“Workshop on Disaster Relief Systems, Network Resilience and Recovery”

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Disaster Solutions based on Experiences in Japan Quake 2011

Takashi Egawa
NEC Corporation
t-egawa@ct.jp.nec.com

Empowered by Innovation NEC

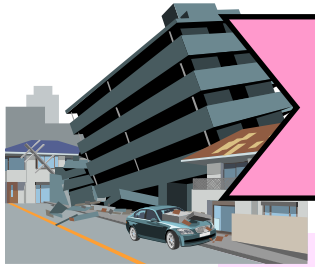
ITU International Telecommunication Union

Introduction

- Lessons from Japan Quake 2011 “3.11” (March 11th, 2011)
  - Cell Broadcast Service (CBS) based Emergency Alerts contributed reduction of damages
  - Location based services were utilized to find evacuation places and people
  - There were interruptions of telephone network in Metropolitan areas, that has triggered Disaster Voice Message Service (DVMS) development
- Outline
  - Part 1: Cell Broadcast Service (CBS)
  - Part 2: SUPL Location Platform (SLP)
  - Part 3: Disaster Voice Messaging Service (DVMS)

Solutions Required in a Disaster

- Different solutions are required on each phase in a disaster.



Disaster occurrence

Evacuation and safety confirmation (within 72 hours)*1

Prevention of second disaster and reconstruction (after 72 hours)

Escape from threat

Emergency alert by Cell Broadcast Service (**CBS**)

➔Part 1-A

Position report on emergency call

➔Part 2-A

Navigation & Tracking services

➔Part 2-B

Emergency Call

Finding **evacuation** place

Communication with families/office

Locating families and friends

Distribution of food and water

Delivery of evacuation information via **CBS**

➔Part 1-B

Assignment of relief supplies and volunteers

Delivery of supplies and human resources

Communication with families/office

Disaster voice messaging service (**DVMS**)

➔Part 3

*1 72 hours from the disaster is known as the limit of life saving activities (“Golden 72 Hours”)

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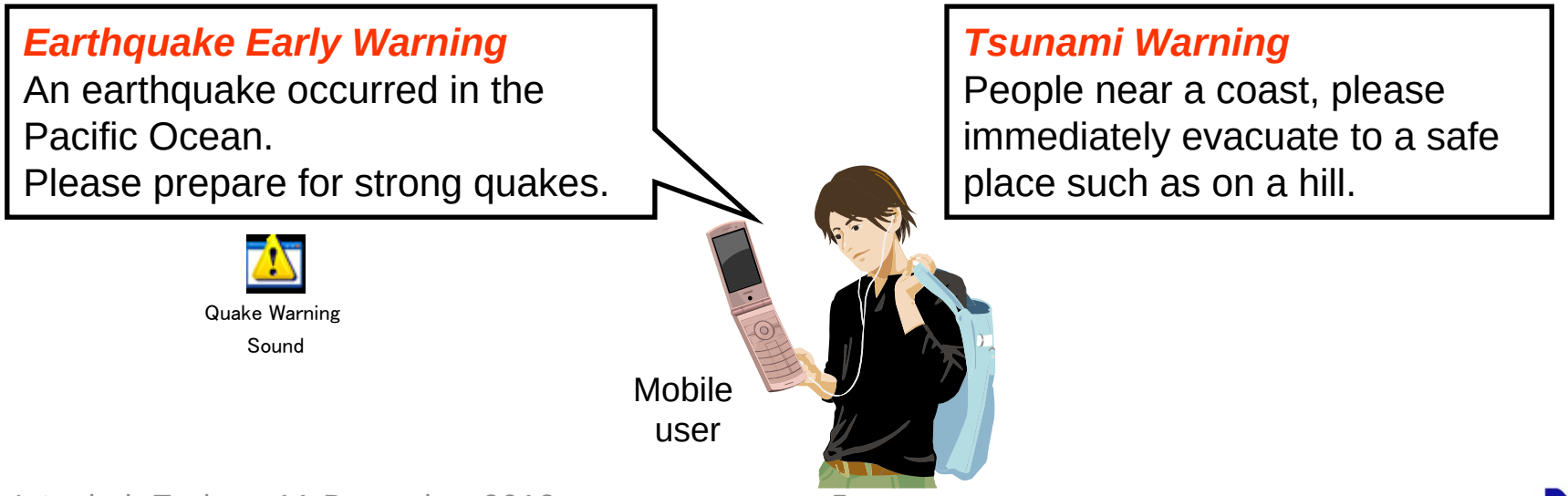
Part 1
Cell Broadcast Service (CBS)

1-A. Emergency Alert by Cell Broadcast Service (CBS)

- Actions in a few seconds in advance of strong quakes **significantly reduce damages**
  - Automatic quake detection/notification gives you in distant area a few seconds
  - Human lives can be saved from collapse of buildings
- **Accurate and timely delivery** of disaster information is critical

➔ ***Broadcast delivery based on automatic earthquake detection and its impact analysis***



1-B. Delivery of Evacuation Information

- Evacuation information should be delivered to mobile phones in damaged areas
- **CBS is network congestion tolerant**
  - It enables to deliver urgent information under congestion after a disaster.

