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

Submission Title: [Technical Discussion on Peer Discovery]
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Re: [.]

Abstract: [Discussion about several technical issues on peer discovery and prioritization of work scope]

Purpose: [Discussion for PAC Framework Document]

Technical Discussion on Peer Discovery

September, 2013

Samsung

Issue1: Discovery Types

- According to direction
  - Unidirectional discovery
    - Advertisement discovery
      - Broadcast my identity without any expectation of response
  - Interactive discovery
    - Query/Reply discovery
      - Broadcast friend's identity with expectation of response
    - Publish/Subscribe discovery
      - Broadcast my identity with expectation of response

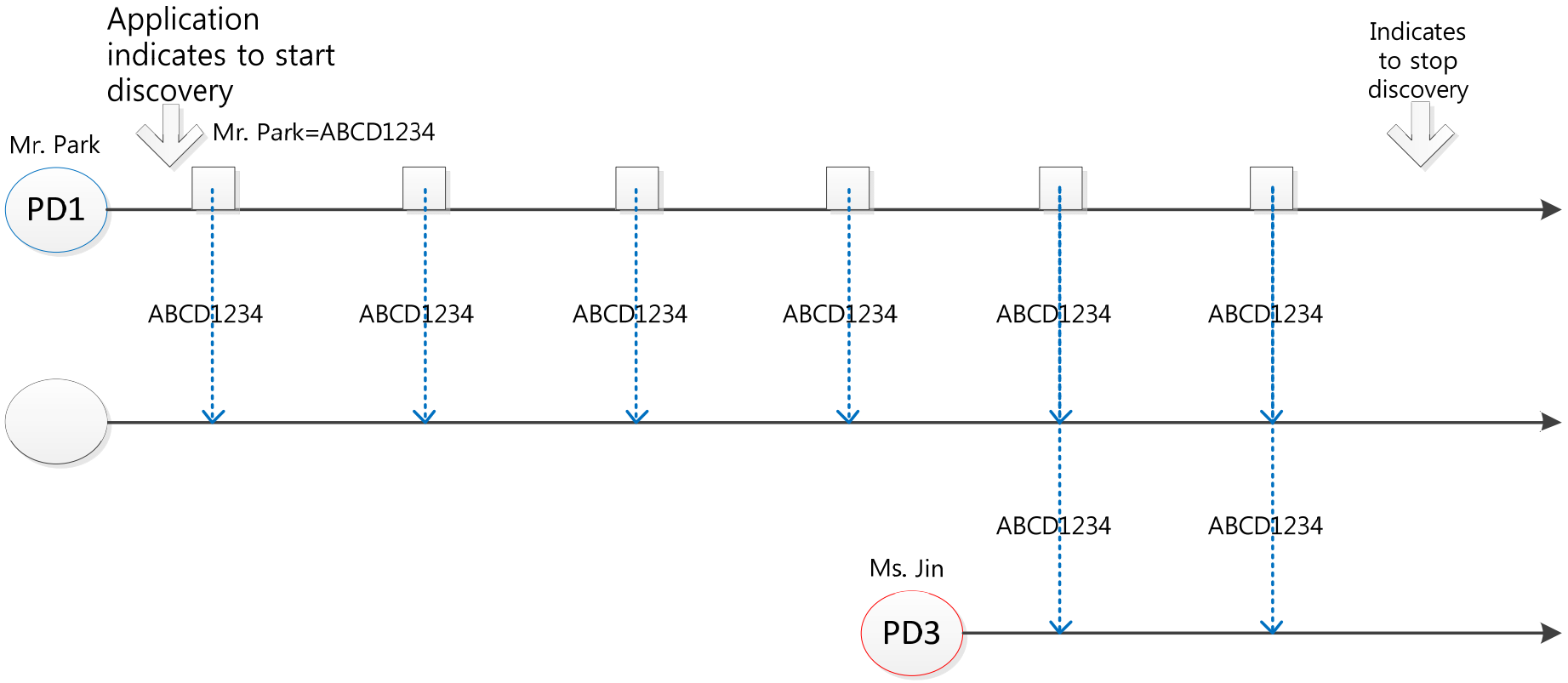
Issue1: Discovery Types

- According to volunteering
  - Solicited discovery
    - Target discovery
    - Query/Reply discovery
  - Unsolicited discovery
    - Non-target discovery
    - Advertisement discovery
    - Publish/Subscribe discovery

