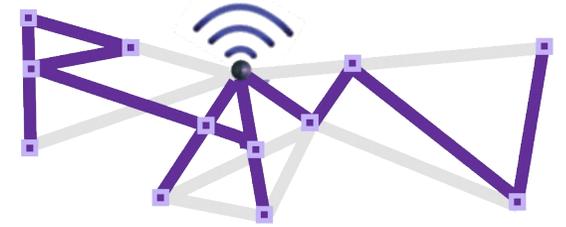


RAW drafts

Presenter: Pascal Thubert / Ethan Grossman

Authors:

Available drafts



Generic info

<https://tools.ietf.org/html/draft-bernardos-raw-use-cases>

<https://tools.ietf.org/html/draft-thubert-raw-technologies>

<https://tools.ietf.org/html/draft-maeurer-raw-ldacs>

Problem statement and requirements

<https://tools.ietf.org/html/draft-pthubert-raw-problem-statement>

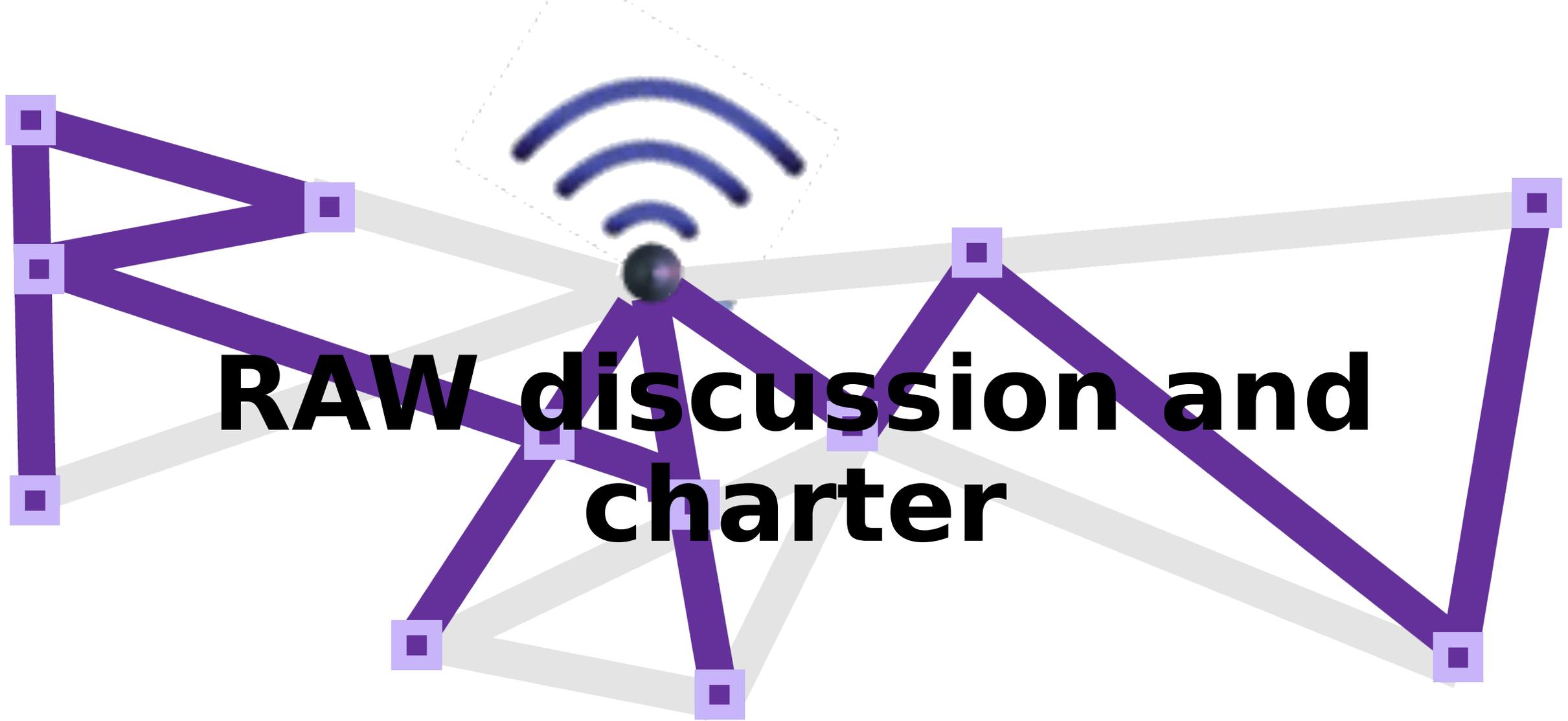
<https://tools.ietf.org/html/draft-papadopoulos-raw-pareo-reqs>