An evacuation instruction from disaster

Evacuation Instruction（Example)
"ABC city issued an evacuation advisory.
A large fire occurred in …
Please get to your nearest evacuation place immediately.
Evacuation place is: C-1 park for D district,
E-4 elementary school for B district…"

Mobile user

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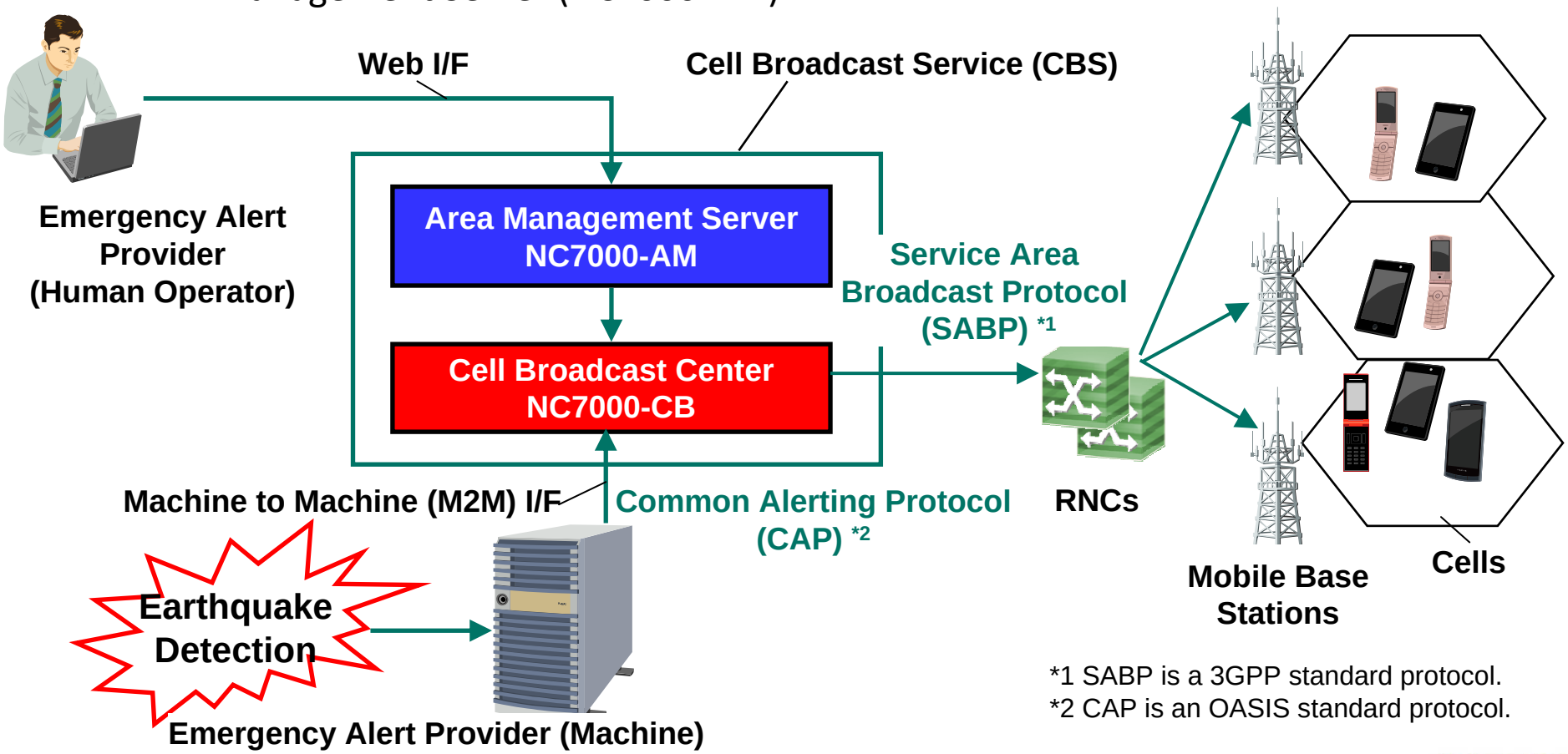
System Structure of NEC's Cell Broadcast Service

