

S-38.3192

Exercise Session:

MPLS/BGP L3 VPN

8.2.2007

Motivation

```

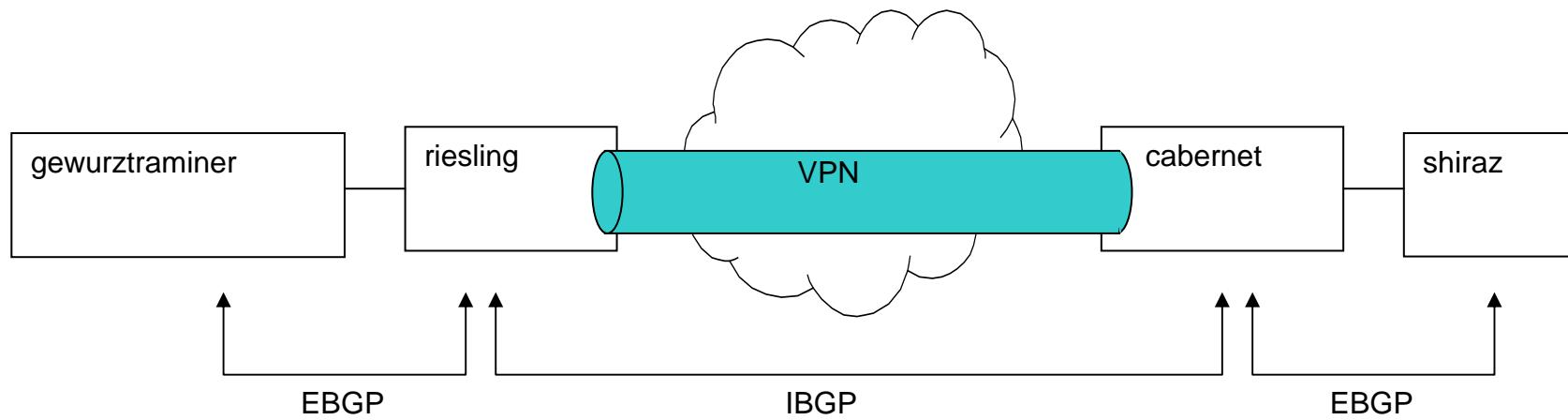
system {
    host-name cabernet;
    backup-router 10.11.0.254;
    time-zone Europe/Helsinki;
    root-authentication {
        encrypted-password "$1$1IzjTvt$1NFojsaEdT1GyokBksIDY1";
    }## SECRET-DATA
    services {
        ftp;
        ssh {
            root-login deny;
        }
        telnet;
    }
    ntp {
        inactive: server 10.255.0.50 version 4;
        inactive: server 10.255.0.51 version 4;
        server 10.255.16.41 version 2;
    }
}
logical-routers {
    merlot {
        interfaces {
            lt-1/2/0 {
                unit 1 {
                    encapsulation ethernet;
                    peer-unit 0;
                    family inet {
                        mtu 1700;
                        address 10.11.0.25/30;
                    }
                    family iso;
                    family mpls;
                }
                unit 2 {
                    encapsulation ethernet;
                    peer-unit 3;
                    family inet {
                        mtu 1700;
                        address 10.11.0.13/30;
                    }
                    family iso;
                    family mpls;
                }
            }
            ge-1/3/0 {
                unit 2 {
                    vlan-id 2;
                    family inet {
                        mtu 1700;
                        address 10.11.0.10/30;
                    }
                    family iso;
                    family mpls;
                }
            }
            lo0 {
                unit 4 {
                    family inet {
                        address 10.100.100.4/32 {
                            primary;
                        }
                    }
                    family iso {
                        address 49.0000.0102.4124.8004;
                    }
                }
            }
        }
    }
    protocols {
        rsvp {
            interface lt-1/2/0.1 {
                aggregate;
                link-protection;
            }
            interface lt-1/2/0.2 {
                aggregate;
                link-protection;
            }
            routing-options {
                router-id 10.100.100.4;
            }
            pinot_noir {
                interfaces {
                    lt-1/2/0 {
                        unit 3 {
                            encapsulation ethernet;
                            interface ge-1/3/0.2 {
                                aggregate;
                                link-protection;
                            }
                            label-switched-path mer-to-cab {
                                from 10.100.100.4;
                                to 10.100.100.6;
                                ldp-tunneling;
                                link-protection;
                            }
                            label-switched-path mer-to-sau {
                                from 10.100.100.4;
                                to 10.100.100.2;
                                ldp-tunneling;
                                link-protection;
                            }
                            label-switched-path mer-to-pin {
                                from 10.100.100.4;
                                to 10.100.100.3;
                                ldp-tunneling;
                                link-protection;
                            }
                            isis {
                                reference-bandwidth 100g;
                                spf-delay 150;
                                no-ipv6-routing;
                                level 1 disable;
                                level 2 wide-metrics-only;
                                interface lt-1/2/0.1 {
                                    point-to-point;
                                }
                                interface lt-1/2/0.2 {
                                    point-to-point;
                                }
                                interface ge-1/3/0.2 {
                                    point-to-point;
                                }
                                interface lo0.4;
                            }
                            ldp {
                                interface lo0.4;
                                session 10.100.100.1 {
                                    authentication-key "$9$tURx0BE7NbajrevL7N2g"; ## SECRET-DATA
                                }
                                session 10.100.100.2 {
                                    authentication-key "$9$MH7Lxdji.FnCYgoGji5T"; ## SECRET-DATA
                                }
                                session 10.100.100.3 {
                                    authentication-key "$9$uBR5Bic-dsZUHevWx-d4o"; ## SECRET-DATA
                                }
                                session 10.100.100.5 {
                                    authentication-key "$9$NSVwgPfzApBZUjqPf6/"; ## SECRET-DATA
