

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. The post-lab assignment for this lab is to practice for the SBA by re-doing:
 - this lab, including all steps and check points
 - previous labs where you had difficulties understanding the topology or configurations
 - previous labs, starting from scratch to build your speed & accuracy with configuration

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
R1	192.168.206.164	192.168.206.196
R2	192.168.206.165	192.168.206.197
R3	192.168.206.166	192.168.206.198
R4	192.168.206.167	192.168.206.199
R5	192.168.206.168	192.168.206.200
R6	192.168.206.169	192.168.206.201
R7	192.168.206.170	192.168.206.202
R8	192.168.206.171	192.168.206.203
R9	192.168.206.172	192.168.206.204
R10	192.168.206.173	192.168.206.205
R11	192.168.206.174	192.168.206.206
R12	192.168.206.175	192.168.206.207

Edu Lab 1 Login	Passwd	Edu Lab 2 Login	Passwd
aca001-328		aca002-318	
aca001-329		aca002-319	
aca001-330		aca002-320	
aca001-331		aca002-321	
aca001-332		aca002-322	
aca001-333		aca002-323	
aca001-334		aca002-324	
aca001-335		aca002-325	

See Blackboard for a list of passwords; write **yours** in the space above.

<https://learningserviceslabs.nokia.com/>

Topology Diagram

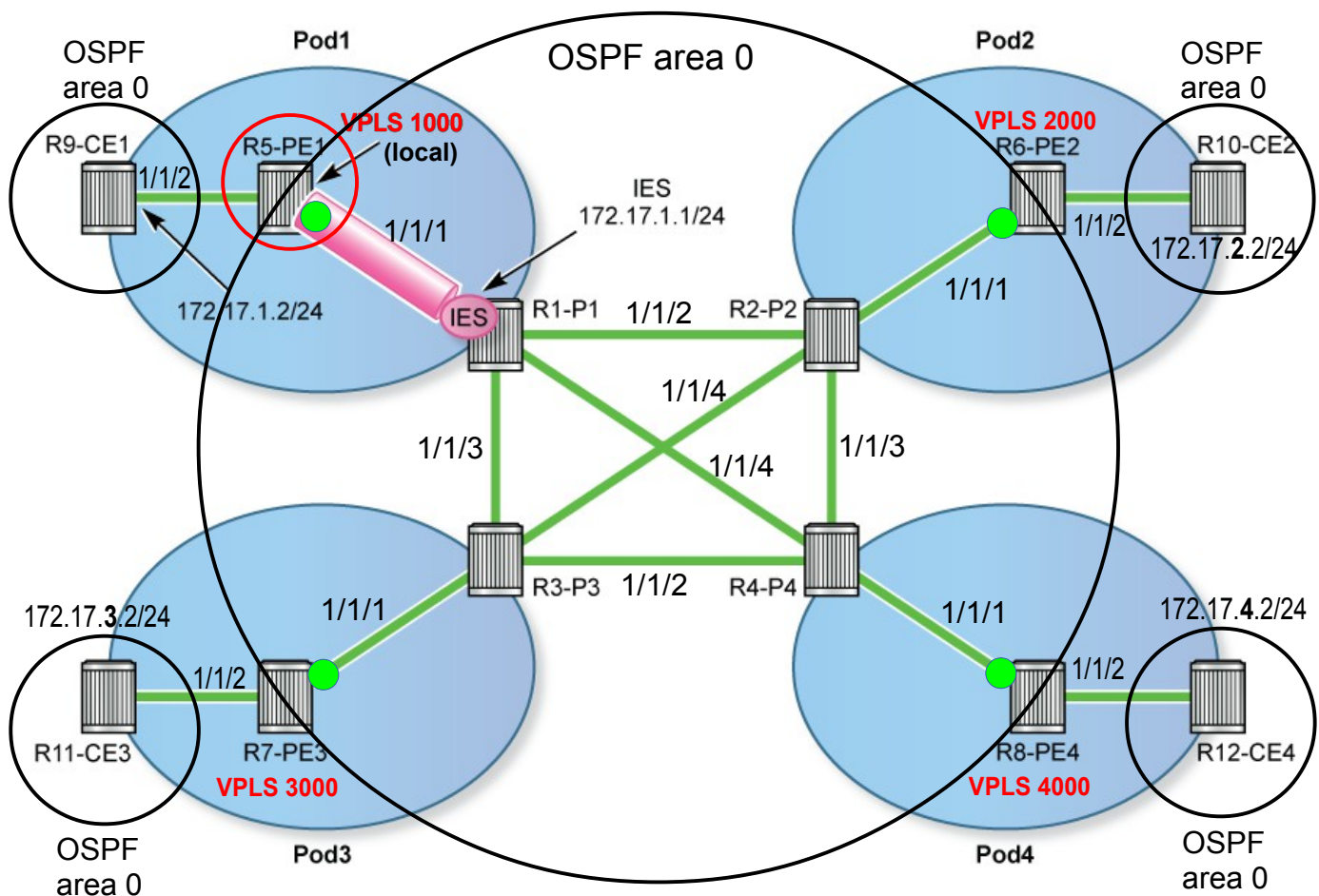


Image source: Nokia SA Lab Guide, p. 59

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
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
```

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?
- 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)