CU separated BNG

draft-cuspdt-rtgwg-cu-separation-bng-architecture

draft-cuspdt-rtgwg-cu-separation-bng-protocol

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Architecture of CU Separation BNG

- Draft: draft-cuspdt-rtgwg-cu-separation-bng-architecture

- Motivation & Objective

  - Provide a document to present the basic idea of CU Separation BNG;

  - Describe the functions and requirements of different interfaces of CU Separation BNG;

  - Help the reader to understand the relationship of a bunch of CUSP related documents;

  - Not have strong opinion to standardize this document;

    - The architecture of CU separation BNG has been published (BBF RT-384)

CUSP Architecture Overview
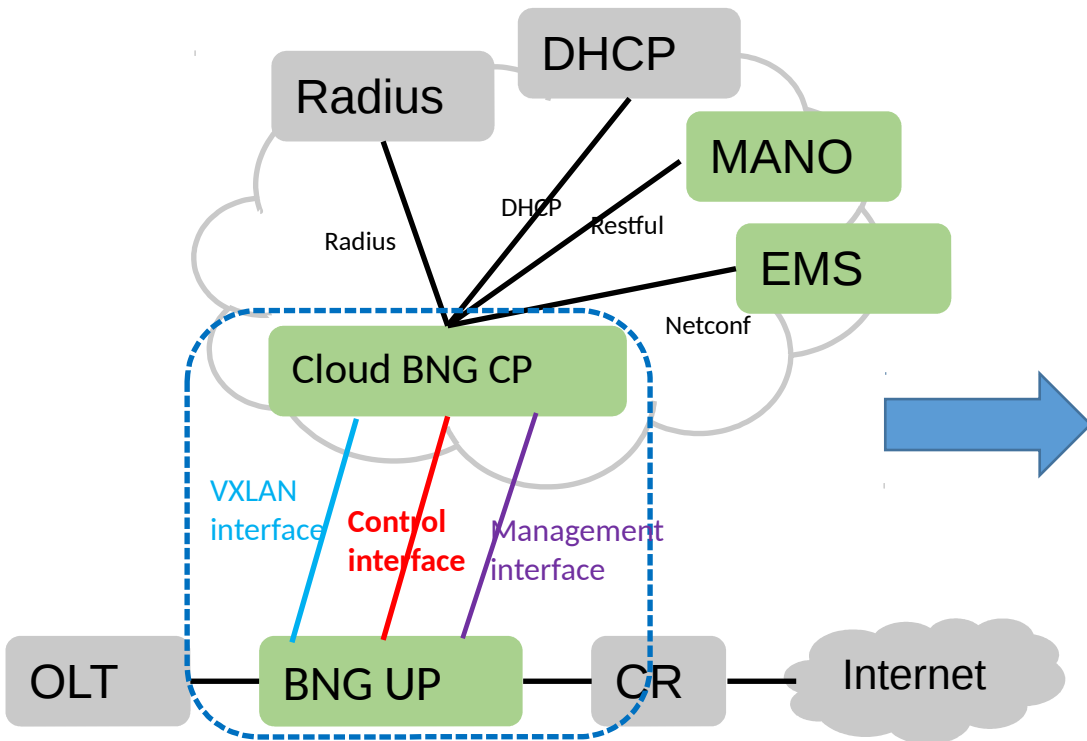
Vxlan interface

- Which be used to transmit dialup packets (i.e. PPPoE or IPoE).
- Related draft： draft-hu-nvo3-vxlan-gpe-extension-for-vbng

