

SpW PnP Protocol High-Level Requirements

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Glenn Rakow
NASA-GSFC
Glenn.P.Rakow@nasa.gov

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SpW PnP Evolution

- SpW PnP protocol initiative started as a response to AFRL ORS desire to use SpW as a network on their Spacecraft Plug-n-Play Architecture (SPA)
- Major requirement was (is) network discovery in a standardized fashion among all routers/nodes
- First draft was a packet based protocol (not memory mapped protocol)
 - Ability for multiple masters to independently discover network
 - Router slot table for registration of multiple network masters
 - No need for global router address
 - Protocol grew into more than device discovery by specifying common configuration for routing table, speed, etc.
 - Implemented on AFRL PnP Sat (ground demonstration) and for NASA IRAD
- Desire by ESA (Star Dundee) to merge PnP protocol into RMAP format
- Recommendation by JAXA to adopt similar protocol configuration approach as Ethernet (SNP MIB)
 - RMAP format met this requirement
- Star Dundee wrote current document, SpW PnP Protocol Definition, Draft A, Issue 2.1

CCSDS SOIS Evolution

- Definition of Sub-network and Application Support services complete
 - Sub-network Device Discovery service is intended to define requirements for SpW PnP protocol (however it grew to include more within the SpW community, i.e., common configuration)
- CCSDS Plug-n-Play (PnP) Birds of Feather (BoF) formed to study PnP for spacecraft (inspired by AFRL ORS work)
- After PnP BOF developed use cases and studied approaches, members agreed to focus upon Electronic Data Sheet (EDS) definition as a starting point
- PnP BOF work has merged with Application Support SOIS WG
- To date, two (2) EDS approaches have been studied for applicability
 - Extensible Electronic Data Sheet (xTEDS)
 - Transducer Electronic Data Sheet (TEDS) (IEEE-1451)
- Both xTEDS and IEEE-1451 as written do not meet use cases currently defined by CCSDS PnP BOF
- ESA SAVOIR effort has chartered work to study problems
- AFRL has released SPA documents for review to be focus of next SOIS WG meeting

Basic SpW PnP Requirement

- Network discovery and identification of SpW routers & nodes using a single protocol
 - Requires nodes like routers to respond to configuration space (leading zero)
 - Currently not allowed in original SpW specification

Recommended Changes to SpW PnP Protocol

- Remove all features not directly related to network discovery and identification of routers/nodes including
 - Configuration and
 - Most commonly used features, link speed, etc.

Rationale: Simplify implementation for intended purpose; and obviate confusion and reconciliation of different implementations and vendor value added features. This is necessary because the SpaceWire standard does not define the configuration space. Next version of SpaceWire (SpW II) should define the configuration space so that this can be standardized

End.
Thank you