Customer Creation

PE1: Configure service customer 100 create

Epipe / Service Creation

//Provider Edge Router (DON"T NEED IP ADDRESS)
PE1: configure service epipe 50 customer 100 create
- Configure a service with SERVICE ID 50 & Customer # 100
PE1>configure>service>epipe# sap 1/1/1:50 create
- Configuring sap to use VLAN tag 50
PE1>configure>service>epipe# spoke-sdp 2:50 create
- Using spoke for SDP #2 and VLAN tag 50
PE1>configure>service>epipe>spoke-sdp 2:50 vc-type vlan create
PE1>configure>service>epipe>spoke-sdp# vlan-vc-tag 150
- Making SDP 2:50 use vlan-vc tag of 150

//Customer Edge Router
CE1>configure port 1/1/1 no shut
CE1> configure router interface ToCE2
CE1>configure>router# port 1/1/1
CE1>configure>router# address x.x.x.x/24

SAP Creation

//Provider Edge Router
PE1: configure port 1/1/2
PE1>configure>port# ethernet
PE1>configure>port>ethernet# mode access
PE1>configure>port>ethernet# encap-type dot1q

//Customer Edge Router
CE1: configure port 1/1/3
CE1>configure>port# ethernet encap-type dot1q
CE1>configure>port# no shut

CE1: configure router interface toCE2 [CE2 is router you want to reach]
CE1>configure>router>if# address x.x.x.x/24
CE1>configure>router>if# port 1/1/3:50
- Using VLAN Tag 50

CE1>configure>router>if# no shut

Creating an SDP and Binding to LSP

//needs MPLS and LDP and OSPF
PE1: configure service sdp 2 mpls create
PE1>configure>service>sdp# far-end 10.10.10.2
PE1>configure>service>sdp# lsp "toPE2"
  ● Creating an SDP to neighbor PE2 whose address is 10.10.10.2
PE1>configure>service>sdp# ldp

VPLS Configuration

PE1: configure service vpls 1000 customer 1000 create
PE1>configure>service>vpls# mesh-sdp 2:*VCID* create
PE1>configure>service>vpls# spoke-sdp 2:*VCID* create
PE1>configure>service>vpls# sap 1/1/4:*VCID* create

IES Creation

PE1: configure service ies 100
PE1>configure>service>ies# interface toSite1 create
PE1>configure>service>ies>if# address x.x.x.x/234
PE1>configure>service>vpls# mesh-sdp 2:*VCID* create
PE1>configure>service>vpls# spoke-sdp 2:*VCID* create
PE1>configure>service>ies>if# sap 1/1/3:50 create

Configure MP BGP

PE1>configure>router# autonomous-system 64496

PE1>configure>router>bgp# group "multi-bgp"
PE1>configure>router>bgp>group# family vpn-ipv4
PE1>configure>router>bgp>group# peer-as 64496
PE1>configure>router>bgp>group# neighbor x.x.x.x
PE1>configure>router>bgp>group>neighbor# local-address x.x.x.x

Ex:
config>router>bgp info
        Group "Group-name"
        Family vpn-ipv4
                Peer-as [peer#]
                Neighbor [10.10.10.2]

Local-address [l10.10.10.1]

Configure VPRN

PE1: configure service vprn **10** customer **10** create
PE1>configure>service>vprn# description "xxx"
PE1>configure>service>vprn# router-id 10.10.10.1
PE1>configure>service>vprn# autonomous-system {as-number} → number of peer not core
PE1>configure>service>vprn# route-distinguisher 64496:**10**
PE1>configure>service>vprn# vrf-target target:64496:**10**
PE1>configure>service>vprn# auto-bind-tunnel
PE1>configure>service>vprn>auto-bind-tunnel# resolution filter
PE1>configure>service>vprn>auto-bind-tunnel# resolution-filter ldp
PE1>configure>service>vprn# interface toCE1 create
PE1>configure>service>vprn>interface# description "xx"
PE1>configure>service>vprn>interface# address x.x.x.x/24
PE1>configure>service>vprn>interface# sap 1/1/3 create
PE1>configure>service>vprn# bgp
PE1>configure>service>vprn>bgp# group toCE1
PE1>configure>service>vprn>bgp>group# neighbor x.x.x.x
PE1>configure>service>vprn>bgp>group# export mpbgp-bgp
PE1>configure>service>vprn>bgp>group# peer-as {peer-as #}

Ex:
Configure service vprn **10** customer **10** create
        Autonomous-system [AS# OF PEER NOT CORE]
        Description "xx"
        Router-id [10.10.10.1]
        Router-distinguisher 64496:**10**
        Vrf-target target:64496:**10**
        Interface toCE1 create
                Description "xx"
                Address [10.1.3.1/27]
                Sap 1/1/3:10 create
        Auto-bind-tunnel
                Resolution-filter ldp
                Resolution filter
        Bgp
                Group toCE1
                        Neighbor 10.1.3.3
                        Export mpbgp-bgp
                        Peer-as 64496

MP-BGP Policy statement needed

PE1:configure>router>policy-options#begin
PE1:configure>router>policy-options>policy-statement mpbgp-bgp
PE1>configure>router>policy>policy-statement# entry 10
PE1>configure>router>policy>policy-statement>entry> from protocol bgp-vpn
PE1>configure>router>policy>policy-statement>entry> action accept
PE1:configure>router>policy-options#commit

Ex:
Configure router policy-statement [mpbgp-bgp]
      Entry 10
            From
                        Protocol **bgp-vpn**
            Exit
            Action accept
      commit

Basic Configurations

PE1: configure system name {Name}
PE1: configure card {#} card-type {card-type-from-info}   Probably [iom3-xp]
PE1: configure card {#} mda {#} mda-type {mda-name}   Probably [m10-1gb-xp-sfp]