- Broadcasts information to cell phones in the suffered area
  - Cell Broadcast Center (NC7000-CB) broadcasts messages to phone cells
  - Automatic operation is triggered via M2M interface of NC7000-CB
  - Message input operation is performed manually via Web I/F of Area Management Server (NC7000-AM)

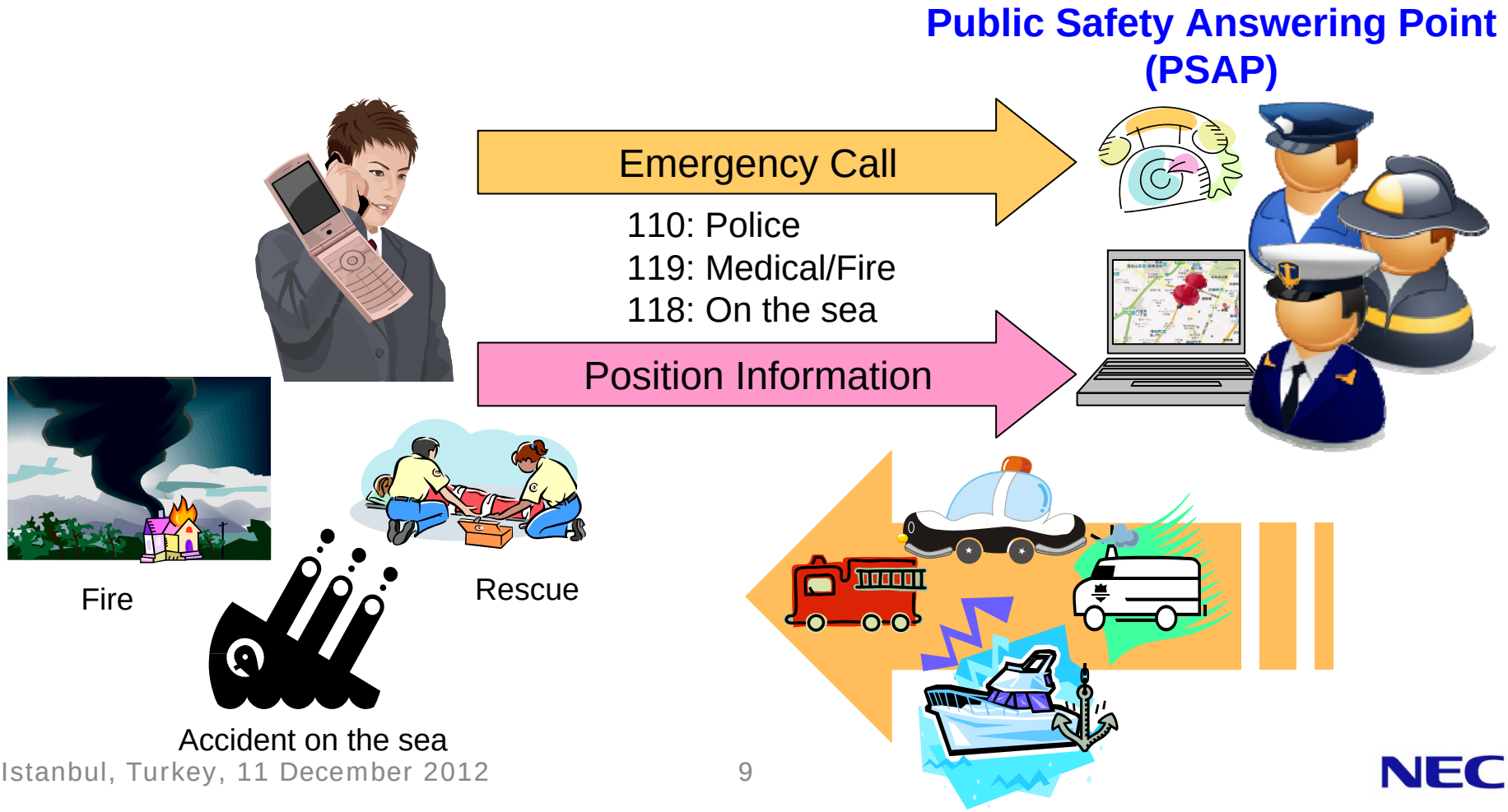


*1 SABP is a 3GPP standard protocol.
*2 CAP is an OASIS standard protocol.

