MCTP over USB binding V0.2

Yuval Itkin October 19th 2021

Disclaimer

- The information in this presentation represents a snapshot of work in progress within the DMTF.

- This information is subject to change without notice. The standard specifications remain the normative reference for all information.

- For additional information, see the DMTF website.

- This information is a summary of the information that will appear in the specifications. See the specifications for further details.

Motivation

Gaps and needs

- The current binding specifications of MCTP bindings do not address a need for management bandwidth without relying on PCIe
    - SMBus provides up to 400Kbps in real systems
    - I3C provides up to 12.5Mbps
- The only other interface which allows networking traffic to a BMC uses RBT which is not part of PCIE CEM connector.
- In order to remove the need for platforms customization while enabling the needed bandwidth for management protocols we need to introduce a new MCTP binding spec.
- Adding USB to PCIe CEM spec will allow us to provide up to 480Mbps
- USB has native support for hot-insertion and removal

High Level Requirements

Define a new USB device-class which is dedicated for DMTF MCTP over USB traffic binding

- Vendor and device ID should be independent from the interface class

- Endpoint types for managed devices and host-interface should be supported

- The DMTF MCTP EID interfaces should be exposed as a given sub-class

- Each endpoint size will be at least MCTP BTU size (64Bytes for MCTP 1.0)

- The mandatory USB control endpoint (USB endpoint 0) shall not be used for the MCTP interface

- Each such interface should expose an MCTP endpoint, allowing for multiple endpoints on a device

- The USB root should be able to support MCTP bus owner functionality

Bridging

- A USB root may serve as an MCTP bridge

- An endpoint may also serve as an MCTP bridge (same method as defined in DSP0233)

MCTP over USB binding proposal details

USB traffic does not require any data encapsulation to enable data transfer

An MCTP packet can be sent without encapsulation

Identification of an **interface** using USB is based on USB descriptors schema

- An MCTP EID will be exposed as a new USB Interface that is associated with 2 bulk endpoints

  - An IN endpoint will be used for data going out of the device to the USB root node

  - An OUT endpoint will be used for data going into the device from the USB root node

- Each endpoint size will be at least MCTP BTU size (64Bytes for MCTP 1.0)

- The mandatory USB control endpoint (USB endpoint 0) shall not be used for the MCTP interface

Endpoint descriptors details proposal

Use new TBD defined DMTF interface class

At least 2 sub-classes

- MCTP Managed device endpoint

- MCTP Host interface endpoint

Device-qualifier allowing for 480Mbps down to 12Mbps

Interface descriptor

- Defines an EID with its endpoints.

- There is no alternate settings for a given EID (fixed configuration only).

- The 1st EID in the device is Interface 'n' the 2nd EID is Interface 'n+1' and so on

  - 'n' is arbitrary and depends on the existence of other interfaces on the device

Configuration descriptor - describe the Endpoints count and their maximal data rates.

- Each EID is an independent interface

- Each EID has 2 Bulk endpoints

- All packets including AENs will use Bulk transfers