<https://tools.ietf.org/html/draft-theoleyre-raw-oam-support>

Externally sponsored solution drafts

<https://tools.ietf.org/html/draft-ietf-roll-nsa-extension>

<https://tools.ietf.org/html/draft-thubert-bier-replication-elimination>

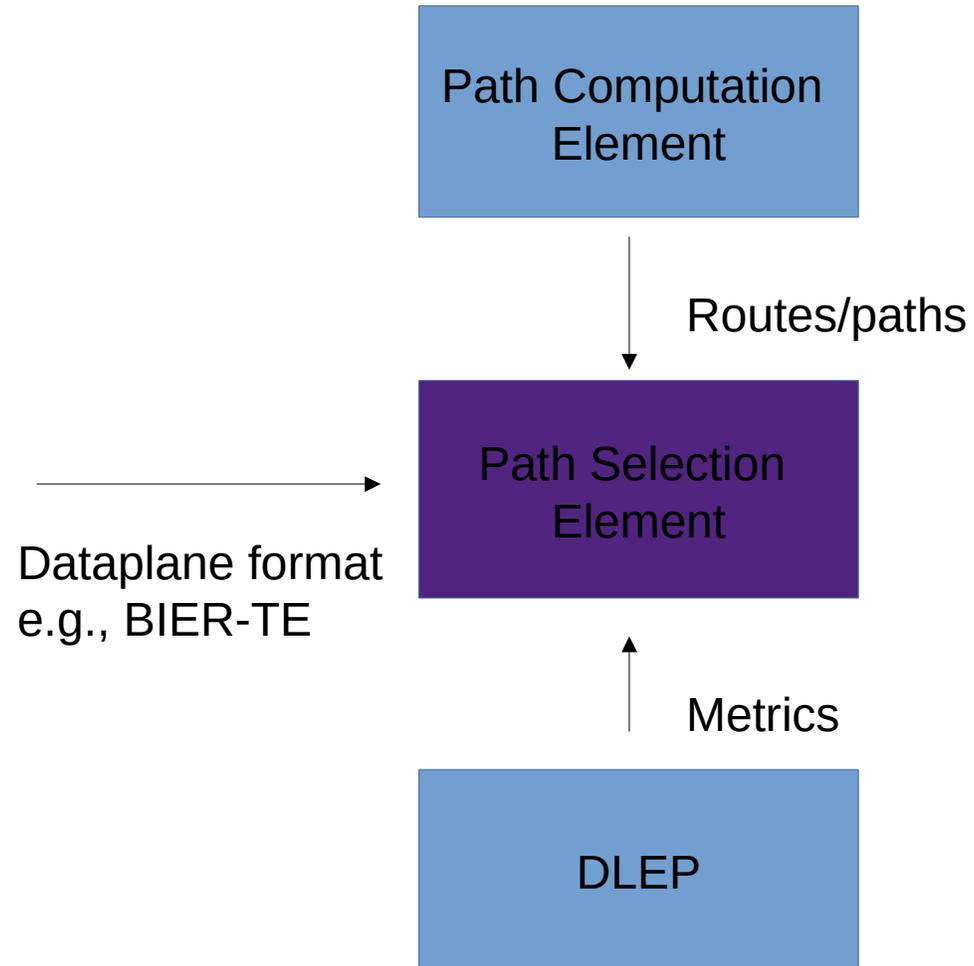
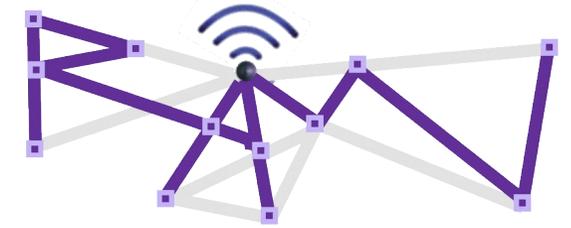


