Predictable and Available Wireless

Non WG forming BoF

Note Well

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Definitive information is in the documents listed below and other IETF BCPs. For advice, please talk to WG chairs or ADs:

BCP 9 (Internet Standards Process)

BCP 25 (Working Group processes)

BCP 25 (Anti-Harassment Procedures)

BCP 54 (Code of Conduct)

BCP 78 (Copyright)

BCP 79 (Patents, Participation)

https://www.ietf.org/privacy-policy/ (Privacy Policy)

I E T F

Reminder:

Minutes are taken *
This meeting is recorded **
Presence is logged ***

* Contribute online to the minutes at: https://etherpad.tools.ietf.org/p/notes-ietf-104-paw
** Recordings and Minutes are public and may be subject to discovery in the event of litigation
*** Sign the blue sheets!

Administrivia

- Minutes
  - Etherpad: https://etherpad.tools.ietf.org/p/notes-ietf-104-paw

- Remote participation
  - Meetecho: http://www.meetecho.com/ietf104/paw
  - Jabber: paw@jabber.ietf.org

- Mailing list
  - paw@ietf.org
  - To subscribe: https://www.ietf.org/mailman/listinfo/paw

- Meeting materials:
  - https://datatracker.ietf.org/meeting/104/materials.html/#paw
  - One set of slides per presentation

Agenda [1/2]

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13:50 Intro and Status                              [ 5mn]
   * Note-Well, Blue Sheets, Scribes, Agenda Bashing
   * Status on existing documents (chairs)


13:55 BoF presentation                              [15mn]
   * scope of the work (chairs)
   * use cases          (Carlos Bernardos)


14:10 Related work at the IETF
    * DetNet            (Lou Berger, Janos Farkas)     [10mn]
    * CCAMP             (Daniele Ceccarelli, Fatai Zhang)  [ 5mn]
    * 6TiSCH            (Thomas Watteyne, Pascal Thubert)  [ 5mn]
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Agenda [2/2]

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14:30 Technologies
    * 802.11ax and EHT (Dave Cavalcanti, remote)              [10mn]
    * 5G URLLC          (Bikramjit Singh)                     [10mn]
    * LDACS             (Corinna Schmitt)                     [10mn]
    * IEEE 802.15.4 TSCH / 6TiSCH Tracks (Xavi Vilajosana)    [10mn]


15:10 drafts and WIP
    * draft-thubert-paw-for-tisch (Pascal / Xavi)            [ 5mn]
    * draft-papadopoulos-paw-pre-reqs (Georgios Papadopoulos) [10mn]
        * PRE problem statement
        * PRE recent results


15:25 Next Steps
    * going through the proposed charter  (Chairs)           [20mn]
    * BoF in Montreal, renaming to SPAWN, AOB                [QS]
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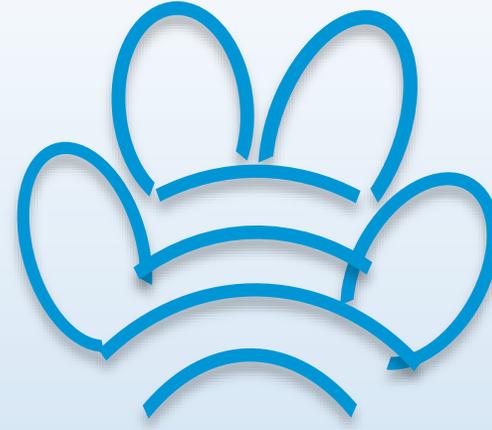
Scope of the work

Making Wireless More Predictable

What is Deterministic?

(per Wiki...)

In mathematics and physics, a determi... ...s is involved in the development of future states of ... ...ways produce the same output ... ...tial state.

[In philo... ...odel of the philosophical doctrine of determinism applied to ... ...g that has and will occur in the system, based on the physical outcomes of ... ...system, every action, or cause, produces a reaction, or effect, and every reaction, ...the cause of subsequent reactions. The totality of these cascading events can ... ...theoretically show exactly how the system will exist at any moment in time.