Control interface

- The CP uses this interface to send service entries to UPs; and the UP uses this interface to report resources & events to the CP.
- Related draft：
  - Requirements: draft-hu-rtgwg-cu-separation-yang-model
  - Protocol: draft-cuspdt-rtgwg-cu-separation-bng-protocol
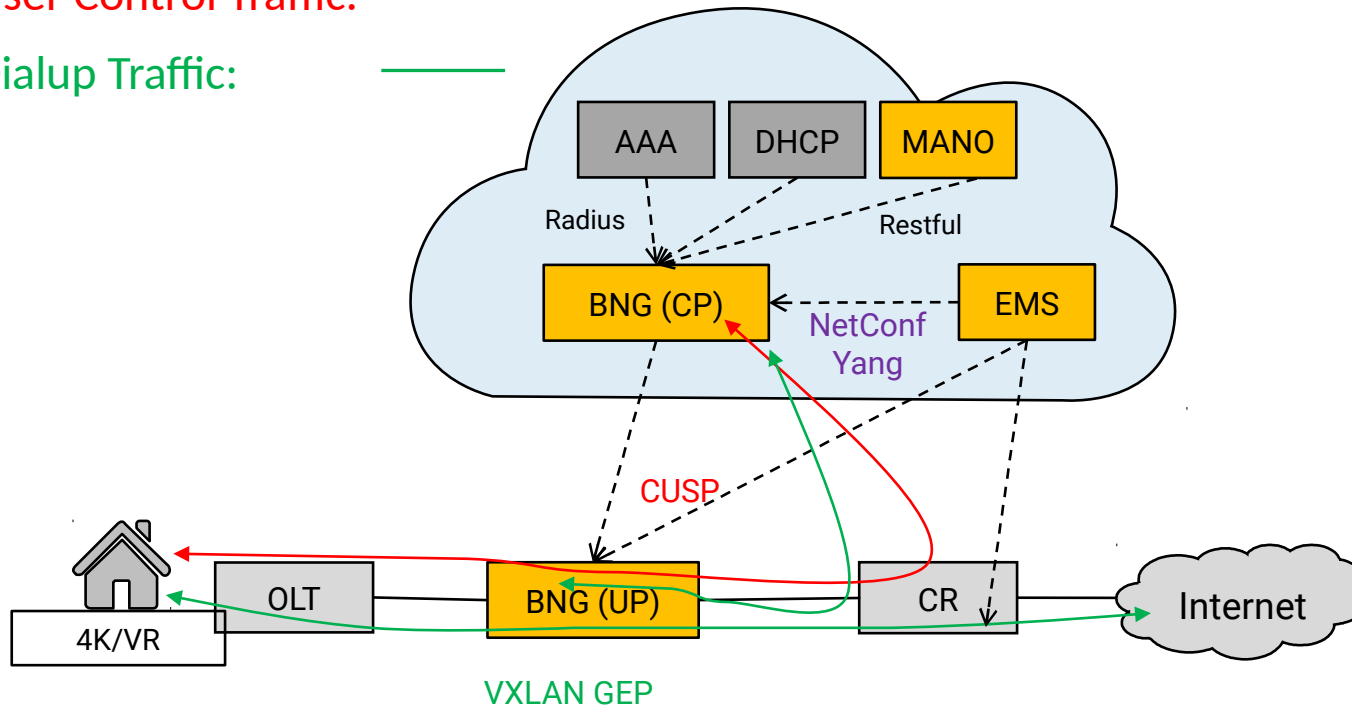 - Information model: draft-cuspdt-rtgwg-cu-separation-infor-model

Configuration interface

- Can be used to configure the CP & UPs.
- Related draft： draft-hu-rtgwg-cu-separation-yang-model

