C7 xDSL Data Services

C7 Release 7.2

#291-00051, Rev 10

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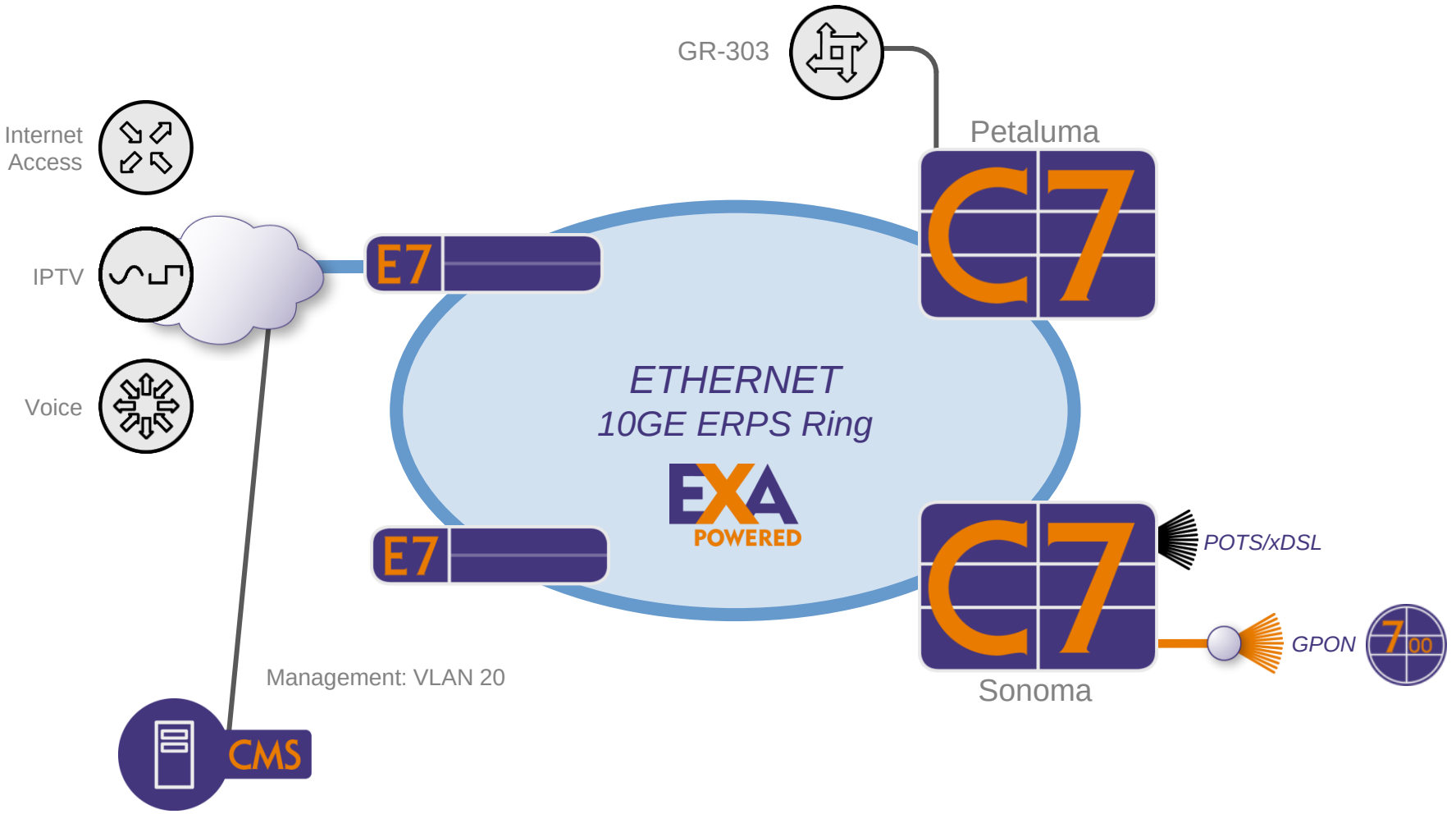
C7 EXA Data Services

Course Overview

- C7 EXA Overview
- C7 Ethernet Links
- Configuring EXA VDSL Service
  - Configuring xDSL Profiles and Templates
  - Configuring xDSL Subscribers
- Configuring EXA GPON Service
  - Configuring Bandwidth Profiles and Templates
  - Configuring GPON Subscribers

Overview

Network Example

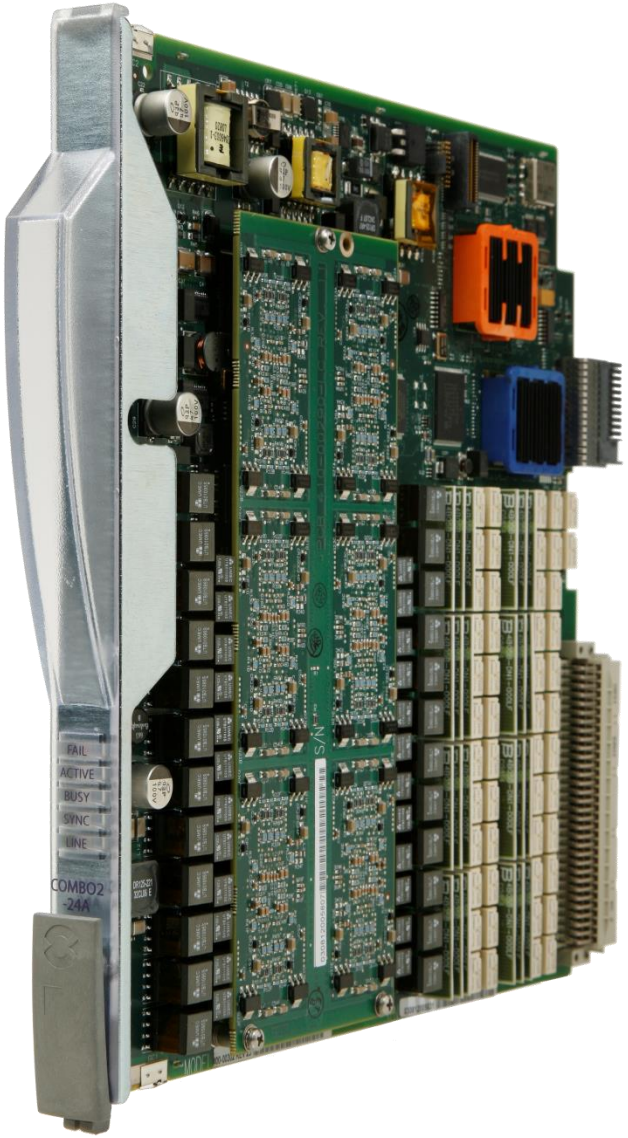


Deploying EXA Services

Calix EXA Line Cards

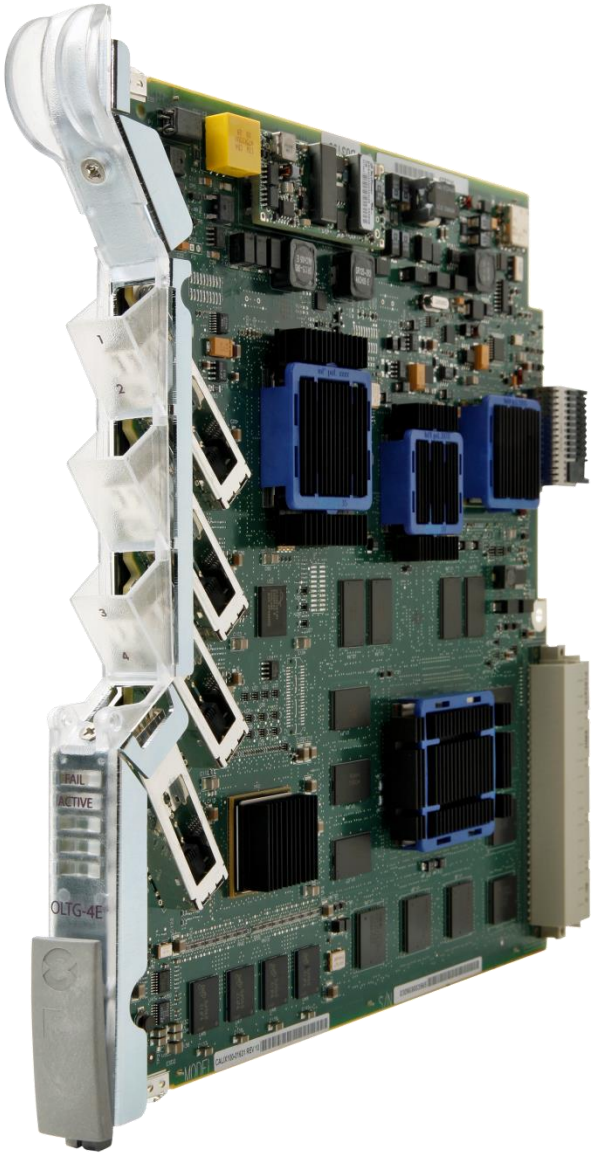
- xDSL service cards
  - COMBO2-24V
  - VDSL2-24
- GPON
  - OLTG4-e

COMBO2-24V Card and VDSL2-24 Card



- VDSL2 with ADSL2+ fallback
- ADSL2+ bonding
- Non-contiguous bonding
- 24 ports, single slot
- Supports EXA and multiprotocol architecture

OLTG-4E Line Card

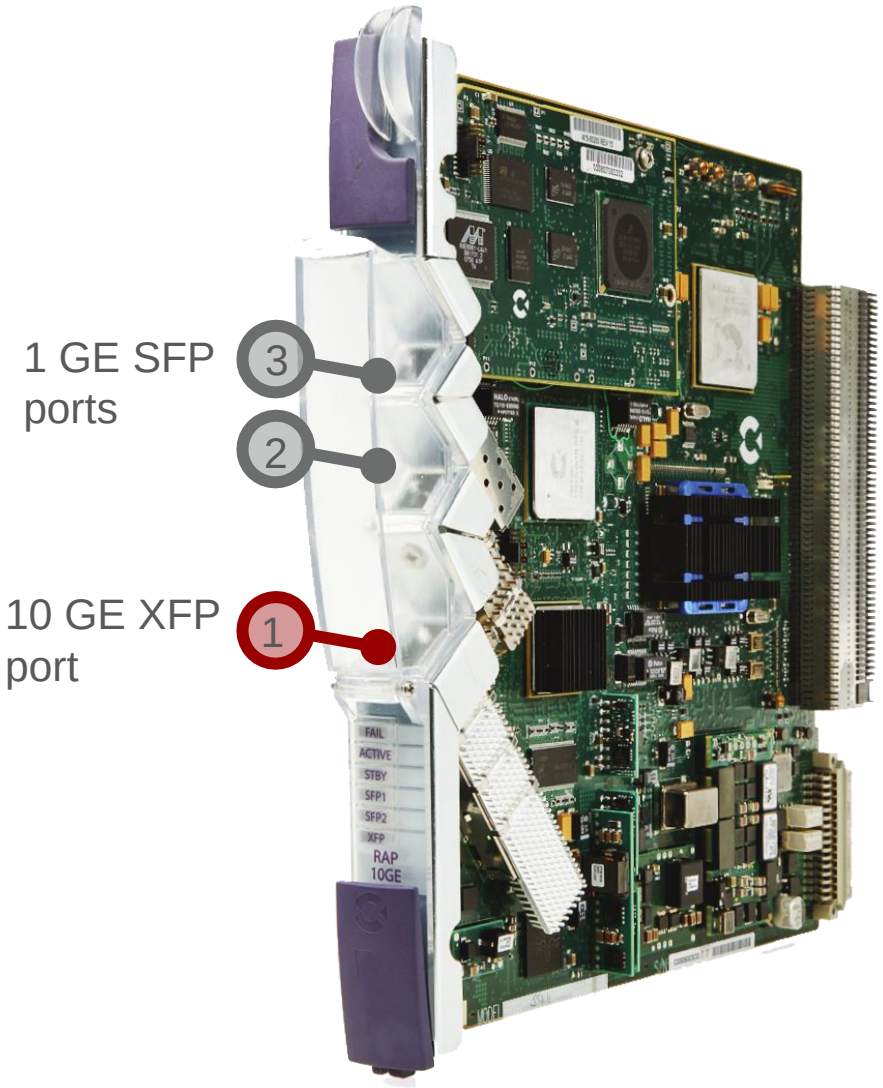


Optical Line Terminal GPON-4 ports

- Four optical ports (PONs) per card.
- Each port supports up to 64 ONTs.
  - 256 ONTs per card
- Supports 2.4 Gbps downstream, 1.2 Gbps upstream per port.
- Supports EXA and multiprotocol architecture

C7 Ethernet Overview

RAP-10GE Card



- Enables EXA architecture
- Supports traditional multiprotocol services
- Ethernet link protection:
  - ERPS
  - RSTP
  - Link aggregation
- All functions of RAP2/RAP3

EXA POWERED

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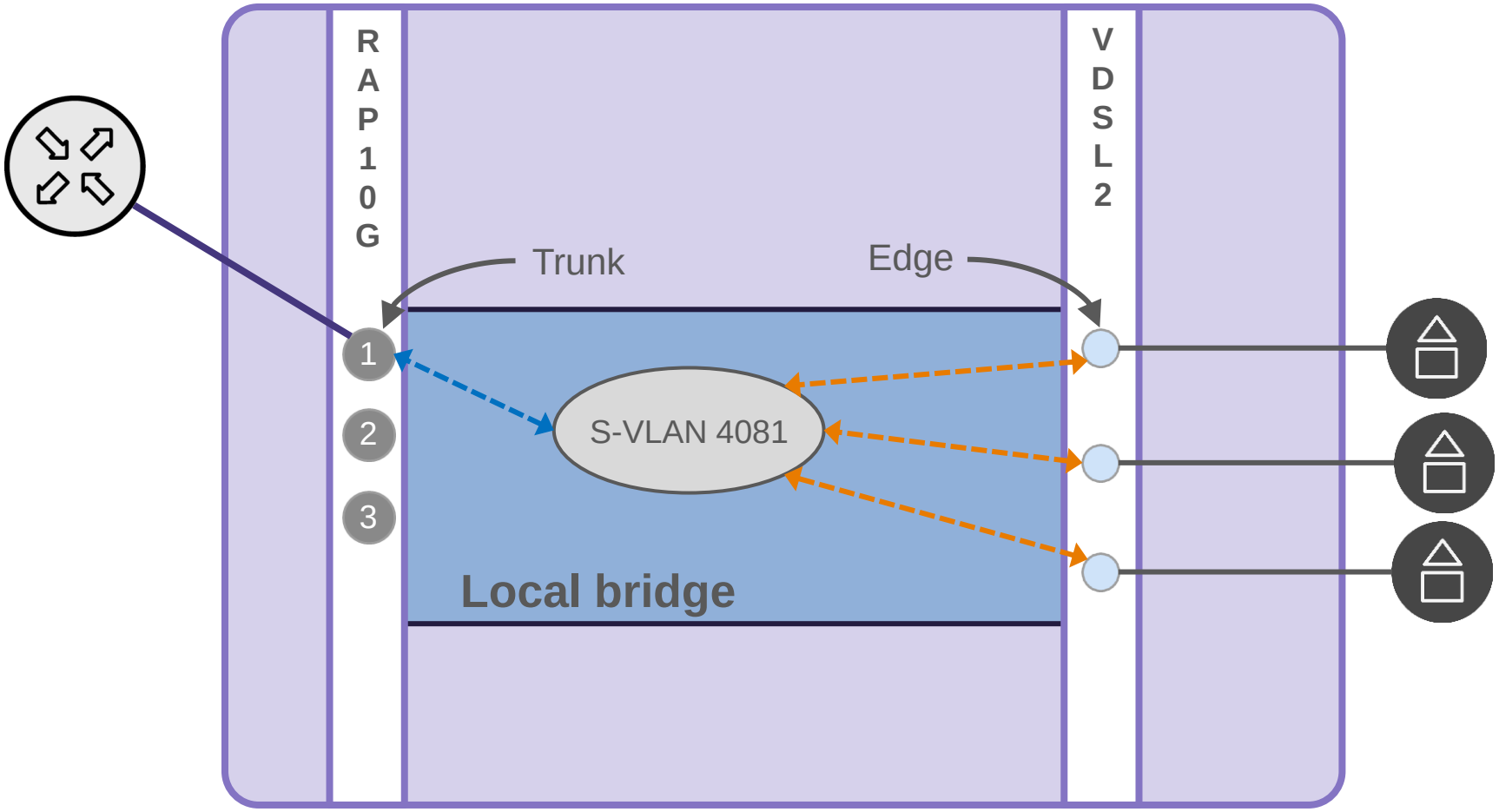
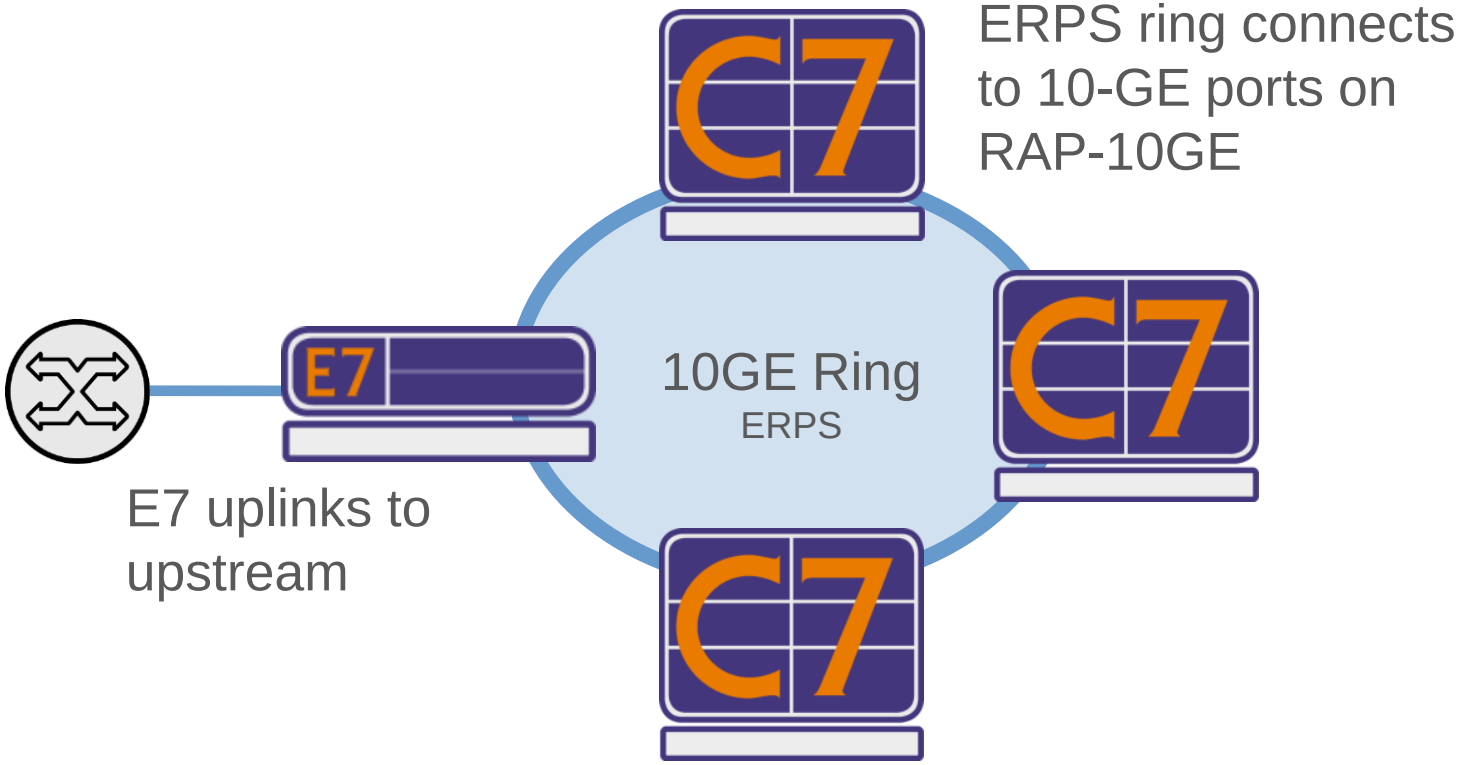
Local Bridging

