

# Hastily-Formed Networks for First Responders



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# Introduction

- HA/DR missions are inherently distributed operations
  - Though often centrally run, data collection and use for data is distributed
  - Real-time data collection, dissemination and use
- HA/DR missions impose many other demanding requirements
- We present a smartphone based system to handle the requirements

# First Responder Needs (1/3)

- Get going with the mission at fast speed
  - TwiddleNet fly-away kits will require little set-up
- Tight-loop, frequent communication with team members
  - Smartphones produce RSS feeds automatically on content capture
  - Tagging is automated
  - Dissemination is automated

# First Responder Needs (2/3)

- Equipment needs to be as light as possible
  - The entire system is smartphone-based!
- Scale-up as team/requirements grow
  - TwiddleNet is focused on the first 48-72 hours after a disaster.
  - Can hand-off to more robust (read heavy metal) infrastructure when it becomes available

# First Responder Needs (3/3)

- And, don't forget the battery...
  - We pay special attention to power management, e.g.:
    - Smart caching of popular content (owner's consent is required)
    - Send content periodically (rather than as it is captured)
    - Don't allow access when the battery is critically low
    - Etc.

# What is TwiddleNet?

- Gateway to Mobile Personal Servers (which are twiddling most of the time)
- Mobile personal servers run on smartphones
- Mobile personal servers host user's content – images, videos, audio, other real-time sensor data

# TwiddleNet – Key Observation

- Today's phones are more powerful than PCs of just a few years ago
  - Processors at 600MHz (1GHz coming!)
  - More than 100MB of RAM
  - More than 2GB of storage
  - And...
    - Wireless network – 2.5/3G, WiFi, Bluetooth etc.
    - Content capture capability – Photos, videos and sounds
- All this in a small form factor of a handheld device!!!

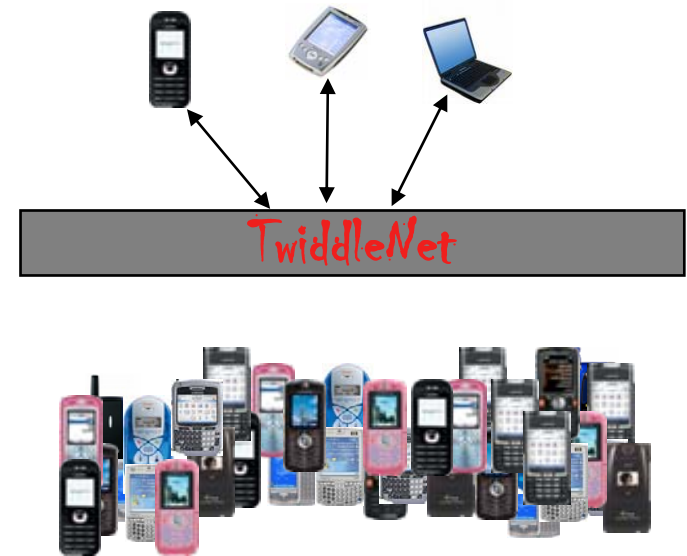
# Why TwiddleNet?

- Immediate content capture and publish
- Full owner control of content
- Harness the power of mobile devices twiddling most of the time
- Allow access to content which is otherwise inaccessible