Part 2
SUPL Location Platform (SLP)

2-A. Position Report on Emergency Call

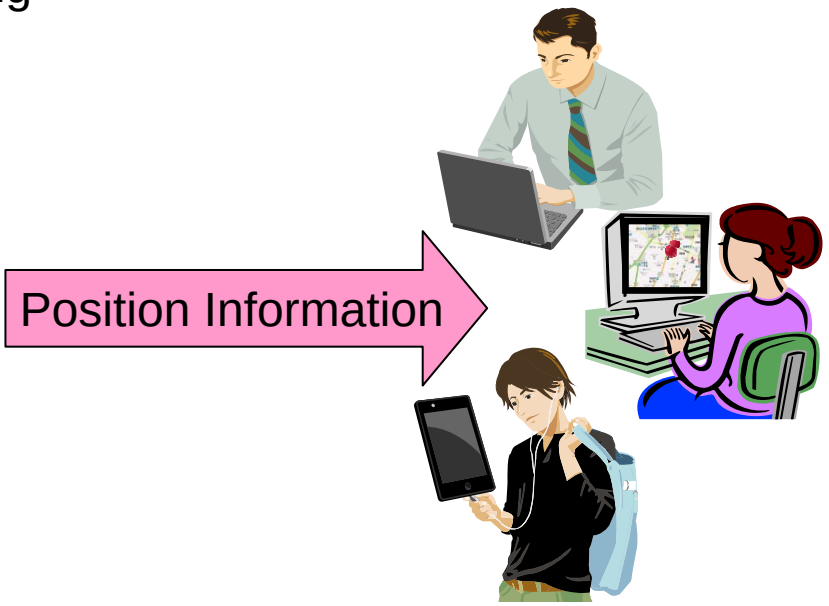
- In Japan, on receiving an emergency call, a Public Safety Answering Point (PSAP) can acquire the caller's position information based on A-GPS or Cell.
  - Emergency calls from mobile phones increased in Japan Quake 2011.



2-B. Utilization of Location Services for Consumers

- Web-based position information service is helpful when call is restricted.
  - Navigation services for getting to an evacuation place
  - Tracking services for locating families and friends

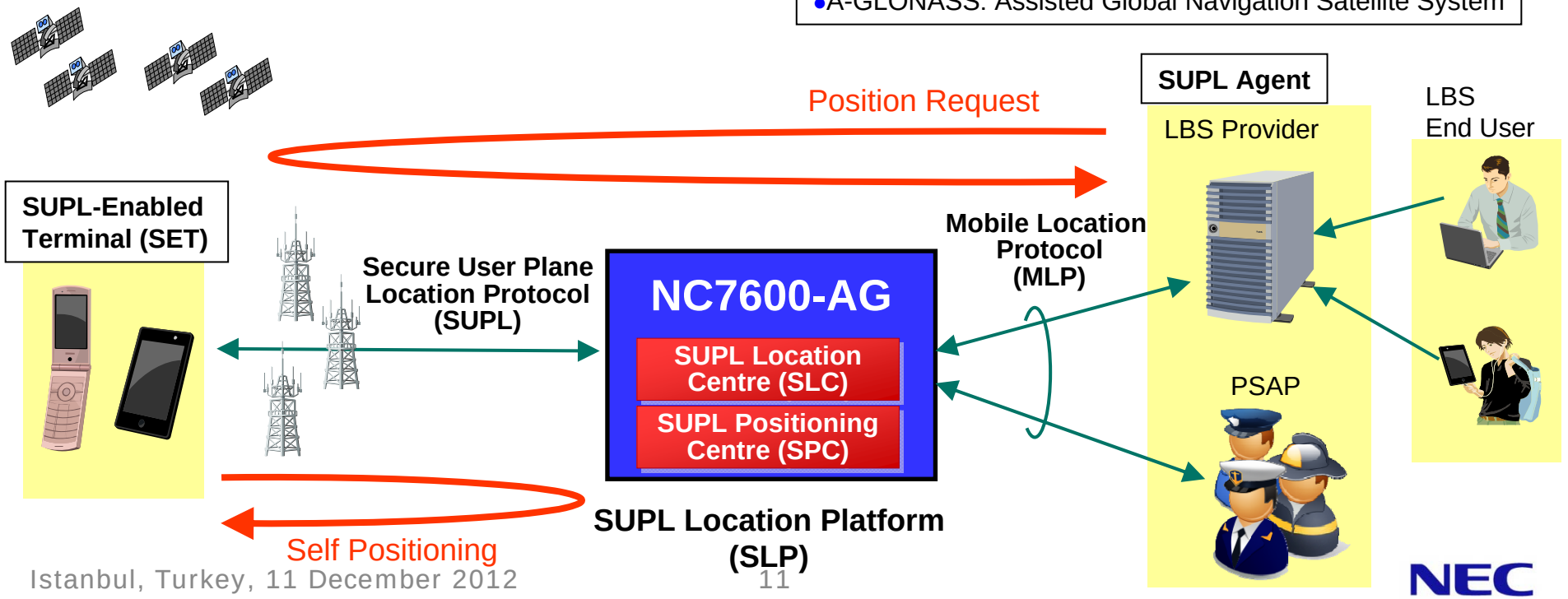
People having difficulties to get home (at Japan Quake 2011)



