NETWORK MANAGEMENT AND CONFIGURATION USING RMAP

Session: SpaceWire Standardisation

Long Paper

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ABSTRACT

The success of the SpaceWire standard has resulted in the availability of a wide variety of SpaceWire devices. Allowing these devices to inter-operate easily is an open-problem with growing importance. This problem has two different manifestations: interoperability in ground equipment and test equipment and interoperability of flight hardware.

On the ground, the most important driver is ease of use. For example, a developer may wish to set up a SpaceWire network for prototyping and simulation. It is likely that the network will use equipment supplied by a number of different vendors. Currently, this means that vendor specific software, or other mechanisms, must be used to configure each of the devices. Should any network management functions be required, such as detecting the status of individual links, or the topology of the network, vendor specific functions are again required.

Although a spacecraft is generally a closed system, similar inter-operability problems are faced. If flight devices from multiple vendors are used, vendor specific mechanisms must be employed to, for example, configure routing tables. This limits the degree to which software and other spacecraft components can be re-used.

This paper proposes a standard mechanism for network management and configuration of network devices building on the remote memory access protocol (RMAP). The paper argues that RMAP is an appropriate starting point for the addition of network management and configuration capabilities as it layers well in a protocol stack and many vendors have existing RMAP capabilities. Adding network management and configuration features could be a fairly easy task for both existing and future SpaceWire equipment. This would give the inter-operability required, promoting ease of use on the ground and high-levels of component re-use in flight.