- Requires RAP-10GE and EXA line cards

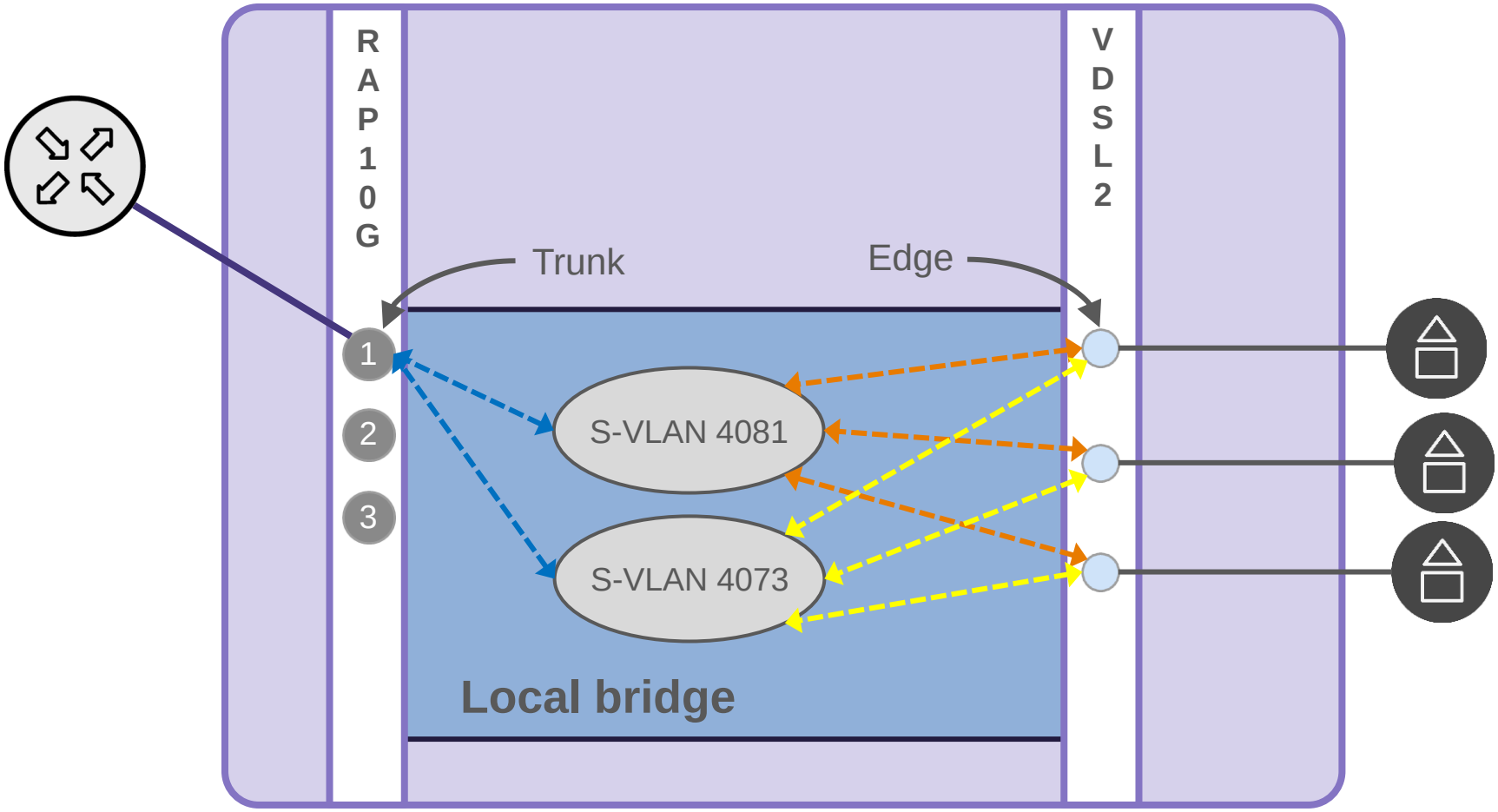


EXA Ethernet Links

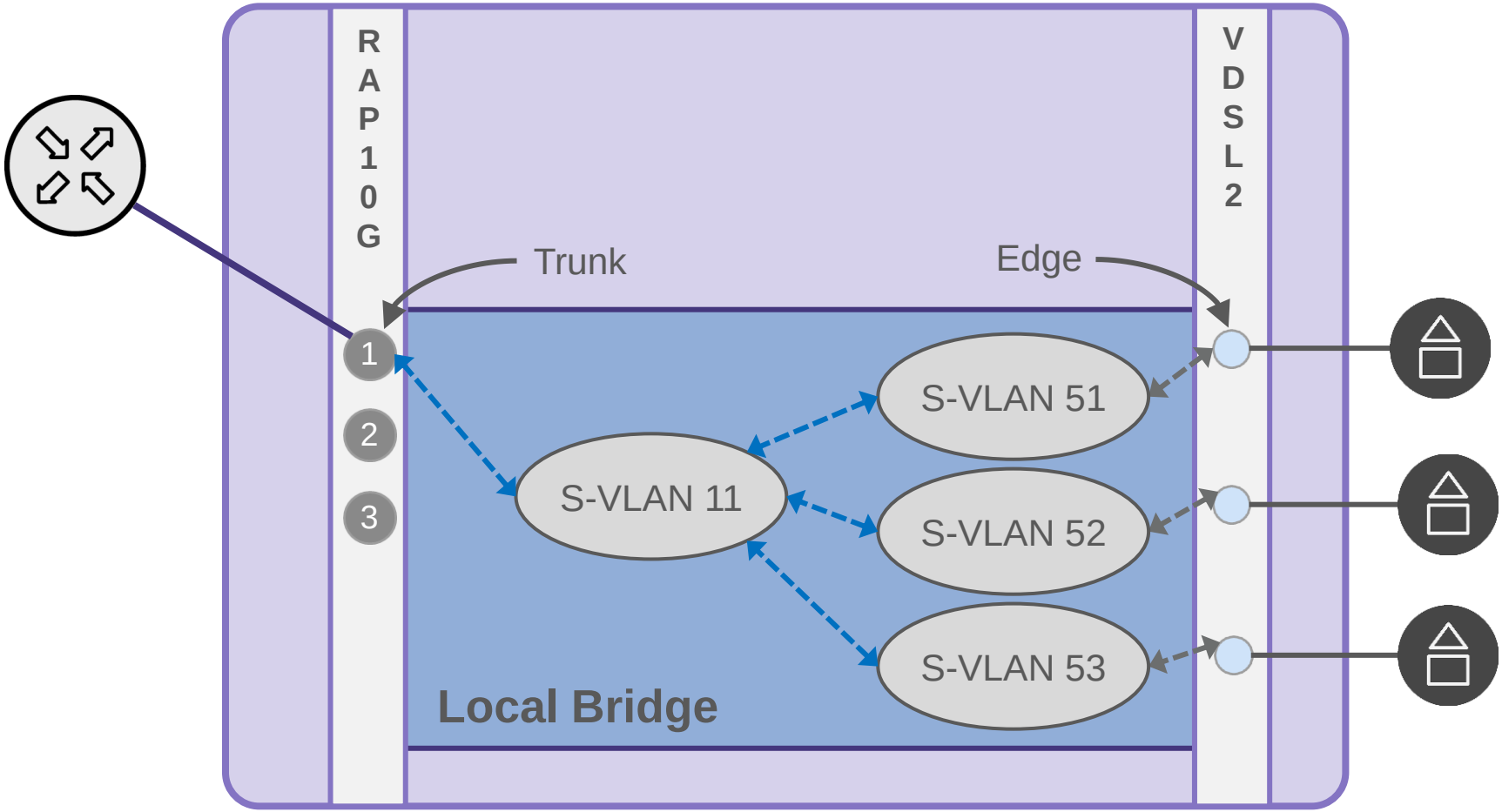
EXA Uplink and Downlink Basics



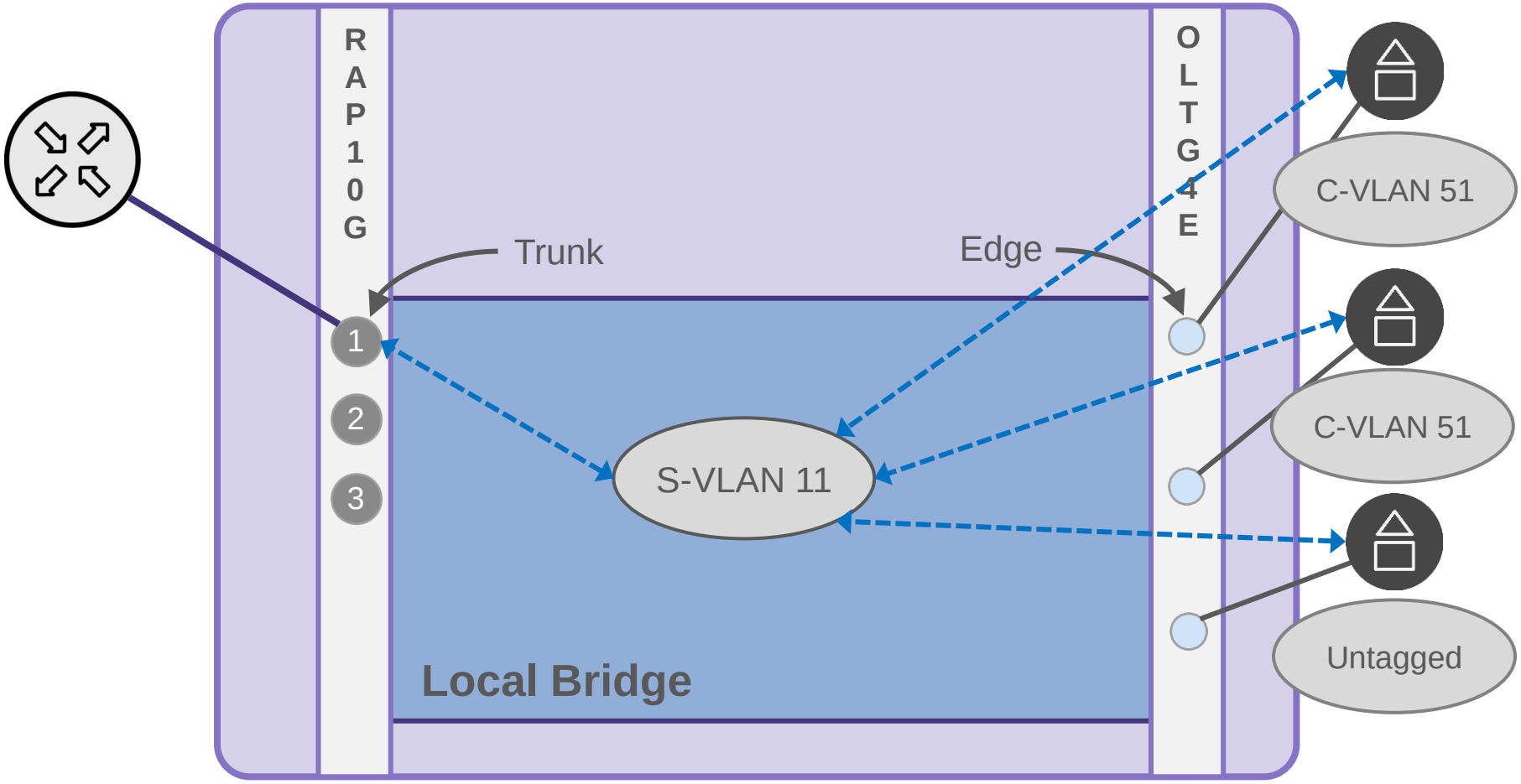
Service Models – VLAN per Service



Service Models – VLAN Per Port

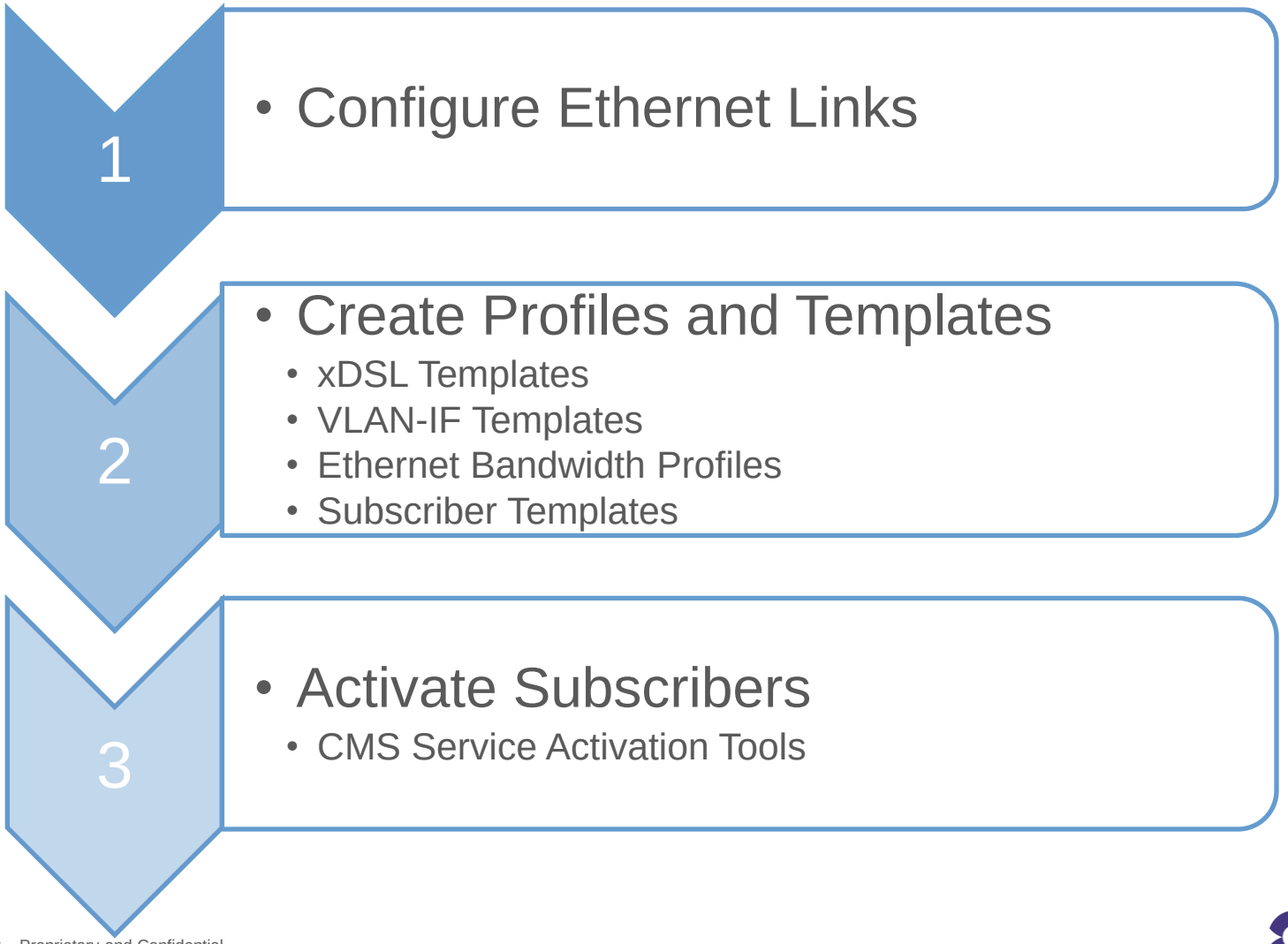


Service Models – Transparent LAN Service



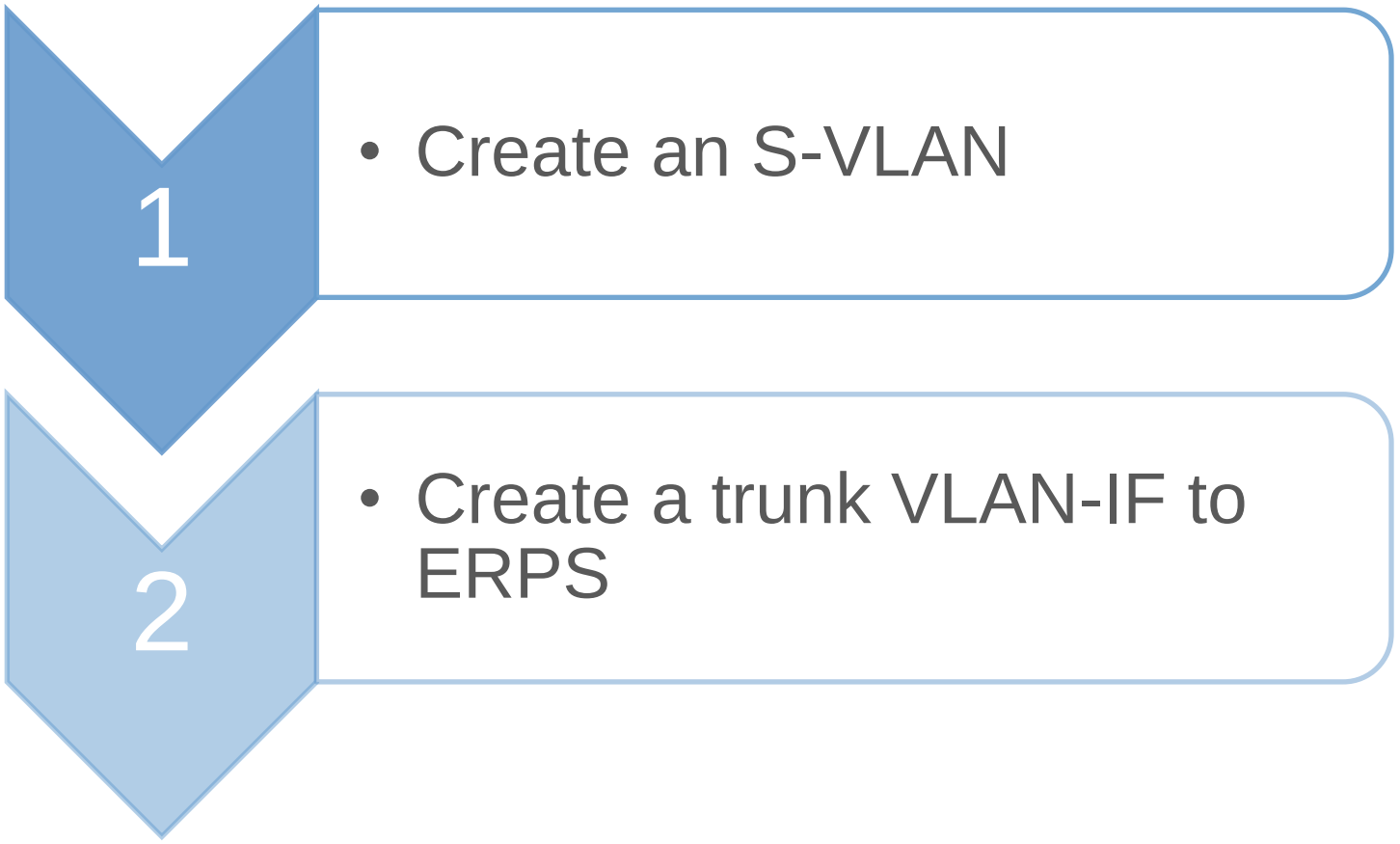
Configuration

Configuration Process

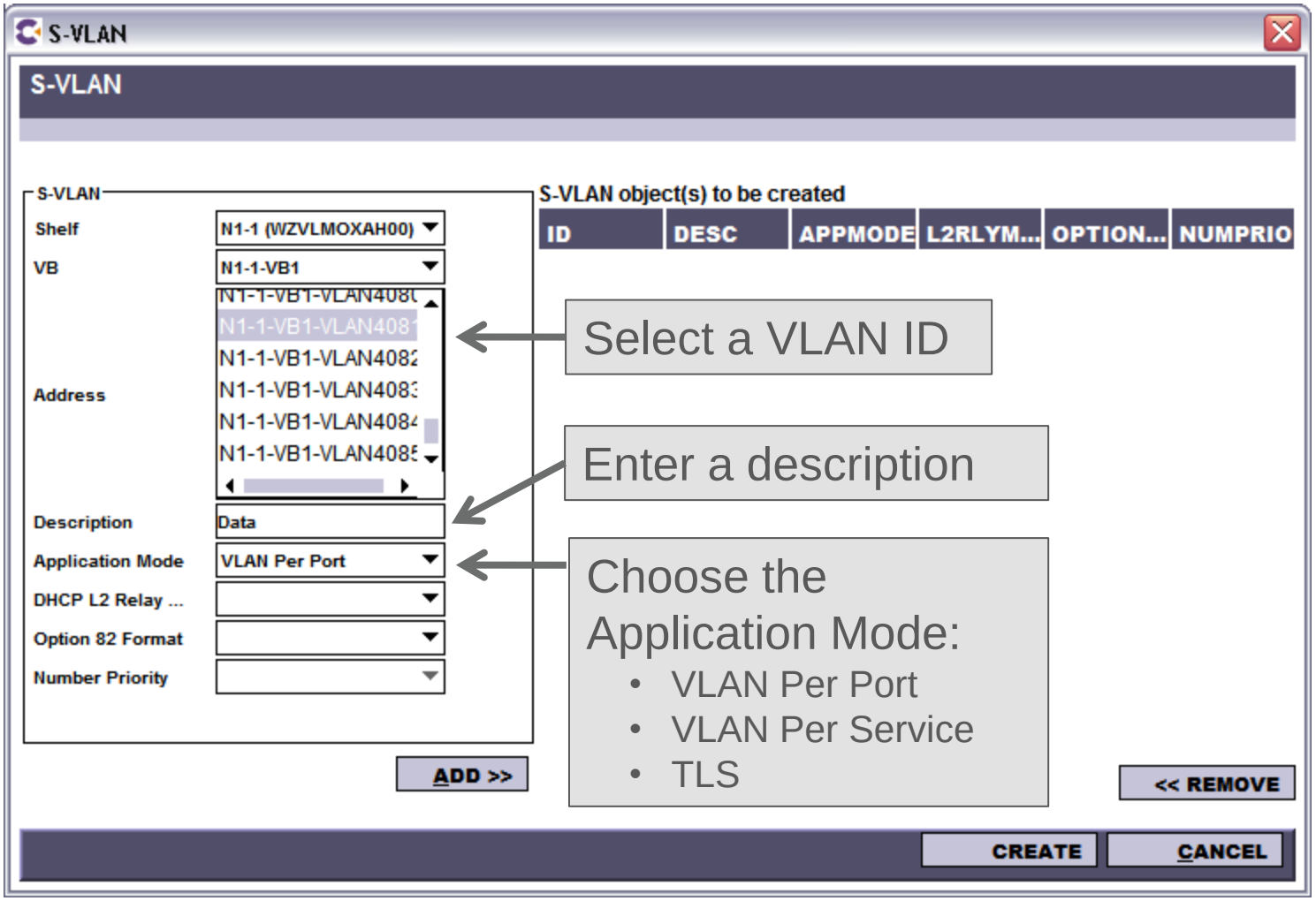


Ethernet Uplink

Uplink Configuration Process

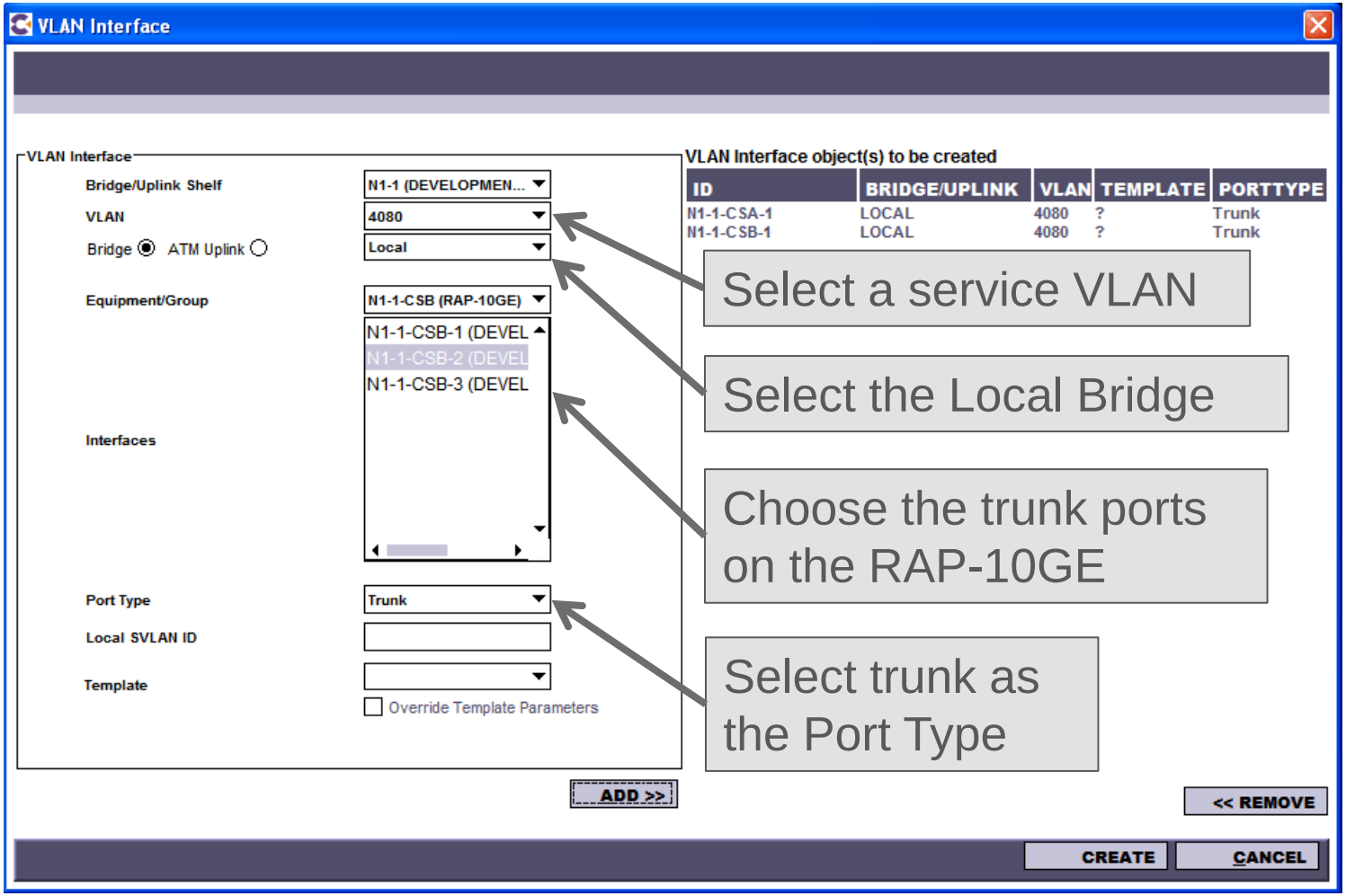


Create an S-VLAN



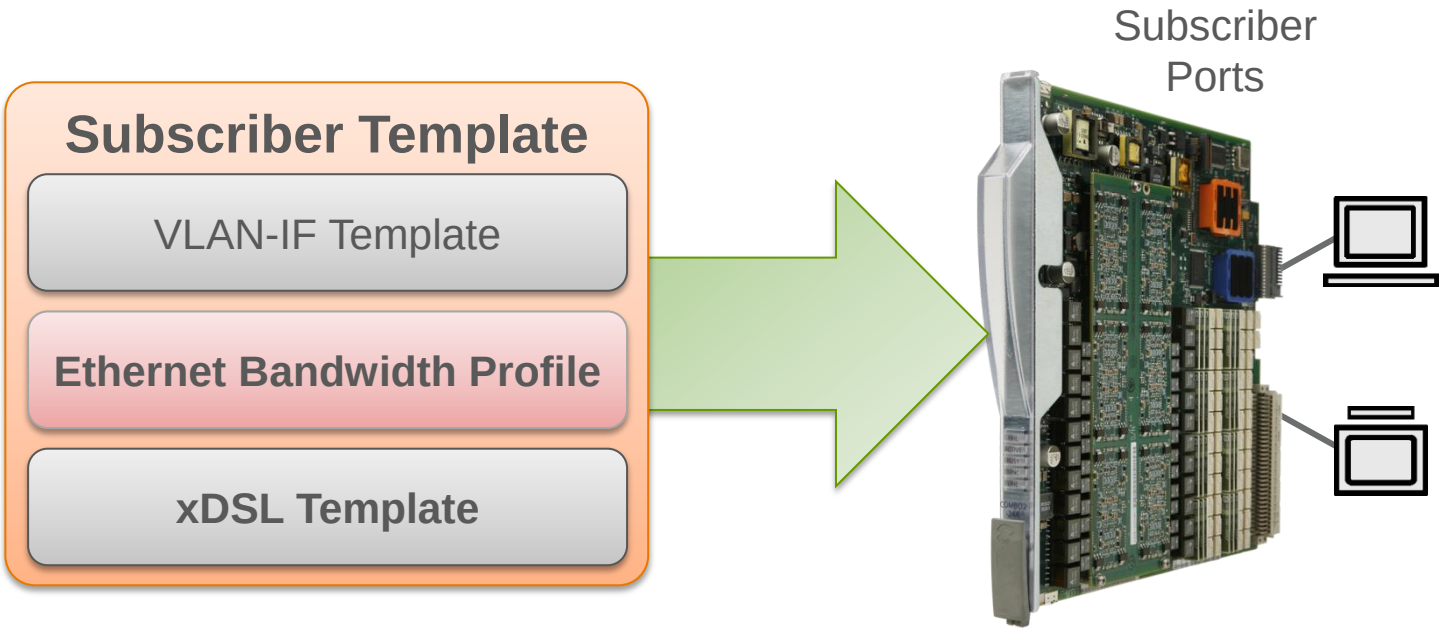
Create a Trunk VLAN Interface

CREATE > VLAN-IF > VLAN INTERFACE



Service Configuration

Subscriber Data Templates



Templates should be based on service offerings

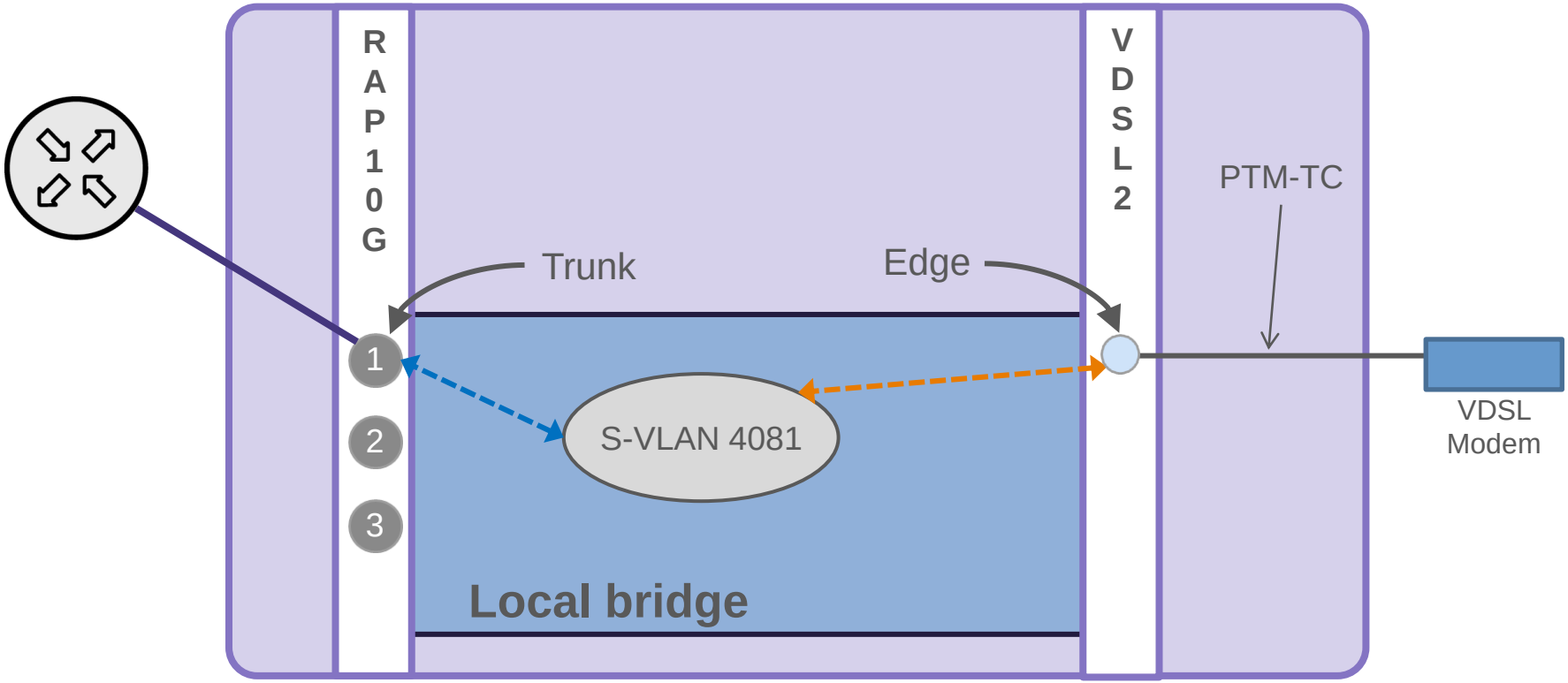
- Simplify provisioning
- Apply pre-defined settings to subscriber connection
- Templates stored in CMS and applied using profiles that have been synchronized to networks.

Configuring xDSL Service

In this section:

- C7 Internal xDSL Connections
- xDSL Configuration