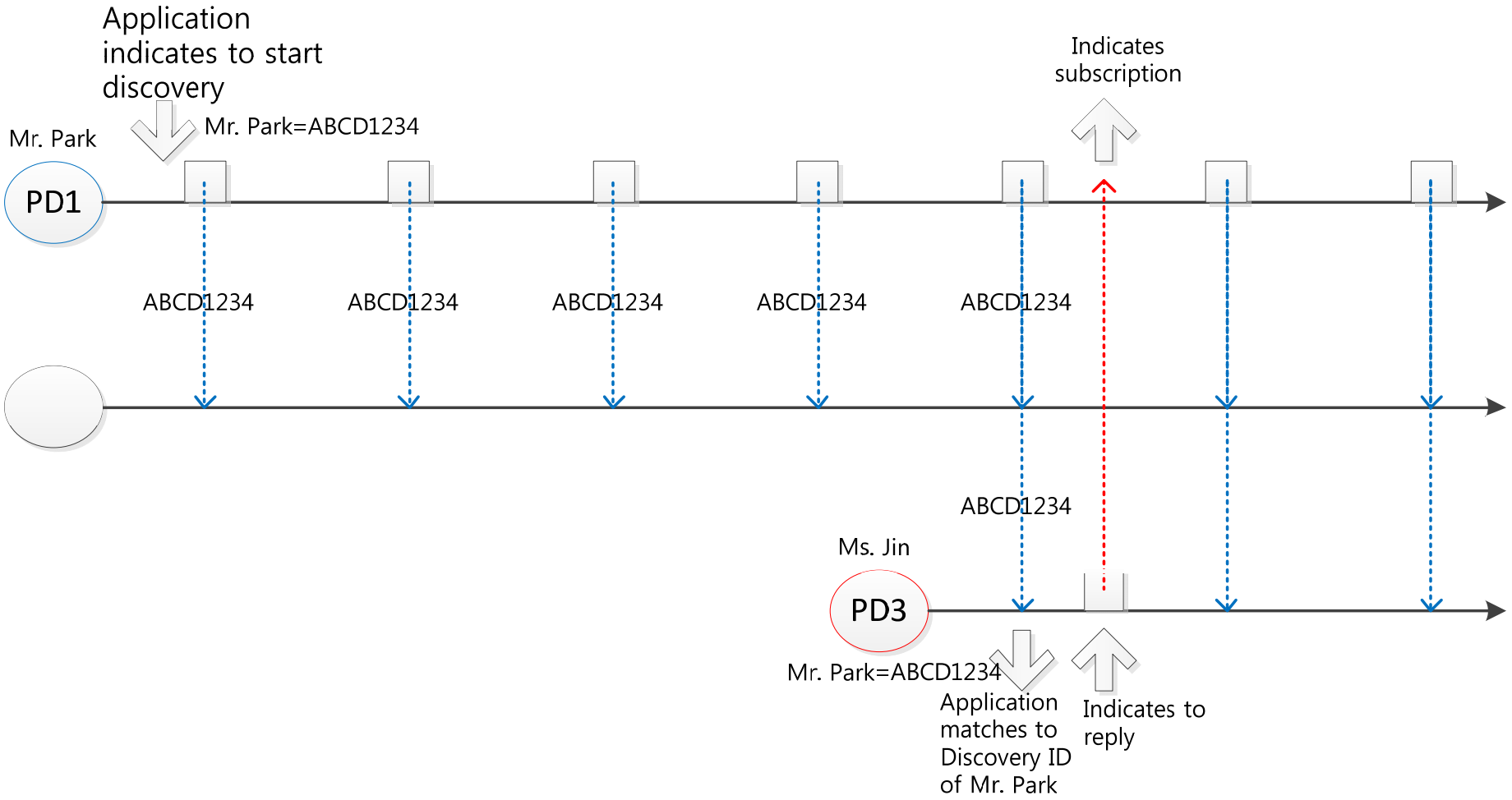
Periodicity of Discovery Transmission

- Unsolicited discovery
  - Broadcast periodically
- Solicited discovery
  - Broadcast periodically until the match successes

