

IEEE1451 standard in wireless sensor networks using TinyOS message abstractions

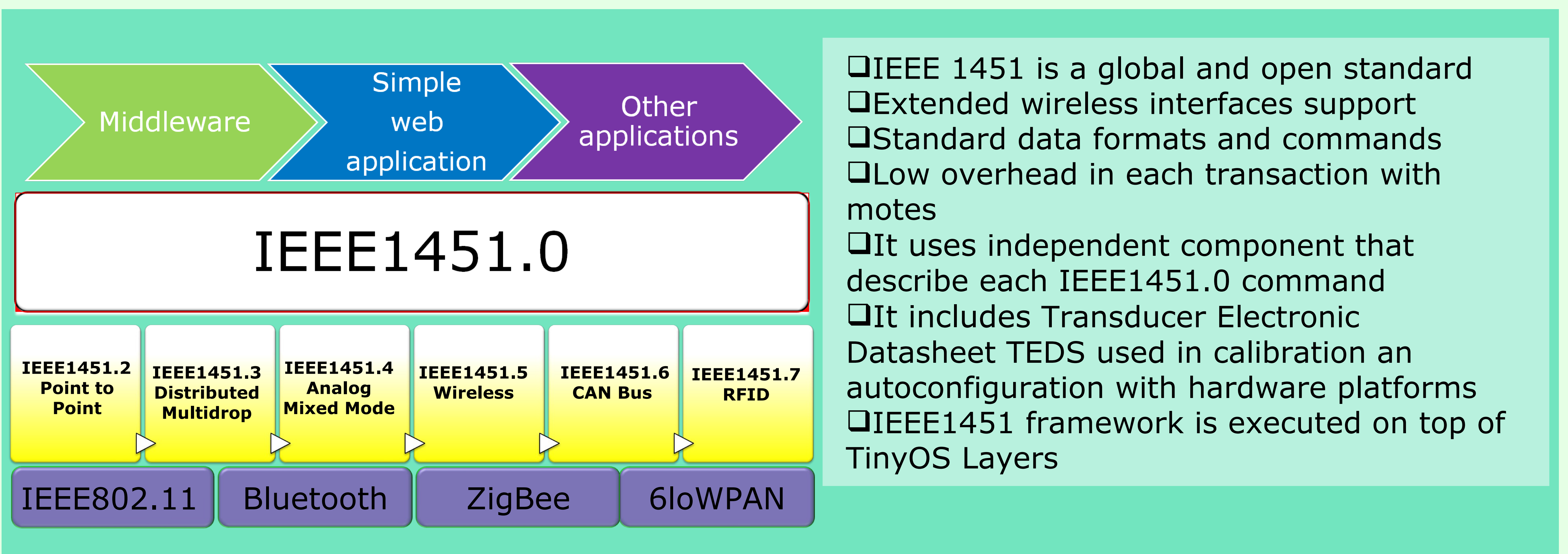
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Introduction

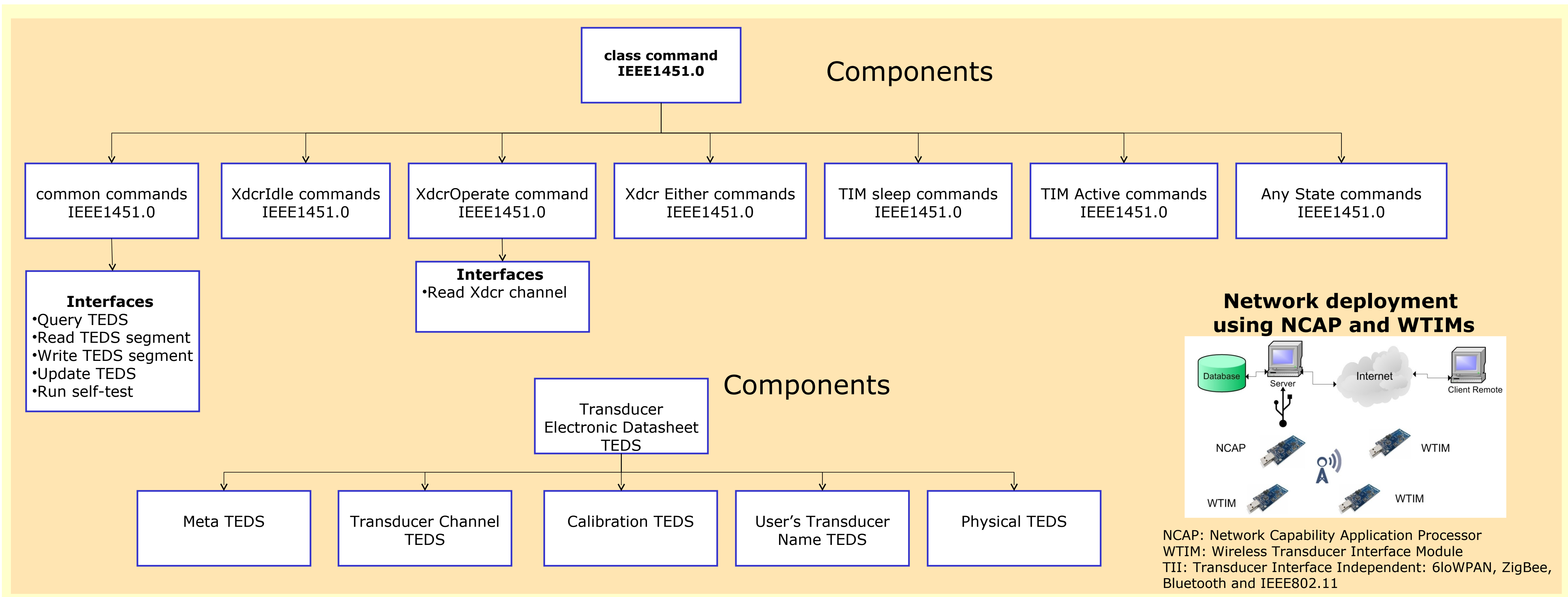
- TinyOS uses by default the message buffer abstraction message_t
- Message_t can be passed between different link layers
- Currently developers don't use standardized commands in TinyOS for read each channel sensor

