Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [NICT's Response to Call for Applications TG 15.8 Peer Aware Communications]

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Re: [Respond to the CFP of PAC]

Abstract: [Applications and use cases proposals for TG15.8 Peer Aware Communications are described]

Purpose: [This document is to respond to call for applicatons for PAC]

NICT's Response to Call for Applications TG 15.8 Peer Aware Communications

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Outlines

- Purpose of this document
- Background
- Four typical usage models
- General requirements of PAC
- Conclusion remarks

Purpose of This Document

- Peer aware communications (PAC), IEEE802.TG 15.8, was approved by SASB in March 2012 with the Project Authorization Request (PAR) of Doc. # 15-12-0157-00-0pac).
- A Call for Applications for the new TG 15.8 Peer Aware Communications (PAC) was announced on April 15, 2012 to solicit presentations on use models and applications.
- The purpose of this document is to response to the Call for Applications for the new TG 15.8 with examples on usage models and applications.

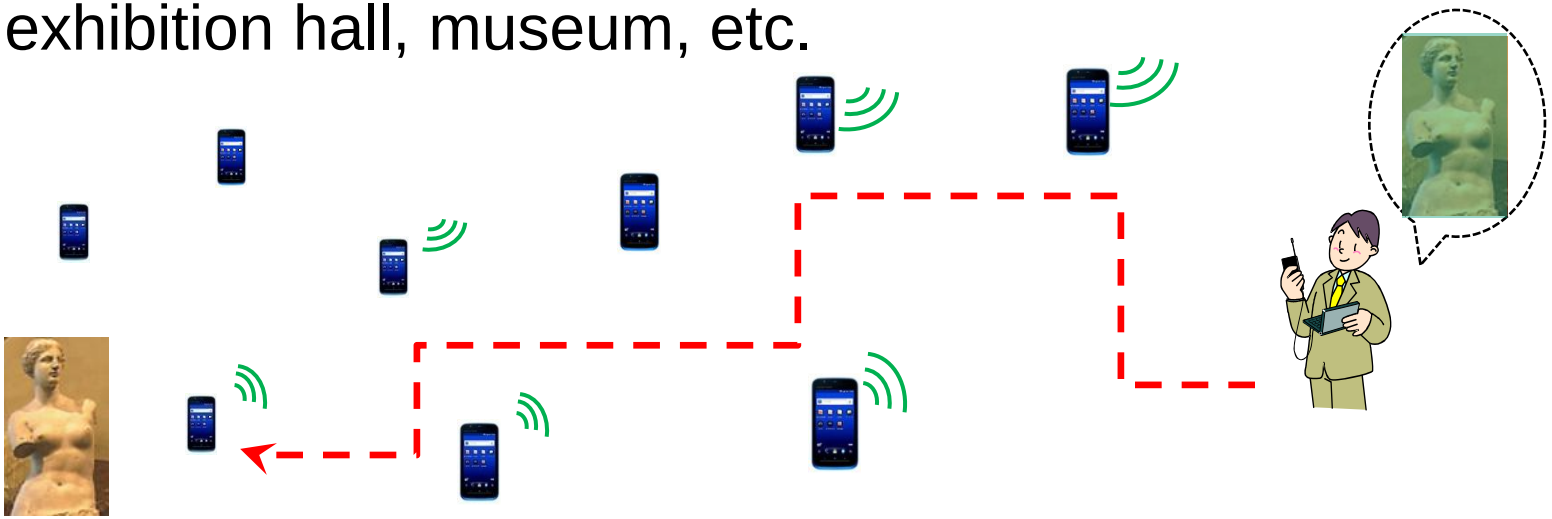
Background: Needs for infrastructure-less local networking

- As demand for wireless connections increases, frequency bandwidth efficiency becomes more and more important. Efforts are made with the development of pico-cell, femto-cell, HetNet, etc. The basic idea is to activate local connecting networks.

- Connecting neighbors without infrastructure is much more direct way to enable local connection. PAC is expected to take such a role and support different types of applications based on local connection.

