Address Flow Scenarios

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Introduction

- Questions came up at the last meeting in February regarding address translations through the UMT.
- Action item was taken to illustrate L3 and L2 transitions
- This presentation examines two scenarios:
  - L3 UMT with TR-069 as an example
  - L2 UMT with OAM via EPoC FCU based on EPoC System Specification project (currently hibernated)
    - With help from Curtis Knittle

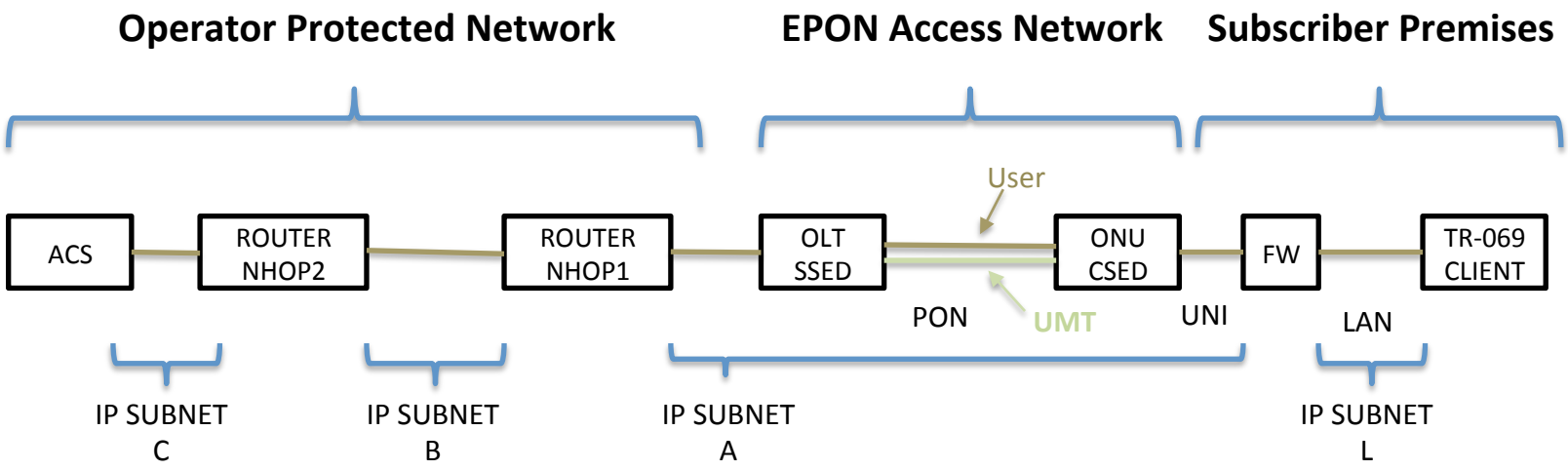
Scenario 1 Setup

- UMT over PON network only
  - Distinguish IP TR-069 with router traversal
- Assumptions
  - Client Side Edge Device is co-located with ONU
    - IP over Ethernet exchanged between ONU and subscriber firewall
    - Client device is located on home LAN
  - Server Side Edge Device is co-located with OLT
  - TR-069 Auto Configuration Service (ACS) is two router hops from OLT

Scenario 1 Questions

- What is the IP and MAC address translations between TR-069 client and ACS?
  - See tf2_1504_laubach_2.pdf
- What must be pre-configured before L3 "flows" are properly distinguished for UMT?
  - What detailed knowledge of service/client address, protocol, ports, etc. must be known in advance?
  - Can any configuration be automatic?
- What can break and/or be misused?

Scenario 1: UMT over PON network only, Distinguish IP TR-069 with router traversal



Address Notations

MAC	M-C-ACS	M-B-NHOP2 M-C-NHOP2	M-A-NHOP1 M-B-NHOP1	M-A-SSED (OLT)	M-A-ONU	M-L-FW M-A-FW	M-L-FW M-L-CLIENT
IP	IP-C-ACS	IP-B-NHOP2 IP-3-NHOP2	IP-A-NHOP1 IP-B-NHOP1			IP-A-FW	IP-L-FW IP-L-CLIENT
Port	443 P3					P2	P1

Further Setup Assumptions for Scenario 1:

1. CSED client at ONU with no IP stack
2. SSED client at OLT with no IP stack
3. Static configuration of UMT clients for match criteria (learning option shown for information for SSED)
    1. IP filter match SSED ingress <DST-MAC,SRC-IP,Protocol,SRC-Port> = <M-A-FW,IP-C-ACS,TCP,443>
    2. IP filter match for CSED ingress <SRC-MAC,DST-IP,Protocol,DST-Port> = <M-A-FW,IP-C-ACS,TCP,443>

Scenario 1 Questions and Answers

- What is the IP and MAC address translations between TR-069 client and ACS?
  - review tf2_1504_laubach_2.pdf

Scenario 1 Questions and Answers

- What must be pre-configured before L3 "flows" are properly distinguished for UMT?
  - In ONU CSED:
    - Received via UNI from FW to place into UMT:
      - Pre-configured per L3 service; e.g., ACS:
        - » Server destination: <IP address, TCP/UDP, Port #>
        - » Cannot be learned, must match service provider configuration of DHCP, etc.
    - Received via PON to UNI:
      - Automatic
      - Any L3-encapsulated UMT Frame is converted back to L3

Scenario 1 Questions and Answers

- (continued)
  - In OLT SSED (pre-configured):
    - Received via PON (from ONU) to NNI [?]:
      - Automatic
      - Any L3-encapsulated UMT Frame is converted back to L3
    - Received via NNI to place into UMT:
      - Configured per L3 service; e.g., ACS:
        - » Server source: <IP address, TCP/UDP, Port #>
        - » Must match service provider server configuration