PE1: configure router static-route {remote network/mask} next-hop {next-hop address}
- configure a static route to remote network
  - Ex: configure router static-route 192.168.1.0/24 next-hop 192.168.1.10
PE1: configure autonomous-system <as#>

Configure Interfaces

Configure router interface system address {address}
- Configuring the system interface
  - Ex: configure router interface system address x.x.x.x/24
Configure router interface {name} address {address}
- Configuring a custom interface (toR1)
  - Ex: configure router interface toR1 address x.x.x.x/24
Configure router interface {name} loopback
- Configuring a loopback interface
  - Ex: configure router interface Lo1 loopback
Configure router interface {name} port {port}
- Configuring a port to an interface
  - Ex: configure router interface toR1 port 1/1/1
Configure port 1/1/x no shutdown
- Turning on the port

Configure router interface {name} ipv6
- Enables IPv6 on an interface
- Gives it an IP address (Starts w/ link local)

Configure IGP / OSPF

Configure router router-id <32-bit-ID>
- Configuring a router ID
  - Ex: configure router router-id 10.10.10.1

Configure router ospf
- Enables OSPFv2 [IPv4]

Configure router ospf3
- Enables OSPFv3 [IPv6]

Configure router ospf area <area-id> interface <int-name>
- Adding an interface to a certain ospf area
  - Ex: configure router ospf area 0 interface toR1
  - Ex: configure router ospf area 0 interface toR1 interface-type point-to-point
    - Making the interface point-to-point

configure router ospf traffic-engineering
- Enables TE support for OSPF & needed on all routers

configure router ospf ldp-over-rsvp
- Configure LDP over RSVP

configure router ospf rsvp-shortcut

Configure LDP

PE1: configure router ldp
PE1>configure>router>ldp# interface parameters
PE1>configure>router>ldp# export <export-policy-name>
PE1>configure>router>ldp>interface-param# interface <interface-name>
PE1>configure>router>ldp>interface-param# exit
PE1>configure>router>ldp# targeted-session
- Optional command (configure LDP targeted peer, need both sides to have this to work)
  - PE1>configure>router>ldp>targ-session# peer x.x.x.x [tunneling]

PE1>configure>router# ldp-shortcut
- enablers LSPs globally for IGP routing
PE1>configure>router>ldp# shortcut-local-ttl-propagate
- Choose handling of **IP** TTL

MPLS Configuration

PE1: configure router mpls
PE1>configure>router>mpls# interface <interface-name>
PE1>configure>router>mpls# no shutdown

PE1>configure>router>mpls# lsp <lsp-name> to <system-id>
- Configure System ID LSP point sto
    - Ex: Configure router mpls lsp <R1toR3> to 3.3.3.3

PE1>configure>router>mpls# interface <interface-name>
PE1>configure>router>mpls>interface# te-metric 400
- Setting the TE metric

//ADMIN GROUP CONFIG
PE1>configure>router>mpls# interface <interface-name> admin-group <group-name>
- adding an interface to the admin group
PE1>configure>router>mpls>lsp# <lsp-name> CSPF
- activates CSPF path determination
PE1>configure>router>mpls>lsp>lsp-name# primary <path-name> exclude <group-name>

//SRLG
configure router if-attribute srlg-group <name> value {number}
configure router mpls interface <name> srlg-group <name>
configure router mpls lsp <name> cspf
configure router mpls lsp <name> secondary <path> srlg

RSVP Configuration

PE1: configure router RSVP
PE1>configure>router>rsvp# interface <interface-name>
PE1>configure>router>rsvp# no shutdown

Admin Group & CSPF Configuration

PE1: configure router if-attribute admin-group <group-name> value <bit-flag>
- Ex: configure router if-attribute admin-group *GREEN* value *4*

Mix of Loose / Strict Hop path Configuration

PE1: configure router mpls
PE1>configure>router>mpls# path <path-name> //for traffic engineering

PE1>configure>router>mpls>path# hop 10.10.10.2 strict
PE1>configure>router>mpls>path# hop 10.10.10.3 strict
PE1>configure>router>mpls>path# hop 10.10.10.6 loose
PE1>configure>router>mpls>path# no shut

LSP Configuration
PE1>configure>router>mpls# lsp toR6
PE1>configure>router>mpls>lsp# cspf //NEED TRAFFIC ENGINEERING IN OSPF
PE1>configure>router>mpls>lsp# to 10.10.10.6
PE1>configure>router>mpls>lsp# primary <path-name>
PE1>configure>router>mpls>lsp# exclude "GREEN"
- Telling it to exclude paths defined in admin group GREEN
PE1>configure>router>mpls>lsp# include "GREEN"
- Telling it to include paths defined in admin group GREEN

PE1>configure>router>mpls>lsp# fast-reroute facility
- Enables fast reroute

Configure BGP

PE1: configure router bgp
PE1>configure>router>bgp# export <policy>
PE1>configure>router>bgp# group <group name>
PE1>configure>router>bgp>group# peer-as <as#>
PE1>configure>router>bgp>group# neighbor <ip address>
PE1>configure>router>bgp>group>neighbor# advertise label <label>
- BGP neighbor advertise labels
  - Ex: configure router bgp group R1toR2 neighbor 10.10.10.2 advertise label ipv6

Configure Policy Options

PE1: configure router policy-options begin
PE1>configure>router>policy-options# policy-statement <policy-name>
PE1>configure>router>policy-options>policy-statement# entry 10
PE1>configure>router>policy-options>policy-statement>entry#from protocol <protocol>
PE1>configure>router>policy-options>policy-statement>entry# action <accept/deny>
PE1>configure>router>policy-options# commit

PE1: clear router ldp session <neighbor-ip address>