N:1 PVC Mapping to PWE with Nonunique VPIs

The N:1 PVC Mapping to PseudoWire Emulation (PWE) with Nonunique virtual path identifiers (VPIs) feature maps one or more ATM permanent virtual circuits (PVCs) to a single pseudowire (PW). There are two modes of AAL0 encapsulation, N:1 and 1:1 mapping. In N:1 mapping, multiple unrelated virtual path identifier/virtual channel identifier (VPI/VCI) are carried over a single Multiprotocol Label Switching (MPLS) PW. This is an efficient mapping method because less resources are used from the MPLS network. In 1:1 mapping, a single VPI/VCI is carried over a single MPLS PW. Benefits of this feature include the following:

- Aggregate quality of service (QoS) can be applied to related PVCs.
- Bandwidth is conserved with the reduction in the number of pseudowires that are used.

Note

This is not applicable for Cisco ASR 900 RSP3 Module.

Restrictions for N:1 PVC Mapping to PWE with Nonunique VPIs

- N:1 PVC mapping configuration is supported only on multipoint subinterfaces; it is not supported on main interfaces or point-to-point subinterfaces.
- N:1 PVC mapping mode is not supported on Access Circuit Redundancy subinterfaces.
- Preconfigured PVCs cannot exist on the multipoint subinterface on which you want to configure N:1 PVC mapping.
- An attachment circuit that has been bound to a pseudowire cannot be removed unless all Layer 2 virtual circuits (VCs) have been removed.
- Layer 3 PVCs cannot be configured on N:1 subinterfaces.
• Cell packing values configured under a VC class attached to the PVC, main interface, or subinterface will not be inherited by N:1 PVCs.

• Operation, Administration, and Maintenance (OAM) functionality is not supported on N:1 Layer 2 PVCs. OAM cells coming from the customer edge (CE) network will be treated as normal data traffic and will traverse through the pseudowire.

• Only ATM adaptation layer type 0 (AAL0) encapsulation is supported for N:1 PVCs.

• The service policy configuration can be configured only at the subinterface level for N:1 PVCs.

• ATM N:1 and PVP modes cannot be configured on different subinterfaces that belong to a physical interface.

• You cannot change the ATM interface mode from point-to-point to multipoint or from multipoint to point-to-point.

• If you change a layer 2 ATM interface to a layer 3 ATM interface, traffic will not flow.

Information About N:1 PVC Mapping to PWE with Nonunique VPIs

N:1 PVC Mapping to PWE with Nonunique VPIs Feature Description

To transport ATM cells over Multiprotocol Label Switching (MPLS), a VC is established between the provider edge (PE) routers on both ends of the MPLS backbone. With the N:1 permanent virtual circuit (PVC) Mapping to PseudoWire Emulation (PWE) with Nonunique VPIs feature, multiple PVCs irrespective of their Virtual Path Identifiers (VPIs), are transported over a single pseudowire configured on a subinterface. (“N:1” refers to the number of PVCs transported over one pseudowire). ATM cells are packed together in a single frame and sent over the single pseudowire. The ATM cell header information is packed together with the cell payload on a per-cell basis in the packets so that packets received at the egress end are unpacked and the ATM cells are mapped to the respective PVCs.

In N:1 PVC mapping mode, the device can pack cells only from a single PVC in an MPLS packet to transmit over a pseudowire; cells from multiple PVCs cannot be packed in a single MPLS packet and mapped to a single pseudowire for transmission. However, if a device receives an MPLS packet that is packed with cells from multiple PVCs, then those cells will be unpacked and sent to the respective PVCs.

