SpaceWire Working Group Meeting12

SpW-RT V2.1 Review Wrap-Up

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SpaceWire-RT -ESA input

- The present RT description explores all possible SpaceWire features, this is useful but the result is a level of complexity which hides the "wood from the trees"

- To be able to move forward and initiate developments we must have a clear specification which clearly defines which features will be implemented for what reason and how

- ESA has a strong preference (and mandate from European primes) for the SpaceWire protocols to comply with the CCSDS SOIS defined subnetwork services

- The SOIS services encompass a wide range of capabilities and different QOS possibilities but they are structured in such a way that only a minimum subset is mandatory, we need to select which services and QOS are applicable to SpaceWire

ESA requirement perspective

- A summary of the driving ESA requirements for SpaceWire-RT are as follows:
    - Should comply with SOIS subnetwork services:
        - **Packet, memory access, synchronisation, device discovery** and **test** services
        - QOS: **Reserved** (mandatory) **Best effort** (for async data), **Assured** and **Guaranteed (**not required)
        - The reserved service provides the essential timeliness required for command and control and the inherent reliability of SpaceWire is considered sufficient for the majority of applications (the very few Applications requiring guaranteed delivery will close the loop at Application level).
        - By removing the need for retransmission we significantly reduce complexity
        - An option should be considered in the protocol for a acknowledgement of delivery (results fed to N/W management, possibly user)
    - Should be acceptable to Avionics designers in terms of capability and testability
    - Should be compatible wherever possible with existing SpaceWire specifications and components
    - Should be available (final, validated spec) within one year from now

CCSDS- SpaceWire-RT layered Architecture
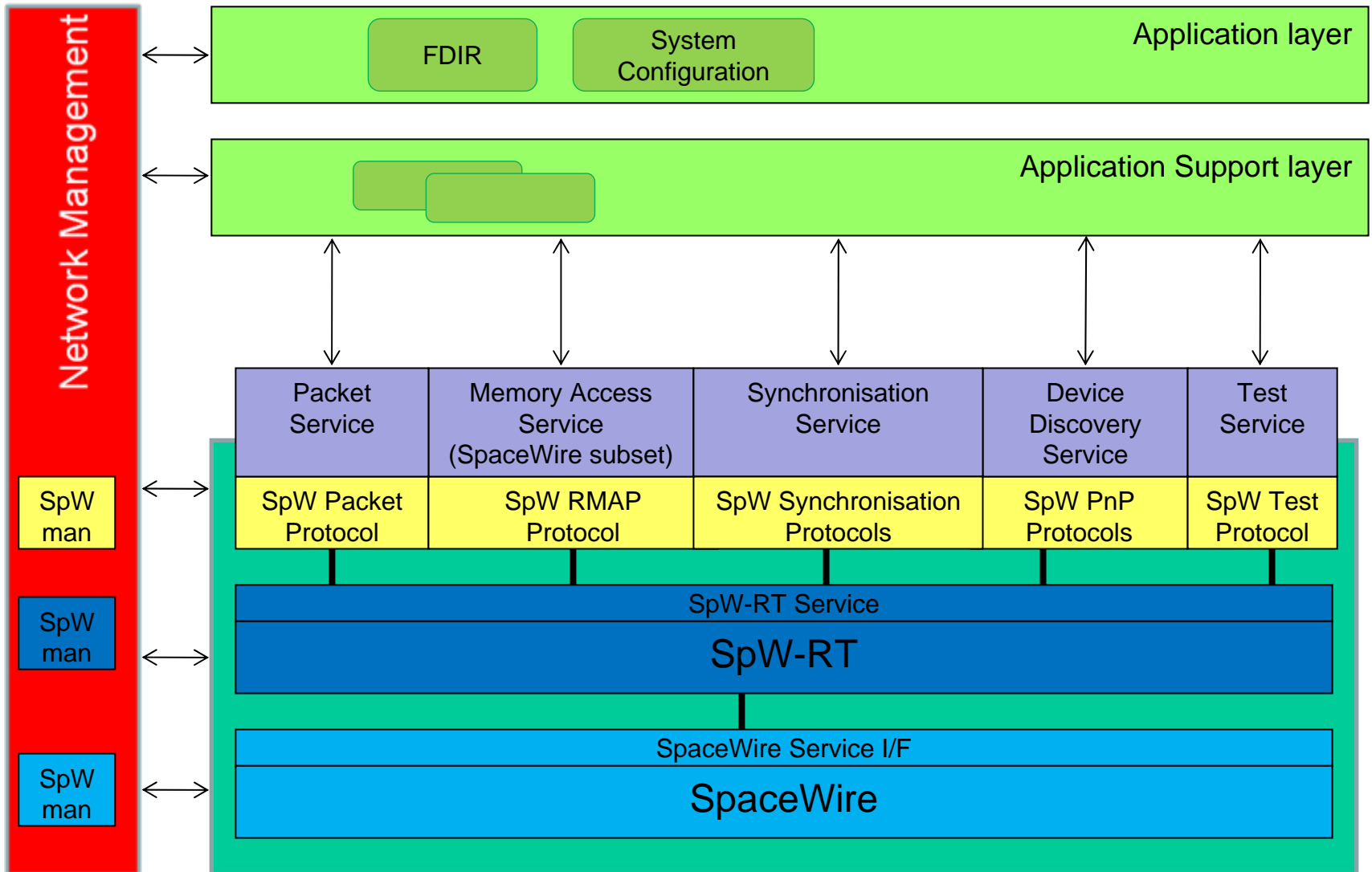
Way forward

- Agree on the QOS to be provided for a SpaceWire flight system
- Agree on the basic SpaceWire mechanisms to be used
- Specify missing services and protocols (synchronisation, test, device discovery and network management)
- Agree on a plan for specification provision and formal reviews
- Provide a new SpaceWire-RT spec in accordance with the above using the CCSDS specification approach
- Perform protocol validation exercise and update specification accordingly
- Publish SpaceWire specification as ECSS standard
- Develop supporting silicon, software and test equipment

Proposal for SpaceWire specification preparation

Architecture Freeze

- Assumptions made by user layers
- Functions to be migrated to higher layers
- Service to be provided to user layers
- Co-existence with RMAP
- Co-existence with other SOIS services
- Router Table population strategy and infrastructure
- Network Management responsibility
- Agreement by mid March

Features Freeze

- Candidates for removal and or simplification:
  - Retry
  - Opportunistic
  - Group Adaptive Routing
  - Redundancy (via group adaptive routing)
  - Guaranteed (tied up with Retry)

  - Master (time slot)
  - Kill function (guard function required)
  - Basic
- Mid April

Milestones

- Architecture freeze (email) – mid March
- Features freeze (meet?) – mid April
- 1st draft spec June – DRRs by July
- 2nd draft spec – DRRs by Sept
- Draft for external review - responses by Nov
- Final spec – Jan 2010
- In parallel – handbook material capturing rationale and guidance ejected from spec.