                                }
                                session 10.100.100.6 {
                                    authentication-key "$9$A/Z/uORx7VoDylK8x7Y2"; ## SECRET-DATA
                                }
                            }
                            isis {
                                reference-bandwidth 100g;
                                spf-delay 150;
                                no-ipv6-routing;
                                level 1 disable;
                                level 2 wide-metrics-only;
                                interface lt-1/2/0.3 {
                                    point-to-point;
                                }
                                interface ge-1/3/0.1 {
                                    point-to-point;
                                }
                                interface lo0.3;
                            }
                            ldp {
                                interface lo0.3;
                                session 10.100.100.1 {
                                    authentication-key "$9$9/xstu1LX-goGcyIMLXws"; ## SECRET-DATA
                                }
                            }
                        }
                    }
                }
            }
        }
        protocols {
            rsvp {
                interface ge-1/3/0.1 {
                    aggregate;
                    link-protection;
                }
                interface ge-1/3/0.2 {
                    aggregate;
                    link-protection;
                }
                protocols {
                    rsvp {
                        interface lt-1/2/0.1 {
                            aggregate;
                            link-protection;
                        }
                        interface lt-1/2/0.2 {
                            aggregate;
                            link-protection;
                        }
                        isis {
                            reference-bandwidth 100g;
                            spf-delay 150;
                            no-ipv6-routing;
                            level 1 disable;
                            level 2 wide-metrics-only;
                            interface lt-1/2/0.3 {
                                point-to-point;
                            }
                            interface ge-1/3/0.1 {
                                point-to-point;
                            }
                            interface lo0.3;
                        }
                        ldp {
                            interface lo0.3;
                            session 10.100.100.1 {
                                authentication-key "$9$AN1iuORx7VoDylK8x7Y2"; ## SECRET-DATA
                            }
                        }
                    }
                    protocols {
                        bgp {
                            export export;
                            group vpn-red {
                                type external;
                                peer-as 65000;
                                neighbor 10.11.0.37 {
                                    family inet {
                                        unicast;
                                    }
                                }
                            }
                        }
                    }
                    policy-options {
                        policy-statement export {
                            term 1 {
                                from protocol direct;
                                then accept;
                            }
                            term 2 {
                                then reject;
                            }
                        }
                    }
                    routing-options {
                        router-id 10.100.100.8;
                        autonomous-system 65002;
                    }
                }
            }
            interfaces {
                fe-0/0/0 {
                    unit 0 {
                        family inet {
                            address 10.111.0.37/30;
                        }
                    }
                }
            }
        }
    }
}

```

8.2.2007

S-38.3192 Exercise session: MPLS/BGP L3 VPN

Network Configuration



To-do list

- Create VRFs
 - Assign the VRFs to PE-CE interfaces
- Change MPLS TE parameters
- Set up BGP sessions
 - Set up neighborhoods
 - Configure Address family parameters
- Test the network
 - Use a ping flow from CE to CE (LB0<->LB0)

Today's topic: MPLS/BGP L3 VPN

- Do the exercise. You find it at course's website.
- Send the exercise as an email attachment to ttheikk2@netlab.tkk.fi. File type must be PDF.
- Remember the feedback questions
- Next exercise session will be on Thu 15.2. at 14 -16 o'clock in Maari-A

For the Next Exercise Session

- Topic will be Network failures
- Familiarize yourself with the topic
- Next exercise session will be on Thu 15.2.
at 14 -16 o'clock in Maari-A