
Development of API for integration with a wireless sensor network

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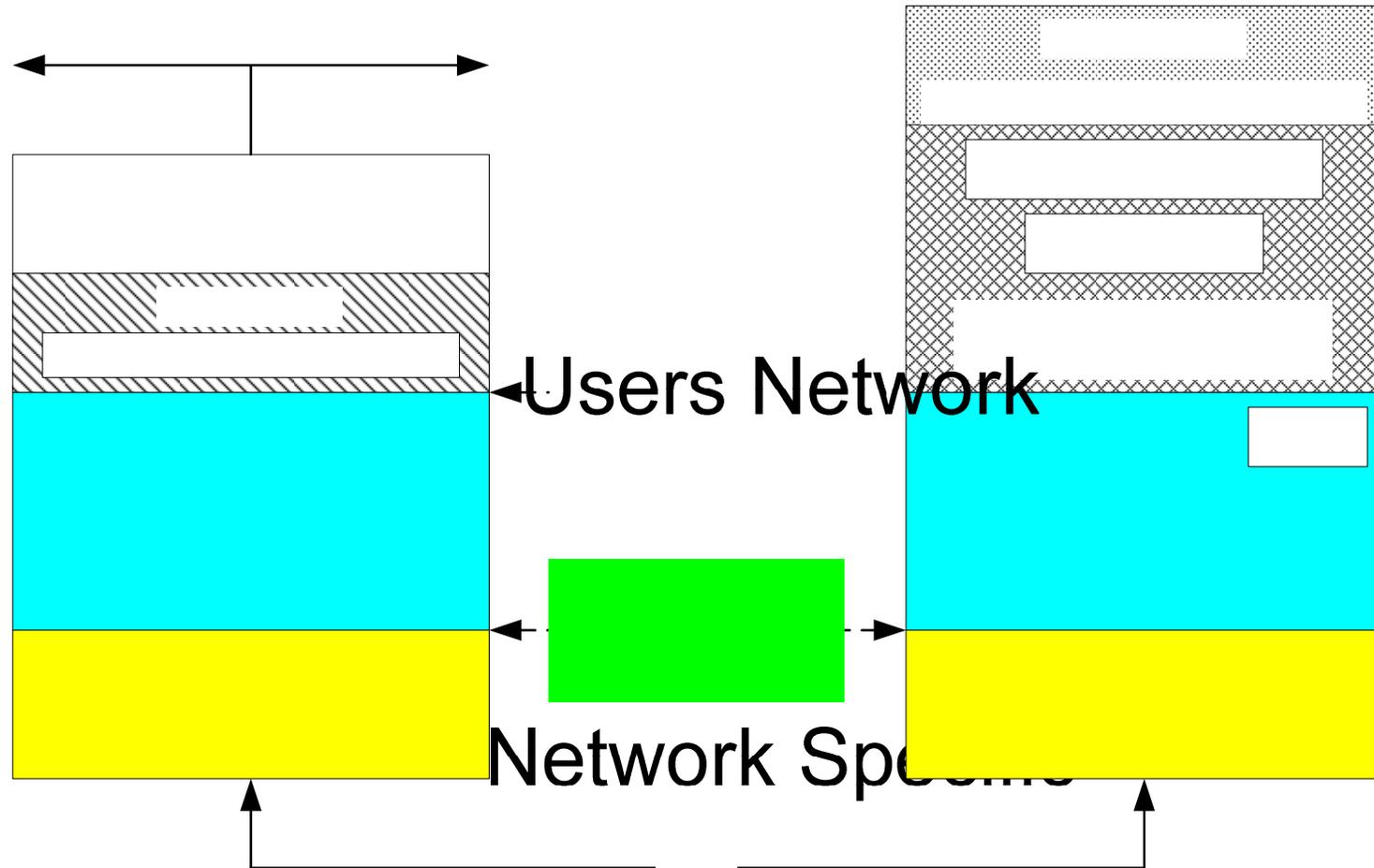
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1451 Architecture



IEEE 1451.1

Measurement Application

Trans
0

Module Communications Interface (MCI)

- Interface between the 1451.0 layer and the 1451.x communications layer
- Same interface specification for the NCAP and TIM.
- Generally the TIM's MCI will be a small subset of the standard.

Characteristics of the MCI

- Symmetrical
- Little to no knowledge of higher level layers.
- MCI is a 'thin layer' that relies on common communication protocols for the radio standard, i.e. TCP/IP, negotiated QoS, etc.

