GMPLS VLAN Path Establishment using Inter-domain VLAN Tag Swapping

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GMPLS establishes VLAN Path on Wide-Area-Ethernet

Frame work

Resource Manager

Route information (including VID)

Customer A (LAN#1)

Customer A (LAN#2)

Customer B

Wide-Area-Ethernet consists of several Carrier's Domains (X and Y)

VLAN Path is established between Customer's LANs Autonomously On Demand

VLAN Path

Tagged frame is used to VLAN Path

including VID(12bit):
= Path identify

Ethernet frame

VLAN Tag

~1518byte

32bit

Path B (VID=45)

Path A (VID=10)

Path C (VID=84)

Forwarding based on VLAN Tag (and MAC)

Solution Ideas:

1) Increasing VLAN address space
   [Innovate New Ethernet frame format]

2) Independent VLAN Assignment per Domain
   [VLAN Tag Swapping]

Problem:

Same VID should be used on the Path
Have to find out the commonly unused VID among domains
Difficulty to find VID in multi-domain network

GMPLS Control Plane Supporting L2SC

Osaka

domain Y

Tokyo
Inter-domain VLAN Tag Swapping System

Proposed Scheme: Point [1] - [3]

1. Generalized Label Object transports IF information
   - 1 = Tag, 0 = Untag
   - Physical Port NO = 5 (1 - 999)
   - VID Information is carried on RSVP

2. RSVP designates Upstream IF VID with Explicit Route Object
   - ERO type4: Node ID | IF Index
   - ERO type3: Generalized Label

3. Tag Swapping is performed by Software Switch
   - Swapping Node
   - Resource Manager

Summary: We accomplished Independent VLAN Assignment per Domain with Extended RSVP and Software Switch. And successfully demonstrated.

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