CUSP Architecture ： Usage Example

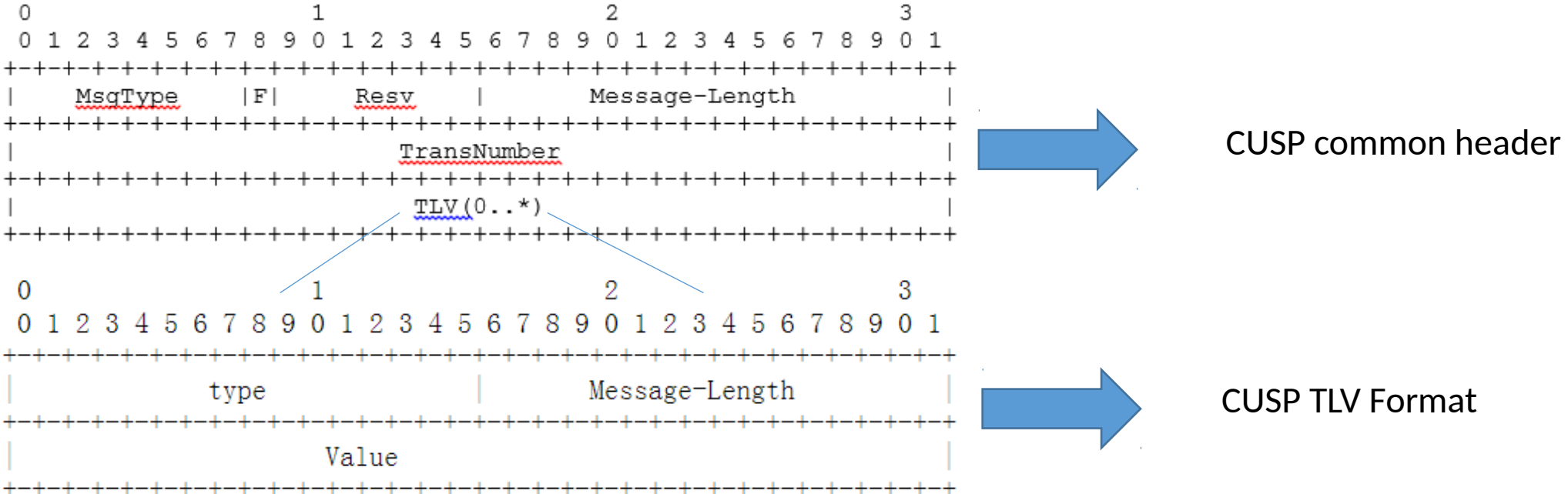User Control Traffic: ——————

Dialup Traffic: ——————

Process ：
1. Configure the CP & UPs via netconf/yang ；
2. If a user request to access in, the User Plane sent the dialup packet to Control Plane via VXLAN tunnel;
3. Control Plane accept this packet to process the user authentication
4. Control Plane dynamic distribute the User-information, User's IP address and other policies such as QoS to User Planes via CUSP;
5. The User Plane forward the dialup packet base on the rules which received from Control Plane.

# CU Separation BNG control channel Protocol (CUSP)

- Draft: draft-cuspdt-rtgwg-cu-separation-bng-protocol

- Motivation & Objective:
  - Design a lightweight protocol to support the CU Separation BNG's control channel
  - Meet the operator's implement requirements.
  - Helps to achieve the interworking of different vendor's devices.
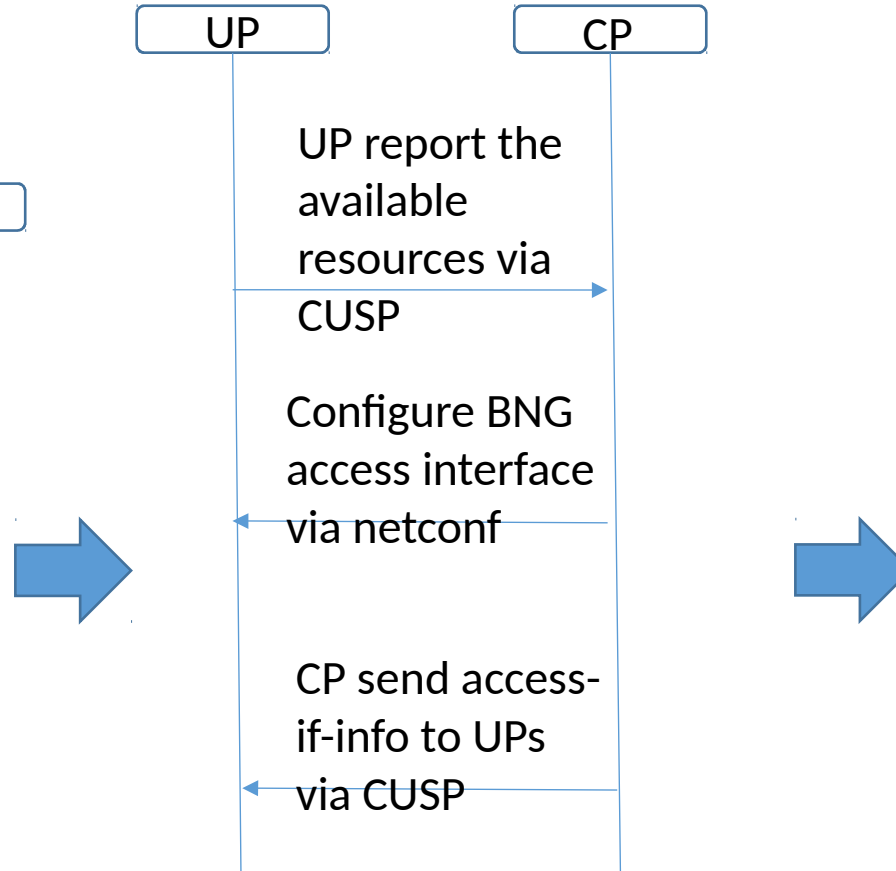
CUSP ： Encapsulation Format Overview