Why use IEEE 1451 Standard in TinyOS



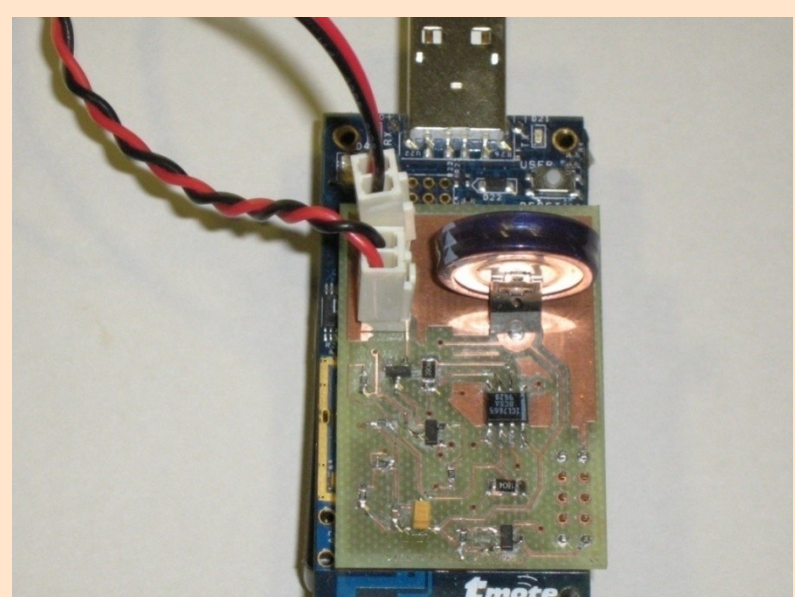
- IEEE 1451 is a global and open standard
- Extended wireless interfaces support
- Standard data formats and commands
- Low overhead in each transaction with nodes
- It uses independent component that describe each IEEE1451.0 command
- It includes Transducer Electronic Datasheet TEDS used in calibration and autoconfiguration with hardware platforms
- IEEE1451 framework is executed on top of TinyOS Layers

TinyOS Components compliant IEEE1451



Applications

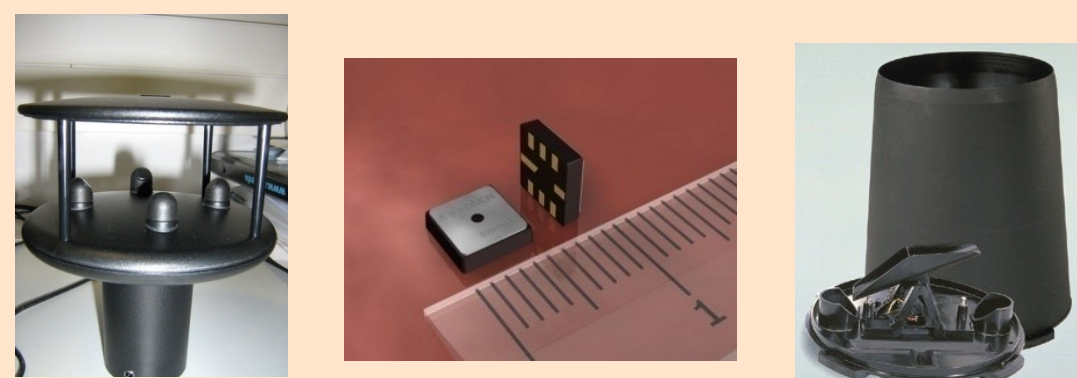
Weather Station node



NCAP node (Base station)

- Ultrasonic WD and WS (CH1)
- Pressure Piezoresistive sensor (CH2)
- Tipping Bucket Rain Gage (CH3)
- Temperature and Humidity (CH4)
- Solar radiation (CH5)

Platform: Tmote Sky
Support: TinyOS 1.X and TinyOS 2.X is in development



Example of Standard TEDS in a WTIM node

TEDS	Memory Used (ROM)	Fuction
MetaTEDS (IEEE1451.0)	40 bytes	WTIM number of physical channels
Transducer Channel TEDS (IEEE1451.0)	99 bytes	Configuration parameters in each physical channel
User's Transducer Name TEDS (IEEE1451.0)	25 bytes	Channel information name ASCII
PHY TEDS (IEEE1451.5)	66 bytes	Physical Configuration interface
Calibration TEDS (IEEE1451.5)	60 bytes	Calibration parameters