  - No supplies. No food.
  - Many staff victims.
  - Long term loss of power and telecommunications networks
  - Rapid increase in reconstruction operations.
  - Local governments and citizens evacuated outside of their district long-term



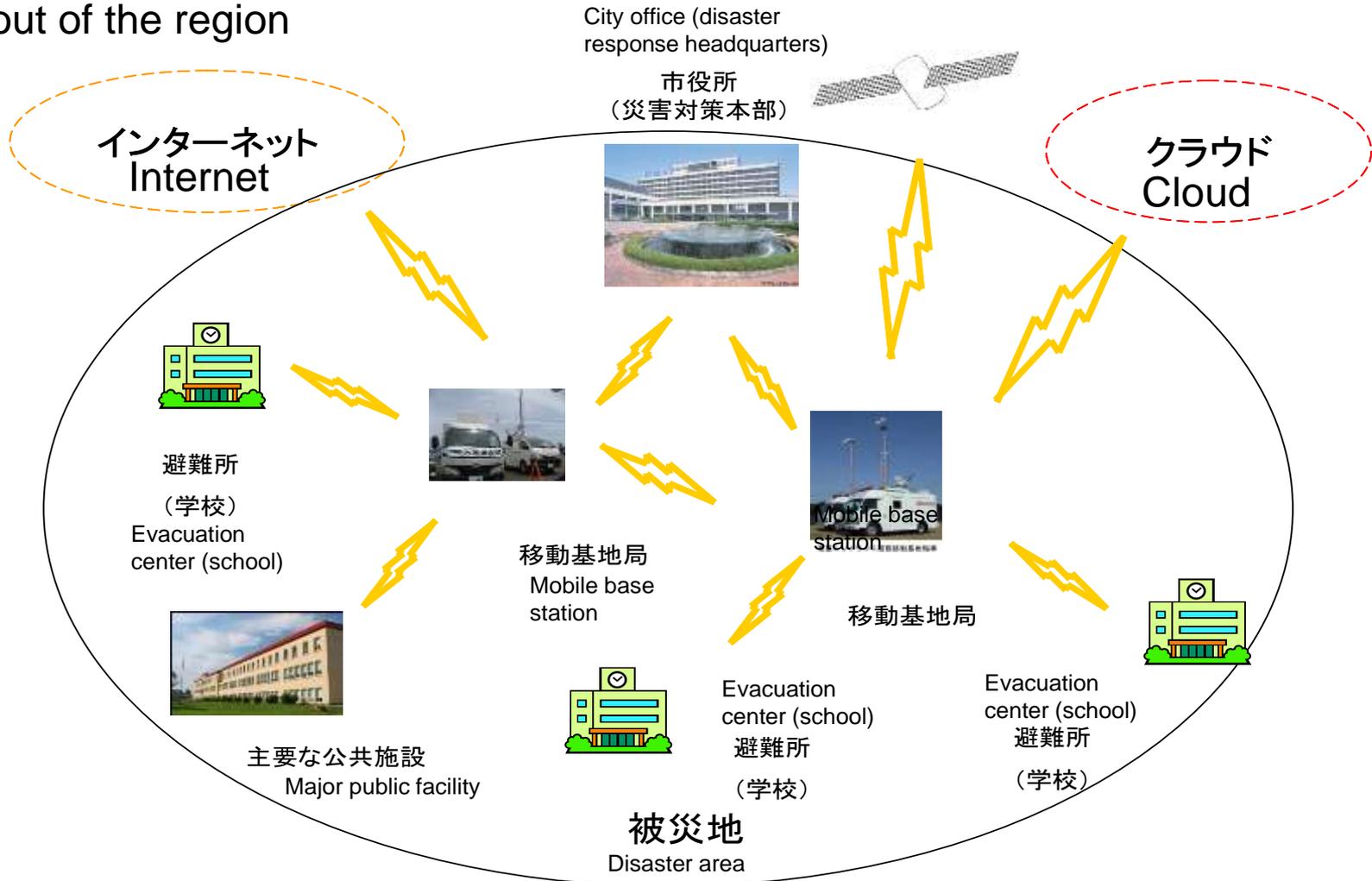
### Regulating prerequisite conditions of next-generation BCP

1. In what way can the situation at time of disaster be determined? It must be envisaged that things taken for granted in supporting operations, starting with government buildings, will be lost in damage expected from a disaster on the scale of the Great East Japan Earthquake.
2. In what way can the roles of national and local governments be determined?  
Operations can not continue smoothly when run by local governments alone.
3. Make compulsory links with regional disaster prevention planning, confirm the need to guarantee effectiveness

## 1. Development of framework for emergency restoration of local government functions

- (1) In this disaster, 4 municipalities and towns such as Rikuzen Takata had government buildings and information systems destroyed. Approximately 4 months is required to build temporary government buildings and restore information systems.
- (2) In order to proceed with restoration as quickly as possible after a disaster, it is necessary to prepare trained personnel and information systems in advance.
- (3) It is desirable that personnel consists of staff who will support overall operations, support the construction of temporary government buildings, and construct information systems.
- (4) In order to make the most of lessons learnt from this disaster in the future, we would like to request that the national government survey and analyze the situation of local governments in the disaster area, and investigate and develop this type of framework.

## 2. Framework development for rapid deployment of communications networks in and out of the region



●When communications become complicated immediately after a disaster, it is necessary for voice and data communications to take place by securing specified frequencies and transmitting through those frequencies via mobile base stations. We would like to request the national government and companies to investigate and develop the securing of such communications networks.

## 3. Cloud use for recovery operations support

- (1) After disasters, in the beginning operations are centered around emergency lifesaving, establishing evacuation centers and emergency measures for destroyed government buildings, but after one week there is an increase in operations related to
  - reception, examination and issuance of damage certificates
  - debris disposal, deconstruction and demolition of damaged buildings
  - Payment of living expense advances, donations, and lifestyle rebuilding grants
  - Temporary housing construction and registration
- (2) Many workers are being accepted from other cities to undergo this work. However, due to administrative reform in the local governments they have been dispatched from, it is difficult to acquire workers long term, and with dispatchees staying for short terms of 3 days to one week, they return just as they are getting used to the work.
- (3) Because much of this work is work which is easy to manualize, we would like the information system supporting overall operations to be shifted to cloud networks using the SaaS method, with the national government providing this to local governments at no cost.

It would be possible to provide training full time in each locality, enabling the training of many workers who can go to work on site immediately.