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    MsgType      |F|    Resv     |        Message-Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          TransNumber                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          TLV(0..*)                            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
CUSP common header

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          type          |          Message-Length             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Value                                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
CUSP TLV Format

A simplest protocol! Lightweight but efficiency!
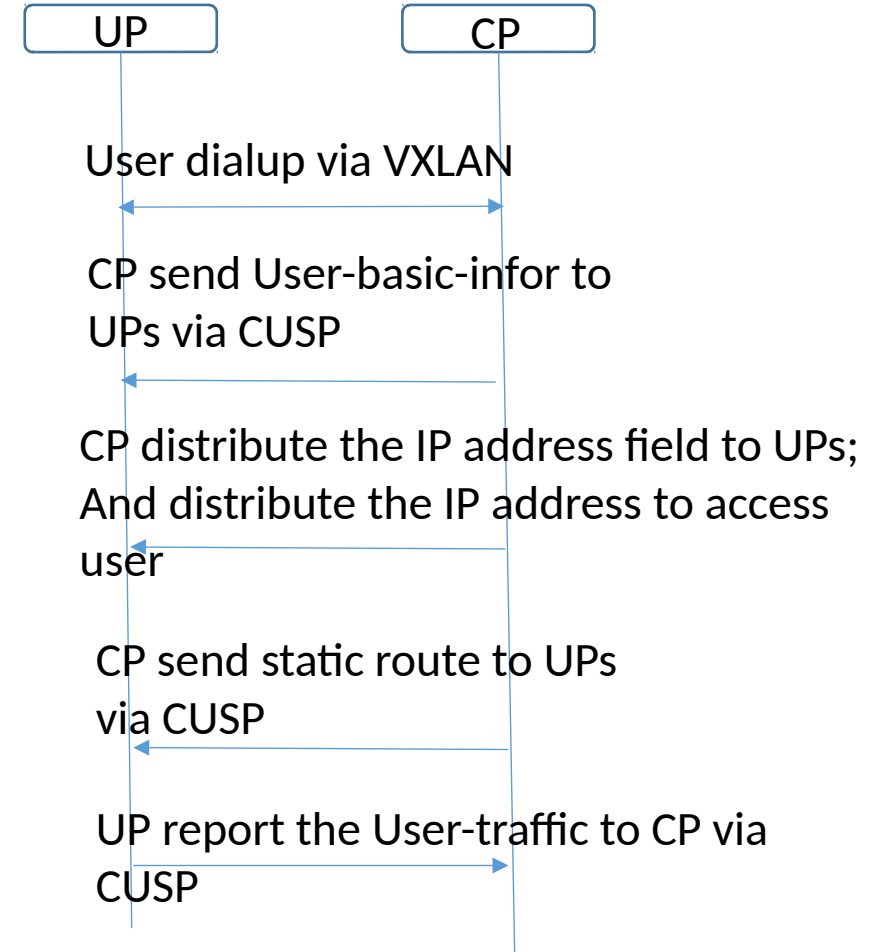
CUSP ： Usage Example - User dialup
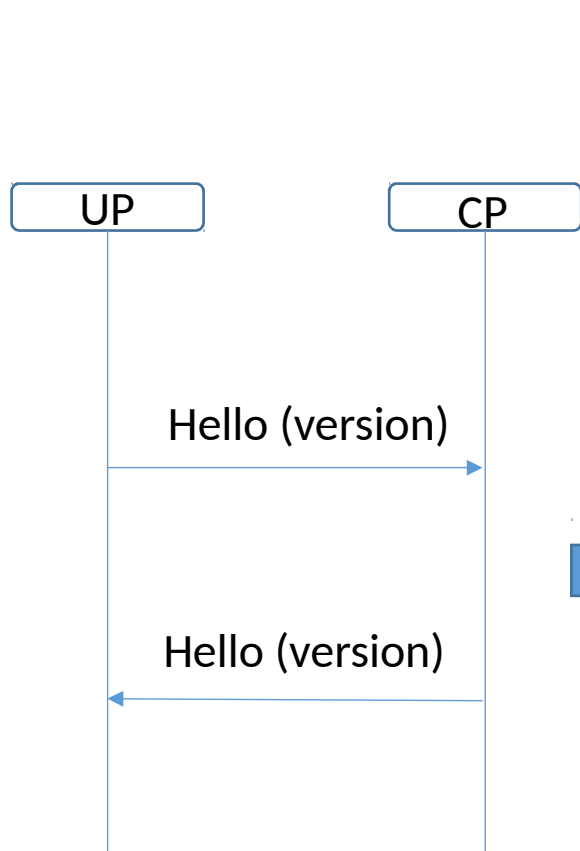
Step 1 ： session establish