I know what, I control when, I can reproduce it every time, guaranteed

Predictable & Available Wireless

Controlling time of emission

Can achieve ~10μs sync on 802.15.4

Can guarantee time of delivery

Protection the medium

ISM band crowded, no fully controlled

all sorts of interferences, including self

Can not guarantee delivery ratio

Improving the Delivery ratio

Different interferers => different mitigations
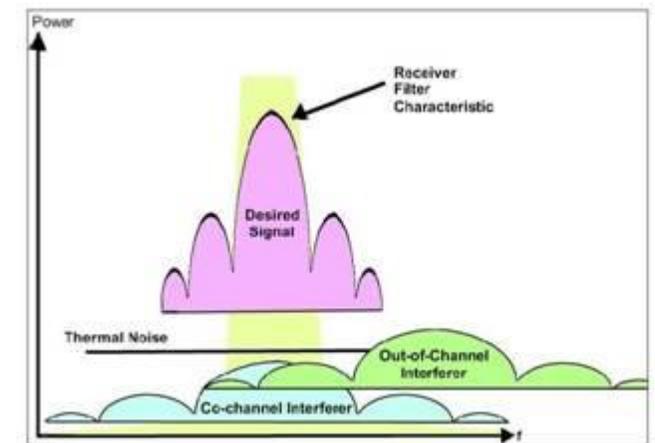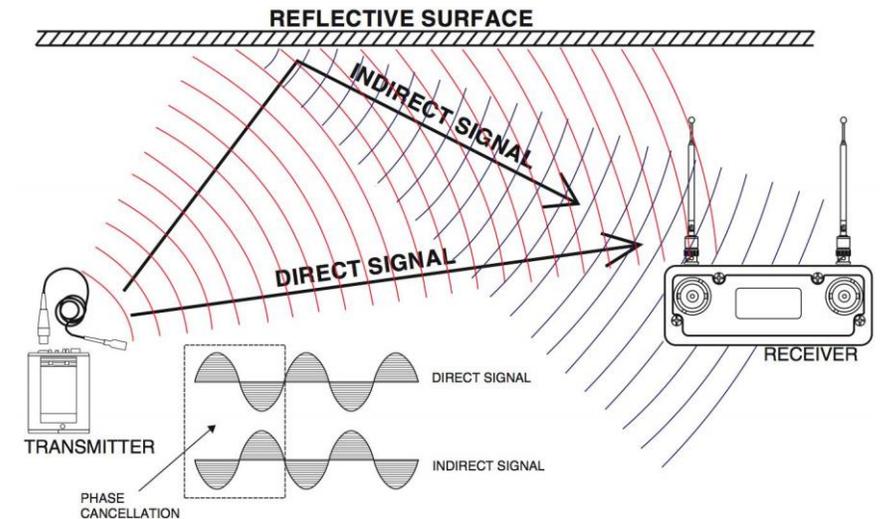
Diversity is the key

Scheduling Wireless Networks

Provides **similar benefits** as wired

⇒ High delivery ratio through path redundancy and collision elimination

⇒ High ratio of critical flows

⇒ Bounded maximum latency (and jitter)

Centrally scheduled operations bring **additional benefits** in wireless

⇒ Medium usage optimization (no IFS, backoff, etc…)

⇒ Energy savings (wake up on scheduled transmission)

⇒ Reduced interference

But **how that is effectively achieved is different** in wireless

⇒ All transmission opportunities **MUST** be aware of PAW schedule

⇒ Reserved scheduled transmission opportunities for critical traffic

⇒ Shared scheduled transmission opportunities & dynamic allocation for best effort

What do we need to do?

Select Appropriate Radios

⇒ Meet effective use case

⇒ Capability to schedule resources

⇒ Diversity capabilities (frequency, beam, …)

Install a PAW flow along a diverse path

⇒ Specific Data Models to match radio properties, e.g., Time and Frequency offsets

⇒ Packet ARQ, Replication, Elimination and Ordering Functions (PAREO Functions)

⇒ Reserve scheduled transmission opportunities for critical traffic (co-existence)

Enable OAM

⇒ In-band and out-of-band Measurement across multiple paths

⇒ In-band control of resource Usage to optimize energy