Sociable Objects Workshop

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Plan for Today

- Final Project Updates

- ZigBee Internet Gateway

- ZigBee Stack

- Profiles Clusters Endpoints

- Workshop

- Readings & Assignments

Final Project Updates

ZigBee Internet Gateway Demo

ZigBee Stack

ZigBee Stack

ZigBee Layer	Description
PHY	Defines the physical operation of the ZigBee device including receive sensitivity, channel rejection, output power, number of channels, chip modulation, and transmission rate specifications. Most ZigBee applications operate on the 2.4 GHz ISM band at a 250kbps data rate. See the IEEE 802.15.4 specification for details.
MAC	Manages RF data transactions between neighboring devices (point to point). The MAC includes services such as transmission retry and acknowledgment management, and collision avoidance techniques (CSMA-CA).
Network	Adds routing capabilities that allows RF data packets to traverse multiple devices (multiple "hops") to route data from source to destination (peer to peer).
APS (AF)	Application layer that defines various addressing objects including profiles, clusters, and endpoints.
ZDO	Application layer that provides device and service discovery features and advanced network management capabilities.

Profiles Clusters Endpoints

ZigBee Application Profiles

- collections of device descriptions and functionalities for a specific application

- public or private

- home automation

- smart energy profile

- RF4CE

- Green Power

ZigBee Clusters

- subsets of application profiles

- define a function, service or action within a profile

  - level control

  - color control

  - thermostat messages

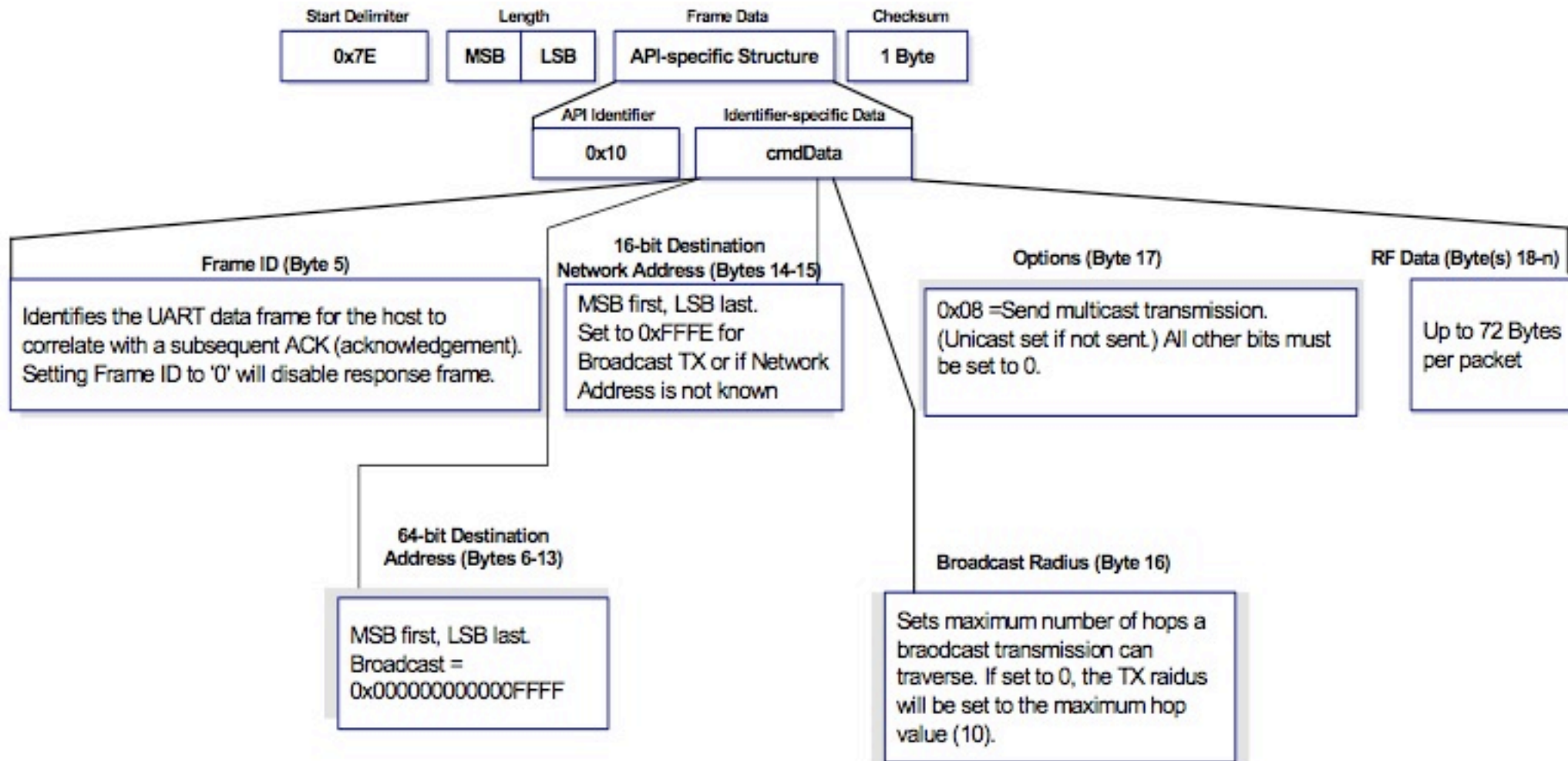- two-byte cluster ID defines the message type
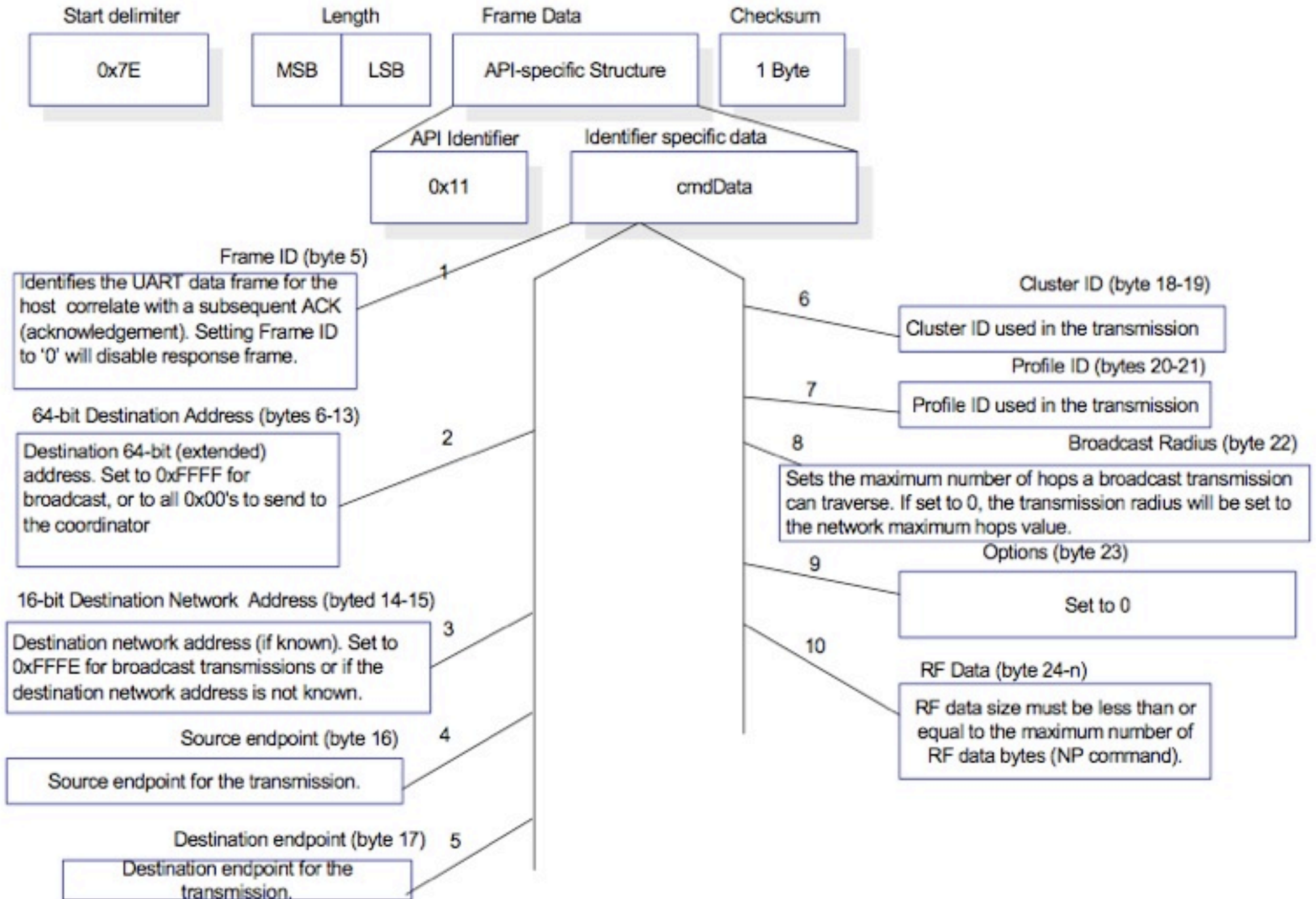
ZigBee Endpoints