  - Creating Profiles and Templates
  - Activating service

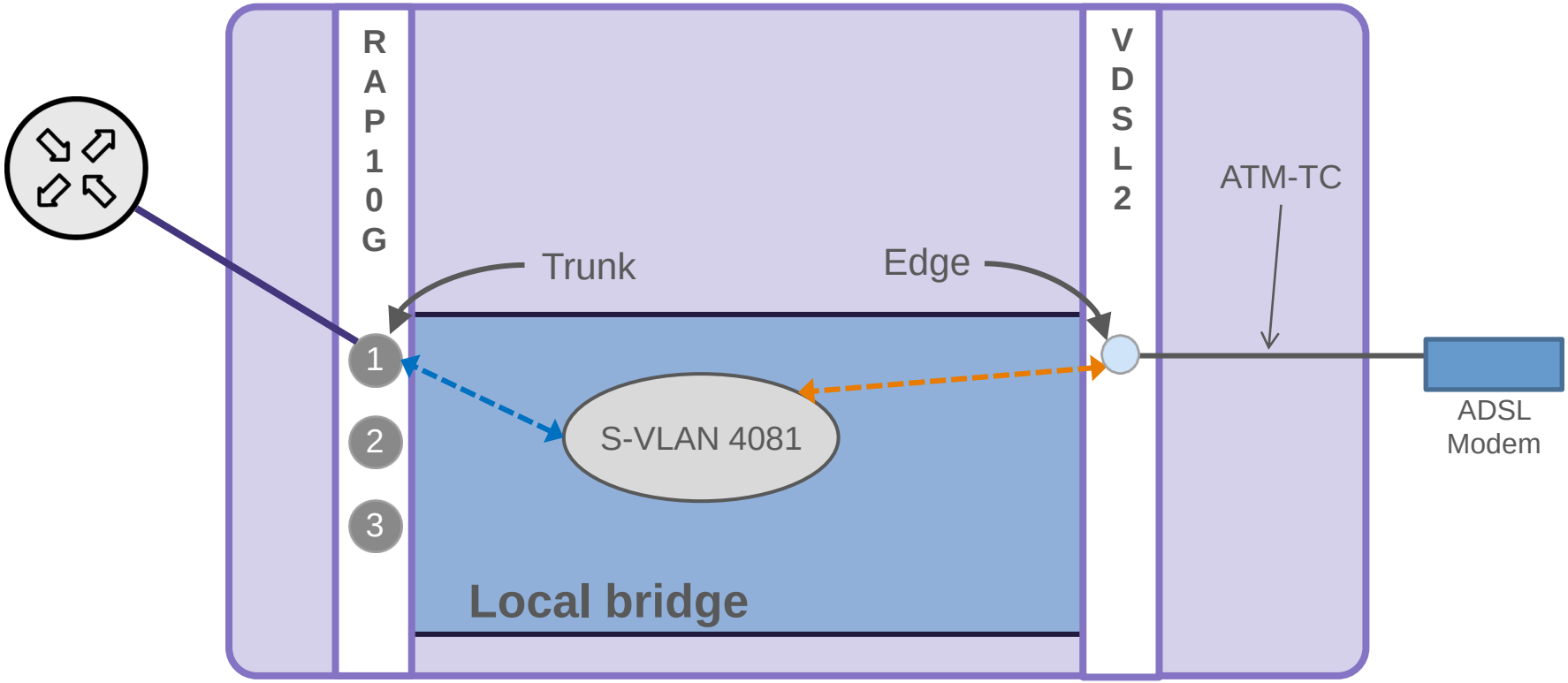
C7 VDSL Connections - EXA



VDSL CPE

- VLAN-IF between local bridge and VDSL port
- VDSL port to VDSL CPE uses PTM-TC on the line

C7 ADSL Connections - EXA



VDSL CPE

- VLAN-IF between local bridge and VDSL port
- VDSL port to ADSL CPE uses ATM-TC on the line
- Same as VDSL in ADSL fallback mode

Packet Mode

- **Packet mode refers to traffic flow inside the C7**
  - Packet mode Y = VLAN-IF (EXA)
  - Packet mode N = virtual bridge (non EXA)
- Only applicable to EXA Powered cards
  - Leave at “Default” – allows xDSL template to be used with all cards
  - C7 chooses correct mode
- No – Forces connection to VDSL ports to use Multiprotocol switch fabric
  - Can’t use VDSL service types – Must have ADSL CPE
  - Uses normal VCs within C7
  - Uses ATM VCs on the line
- Yes – Connections to port can access EXA switch fabric OR multiprotocol switch fabric
  - Uses VLAN-IF or VC with Endpoint ID within C7
  - For ADSL Fallback, uses one ATM VC on the line

EXA Data Services

xDSL Configuration

xDSL Configuration Process

1

- Configure Ethernet Links