RAW discussion and charter

Presenter: Chairs

Summary picture

The chairs have heard something like this



Proposed charter (1)

<https://trac.tools.ietf.org/bof/trac/wiki/RAW>



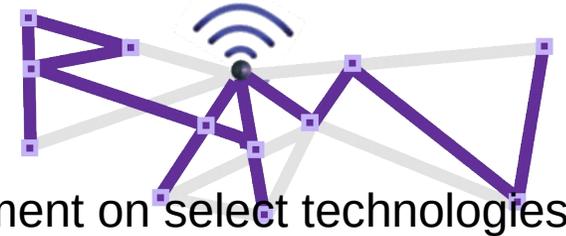
Bringing determinism in a packet network means eliminating the statistical effects of multiplexing that result in probabilistic jitter and loss. Deterministic Networking is an attempt to mostly eliminate congestion loss for a committed bandwidth with a guaranteed worst-case end-to-end latency, even when co-existing with best-effort traffic in a shared network.

Wireless networks operate on a shared medium where uncontrolled interference, including the self-induced multipath fading, adds another dimension to the statistical effects that affect the delivery. Scheduling transmissions can alleviate those effects by leveraging diversity in the spatial, time, code, and frequency domains, and provide a Reliable and Available service while preserving energy and optimizing the use of the shared spectrum.

Reliable and Available Wireless (RAW) extends DetNet to approach end-to-end deterministic performances in a network with scheduled wireless segments, and possibly frequency/time-sharing physical resources with stochastic traffic. While the generic Problem Statement for DetNet applies to both wireless and wired, the media are fundamentally different at the PHY level, and the skills and methods involved in achieving RAW will differ from those used on wires.

Proposed charter (2)

<https://trac.tools.ietf.org/bof/trac/wiki/RAW>

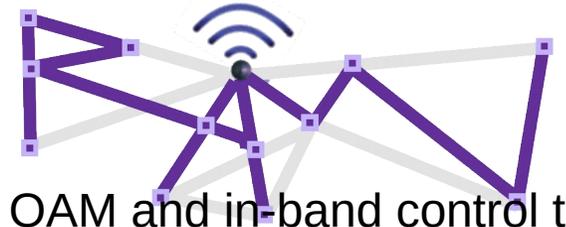


RAW will provide Network Plane protocols for short-range radios and will experiment on select technologies that can be scheduled at the lower layers: IEEE Std. 802.15.4 timeslotted channel hopping (TSCH), 3GPP 5G ultra-reliable low latency communications (URLLC), IEEE 802.11ax/be where 802.11be is extreme high throughput (EHT), and L-band Digital Aeronautical Communications System (LDACS). By inheritance from DetNet, RAW will stay abstract to the radio layers underneath. How the lower layers are programmed, and whether the radio is a single-hop or meshed, are not part of the RAW abstraction.

The computation of a path is not in-scope for RAW and may be the product of a centralized Controller Plane as described for DetNet. As opposed to wired networks, the action of installing a path over a set of wireless links may be slow relative to the speed at which the radio conditions vary. To balance this, a path should provide a high degree of redundancy and diversity such as PREOF, end-to-end network coding, and radio-specific abstracted techniques such as Hybrid ARQ, overhearing, frequency diversity, and time-slotting. The goal of the RAW operation is to control redundant transmissions along a path at the forwarding timescale to maintain the expected service level while optimizing the usage of constrained resources such as energy and spectrum.

Proposed charter (3)

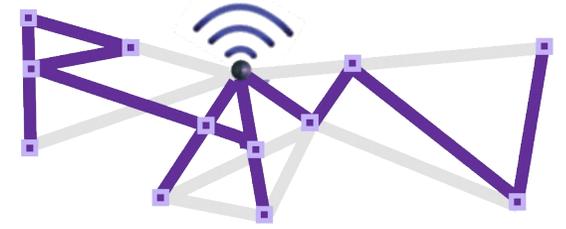
<https://trac.tools.ietf.org/bof/trac/wiki/RAW>



The scope of the RAW WG comprises Network plane protocol elements such as OAM and in-band control to enable the RAW operation at the DetNet Service and Forwarding sub-layers, e.g., controlling whether to use packet replication, with a constraint to limit the use of redundancy when it is really needed. A RAW solution will consist in a set of tools that evaluate the media in real time and another that controls the use of redundancy and diversity that is available along the path. The WG will consider the applicability of existing tools such as L2-triggers, DLEP, BFD and OAM to observe the segments of a path, and DetNet signaling, BIER-TE and Segment Routing to control the use of the path on individual packets.

