



PAW

Towards a Charter

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Candidate Charter [1/4]



Deterministic Networking is an attempt to mostly eliminate packet loss for a committed bandwidth with a guaranteed a worst case end-to-end latency, even when co-existing with best-effort traffic in a shared network. It is getting traction in various industries including manufacturing, professional A/V, cellular radio, and others, making possible many cost and performance optimizations.

This innovation is enabled by recent developments in technologies including IEEE 802.1 TSN (for Ethernet LANs) and IETF DetNet (for wired IP networks). Scheduled Predictable and Available Wireless Networking (SPAWN) services extend DetNet services to approach end-to-end deterministic performances in a network with wireless segments, possibly combined with wired segments.

IP networks become more deterministic when the effects of statistical multiplexing (jitter and collision loss) are eliminated. This requires a tight control of the physical resources to maintain the amount of traffic within the physical capabilities of the underlying technology, e.g., by the use of time-shared resources (bandwidth and buffers) per circuit, and/or by shaping and/or scheduling the packets at every hop.

Candidate Charter [2/4]



Wireless networks operate on a shared medium, and thus transmissions cannot be fully deterministic due to uncontrolled interferences, including the self-induced multipath fading. However, scheduling of transmissions can alleviate those effects by leveraging diversity in the spatial, time and frequency domains, providing a more predictable and available service.

The wireless and wired media are fundamentally different at the physical level, and while the generic Problem Statement for DetNet applies to the wired as well as the wireless medium, the methods to achieve SPAWN will differ from those used to support time-sensitive networking over wires.

The development of SPAWN technologies has been lagging behind deterministic efforts for wired systems both at the IEEE and the IETF. But recent efforts at the IEEE and 3GPP indicate that wireless is finally catching up at the lower layer and that it is now possible for the IETF to extend DetNet for wireless segments through the use of scheduling of wireless transmissions.

Candidate Charter [3/4]



The SPAWN WG will centralize efforts that inherit from DetNet and 6TiSCH, with a primary focus on scheduled wireless operations. The Working Group will leverage cross-participation with the associated set of stakeholders to ensure that the work taking place corresponds to real demands and that the proposed solutions are indeed applicable. It will focus on enabling SPAWN connectivity over the following selection of deterministic wireless technologies: IEEE Std. 802.15.4 timeslotted channel hopping (TSCH), 3GPP 5G ultra-reliable low latency communications (URLLC), IEEE 802.11 extreme high throughput (EHT) and the L-band Digital Aeronautical Communications System (LDACS).

Candidate Charter [4/4]



The group will:

- 1) Produce informational work describing deterministic wireless use cases, in continuation to the DetNet Use Cases document
- 2) Produce informational work describing the technologies that the group will cover (e.g., URLLC, TSCH, EHT and LDACS)
- 3) Produce a Standards Track document to define the generic data models to install a SPAWN flow along a track providing packet replication, elimination and ordering functions with spatial, frequency and time diversity in a scheduled FD/TDMA wireless network.
- 4) Produce a Standards Track document to enable operations, administration and maintenance (OAM) inside a SPAWN network, providing packet loss evaluation and automated adaptation to enable trade-offs between resilience and energy consumption..