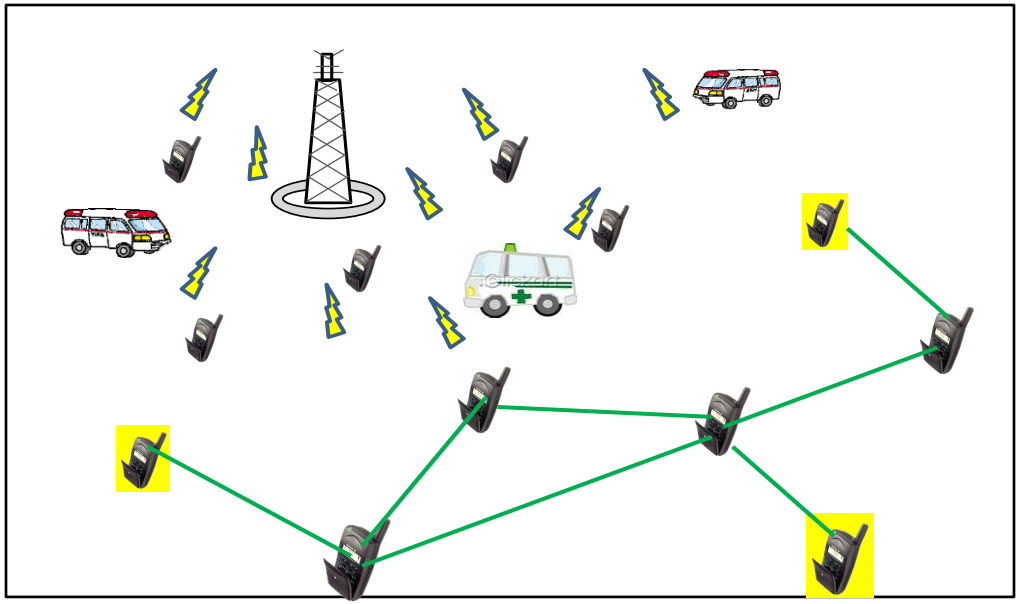
Usage model (1)
In Building Navigation

- GPS provides convenience of locationing services. However, GPS is not available in indoor environment.
- Through peer/neighbor's connection, we can not only exchange information among peer devices but also obtain location information for route guiding in big exhibition hall, museum, etc.



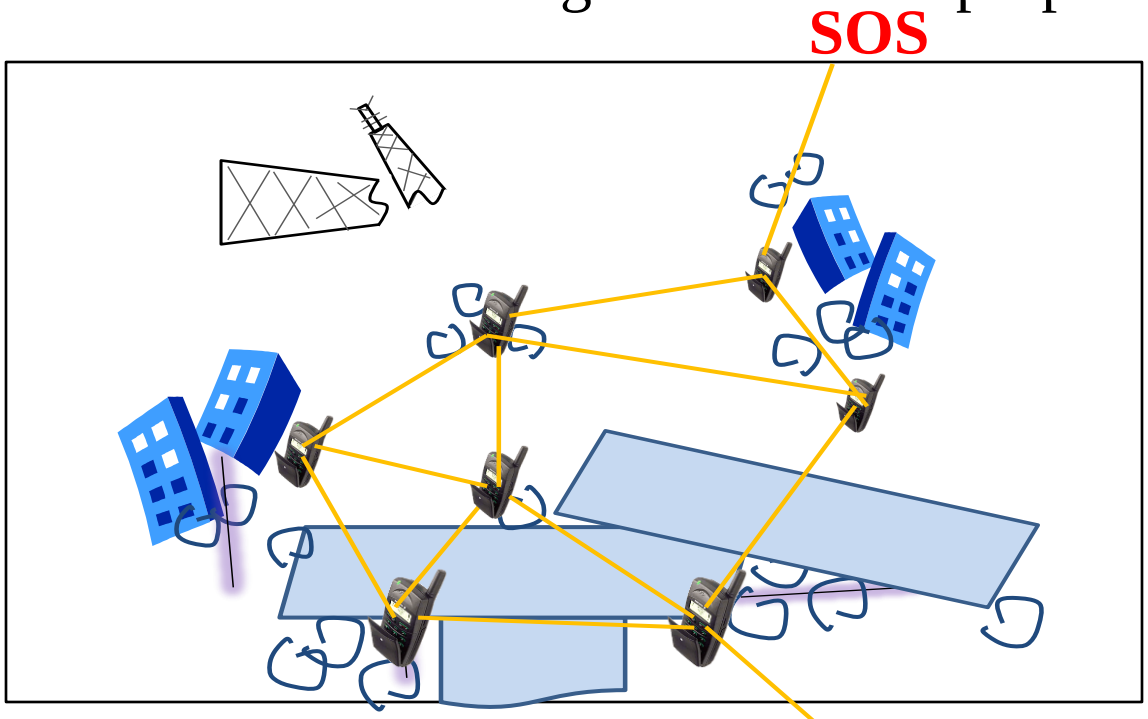
Usage model (2)
Bypass independent from infrastructure

- When base station is out of work due to accident occurrence like power outage, server breakdown or congestion, PAC can provide a bypass to connect devices through multi-hop.



