MPCP General Description

MPCP = Converged Solution

- **The Multi-Point Control Protocol (MPCP) specifies a control mechanism between a Master unit and Slaves units connected to a Point-to-Multi-Point (P2MP) segment to allow efficient transmission of data**

- **Functions performed are:**
  - Controlled network boot process
  - Bandwidth assignment to end-stations
  - Bandwidth polling from end-stations

MAC Control

- **MPCP is implemented in MAC Control layer**
- **Clause 31: "MAC Control provides for real-time control and manipulation of MAC sublayer operation"**
- **New control messages are introduced:**
  - GATE, REPORT assign and request bandwidth
  - REGISTER_REQ, REGISTER, and REGISTER_ACK control the boot process

Optimal Solution

- **MPCP optimizes network resources:**
  - Ranging is performed to determine ONU distance, and reduce slack
  - Reporting of bandwidth requirements by ONUs allow dynamic allocation of bandwidth
  - Fast scheduling cycles allow support of over-subscription
  - At least 64 ONUs are supported in the PON
  - Optical parameters are negotiated to achieve optimal performance

Address Service Requirements

- **Fast granting cycle allows low end-to-end delays, and support voice services**
  - TDM services are supported with 1ms delay
- **Dynamic granting capability allows fast bandwidth assignment**
  - TCP services easily supported in conjunction with statistical multiplexing
- **PON Native mode has single copy broadcast capability**
  - Video can be broadcasted without bandwidth waste

Extensible

- Support of line encryption easily added by making use of P2P Emulation tag
- Protocol has ability to add later fields
- Vendor-specific enhancement is possible without compromising interoperability
- Split ratio not limited by standard
- Allows support of PAUSE per ONU
- Ability to later support link aggregation

Compliant

- MPCP is compliant with deployed Ethernet by using P2P Emulation layer
- An 802.3ah point-to-multipoint network is a layer 2 domain with a Bridge at the OLT having a direct link to each ONU
- Spanning tree is used to disable loops
- Traditional Ethernet framing is maintained
- Peer-to-peer communications can be disabled at bridge