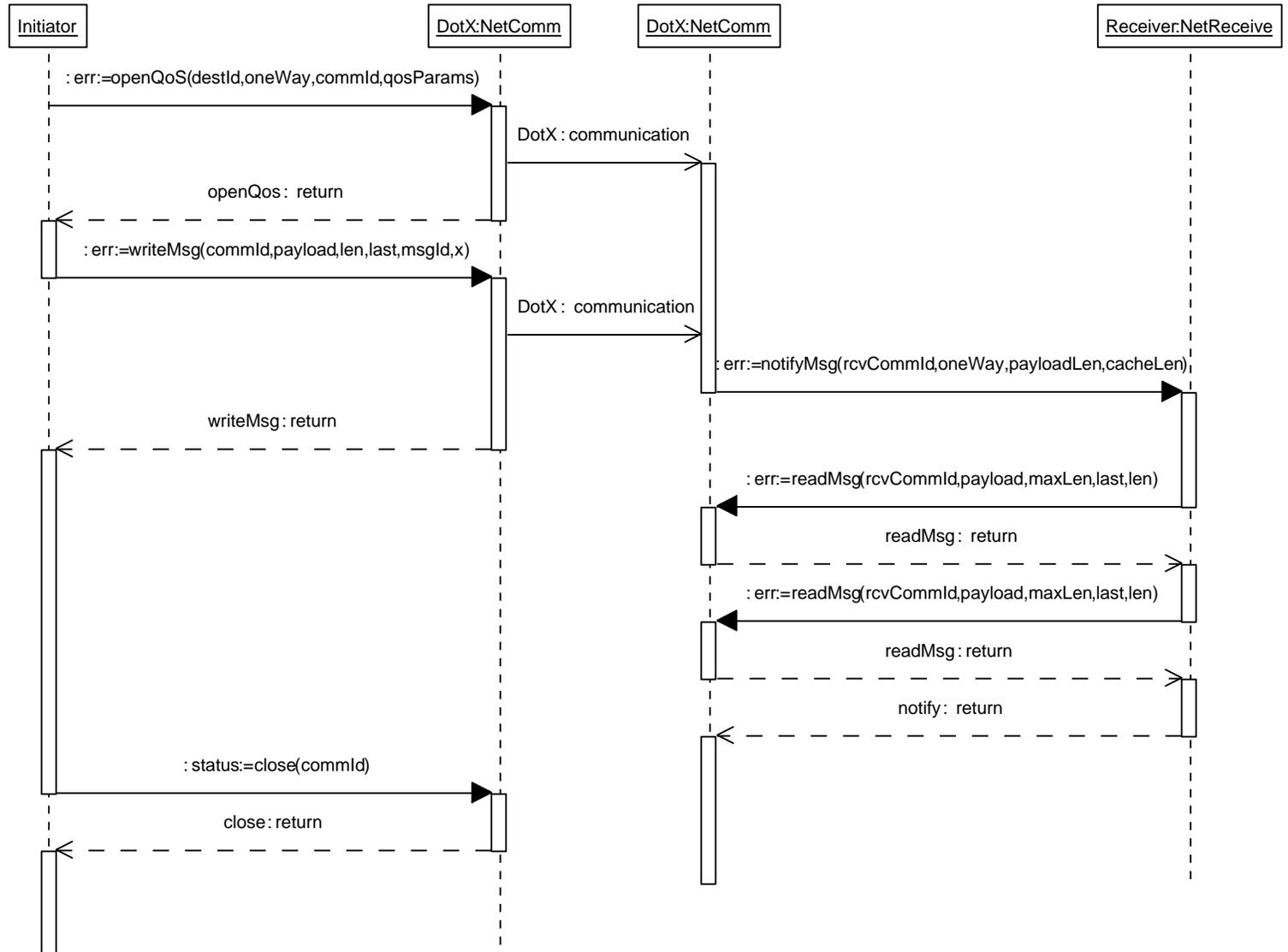
2 types of MCI

- Simplified form for TIMs and point to point NCAPs
- Rich set available for multi-drop NCAP
- No multicast addresses, address groups, or complex discovery in simplified form

Module Communications API

- Contains Low Level Read and Write Functions
- Open, close, QoS Negotiation
- Discovery and Registration
- Address Group Management
- Callback Management
- Triggers
- Time Synchronization (IEEE 1588)

Read/Write Example



1451.5 WiFi

- Specify 802.11b using TCP/IP
- IPv4 or IPv6 acceptable
- Decision based on what is available in radio chipset. Rom considerations
- Packet segmentation and recreation occurs in dot-5 layer.

1451.5 Reference Implementation

- Being Performed by several companies
- Currently using Bluetooth as radio
- Smart Sensor Systems, ESensors, CSR, NIST.
- Goal is to provide NCAP function in traditional PC and TIM as an embedded system, using CSR prototype board and ESensors RS-232 TIM.

1451.5 Reference Implementation

- NCAP Implementation in Visual C++
- TIM Implementation in PIC C
- Currently in coding phases with some design work still needed.
- Current focus is on MCI layer.
- NCAP uses Windows services for TCP/IP and Bluetooth.

1451.5 Reference Implementation

- Intent is to release this code as an open reference implementation to prove standard is implementable.
- Will be distributed and available.

A Note on Standards

- There is a big difference between a complex standard and a complex implementation
- 1451 is a rich standard with a lot of OPTIONAL capabilities
- The typical installation requires only 12 commands and about 170 bytes of TEDS information.
- Easily fits into a PIC.