Step 2 ：
- UP report available resource;
- Configure BNG access interface;
- CP sends the Access Interface Information message to UPs that contains a variety of objects that specify the set of constrains and attributes for the BNG access interface.

Step 3:
-When a user dialup via VXLAN,
-The CP sends several message to UPs that contains a variety of objects that specify the attributes for the user's basic information, user's ipv4 information, and routing information. This can distribute users equally to UP devices.
-The UPs reports the user's traffic status via USER_TRAFFIC_INFO message.

Hackathon

- Goal: To verify the validity and performance of CUSP

- Result: Hack two benchmarks:
  - Control Plane communicate with User Planes via CUSP;
  - Control Plane centralized manage the UP resource;
    - Dynamic assign the IP address field to UPs.

- More details please review "appendix-Hackathon" of this slides and links:
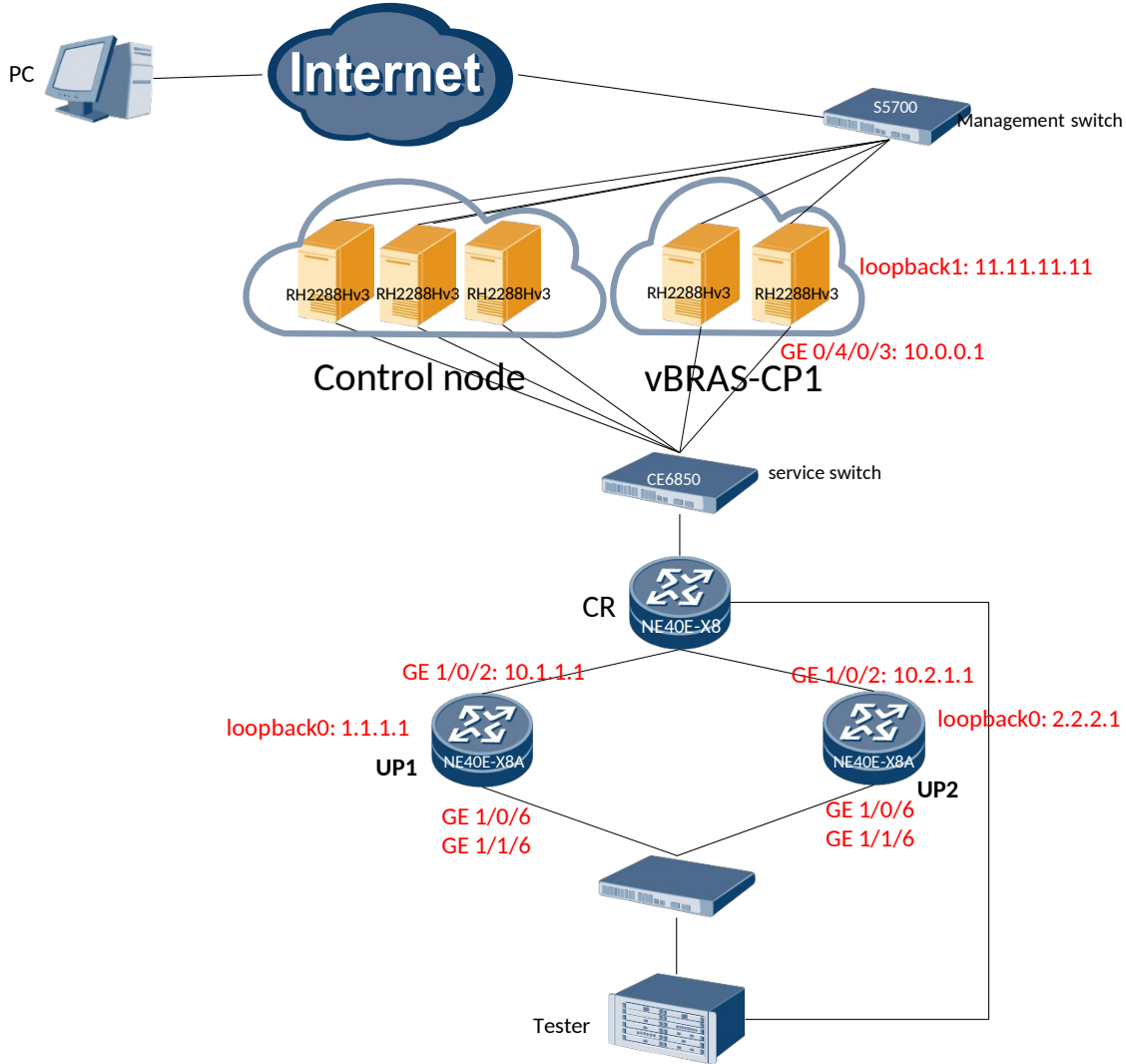 - https://github.com/IETF-Hackathon/ietf102-project-presentations/blob/master/IETF102-Hackathon-CUSP-demo.rar

