Multimedia Applications

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National Communications System

Information Flow Requirements

National Government

Regional/State Government

Local Government

Other National Governments

International Agencies

Population within Affected Area

Disaster Relief Organizations

Population(s) Outside Affected Area
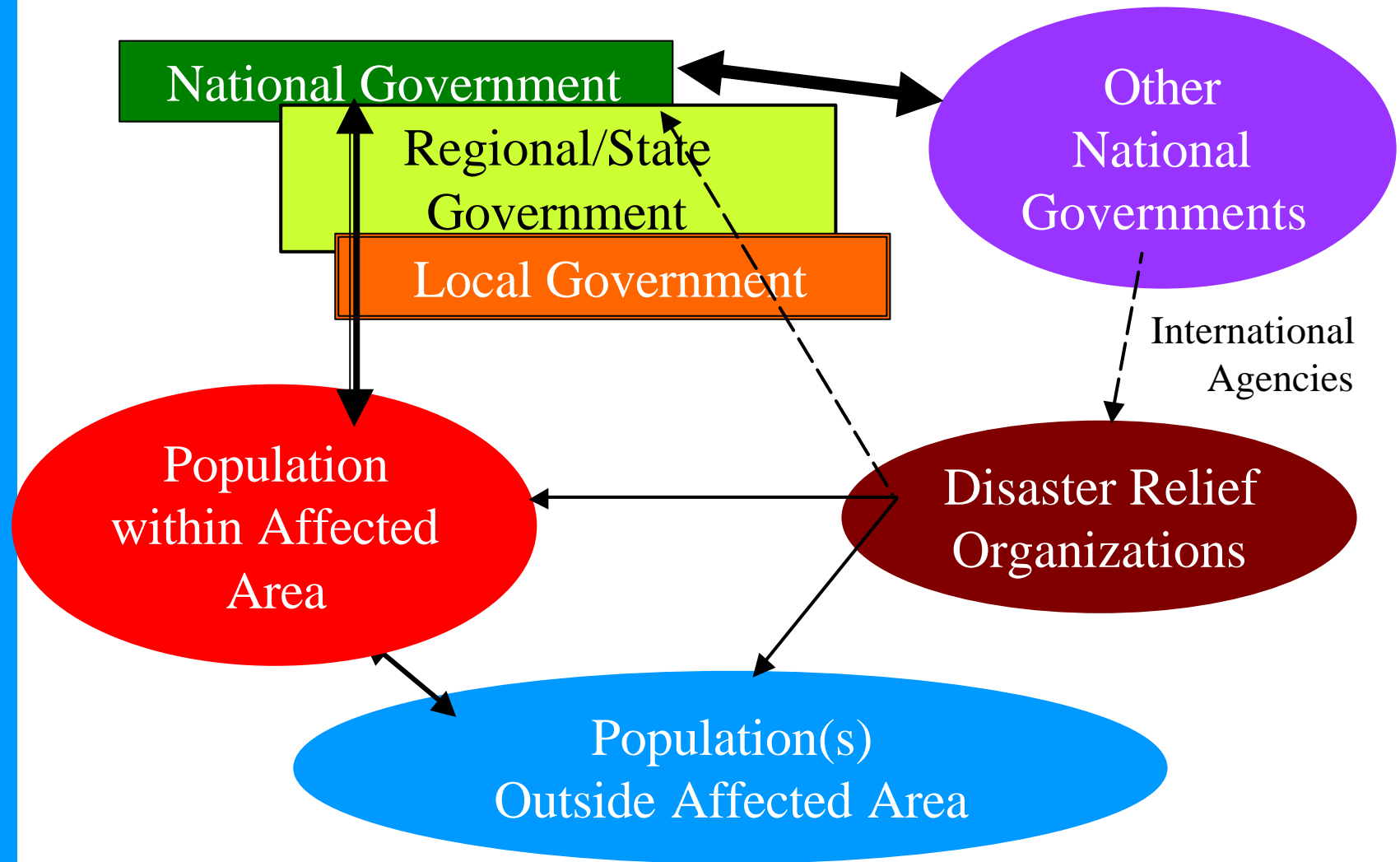
Why Multimedia