2

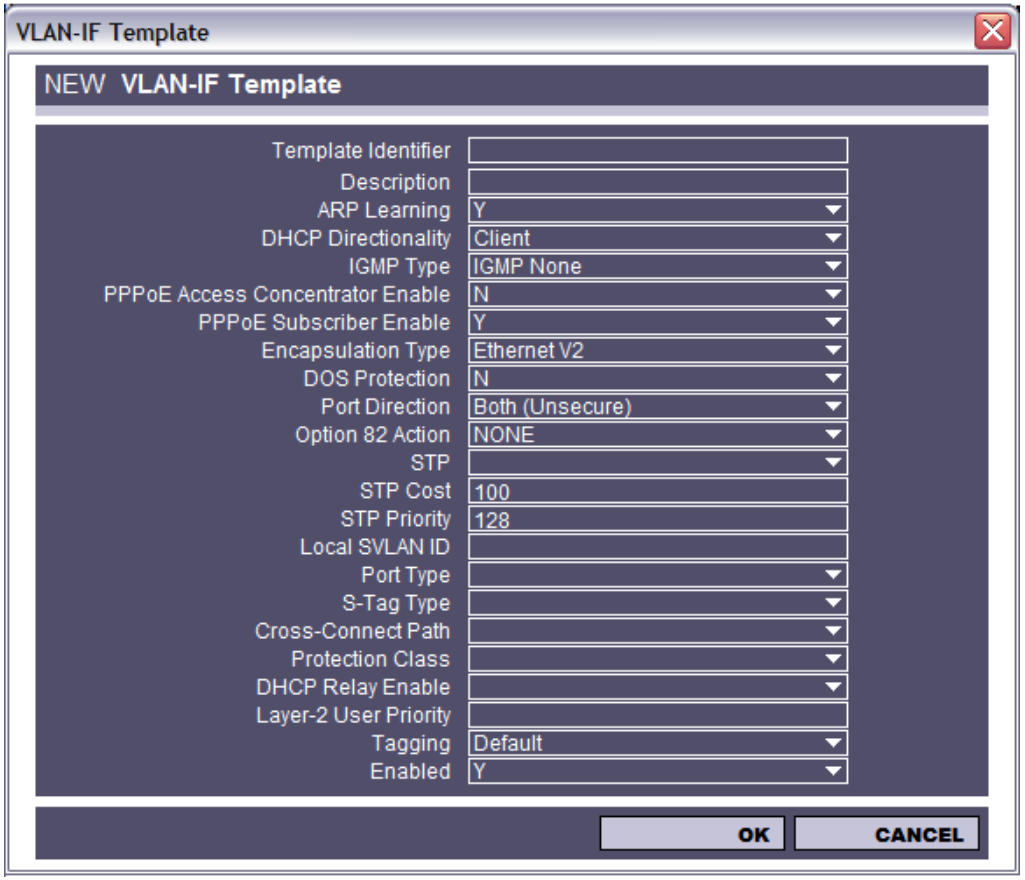
- Create Profiles and Templates
  - xDSL Templates
  - VLAN-IF Templates
  - Ethernet Bandwidth Profiles
  - Subscriber Templates

3

- Activate Subscribers
  - CMS Service Activation Tools
  - VLAN-IF

VLAN-IF Template

- Only used with Ethernet uplinks
- Define common values for subscriber facing VLAN interfaces
- Not all fields are used
  - See Course Guide
- Up to 20 VLAN-IF templates are allowed



xDSL Template – VDSL Key Settings

- Service Type – Must be **VDSL2** or **VDSL2MM**
  - **VDSL2MM allows for ADSL fallback**
- Packet Mode – Forced **Y** for VDSL
- Fallback VP/VC
- Line Profile – Default is 8D
- Maximum and Minimum Rate Downstream and Upstream
  - Enter values in kbps
  - Values are automatically rounded to the next increment of 32

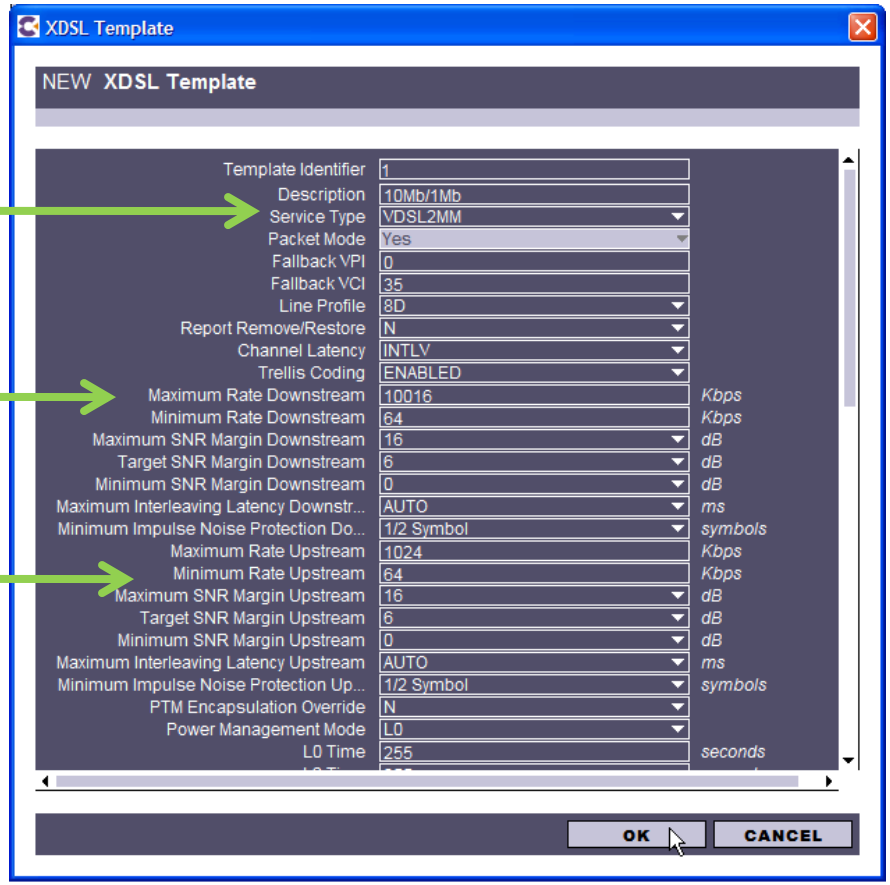
XDSL Templates

- Define service attributes for xDSL service
- Three key fields:

Service Type

Max Downstream

Max Upstream



Ethernet Bandwidth Profile Parameters

Committed Information Rate (CIR)

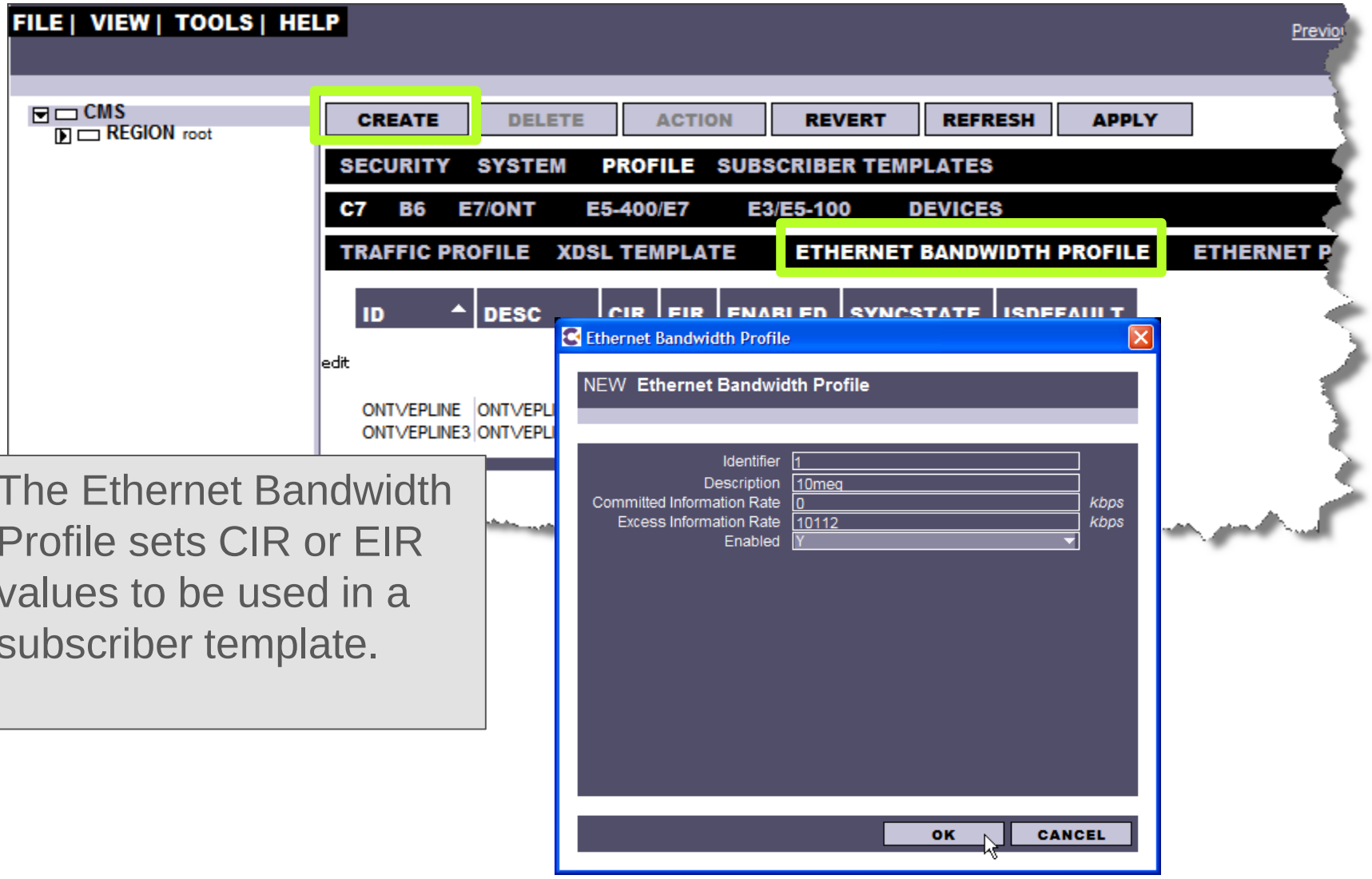
- Guaranteed bandwidth
- Analogous to GFR

