3TC(A) NAS Project

pierre.francois@insa-lyon.fr

Objective

Automate the provisioning of BGP/MPLS VPN services

GNS Project: Automate provisioning of Internet Services

⇒NAS Project: Add MPLS and BGP/MPLS VPN features

You are allowed to work on the basis of your existing code base

IPv4 :')

Phasing

Phase 0: Setup

Phase 1: Core MPLS routing

Phase 2: Core BGP/MPLS VPN routing

Phase 3: Customer onboarding

Phase 4: More stuff

Phase 0: Setup

Phase 0

- Groups (Group number, email w/everyone in cc to pfr and raz)
- GNS basic setup
  - 4 routers in a row. PE1 -- P1 -- P2 -- PE2
  - Addressing
    - IPv4 Interfaces
    - IPv4 Loopback Interfaces
  - Routing
    - OSPF(v2), google it
    - Route loopbacks
  - Validate routing and forwarding

Phase 1: Core MPLS routing

Phase 1.a : LDP Config

- Enable LDP on your interfaces
- Validate
  - LDP session states
  - MPLS transport in the core
  - Penultimate Hop Popping behaviour

Phase 1.b : Automate

- Addressing
- OSPF Routing
- LDP

Phase 2: Core BGP/MPLS VPN routing

Phase 2.a : Documentation

- Google: “Cisco IOS Basic BGP/MPLS VPN”
  - Note: Uses route reflection (you can if you want)
  - Note: uses IS-IS instead of OSPF (don’t)

Phase 2.b : Configuration

- Configure iBGP for vpnv4 address family
- Loopback to Loopback iBGP sessions

Phase 2.c : Automate

- Addressing
- OSPF
- MPLS
- BGP for vpnv4

Phase 3: Customer onboarding

Phase 3.a : Add CE Routers, VRF's

- Add 4 CE routers (2 customers)
- Configure VRF on PE routers
- Associate VRF to the PE-CE interfaces

Phase 3.b : PE-CE Routing

- Configure eBGP as the PE-CE routing protocol
  - Normal BGP config on the CE
  - Normal BGP config **in the VRF** of the PE
- Make some networks attached to the CE routable through your platform
- Validate routing
  - (routes appear at the right place, no leaking among customers)
- Validate forwarding

Phase 3.c : Automate

- Automate configuration of VRFs, association with interfaces, eBGP in the VRF

- Everything automagically works? Book a demo, you validated the project

Phase 4: Deeper

Phase 4.a: Manageability

- Remember what you configured on your net
- Be able to change your configuration intention without
  - a router reload
  - a cfg wipe
  - config ghosting
- Add
- Delete
- Update

Phase 4.b: More Services

- Allow for site sharing among customers (play with multiple RT's)
- Add Internet services on this network
  - Same core network, different customer interfaces, don't make a mess
- Add Ingress TE services for multi-connected CE routers
  - A CE is connected to two PE, give the customer the means to decide on which link it is going to receive traffic for a given prefix announced by the CE, without waking you up at night
- Add RSVP