Next Steps:

- **Documents update:**
  - ❖ The authors appreciate thoughts, feedback, and text on the content of the documents.
  - ❖ And then prepare another version.

Thank you

appendix-Hackatho

PC

Internet

S5700 — Management switch

RH2288Hv3 RH2288Hv3 RH2288Hv3   RH2288Hv3 RH2288Hv3

loopback1: 11.11.11.11

Control node   vBRAS-CP1

GE 0/4/0/3: 10.0.0.1

CE6850 — service switch

CR
NE40E-X8

GE 1/0/2: 10.1.1.1   GE 1/0/2: 10.2.1.1

loopback0: 1.1.1.1   loopback0: 2.2.2.1
NE40E-X8A   NE40E-X8A
UP1   UP2

GE 1/0/6   GE 1/0/6
GE 1/1/6   GE 1/1/6

Tester

| cu-11-cp | UP1-122 | UP2-123 |

```
[CP1-cu-controller]disp this
#
cu-controller
 #
cl
co
tu
-t
nt
nt
en
or
ll
t
l-
ol
cl
co
tu
-t
nt
nt
en
or
ll
t
l-
ol
```

| cu-11-cp | UP1-122 | UP2-123 |

```
[CP1]disp dap-server ip p
  -------------------------
  Index      Name
  -------------------------
  0          odapv4
  -------------------------
  Total Pool Statistic
    Total    :1    Locked
  Total Subnet Statistic
    Total    :256    Used
[CP1]display bas

  -------------------------

Up-Group : 0

  -------------------------

  -------------------------
  Interface
  -------------------------
  GigabitEthernet1024/1/
  GigabitEthernet1024/1/
  GigabitEthernet1025/1/
  GigabitEthernet1025/1/
  -------------------------
  Total 4 BASIF is config

  -------------------------

Up-Group : 1
  -------------------------

  -------------------------
  Interface              BASIF-access-type         config-state    access-number
  -------------------------
  GigabitEthernet1024/1/0/6.1 Layer2-subscriber     Updated         0
  GigabitEthernet1024/1/1/6.1 Layer2-subscriber     Updated         0
  GigabitEthernet1025/1/0/6.1 Layer2-subscriber     Updated         0
  GigabitEthernet1025/1/1/6.1 Layer2-subscriber     Updated         0
  -------------------------
  Total 4 BASIF is configured
[CP1]display access-user domain domain1
Info: No online user!
```

| cu-11-cp | UP1-122 | UP2-123 |

```
[CP1]display current-configuration config cusp
#
cusp controller
 listening-ip 11.11.11.11
 #
 agent up1
  agent-ip 1.1.1.1
 #
 agent up2
  agent-ip 2.2.2.1
#
return
[CP1]display cusp session
AgentName    : up1
  AgentIP    : 1.1.1.1
  ControllerIP : 11.11.11.11
  Uptime : 0d00h12m21s   State : REGISTERED

AgentName    : up2
  AgentIP    : 2.2.2.1
  ControllerIP : 11.11.11.11
  Uptime : 0d00h07m17s   State : REGISTERED
[CP1]display netconfc session
Peer ID              : 1025
NETCONFC Session ID  : 15623
User Name            : netconf
Session Type         : CFG
Session State        : READY
Up Time              : 2018-07-15 13:43:28
PID                  : 26674368
```

CUSP SESSION Set up

appendix-Hackathon