Excess Information Rate (EIR)

- Uncommitted bandwidth in excess of CIR
- Analogous to UBR+

Ethernet Bandwidth Profile is global in CMS and can be reused

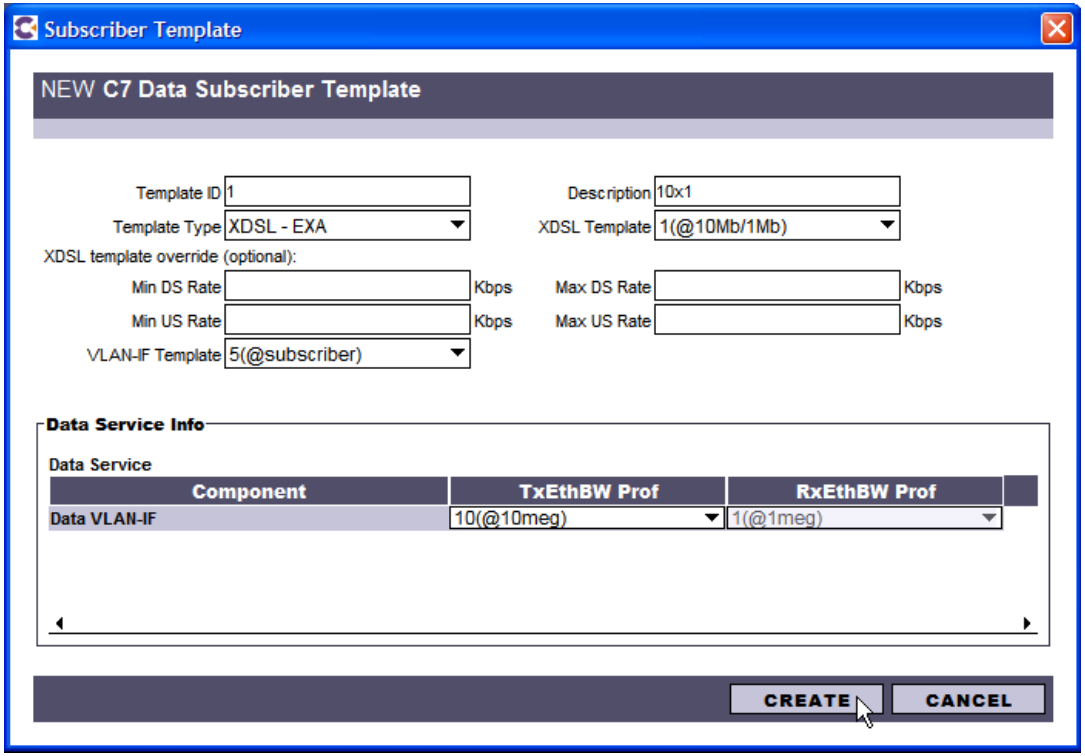
Ethernet Bandwidth Profile



The Ethernet Bandwidth Profile sets CIR or EIR values to be used in a subscriber template.

Creating Subscriber Templates - EXA

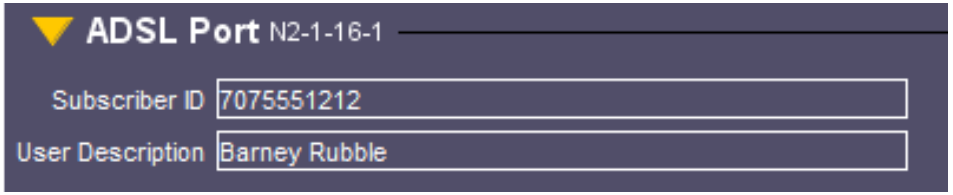
- **CMS > Subscriber Templates > C7 > Data > Create**
- Must select correct **Template Type: XDSL - EXA**
  - Cannot apply EXA templates to ports on non-EXA cards

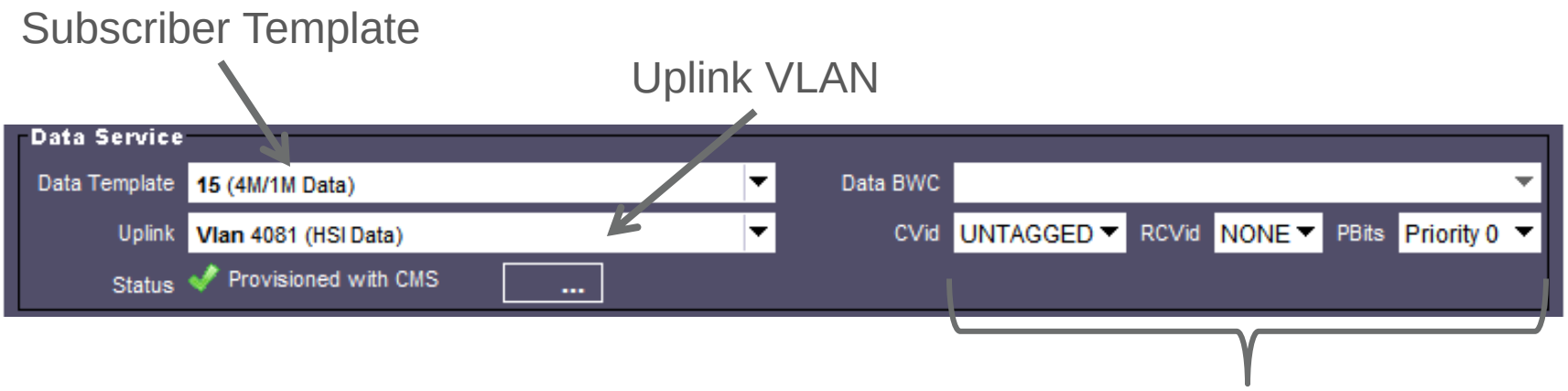


Activating Service

Using the Services Screen

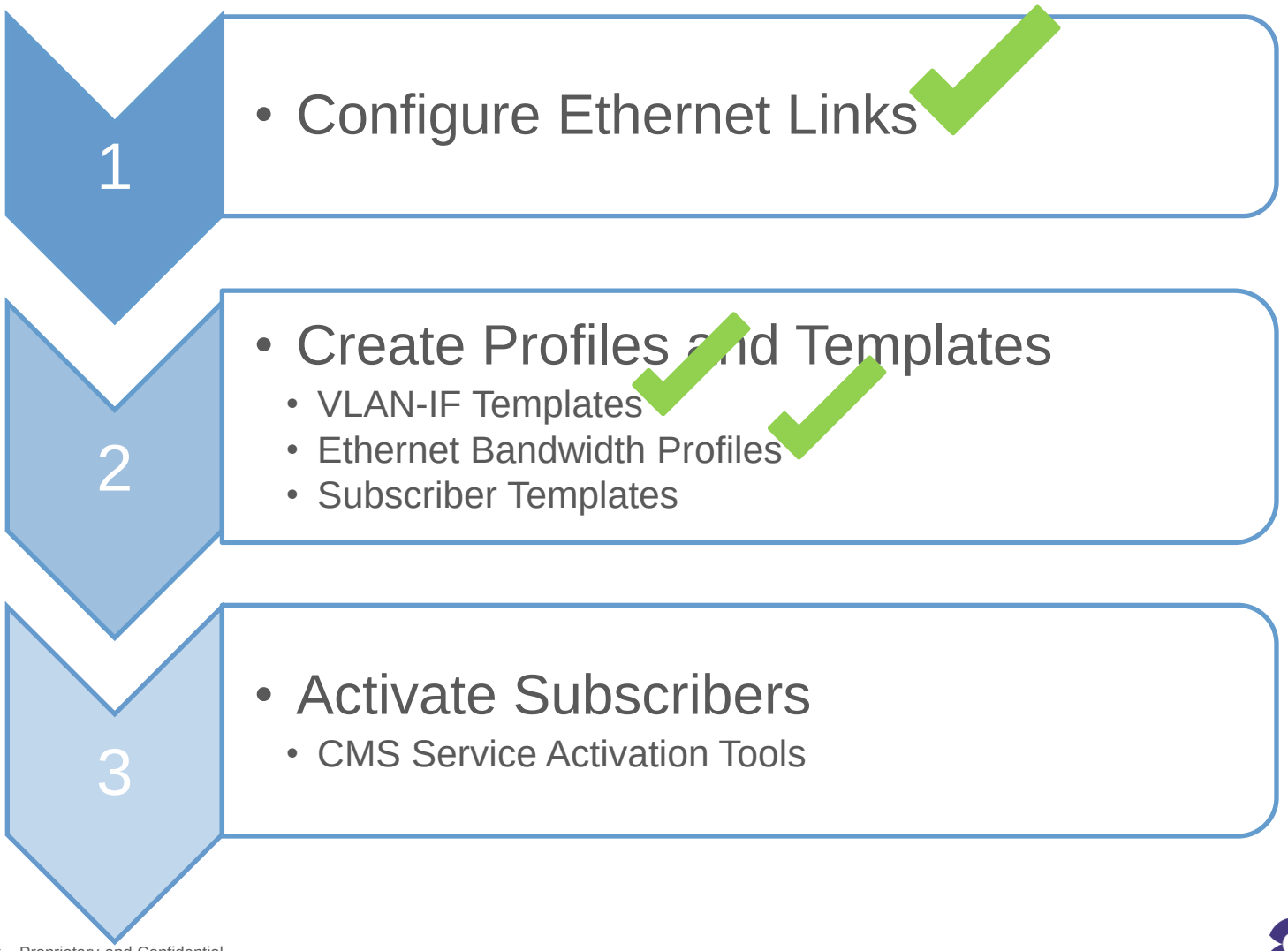
- Enter subscriber information
  - Used with Search
- Data template
  - Only valid templates for the port type will show
  - ADSL ports won't show VDSL templates





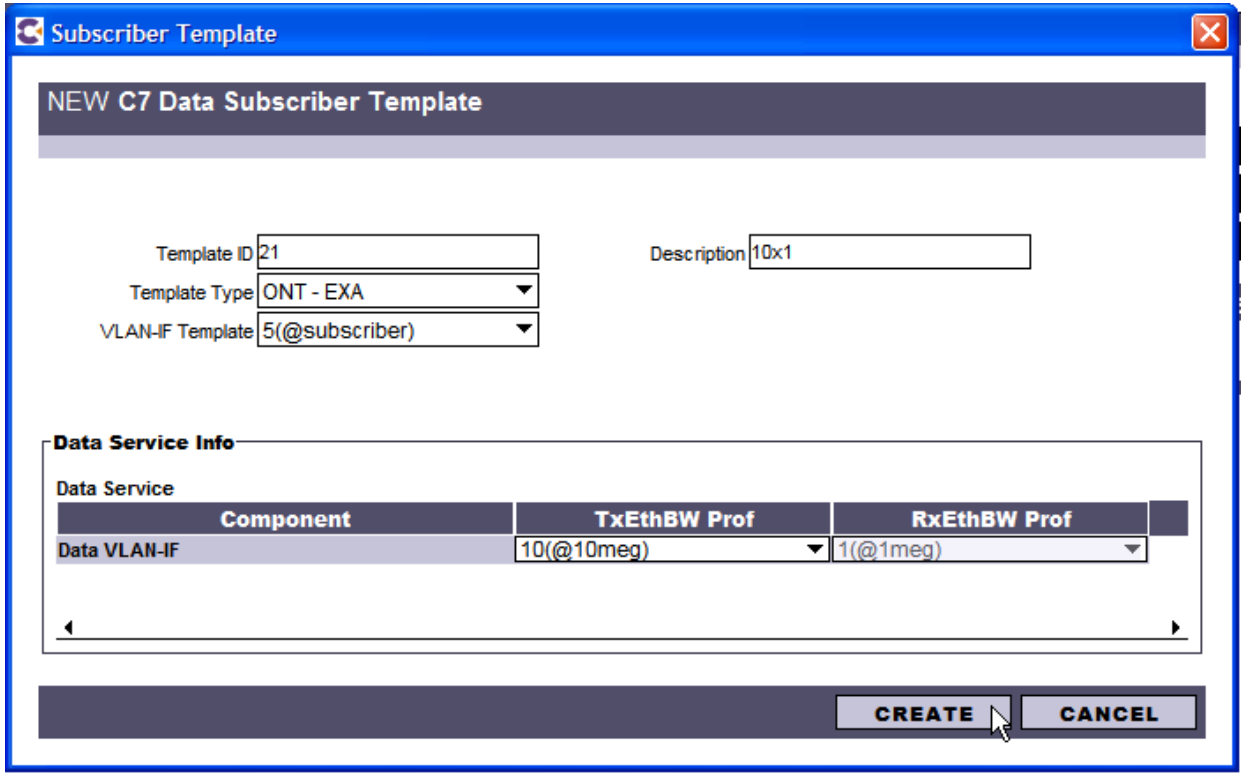
GPON Configuration

GPON Configuration Process



Creating Subscriber Templates - EXA

- **CMS** > **Subscriber Templates** > **C7** > **Data** > **Create**
- Must select correct **Template Type: ONT - EXA**
  - Cannot apply EXA templates to ports on non-EXA cards