RAW forwarding decisions may be made at the ingress and signaled in-band. Alternatively, they may be made at intermediate hops and depend on the state of the next hop and local policies, in which case a different in-band signaling will be needed. It is unclear at the time of this writing which approach will be preferred, or if both will be supported.

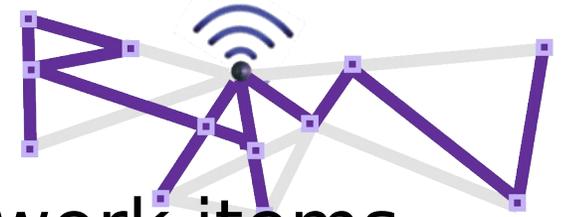
Proposed charter work items



The group will:

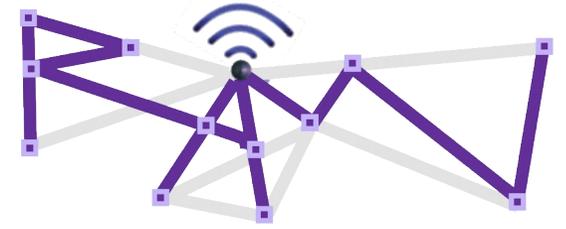
- 1) Produce informational documents describing deterministic wireless use cases, in continuation to the DetNet Use Cases document
- 2) Produce informational documents describing the technologies that the group will cover (e.g., URLLC, TSCH, 802.11ax/be and possibly LDACS)
- 3) Produce a Standards Track document to enable operations, administration and maintenance (OAM) inside a RAW network, providing packet loss evaluation, self-testing and automated adaptation to enable trade-offs between resilience and energy consumption.
- 4) Produce a Standards Track document to specify an in-band control protocol that controls the use of redundancy, either controlled by the ingress node, or along the path, to be determined by the WG.