System Structure of NEC's Positioning Solution

- NC7600-AG provides Positioning Service (A-GPS and Cell) for SUPL-Enabled Terminals (3G/LTE)
  - compliant with OMA standards: Secure User Plane Location (SUPL) and Mobile Location Protocol (MLP)
  - supports self positioning and position requests by SUPL Agent
  - will also provide A-GLONASS

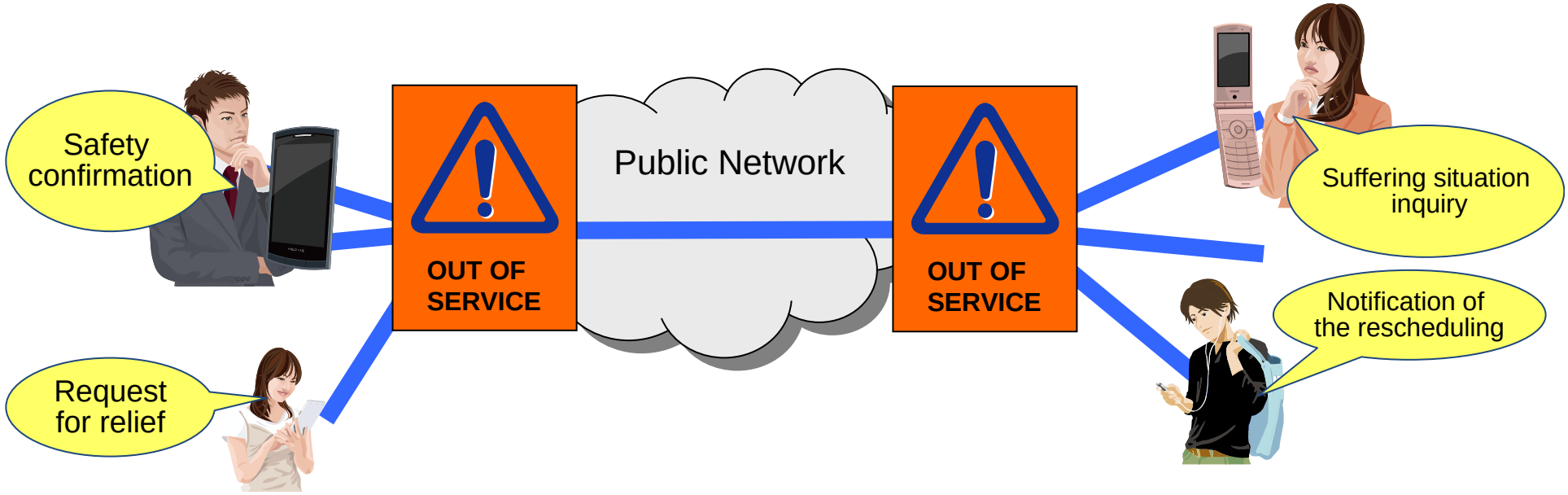
- A-GPS: Assisted GPS
- LBS: Location Based Service
- A-GLONASS: Assisted Global Navigation Satellite System



Part 3
Disaster Voice Messaging Service (DVMS)