- kind of like ports in TCP/IP

- define running application

- 1-byte address

- each endpoint is tied to an application profile

API Transmit Request

ZigBee Explicit API Transmit Request

Start delimiter

| 0x7E |

Length

| MSB | LSB |

Frame Data

| API-specific Structure |

Checksum

| 1 Byte |

API Identifier

| 0x11 |

Identifier specific data

| cmdData |

Frame ID (byte 5) — 1

Identifies the UART data frame for the host correlate with a subsequent ACK (acknowledgement). Setting Frame ID to '0' will disable response frame.

64-bit Destination Address (bytes 6-13) — 2

Destination 64-bit (extended) address. Set to 0xFFFF for broadcast, or to all 0x00's to send to the coordinator

16-bit Destination Network Address (byted 14-15) — 3

Destination network address (if known). Set to 0xFFFE for broadcast transmissions or if the destination network address is not known.

Source endpoint (byte 16) — 4

Source endpoint for the transmission.

Destination endpoint (byte 17) — 5

Destination endpoint for the transmission.

Cluster ID (byte 18-19) — 6

Cluster ID used in the transmission

Profile ID (bytes 20-21) — 7

Profile ID used in the transmission

Broadcast Radius (byte 22) — 8

Sets the maximum number of hops a broadcast transmission can traverse. If set to 0, the transmission radius will be set to the network maximum hops value.

Options (byte 23) — 9

Set to 0

RF Data (byte 24-n) — 10

RF data size must be less than or equal to the maximum number of RF data bytes (NP command).

Final Projects

Final Project Suggested Timeline

- ~~Week 10: Make observations, select your idea and finalize your group~~

- ~~Week 11: Build a prototype and test it. Observe the results.~~

- Week 12: Build a revision and test it. Observe the results.

- Week 13: Create a final that works well, with a presentation and demo that tells its story

- Week 14: Final Presentations

Readings and Assignments

- Assignments

    - Final Project: Build a revision and test it. Observer the results.