o **Enhanced Capabilities Beyond Voice**

— Data and Video

o **Emerging Media for Bridging Distances**

o **Robustness**

o **Supports Near Real Time and Non-real Time**

— Real Time Not Reliably Guaranteed

Applications

o Voice Telephony

— PSTN, Wireless, Voice over Internet Protocol (VoIP)

o Reporting & File Transfers

o Telemetry Applications

o Video Teleconferencing

o Telemedicine

o Database Services

o Interactive Victim Database

Voice Telephony

o Primary Communication Used by Government and Relief Organizations

1. Dedicated
   - Satellite Phones
   - Packet Switched
   - Circuit Switched

2. Public Networks
   - Circuit Switched
   - Wireless
   - Packet Switched

Voice Telephony

o **Minimum Essential Communications Required by Disaster Responders**

1. Supports Real Time Information Flows

2. Lacks Enhanced Capabilities Provided by Multimedia Based Systems

3. Limited Effectiveness for Long/complicated Information Transactions

Reporting & File Transfers

o After Voice, Next Level of Multimedia Support for Disaster Relief Workers

  1. Short Messaging Service (SMS)
  2. Reliable E-mail With Attachments
  3. Transfer of High Resolution Images & 3D Graphics (Disaster Site Scenes)

  4. Full motion video

o Local Access & Connectivity Is Vital

  — Availability at Disaster Site

Telemetry Applications

o Seismic Activity

o Weather Data

o Search and Rescue Information

o Information From Audio Sensors, Infrared Video, & Video Scanners

o Structural Integrity of Buildings

o Chemical Test Data

Video Teleconferencing

o Coordinating a Response to Disasters

– Governments for Crisis Management

1. Consultation for Response & Recovery Efforts

2. Deployment of Rescue Teams

– Relief Organizations Providing Humanitarian Aid
(e.g., Red Cross, Red Crescent)

Telemedicine

"the practice of medical care using interactive audiovisual and data communications. This includes medical care delivery, diagnosis, consultation and treatment, as well as education and the transfer of medical data"

- Advisor on Informatics of the World Health Organization.

Report by the WHO Director General to the 99th Session of the Executive Board,

6 January 1997 (Ref: EB99/30)

Telemedicine Applications

o Brings Hospital-based Expertise to Field Environments

o Store-and-forward for Transferring Digital Images

o Telemetry for Monitoring Vital Signs of Victims

o Two-way Interactive Television (IATV) for Remote Medical Services

Telemedicine Outlook

o Virtually All Telemedicine Transmissions Will Happen Using Internet Protocols, Whether or Not the Transmissions Happen Over the Internet

o As Internet Capacity Grows, It Is Expected That Nearly All Telemedicine Transactions Will Be Done Via the Internet

Database Services

o Managing the Supplies/Resources Needed to Help Mitigate the Disaster

  1. Access to Inventory Lists & Distribution Systems

  2. Ordering/procurement of Supplies

     – Medicine, Food, Water, Shelter, Telecommunications

  3. Location and Delivery Updates

Database Services

o **Access to Reference Information**

1. Manuals & Technical Documentation

2. Queries on Hazardous/toxic Materials & Handling Instructions

3. Maps (topology information)

Victim Locator Database

o Allows People in Disaster Areas to Register Their Whereabouts

o Provides an Alternative Source of Information for Relatives

o Could Help Minimize Calls to Relief Organizations & PSTN Congestion

o "I Am Alive" Service Being Deployed in Japan

Multimedia Requirements

o **Sustained Bandwidth**
   1. H.323 (H.263) 28Kbits/s – 1 Mbits/sec
   2. MPEG1: 1.5 Mbits/sec
   3. MPEG4: 5 Kbits/sec – 4 Mbits/sec

o **High Quality Video**
   1. Video Should be at Least VHS Quality (> 1Mbps MPEG1)
   2. Low Latency & Jitter

Multimedia Requirements

o **High Quality Audio**

— Delay, Jitter, and Packet Loss

o **Quality of Service**

— Adaptive Applications

o **Low Drop Probability or Preferential Queuing**

Summary

o **Multimedia applications, especially wireless, will provide enhanced capabilities for dealing with disasters**

o **A number of technical challenges lie ahead**