

## Lab 10: VPLS Spoke Termination to an IES

Or: What's an SVI anyway?

### What you will do:

1. Gain additional practice configuring a (local) VPLS.
2. Configure a spoke termination on an IES.
3. Determine which "show" commands assist in locating a MTU mis-match.
4. Configure IES MTU to match the required MTU.
5. Verify proper operation of both the VPLS and IES
6. Confirm proper operation of OSPF connecting with an IES, and resolving any MTU issues

### Things that you will need to know or learn:

1. CLI commands for configuring all components of a (local) VPLS.
2. CLI commands for configuring an IES.
3. CLI command for narrowing in on the service MTU for a VPLS and IES.
4. CLI commands for showing, ping, and tracing across a VPLS and IES.

### What you need to submit and when:

1. There is no pre-lab for this lab.
2. Complete the in-lab part of the exercise (see below), **before** the end of your lab period.
3. Complete the "Lab 10 Post-lab" exercise on Spoke Termination to an IES, **before** your lab section's assigned due date.

### Required Equipment:

- USB memory stick to save results for post-lab questions
- Hard-cover lab notebook, for reference during SBA at the end of the course.
- PC with internet access, a browser, Java, and terminal program (Provided in T108)

### In-Lab Marks:

- 1 mark: Demo of fully functional VPLS to CE. Prove it! (Which oam command(s) for a VPLS?)  
1 mark: Demo of fully functional IES spoke termination (CE – core P connectivity).  
1 mark: Demo of successful end-to-end connectivity from one CE to any other CE (or failing that, demo all provider core routes appearing in CE routing table)

The in-lab is worth 1/2 of the overall lab mark; the post-lab is worth 1/2 of the overall lab mark.

10% of your final mark is for labs done during the course of the semester.

### References and Resources:

- SA Module 5 on L3 VPN services
- SA Lab guide, Lab 8 – VPLS Spoke Termination on IES
- EDU Lab: remote-access lab facility hosted at Nokia's Kanata campus

## Addressing & Login Table

	Edu Lab 1	Edu Lab 2	Edu Lab 3
R1	.164	.196	.228
R2	.165	.197	.229
R3	.166	.198	.230
R4	.167	.199	.231
R5	.168	.200	.232
R6	.169	.201	.233
R7	.170	.202	.234
R8	.171	.203	.235
R9	.172	.204	.236
R10	.173	.205	.237
R11	.174	.206	.238
R12	.175	.207	.239

	<i>My</i> specific login information
EDU Lab # (1, 2, or 3)	
Individual login ID	
Corresponding password	

See BrightSpace for a list of login IDs and passwords; write **yours** in the space above.