Activating Service

Using the Services Screen

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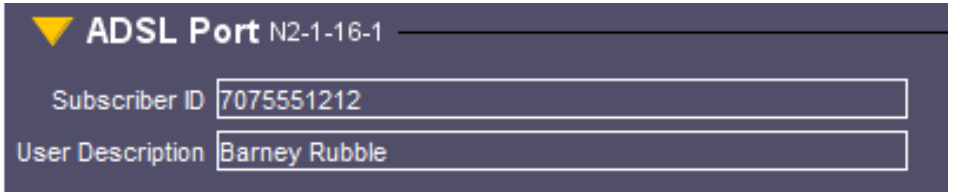
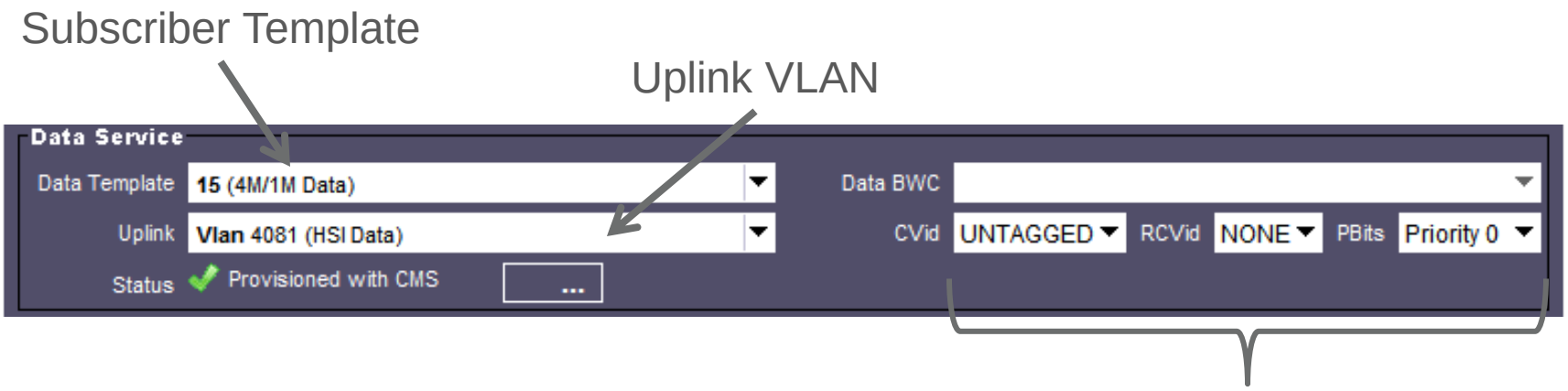
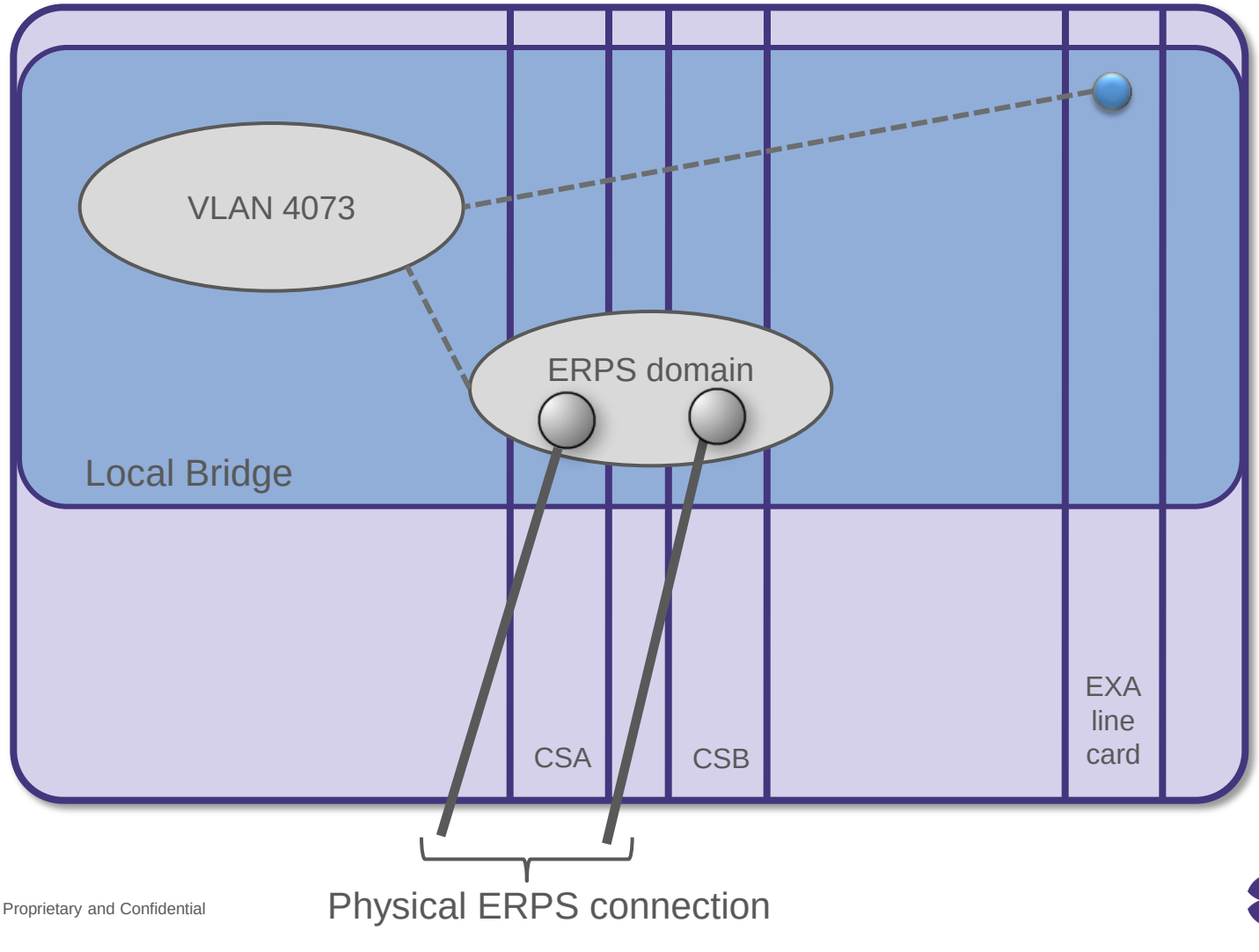