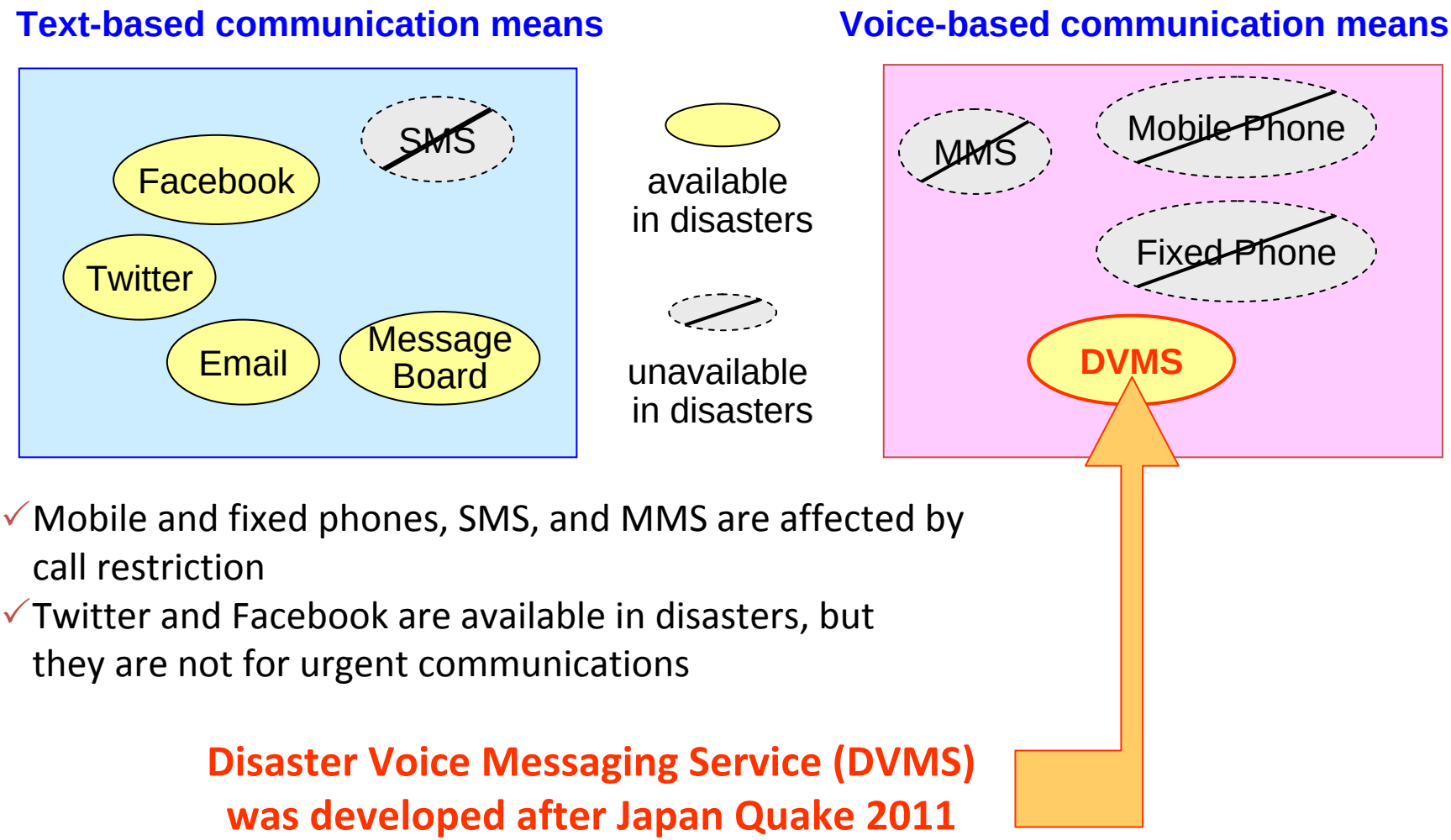
Communication Problems in Japan Quake 2011

- Huge volume of phone calls generated in Metropolitan area to inform his/her situations, to inquire others' safety, etc.
- Network operators ***restricted phone calls*** to avoid a system stop
  - Fixed network: *90 percent calls were restricted* at most (NTT East)
  - Mobile network: *90 percent voice calls and 30 percent packets were restricted* at most (NTT DOCOMO)
- The key problem is *how to establish* ***an alternative communication means*** *when telephony system is hardly available*



Alternative Communication Means in Disasters

- Voice communication is required in disasters ***to carry feeling of relief***



✓Mobile and fixed phones, SMS, and MMS are affected by call restriction

✓Twitter and Facebook are available in disasters, but they are not for urgent communications

Disaster Voice Messaging Service (DVMS) was developed after Japan Quake 2011

Development of Disaster Voice Messaging Service (DVMS)

Press Release on DVMS Interconnection Guidelines by TCA[*1] and all mobile operators in Japan (Nov. 28, 2011)

携帯電話事業者間における「災害用音声お届けサービス」の共通的な運用に関するガイドラインを策定

2011年11月28日

社団法人電気通信事業者協会

- TCA members (six mobile operators in Japan) formulated guidelines on common operations of DVMS
- The guidelines contain specifications about interconnection among operators

「災害用音声お届けサービス」は、発信者が携帯電話でファイル化した音声をパケット通信で届けるサービスで、音声通信が混みあって電話がかかりにくい場合であっても安否確認等を可能にします。本サービスの利用が促進されることにより、音声通信の輻輳が軽減され、緊急通報などの重要通信を確保しやすくなります。

本サービスは、2011年7月29日に総務省主催の「大規模災害等緊急事態における通信確保の在り方に関する検討会」（座長：桜井 俊 総合通信基盤局長）中間取りまとめにおいて、早期の実現に向けて各事業者が連携して取り組みを速やかに開始することが提言されております。

*1 Telecommunication Carrier Association (TCA): an industry group organized by telecommunication carriers in Japan.