How to Configure N:1 PVC Mapping to PWE with Nonunique VPIs

Configuring N:1 PVC Mapping to PWE with Nonunique VPIs

SUMMARY STEPS

1. enable
2. `configure terminal`
3. `interface atm slot/subslot/port`
4. `atm mcpt-timers timer1 timer2 timer3`
5. `exit`
6. `configure terminal`
7. `interface atm slot/subslot/port.subslot` multipoint
8. `no ip address`
9. `atm enable-ilmi-trap`
10. `cell-packing maxcells mcpt-timer timer-number`
11. `xconnect peer-ipaddress ve-id encapsulation mpls`
12. `pvc vpi/vci `l2transport`
13. Repeat Step 12 for the number of PVCs that you want to configure.
14. `end`

### DETAILED STEPS

<table>
<thead>
<tr>
<th>Step</th>
<th>Command or Action</th>
<th>Purpose</th>
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| **Step 1** | `enable` | Enables privileged EXEC mode.  
 * Enter your password if prompted. |
| **Example:** | `Device> enable` |
| **Step 2** | `configure terminal` | Enters global configuration mode. |
| **Example:** | `Device# configure terminal` |
| **Step 3** | `interface atm slot/subslot/port` | Enables the ATM interface and enters interface configuration mode. |
| **Example:** | `Device(config)# interface atm 9/1/1` |
| **Step 4** | `atm mcpt-timers timer1 timer2 timer3` | Sets the Maximum Cell Packing Timeout (MCPT) values in microseconds.  
 * The MCPT timer sets the time for which the device waits for the raw cells (AAL0 encapsulation) to be packed into a single packet for punting to the pseudowire. |
| **Example:** | `Device(config-if)# atm mcpt-timers 100 200 300` |
| **Step 5** | `exit` | Exits interface configuration mode. |
| **Example:** | `Device(config-if)# exit` |
| **Step 6** | `configure terminal` | Enters global configuration mode. |
| **Example:** | `Device# configure terminal` |
Configuration Examples for N:1 PVC Mapping to PWE with Nonunique VPIs

Example: Configuring N:1 PVC Mapping to PWE with Nonunique VPIs

The following example shows how to configure the N:1 ATM permanent virtual circuit (PVC) mapping to pseudowires with non unique virtual path identifiers (VPIs):

```
Device> enable
```
Device# configure terminal
Device(config)# interface atm 0/1/0
Device(config-if)# atm mcpt-timers 500 5000 50000
Device(config-if)# exit
Device# configure terminal
Device(config)# interface atm 0/1/0.1 multipoint
Device(config-subif)# no ip address
Device(config-subif)# atm enable-ilmi-trap
Device(config-subif)# cell packing 20 mcpt-timer 2
Device(config-subif)# xconnect 10.1.1.1 100 encapsulation mpls
Device(config-subif)# pvc 10/100 12transport
Device(config-subif)# pvc 11/122 12transport
Device(config-subif)# pvc 19/231 12transport
Device(config-subif)# end

Verifying the N:1 PVC Mapping to PWE with Nonunique VPIs Configuration

To verify the N:1 PVC Mapping to PWE with Nonunique VPIs Configuration, use the `show mpls l2transport vc` command in user EXEC or privileged EXEC mode.

Router# show mpls l2transport vc

<table>
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<th>Local circuit</th>
<th>Dest address</th>
<th>VC ID</th>
<th>Status</th>
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<tr>
<td>ATM0/1/1.1</td>
<td>ATM CELL ATM0/1/1.1</td>
<td>2.2.2.2</td>
<td>100</td>
<td>UP</td>
</tr>
</tbody>
</table>

Interface ATM0/0/0.1/1/1
atm mcpt-timers 20 30 40

Interface ATM0/0/0.1/1/1.1 multipoint
no ip address
no atm enable-ilmi-trap
cell-packing 2 mcpt-timer 1
xconnect 2.2.2.2 100 encapsulation mpls
pvc 10/100 12transport
pvc 20/200 12transport
pvc 30/300 12transport

Additional References

Related Documents

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Technical Assistance

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<td>tools on the Cisco Support and Documentation website requires a Cisco.com</td>
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