**Base IP address is: 192.168.206.0/24**

## Topology Diagram

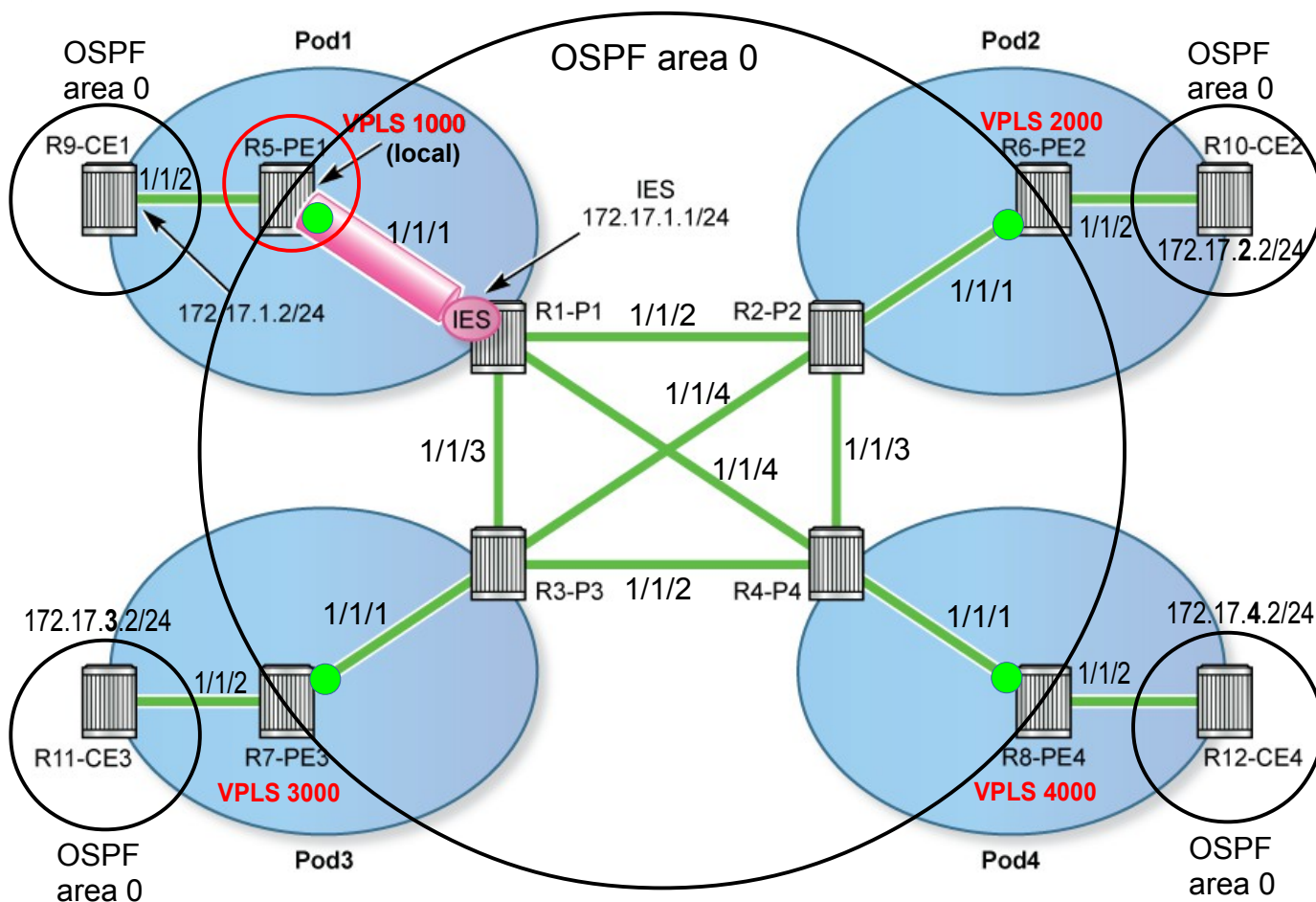


Image source: Nokia SA Lab Guide, p. 59

## Command Reference (see SA Lab 8 for additional commands)

### no shutdown

# Don't forget this!! Everywhere!

```
configure • router • ospf • area {num} • interface <int-name> • mtu {bytes}          # OSPF MTU
configure • service • ies {svc-#} • interface <int-name> • create                    # Create a L3 i/f
configure • service • ies {svc-#} • interface <int-name> • address {IP-address}      # (base router!)
configure • service • ies {svc-#} • interface <int-name> • spoke-sdp {sdp-id:vc-id}  # Like an SVI !
configure • service • ies {svc-#} • interface <int-name> • ip-mtu {mtu}            # "Kinda like" SAP MTU

show • router [svc-id] • status                                                    # Show all running proto's
show • router • ldp • bindings [fec-type] services
show • service id {svc-id} • base                                                  # Quick check for Up/Up
show • service id {svc-id} • sdp {svc-id:vc-id} • [detail]                       # All details for an SDP
show • service id {svc-id} • all                                                  # ALL details on the service

show • log • log-id 99                                                            # Default system log

oam • cpe-ping service {num} destination {subscriber-IP} source 0.0.0.0
```

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### Task 1: Configure a new VPLS on your PE router

Build a new VPLS that connects to your CE router, using Dot1Q encapsulation. This VPLS is local, so the configuration is quite short.

- On your PE router, configure a VPLS service **X000**, where **X** is your pod number.
- Bind a SAP for the CE router to the VPLS using VLAN ID 70.
- On the CE router, configure and interface with address 172.17.**X.2**/24 (where **X** is your pod number) and a VLAN ID of 70.
- On the CE router, add the interface to OSPF area 0.
- Verify connectivity right to the CE router using an appropriate oam VPLS command.

**CHECK POINT #1:** Demo your fully functional VPLS to the CE.

### Task 2: Configure spoke termination to an IES

The new step in this lab is configuring an IES and then ensuring that all the MTU values match up properly.

- What supporting protocols are required for distributed services? Configure them now.
- On your PE router, configure a spoke SDP from the VPLS to the IES on the P router.
- On your P router, configure an IES service with an address of 172.17.**X.1**/24, where **X** is your pod. Bind the IES interface to a spoke SDP for your PE router.
- On both your P and PE routers, use a show command to quickly verify whether the service and all its component SAPs & SDPs are fully Up/Up.
- Find as many "show" commands as possible which reveal any MTU values for both ends of the IES service. Which one is most helpful at pin-pointing the MTUs on the two sides?
- Make sure the MTU's are matched, using IES MTU as necessary.

**CHECK POINT #2:** Demo of fully functional IES spoke termination (CE – core P connectivity).

### Task 3: Full connectivity – OSPF

Remember that an IES interface becomes part of the "base" router configuration. You'll need to do some thinking & troubleshooting to ensure that the IES fully participates in the P router routing.

- Configure the CE router with OSPF area 0; include only the system interface and the new 172.17.X.2/24 interface.
- On the core router, add the new IES to the existing OSPF area.
- Check the OSPF neighbouring: **show router ospf neighbor**
- Examine the default log (log-id 99) for some hints on any potential mis-matches between the IES and other network port to which it connects. Are the log messages the same on both sides of the connection?
- Based on the info in the log messages, dig into OSPF on each of the CE and P routers: search through all the settings of the interfaces joining them for relevant details:  
**show router OSPF interface {xxxx} detail**
- For the sake of simplicity, handle any MTU mis-matches by changing the MTU advertised by OSPF on the CE Router configuration.
- Verify full connectivity from end-to-end across the entire topology (diagonally, horizontally, or vertically). According to traceroute, how many hops is it from your CE router (R9-R12) to the closest "green dot" (as shown on the topology diagram)?
- Help your fellow teams in your EDU lab.

**CHECK POINT #3:** Demo of successful end-to-end connectivity from CE to CE.

### Task 4: Save your configs

As always, save the configs for your P, PE, and CE routers on the EDU ftp server:

use **edu1 / dEEtgx2Y** or **edu2 / dEEtgx2Y** for each 1/2 of the class; **Rxx = R01, R02, ...**

**save:** `admin save ftp://{acct}:{pswd}@192.168.181.81/Rxx/ande0001-L10.cfg`

**check:** `file dir ftp://{acct}:{pswd}@192.168.181.81/Rxx/`

**restore:** `exec ftp://{acct}:{pswd}@192.168.181.81/Rxx/ande0001-L10.cfg`

To repeat this lab using MySRLab, use the routers according to the following topology:

R3(CE) — R1(PE) – R5(P) – R6(P) – R2(PE) — R4(CE)