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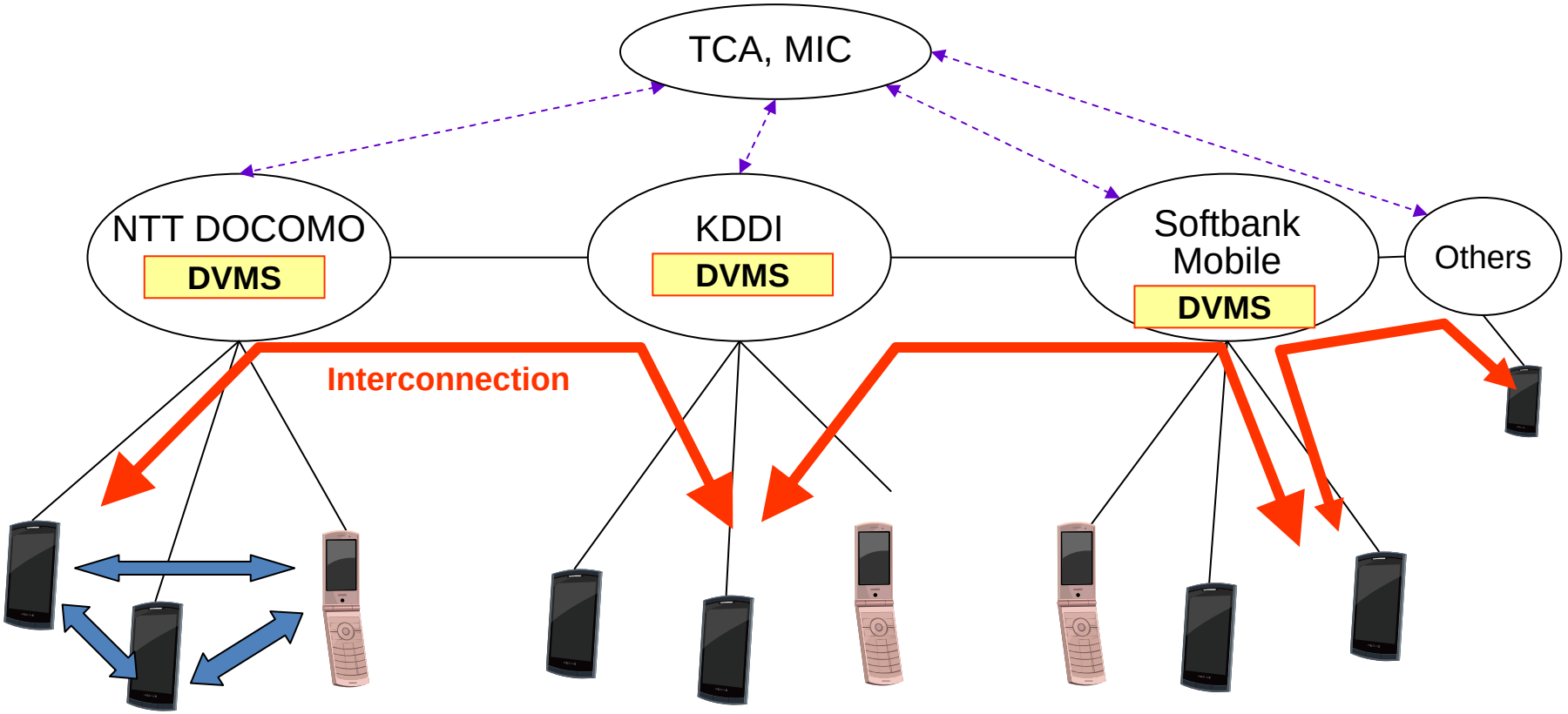
Structure of DVMS network in Japan

- DVMS will cover all residents in Japan by cooperation of mobile operators
  - NTT DOCOMO, KDDI and Softbank Mobile have started the service