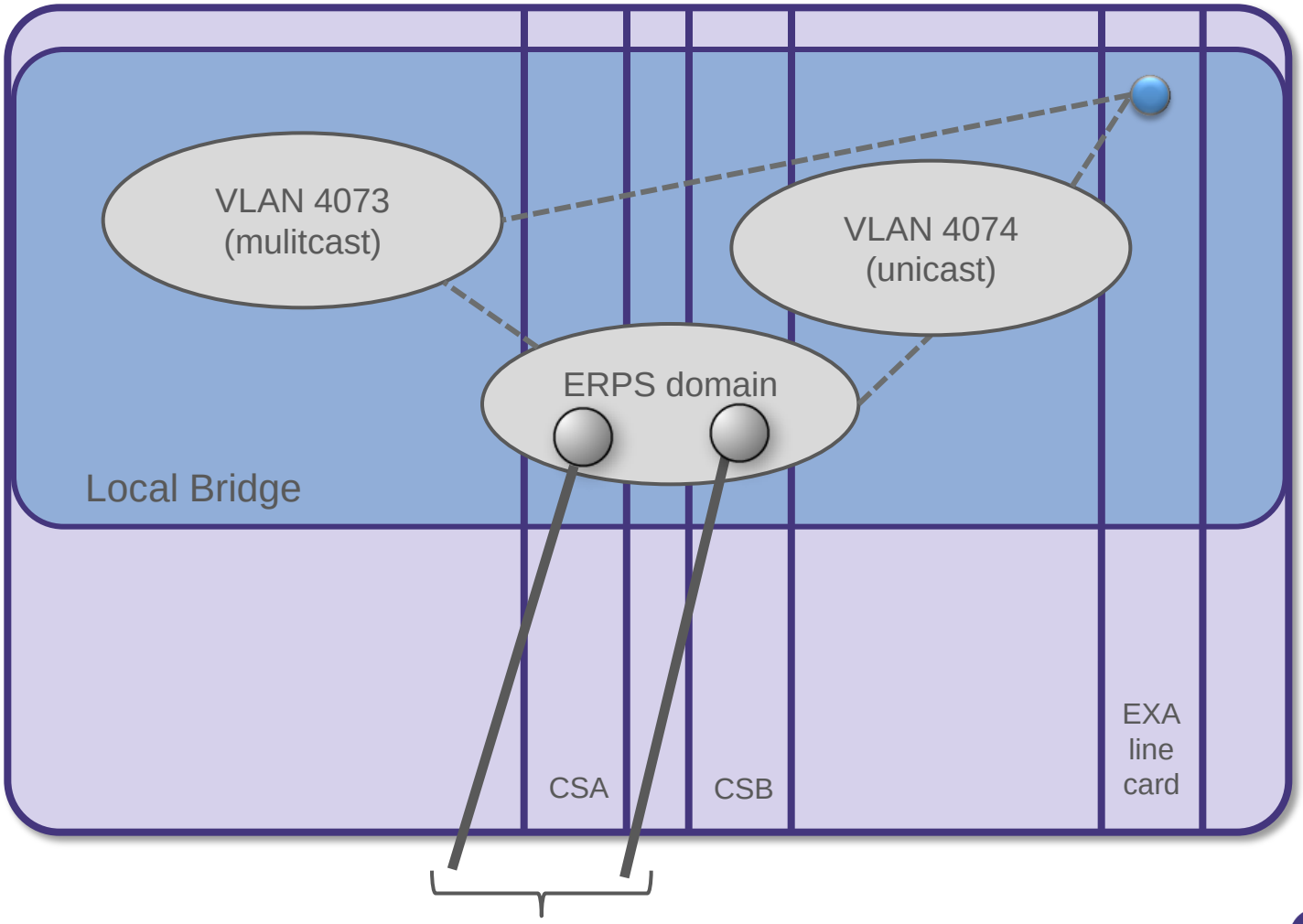


EXA Video Services

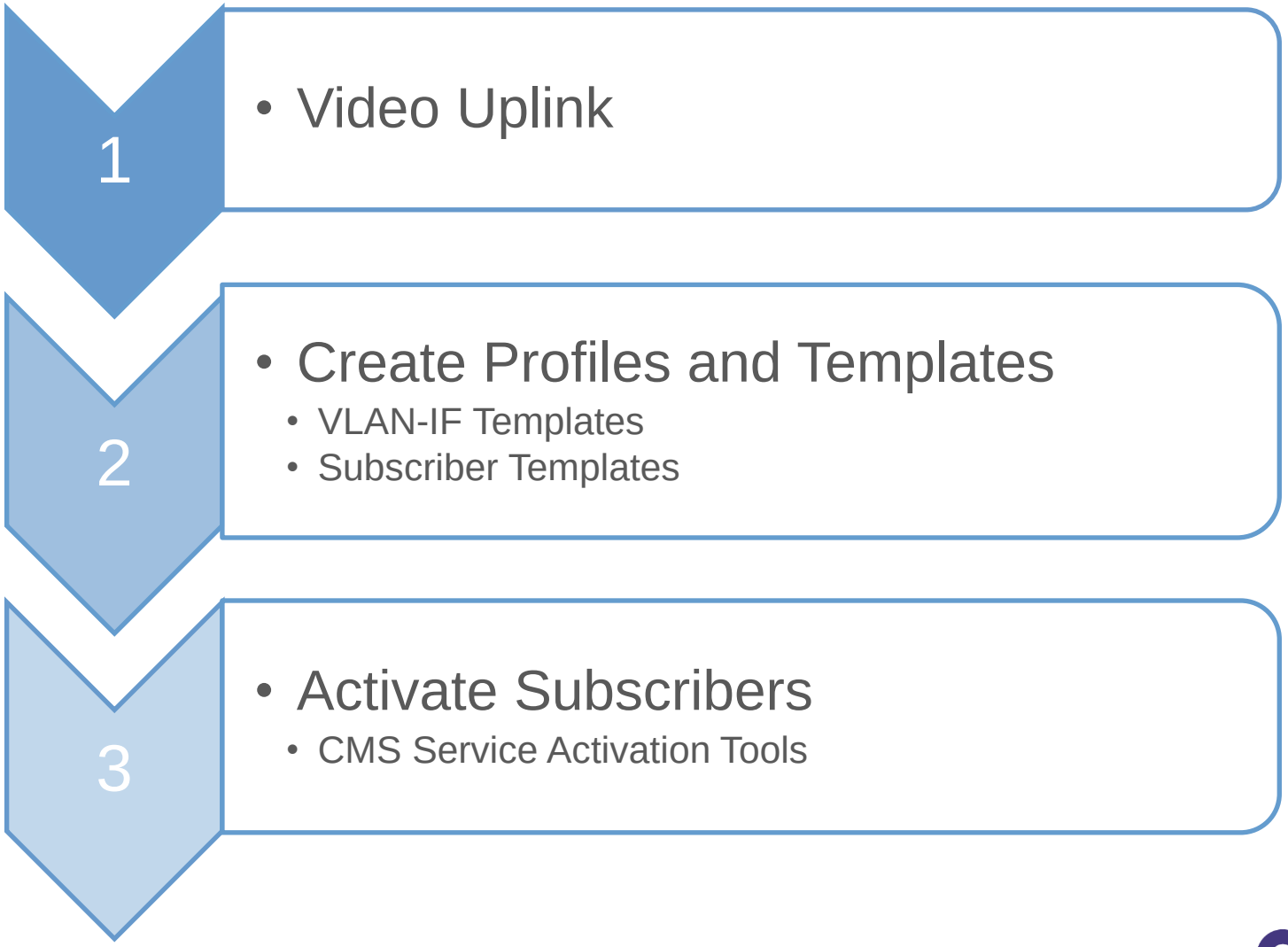
Single VLAN



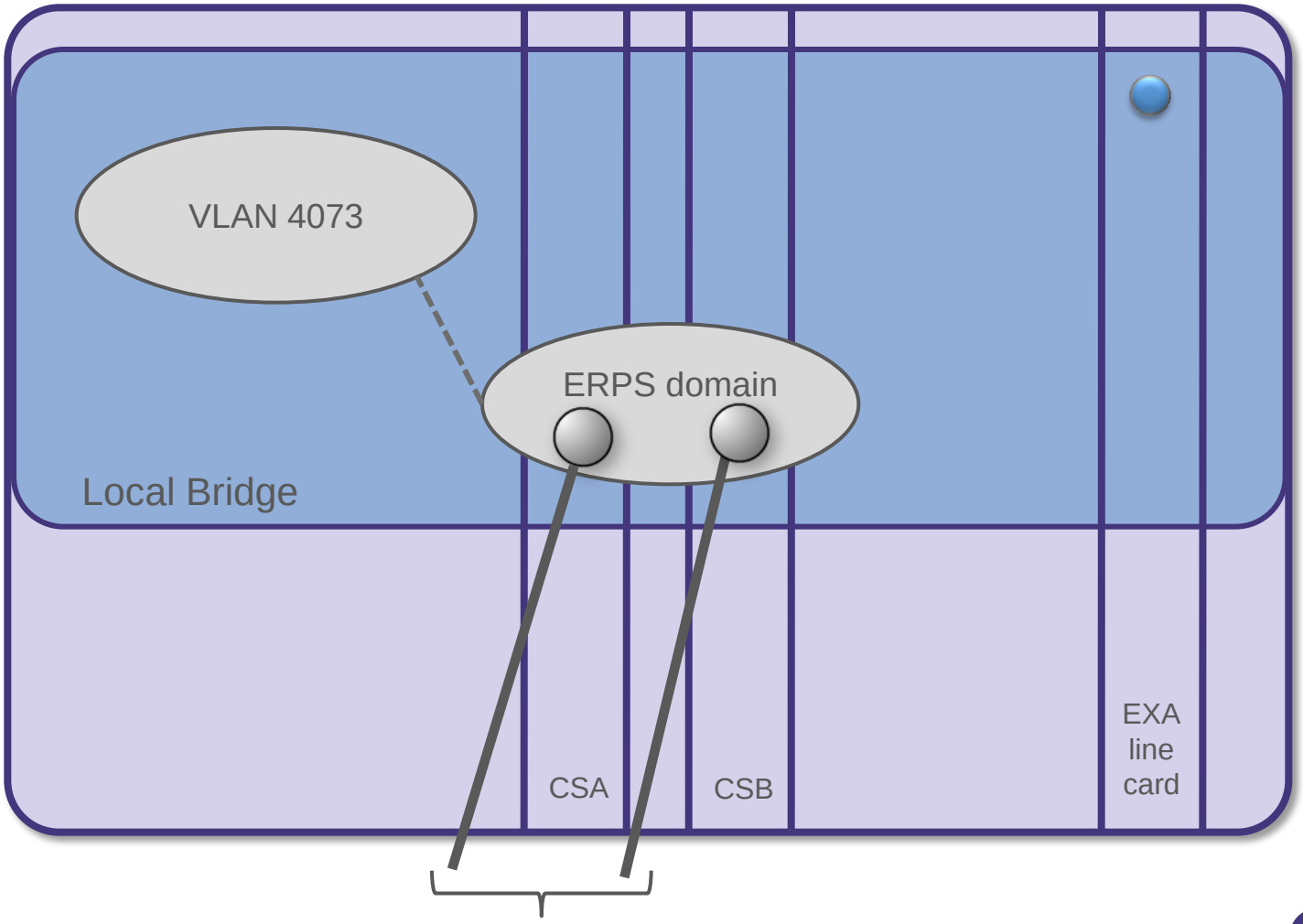
MVR



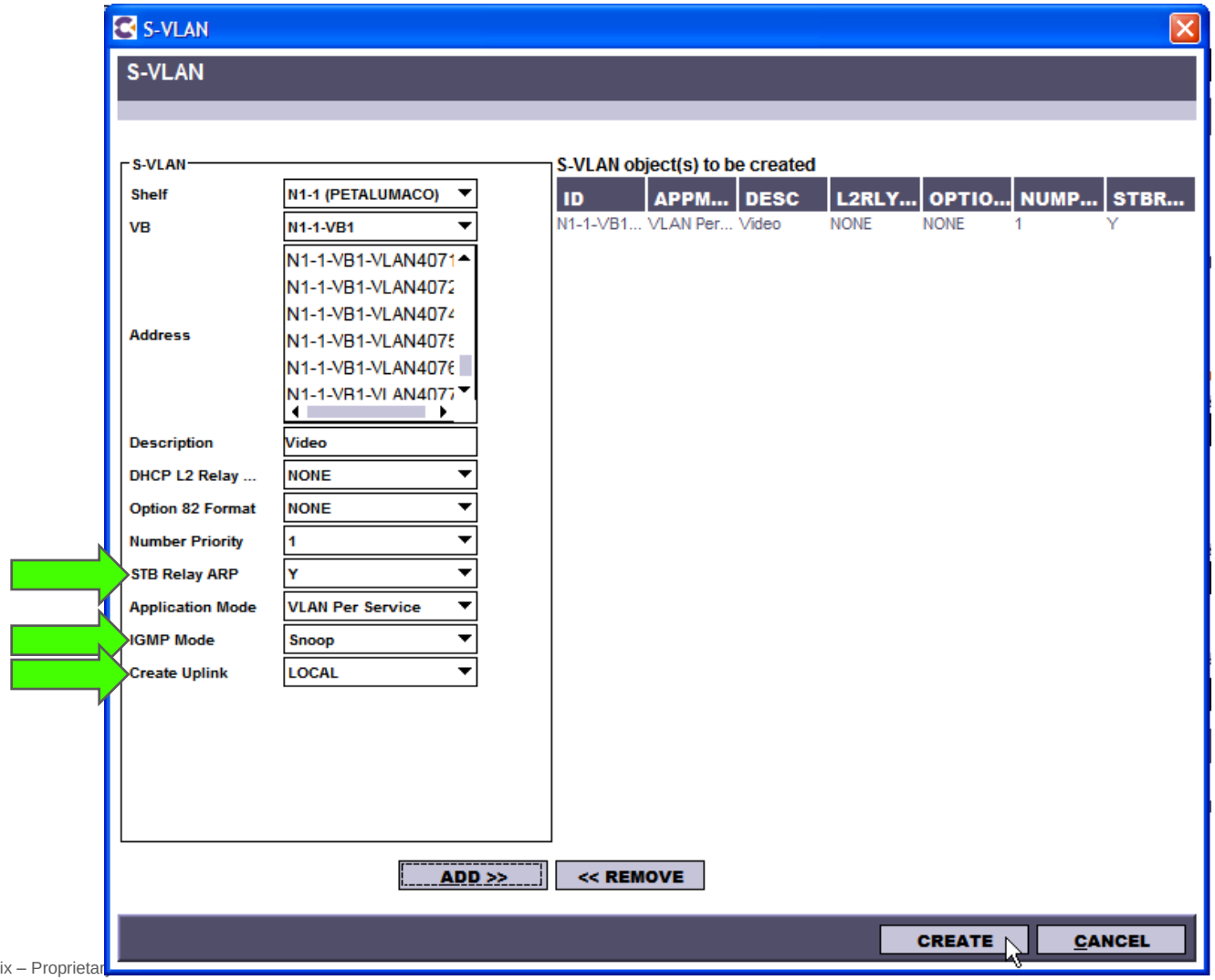
Configuration Process



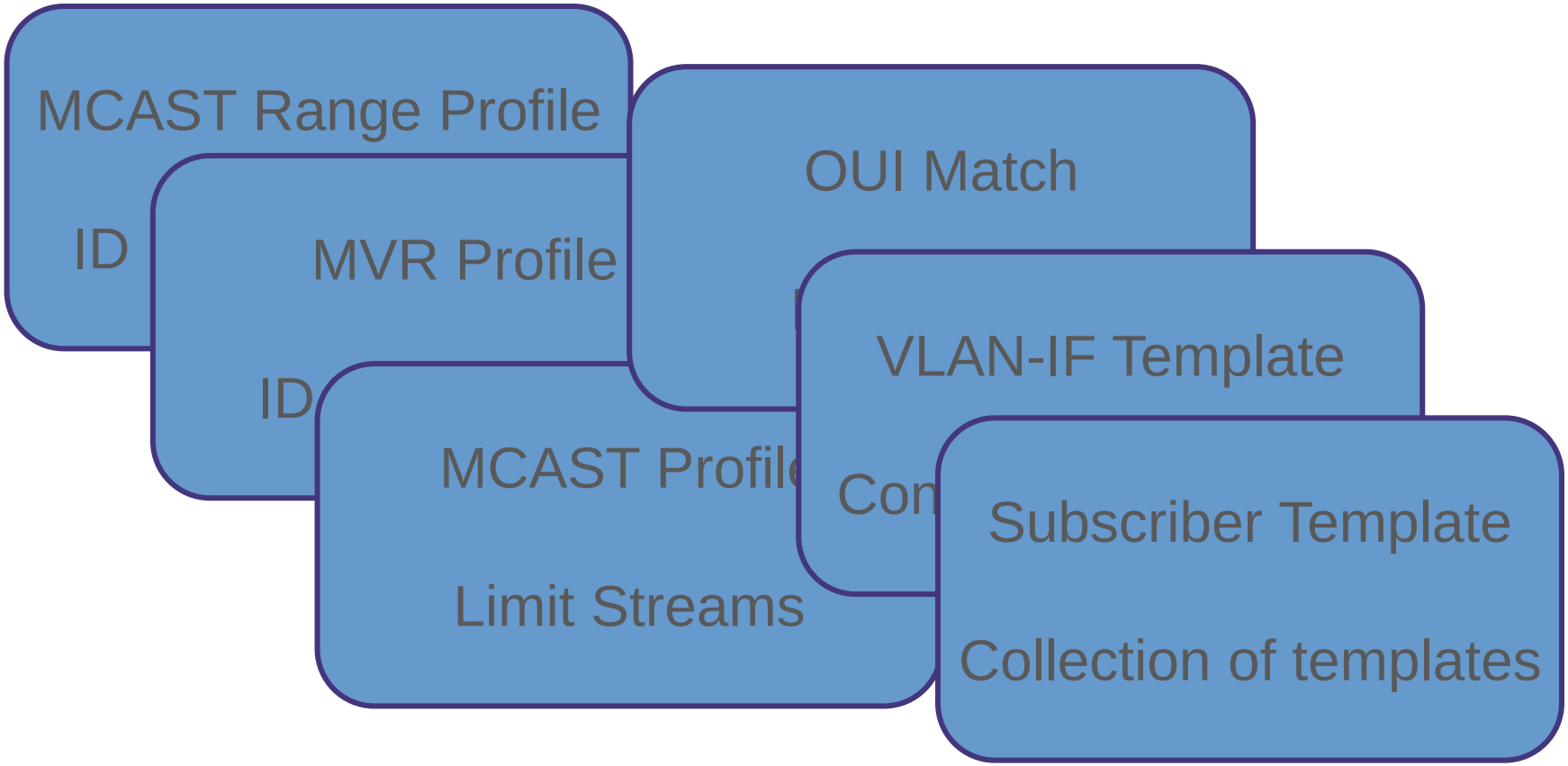
Video Uplink



Video Uplink



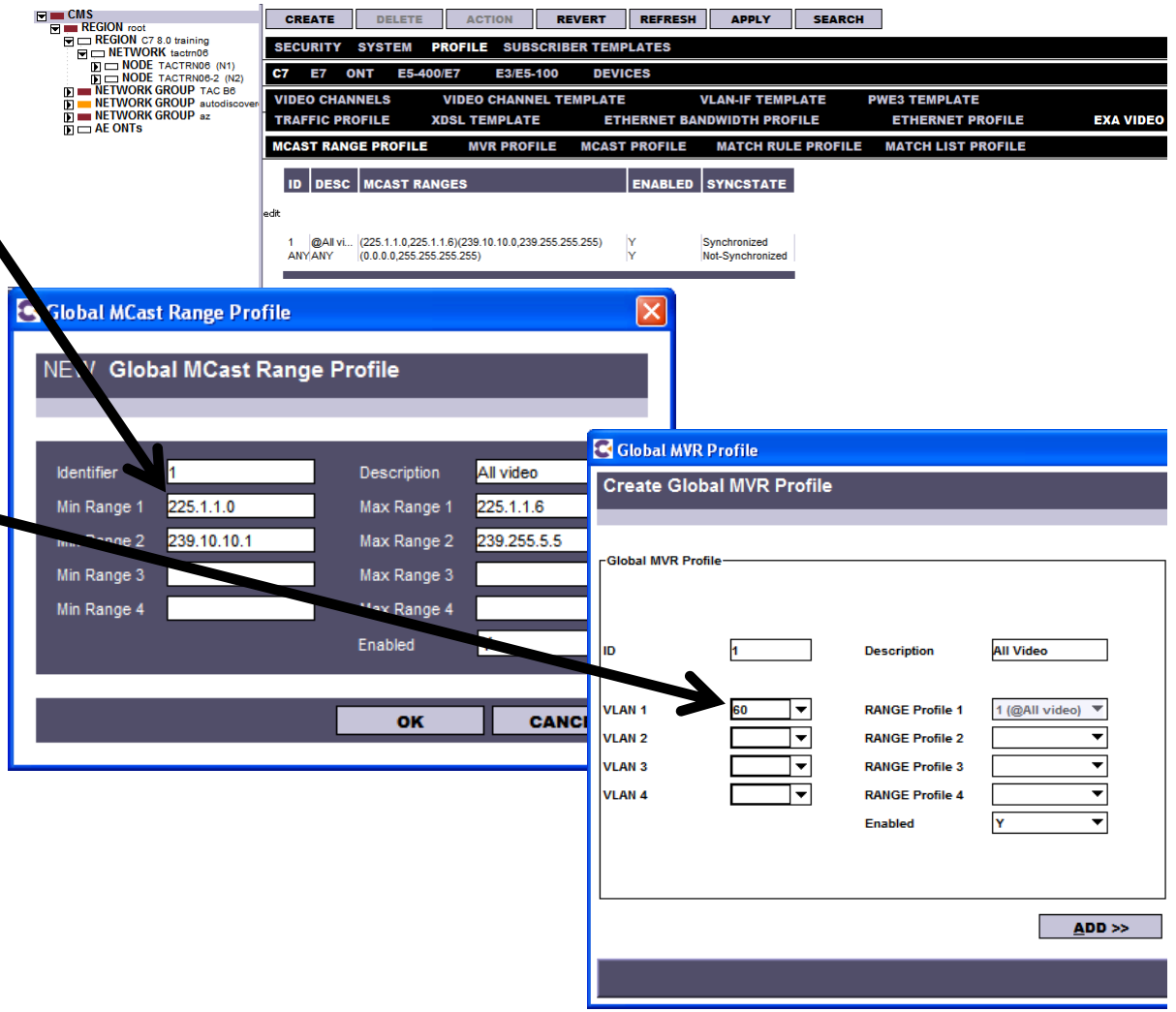
Profiles and Templates



Profiles and Templates

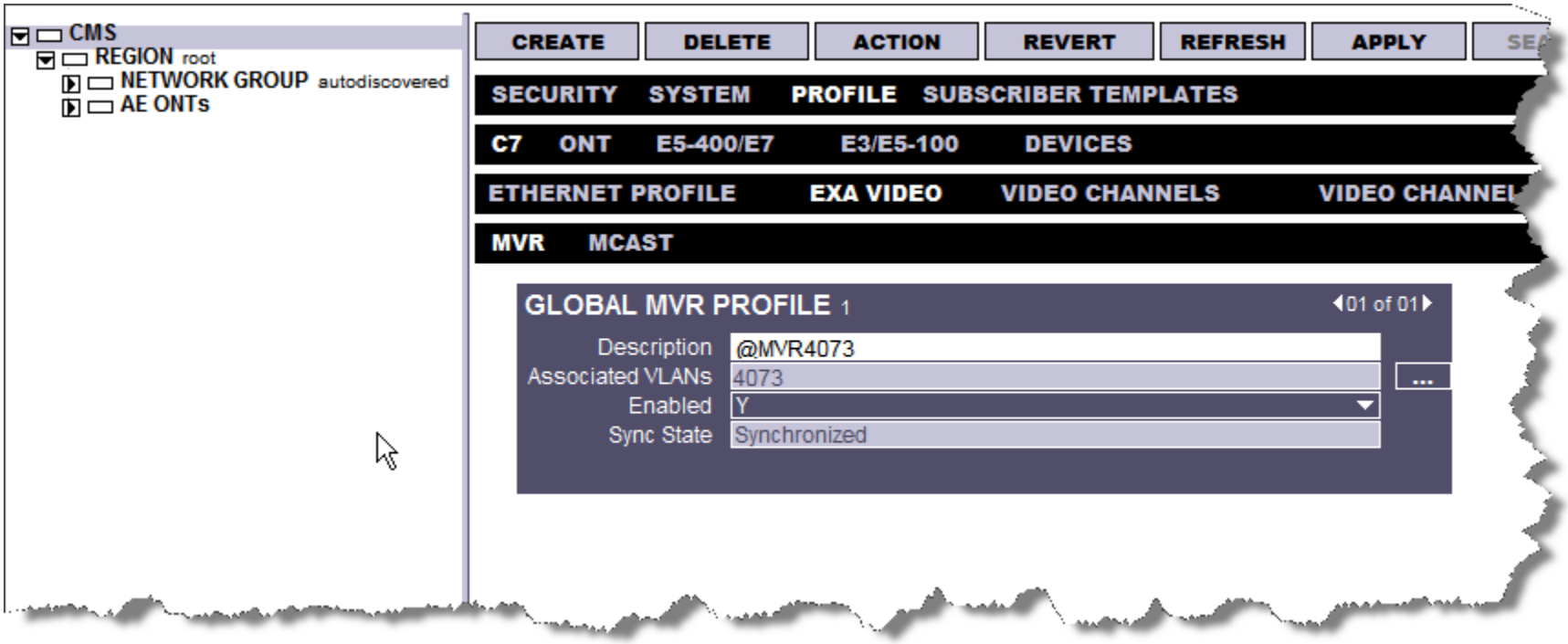
Multicast Range

- Create an MCAST Range Profile to specify each range of IP addresses
- Create the MVR Profile to map each range profile to a VLAN
- If you only have one video VLAN, you may use the existing ANY range profile



Profiles and Templates

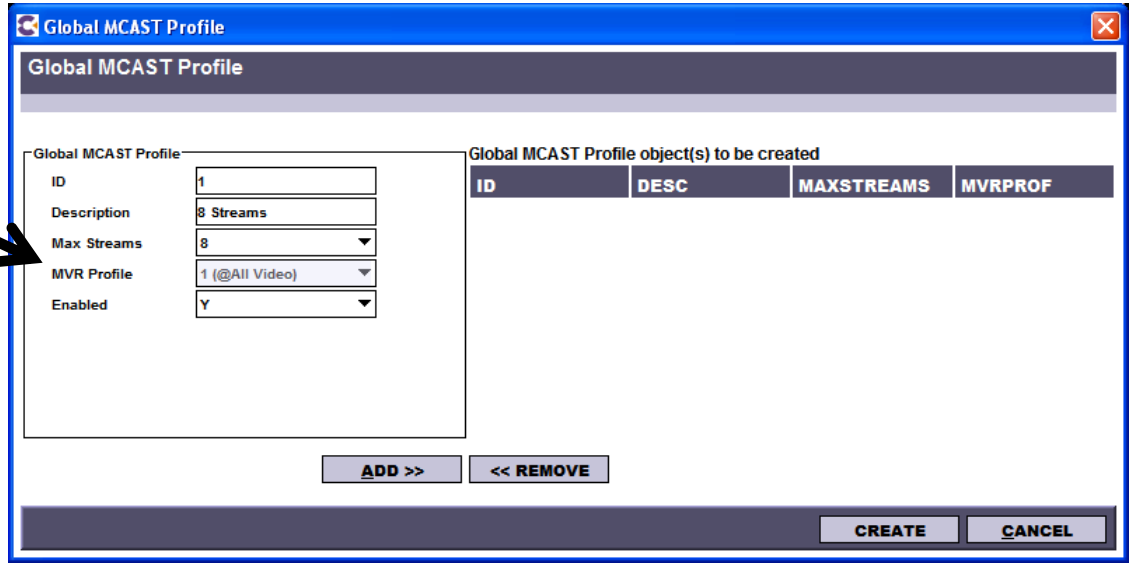
MVR Profile



Profiles and Templates

MCAST Profile

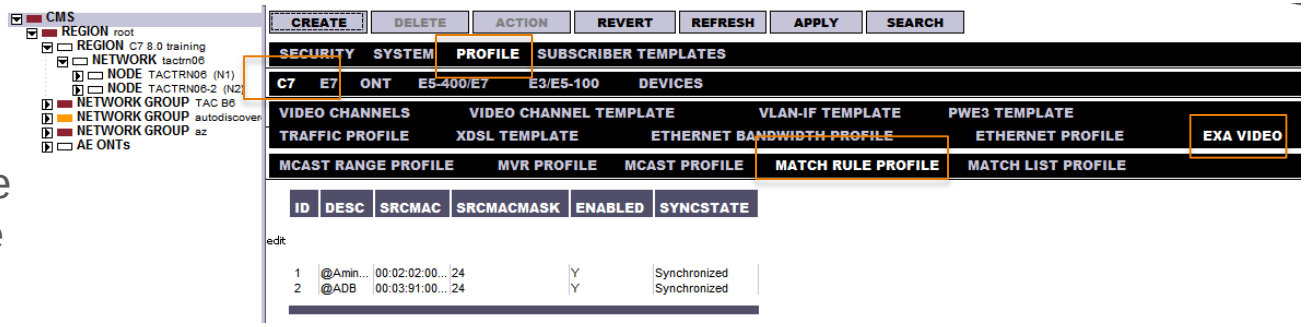
- Create the MCAST profile that points to the MVR profile

