Why Carriers Like Pseudowires…

- A type of "virtual circuit": on top of all Layer-2, below Layer-3 (IP)
- A point-to-point connection that carries packets, cells or bit streams
- Uses MPLS control plane to provision data flows
- Works over legacy as well as low-cost Metro Ethernet
- Future-proofed against ‘next big thing’ in access
  ➔ Suitable for Service Convergence
  ➔ Utilizes current access assets

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Making a Service out of Pseudowires

- **Flexibility**
  - Multiplex traffic from all access infrastructure
- **QoS guarantees at fine granularity**
  - Sustain per-flow QoS after aggregation
  - Support delay-sensitive traffic
- **Edge-to-edge OAM**
  - Support MPLS-Ethernet/ATM OAM Mapping
- **Rapid Protection & Restoration**
  - Recovery from failures in msec’s
- **Support Multiple Control-Planes**
  - MPLS, Ethernet, ATM…
- **Easy to Manage**
  - Compatible with backbone’s MPLS control-plane
- **Cost Effective**
  - Remove unnecessary IP functions
- **Equipment Requirements**
  - Process at Pseudowire-level (e.g. switching)
  - No need to carry Layer-2 traffic with Layer-3 gear
Draft-Martini: Originally Designed as Generic Encapsulation for Routers

- Data Tunnel Label 100 PW Label 1000 Data
- User 1 Pseudowire for User 1 Pseudowire for User 2 MPLS Tunnel
- User 2
- Data Tunnel Label 100 PW Label 2000 Data

Access Core Access
IP Routing (Needed to setup MPLS Tunnels)
MPLS Tunnels
Pseudowires
Draft-Martini:
In Practice, Requires IP Routing and Routers Everywhere

User 1
User 2

Data
Tunnel Label 200
PW Label 1000
Data

Pseudowire for User 1
Pseudowire for User 2

MPLS Tunnel

Access
Edge
Core
Edge
Access

IP Routing
IP Routing
IP Routing

MPLS Tunnels
MPLS Tunnels
MPLS Tunnels

Pseudowires
Pseudowires
Pseudowires
Dry-Martini:
Provide Data Multiplexing, Simplify Network Access
How does Dry-Martini Work?

- **Option 1**: Peer-to-peer Target LDP
- **Option 2**: Lightweight PW UNI
- **Option 3**: Setup PW’s via out-of-band

**Access Network Connection**
- Insert a label per flow
- Label: MPLS or VLAN
- Look up label & forward

**Networks**
- Net-1
- Net-2

**Devices**
- CPE/MSPP/PON
- Edge Switch
- Proxy

Any Access Infrastructure
Impact of Dry-Martini

- **IP Router is overkill for data access**
  - Support of draft-martini needs IP routing (to setup MPLS tunnels)
  - With dry-martini, no need for full IP/MPLS stack on access devices

- **Access devices can be cheap and simple**
  - Just insert labels to data flows
  - Control plane can be as simple (or fancy) as you want
  - Access device can aggregate data flows with minor add-on for packet forwarding
  - Introduce cost reduction for access devices:
    - **EPON, GPON**
    - **CPE**
    - **MSPP**

- **Edge switch needs not to be a “God Box”**
  - Aggregate user flows toward IP routers for VPN services…
  - Support PWE3 and some basic MPLS features
  - But needs to be very good at QoS, OAM and per-port cost