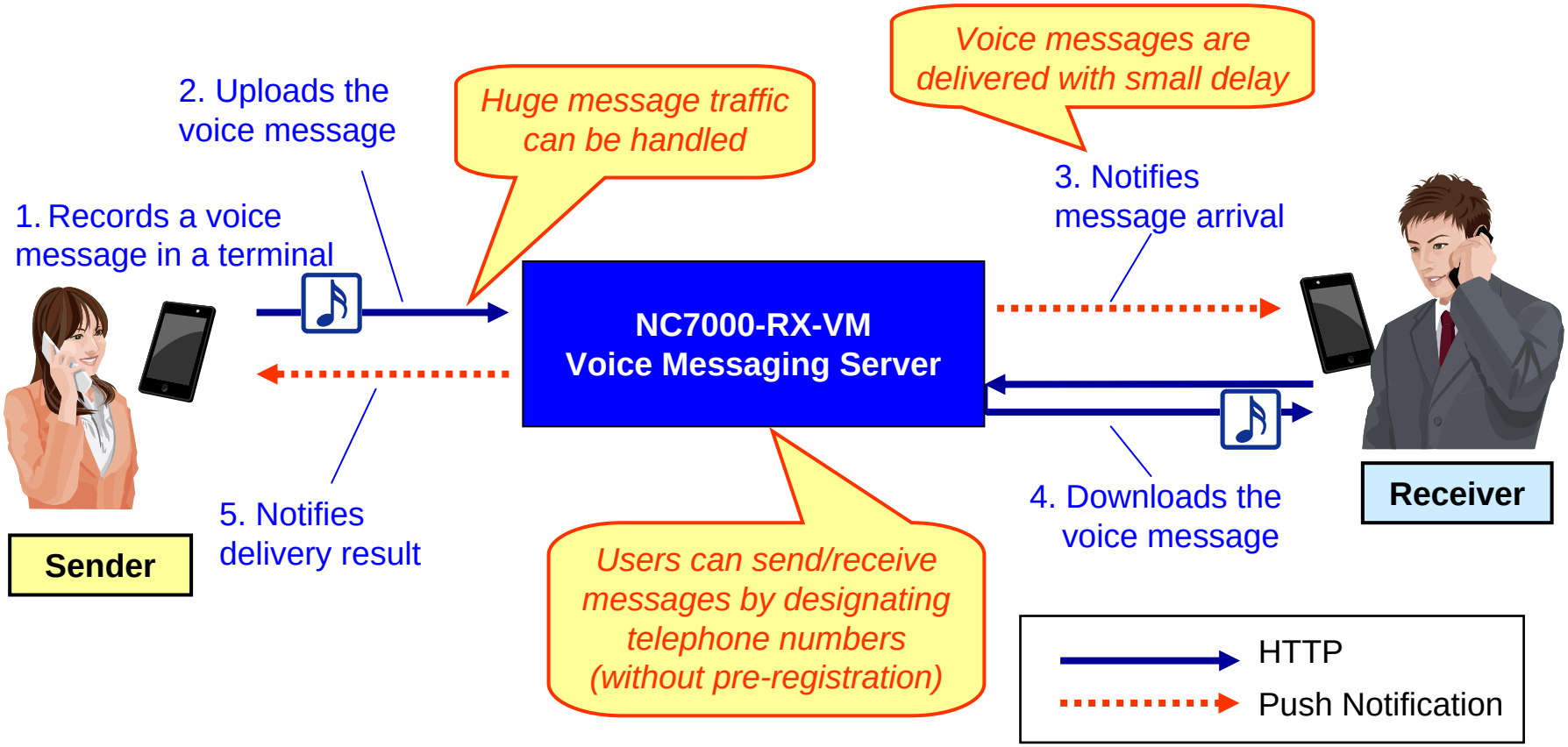


Smart phones and feature phones

TCA: Telecommunications Carriers Association
MIC: Ministry of Internal Affairs and Communications

NEC's Disaster Voice Messaging Solution: NC7000-RX-VM

- NEC provides a voice messaging solution for disasters that
  - utilizes the subscriber database of the operator,
  - is scalable to huge message traffic, and
  - delivers prompt messages with push notifications.



User Interface Example in the Client

- A user can send a voice message similar to making a telephone call

Summary

- NEC provides three solutions covering all the phases in a disaster:
  - The CBS solution contributes reduction of damages from disasters by message broadcasting (NC7000-CB and NC7000-AM)
  - The positioning solution contributes safety confirmations by transferring location information (NC7600-AG).
  - The DVMS solution provides a user-friendly alternative communication means after a disaster (NC7000-RX-VM).

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