Discussion



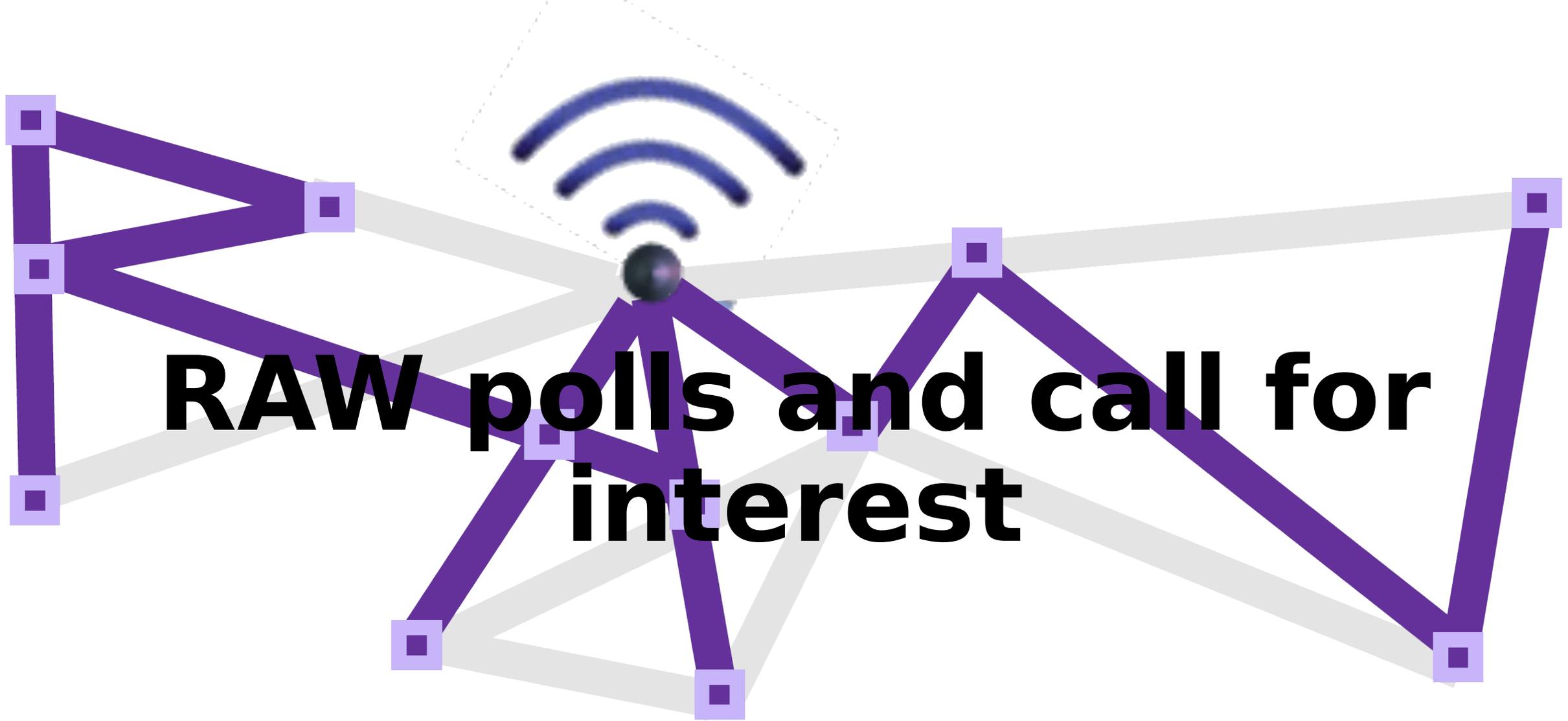
In particular, are the problem statement and work items clear and well-scoped?

Other potential work items



Based on what has been discussed today:

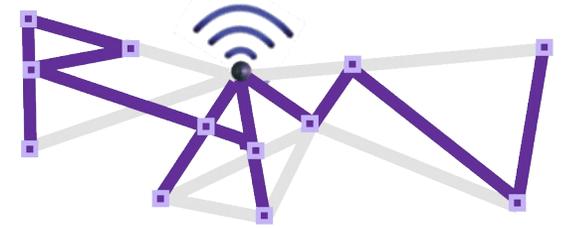
- 5) Produce a functional architecture document showing information flow from PCE and metrics etc into a PSE and the responsibility of each functional block.
- 6) Specify an initial set of metrics which PSE will use for wireless media. This might differ for different radio channel characteristics.
- 7) Any extensions to existing protocols will be done in respective WG.



RAW polls and call for interest

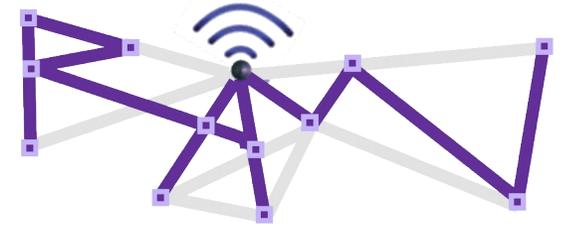
Presenter: Chairs

Questions of the BoF (1/3)



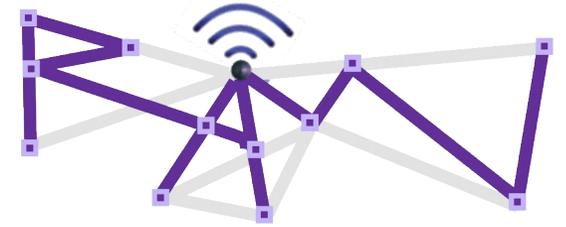
- Is the problem statement sufficiently clear and well-scoped?
- Are the work items sufficiently clear?

Questions of the BoF (2/3)



- Does solving this problem belong in the IETF?
- Is there support for forming a WG with the presented/discussed work items as the charter?

Questions of the BoF (3/3)



- Are you planning to contribute to or edit drafts in RAW (show of hands)
- Are you planning to review drafts in RAW