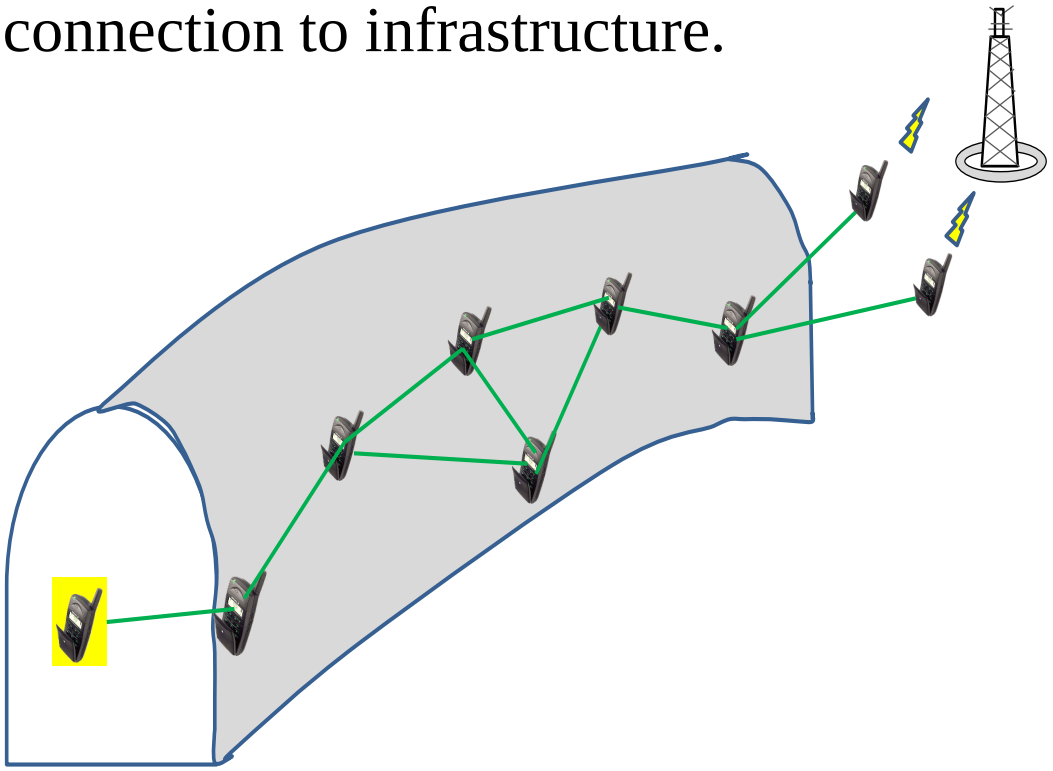
Usage model (3)
Emergency connection in disasters

- In disasters like earth quake, hurricane, floods, etc., PAC can provide emergency connection among a cluster of neighbours and send SOS signal for rescue purposes.



Usage model (4)
Extension to infrastructure

- When traveling in infrastructure-uncovered area like tunnel, underground, PAC can provide relay within peer devices to extend the connection to infrastructure.



Requirement on Peer Aware Communications (1)

- Additional mechanisms are needed to guarantee being connected at any where and at any time when a cluster of peers exists.
- Connections need be organized without a particular centralized base station or AP.
- The PAC-NET need to operate independently but should also include a hook to enable connection with existing infrastructure.

Requirement on Peer Aware Communications (2)

- Distributed and self organized
- A high degree of autonomous and ad hoc
- Multiple relay and cooperative communication
- Congestion avoidance
- Special mode for disaster and emergency
  - Extremely low power consumption for long time operation
  - To send SOS and report location in case of disasters
  - Low emission power for long distance

Conclusion Remarks

- Four typical usage models for PAC are presented with illustration.
- Special operation mode for disaster and emergency usage are required.
- Complementary role or as extension of infrastructure are desired.