Scenario 1 Questions and Answers

- (continued)
  - In OLT SSED (learned):
    - Received via PON (from ONU) to NNI:
      - Automatic
      - Any L3-encapsulated UMT Frame is converted back to L3
      - Learned FW source: <IP address, TCP/UDP, Port #>
    - Received via NNI to place into UMT:
      - Received L3 matching FW IP source is placed into UMT

Scenario 1 Questions and Answers

- What can break and/or be misused?
  - If CSED or SSED filter rules are not in place (or are stale and not following server changes) any L3 management traffic would not be placed in UMT
    - Nothing breaks, this is today's behavior
      - Accounted in user traffic
  - Can the service be misused?
    - Yes, by "clever" subscriber
    - Any Ethernet frame received at ONU via UNI from subscriber with ETYPE of 0x8UMT should be discarded

Scenario 2

- UMT over PON network only
  - Distinguish L2 OAM with EPoC FCU traversal

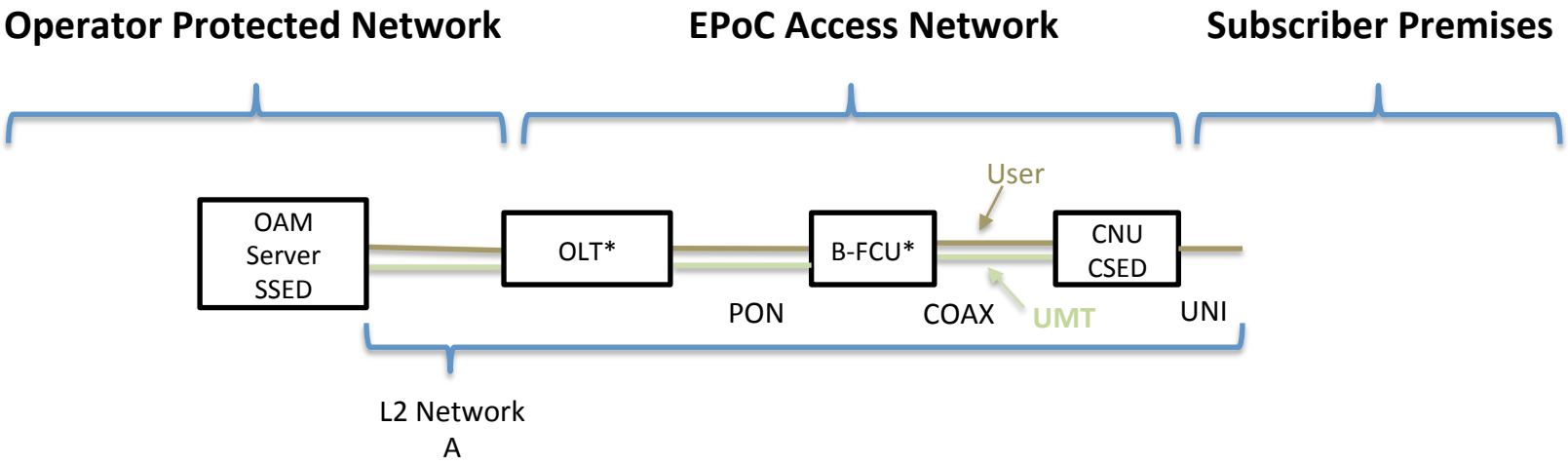
Scenario 2 Setup

- UMT over PON network only
  - Distinguish L2 OAM with EPoC FCU traversal
- Assumptions
  - Client Side Edge Device with CNU
  - Server Side Edge Device with OAM Server
  - EPoC System Specification B-FCU bridge model
    - Unicast DA's for OAM

Scenario 2 Questions

- What are the L2 address translations?
- What must be pre-configured before L2 "flows" are properly distinguished for UMT?
  - What detailed knowledge of service/client address, protocol, ports, etc. must be known in advance?
  - Can any configuration be automatic?
- What can break and/or be misused?

Scenario 2: UMT for EPoC System FCU



Address Notations

MAC	M-A-Server	M-A-OLT	M-PON-FCU M-COAX-CNU	M-A-CNU

Assumptions for Scenario 2:

1. CSED client at both CNU
2. SSED client at OAM Server
3. *B-FCU and OLT may place UMT Ethertype into a different aggregate service flow (e.g. one PON LLID to carry all UMT traffic) Not learned.

Scenario 2 Questions and Answers

- What are the L2 address translations?
  - Existing OAM runs as-is
  - None for Ethertype 0x8UMT traffic
- What must be pre-configured before L3 "flows" are properly distinguished for UMT?
  - CNU configured for UMT CSED support
    - eOAM is directly encoded in/out UMT in the CSED stack
  - OAM server configured for UMT SSED support
    - eOAM is directly encoded in/out of UMT in SSED stack

Scenario 2 Questions and Answers

- What must be pre-configured (continued)
  - B-FCU and OLT may place UMT Ethertype into a different aggregate service flow (e.g. one PON LLID to carry all UMT traffic)
    - Not learned.
    - Configured by the service provider outside of UMT
  - B-FCU and OLT must bridge (forward) Ethertype 0x8UMT traffic

Scenario 2 Questions and Answers

- What can break and/or be misused?
  - OLT bridge table must know of CNU Coax MAC address for forwarding from OAM server to PON
  - Can the service be misused?
    - Yes, by “clever” subscriber
    - Any Ethernet frame received at ONU via UNI from subscriber with ETYPE of 0x8UMT should be discarded

Summary

- UMT approach works as expected for the L3 and L2 scenarios presented
  - EPoC System Specification B-FCU model appears to be fully supported by UMT Scenario 2
    - We just need IEEE P802.3bn to get into ballot and CableLabs project restarted

THANK YOU