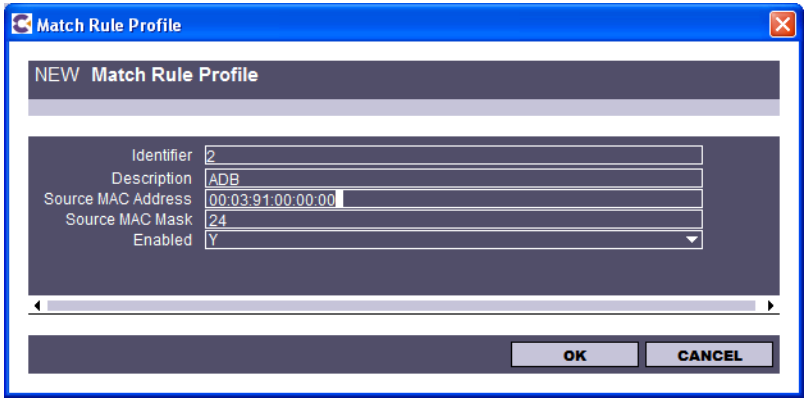


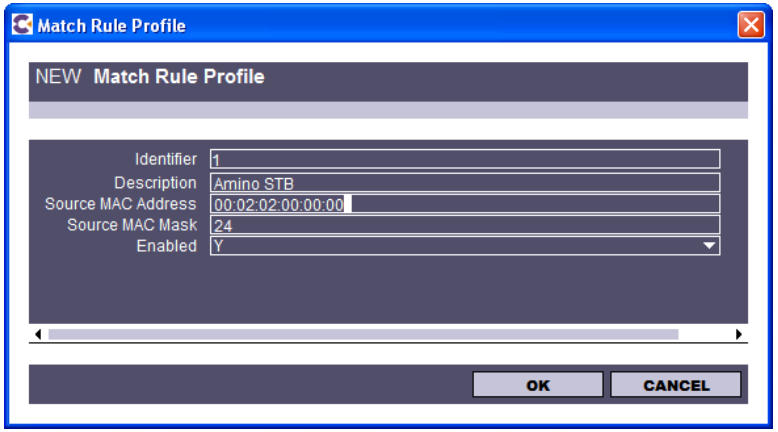
Profiles and Templates

OUI Match List for Untagged EXA Video

- Create the Match Rule(s):
  - In CMS, create a Match Rule Profile for each STB type



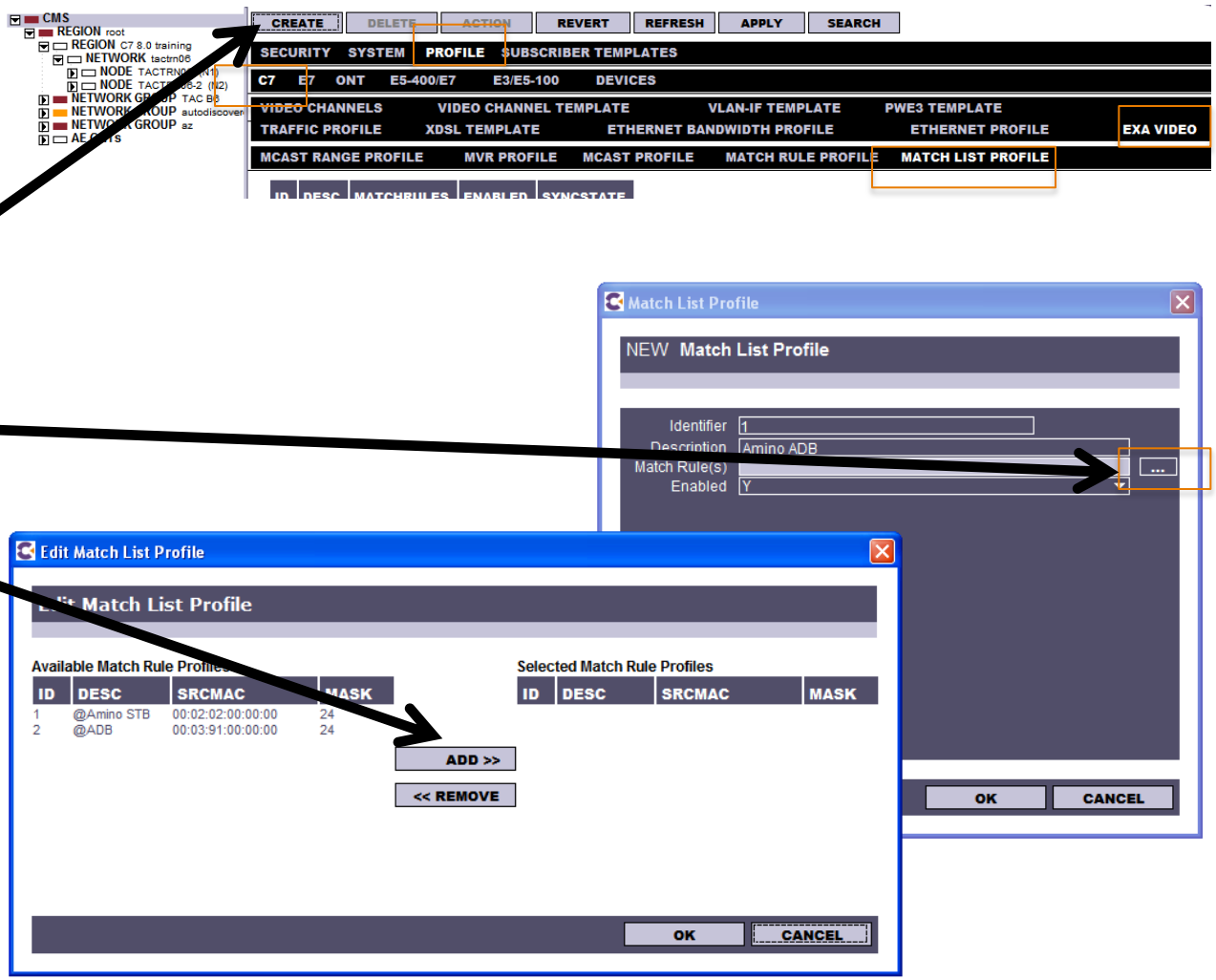




Profiles and Templates

OUI Match List for Untagged EXA Video

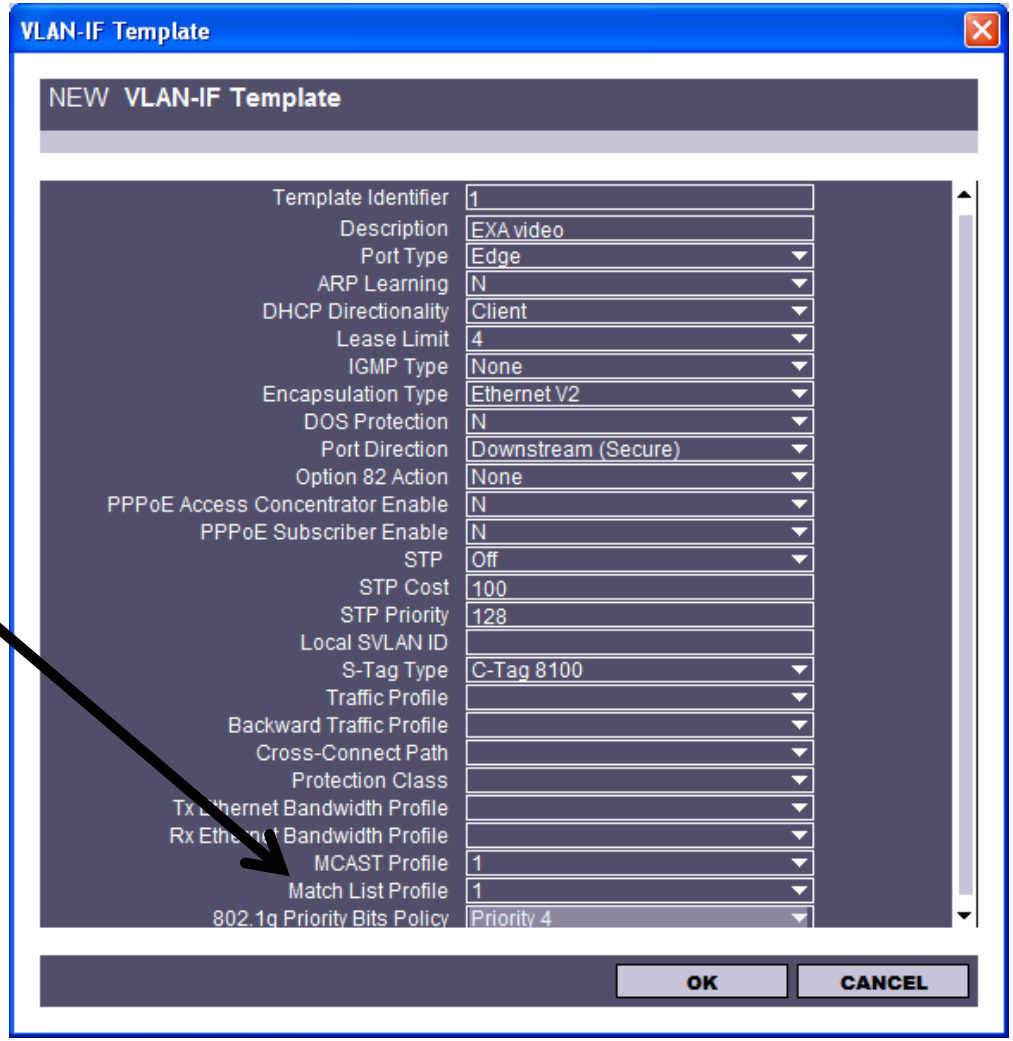
- Create the Match List Profile:
  - From CMS Profile>C7>EXA Video>Match List Profile, click Create.
  - Click the selection button.
  - Specify the rule(s) to include.



Profiles and Templates

VLAN-IF Template

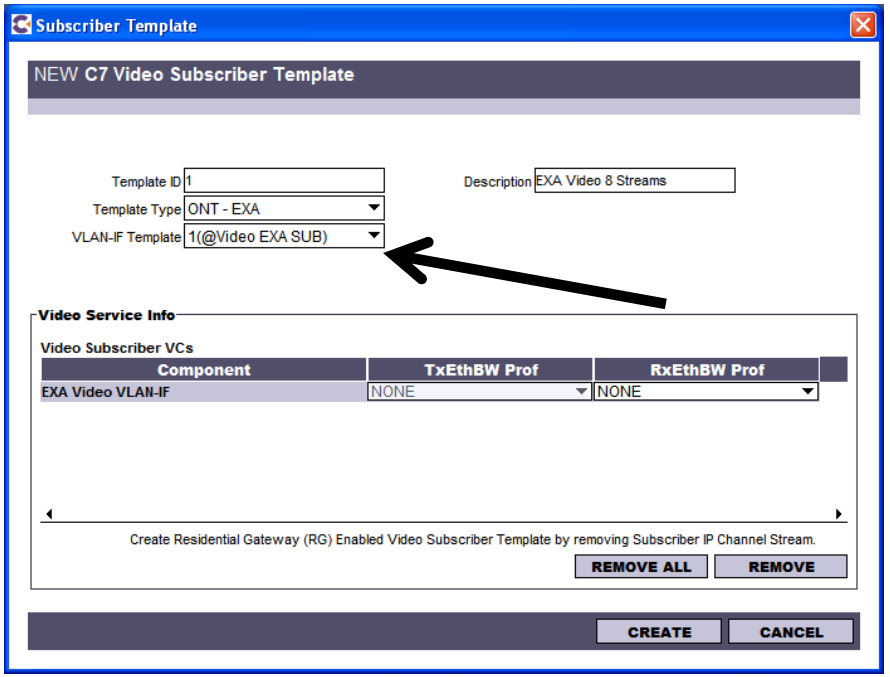
- Create the VLAN-IF Template
  - Specify the MCAST and Match List Profile

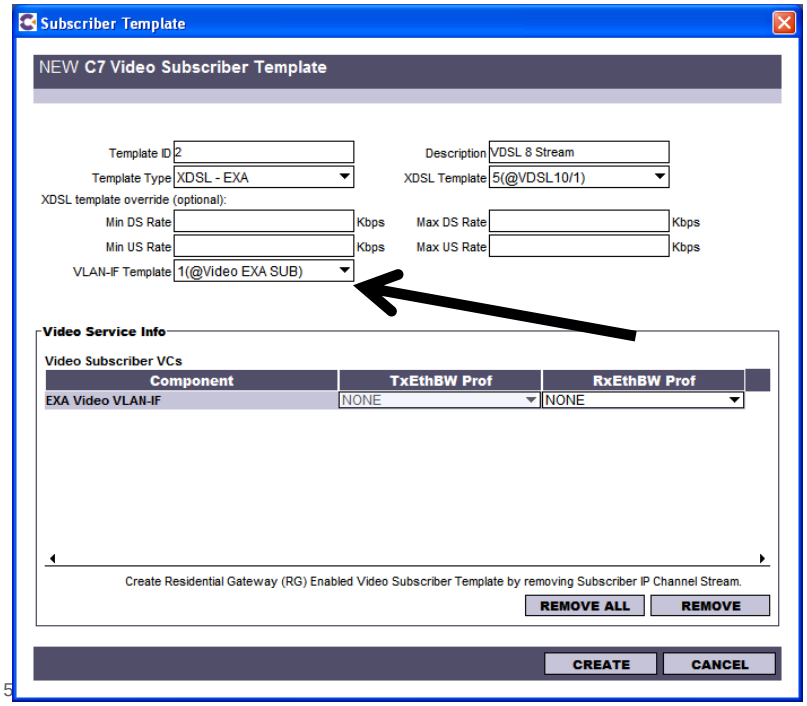


Profiles and Templates

Subscriber Template

- Create Video Subscriber Template(s) that reference the correct VLAN-IF template

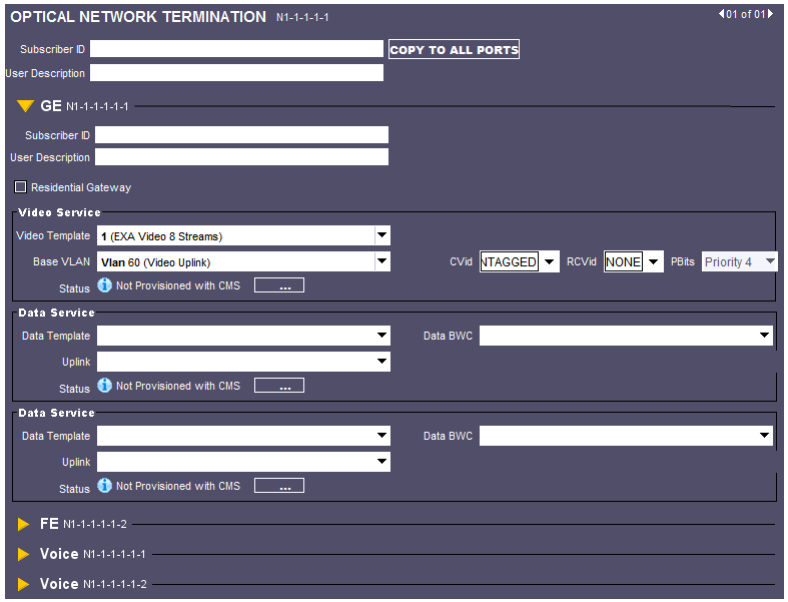


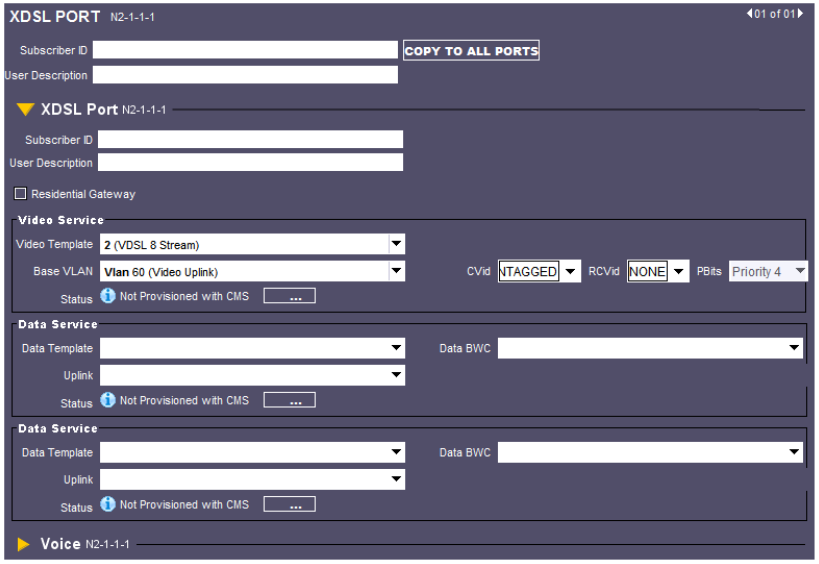


Service Activation

Apply Subscriber Template

- Apply the Video Subscriber Template





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