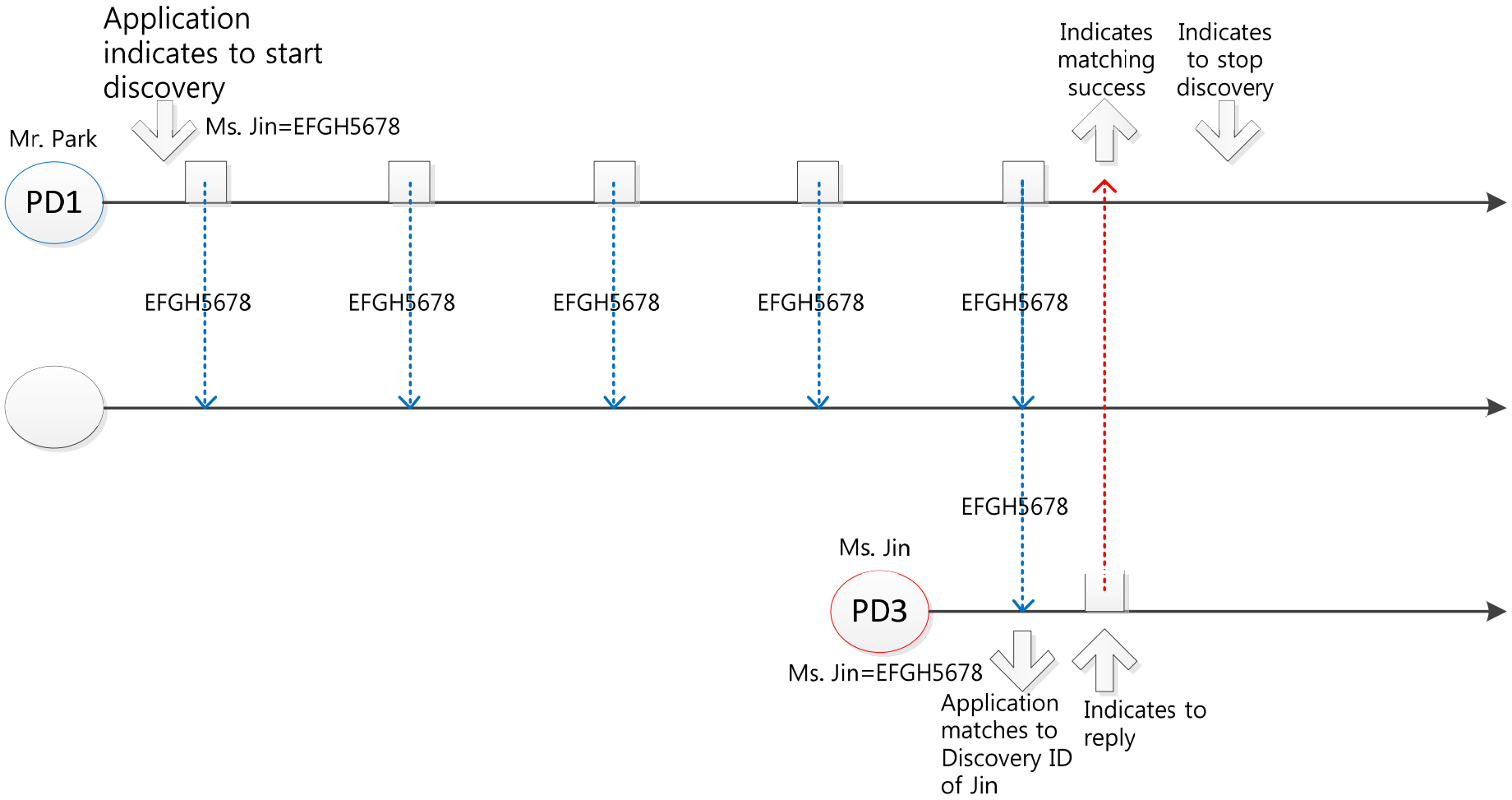
Unsolicited Discovery
- Advertise -



Unsolicited Discovery - Publish/Subscribe -



Solicited Discovery
- Query/Reply -



Conclusion 1

- Regardless of discovery types,
  - Discovery information is periodically transmitted
  - Base on periodic discovery transmission
    - Advertise discovery does not require response
    - Query/Reply and Publish/Subscribe discovery requires response from the received PD

Issue 2: TX/RX Role during Discovery Operation

- Discovery TX
  - PD “to be discovered”: broadcasts my identity
  - PD “to discover”: broadcasts friend’s identity
- Discovery RX
  - PD “to discovery”: when receiving friend’s identity
  - PD “to be discovered” : when receiving my identity
- In real usage scenario,
  - A PD may have multiple application with different discovery types
  - So TX and RX role is equally demanded to a PD

Conclusion 2

- Discovery operation assumes
  - Periodic transmission
    - Maximum required discovery period needs further study
  - A PD has both TX and RX role concurrently
    - So half duplex problem should be considered for discussion

Issue 3: Dedicated Resource for Discovery

- System design requirement may be different to discovery and others
- Discovery
  - Broadcast
  - High density of discovery TX PDs
- Others (Peering, Communication)
  - Mainly unicast
  - Less density than discovery situation

Conclusion 3

- Dedicated Resource for Discovery is preferred
  - No contention/interference between discovery signals and other signals
  - Several design approaches needs more discussion
    - TDM, FDM(channel, band), TDM-FDM

Issue 4: Security of Discovery Information

- In TGD
  - IEEE 802.15.8 shall support mechanisms to ensure privacy that a PD is not tracked.
  - IEEE 802.15.8 shall support protection of identity from impersonation.

Issue 4: Security of Discovery Information

- From PAR
  - 5.2 Scope: This standard defines PHY and MAC mechanism for Wireless Personal Area Networks (WPAN) Peer Aware Communications (PAC) optimized for peer to peer and infrastructureless communications with fully distributed coordination. PAC features include: discovery for peer information without association, …
  - This is interpreted as follows:
    - *Discovery of peer information by broadcast transmission*
      - Before peering or link establishment

Conclusion 4

- The security issues to protect discovery information should be discussed
  - To support secured discovery information
  - To support to avoid replay attack

- Idea
  - The frame number can be utilized to generate same secured discovery information between discovery TX and RX