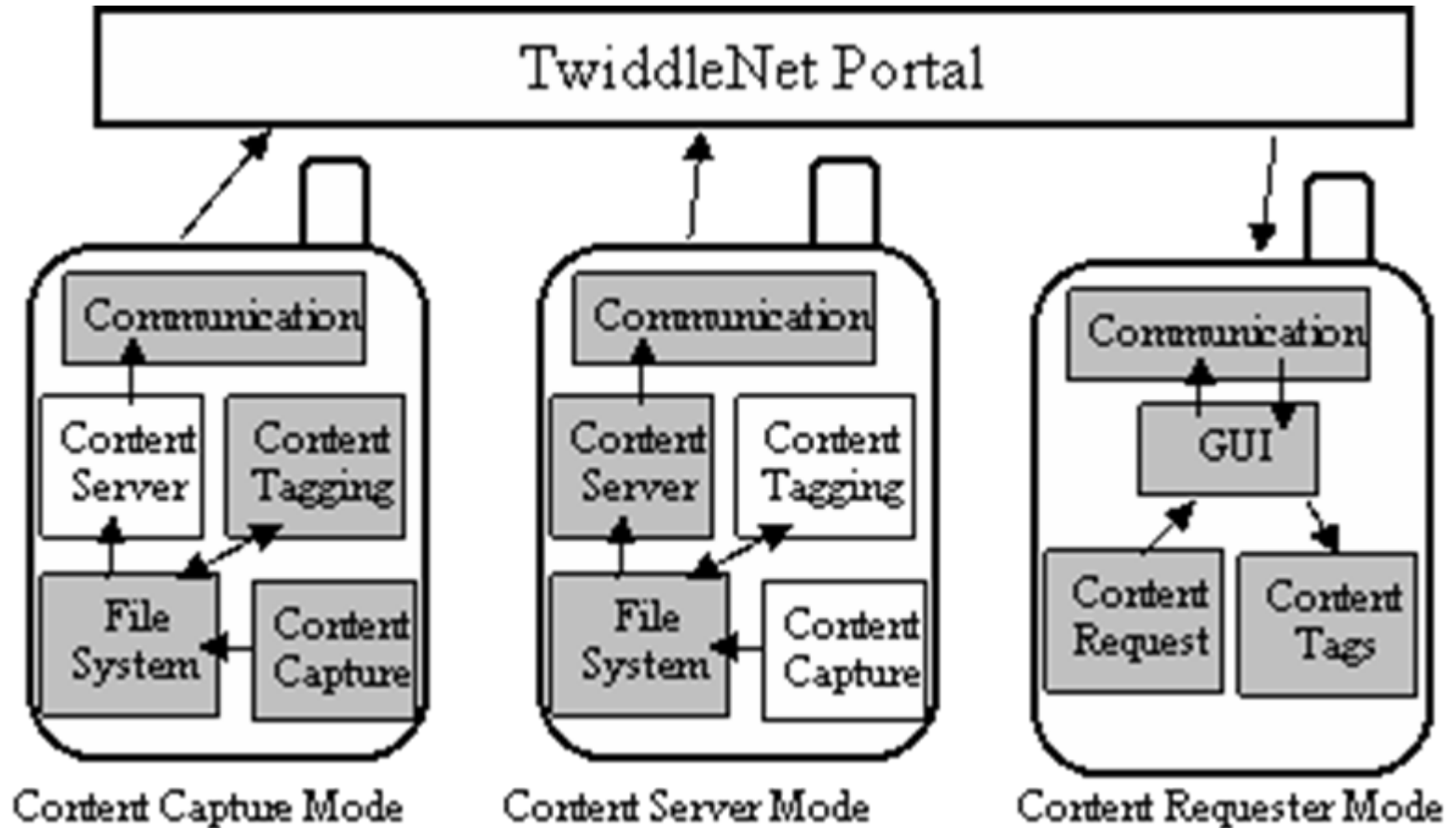


# TwiddleNet Architecture

- Portal (but not a server) which is gateway to Mobile Personal Servers
- Allows search, viewing and download of content hosted on personal servers
- Content access statistics for smart caching
- Accessible from handhelds and desktops
- Match the end-user device capability



# Smartphone Modes in TwiddleNet



# TwiddleNet Applications

- First-responder hastily formed networks
- Social networking
- Other rapid content applications

# Current Status

- Tested an early version in Operation Golden Phoenix 07
- Planned test in COASTS Field Experiments in Ao Manao, Thailand – May '08

# Next Steps

- Continue R&D
  - Security
  - Availability
  - Content management
  - Scalability
  - Manageability
  - Server migration in the middle of operation
- Test in COASTS '08 – Thailand

Thank you.

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