Consideration for

Applying PCE in Native IP network

【 _ Centrally Control Dynamic Routing(CCDR) 】
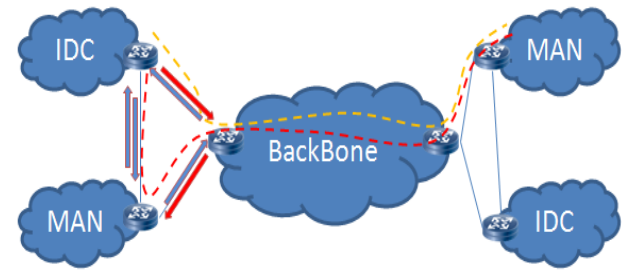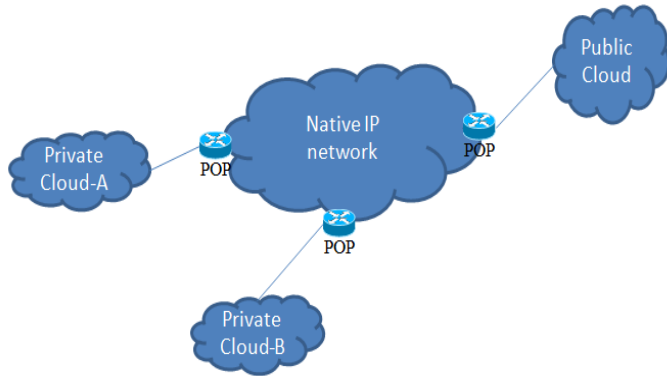
Aijun Wang

China Telecom

IETF100@Singapore, Nov 2017

Contents

- Scenarios Summary and Requirements
- Proposed Solution
- Comparison with current technologies
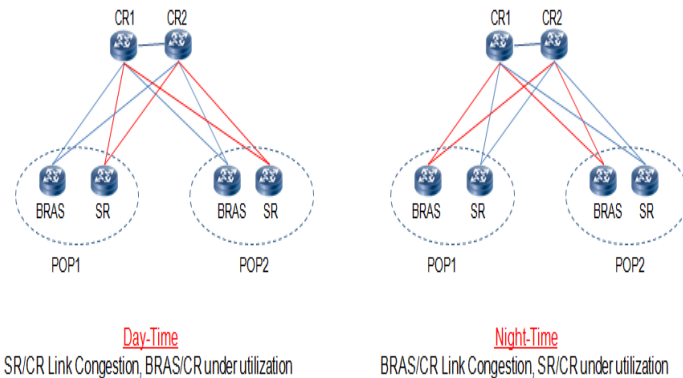- Further Action

Scenario Summary
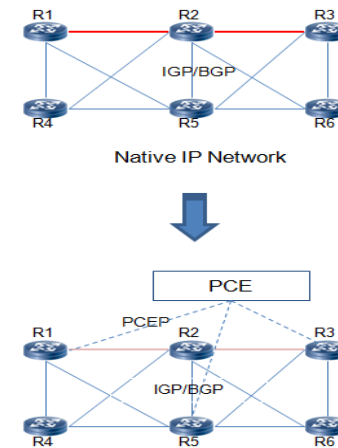## ([Detail Material](#))

S1: QoS Assurance for Hybrid Cloud Communication

S2: Traffic engineering for IDC/MAN asymmetric link

S3: Increased link utilization based on tidal phenomena

S4: Network temporal congestion elimination

Solution Requirements/Expectations

1. Apply for Native IP network

2. Identical deployment method for intra- and inter- domain.

3. No influence to existing router forwarding behavior

4. Easy interoperation for routers from different vendors.

5. Software Engineering friendly API interface.

6. Can utilize the power of centrally control(PCE) and flexibility/robustness of distributed control protocol.

7. Coping with the differentiation requirements for large amount traffic and prefixes.(China Telecom has about tens of T bps traffic and tens of thousand prefixes within the network)

Contents

- Scenarios Summary and Requirements
- Proposed Solution
- Comparison with current technologies
- Further Action

Proposed Solution

- Deploy PCE/SDN Controller in the native IP network
- PCE/SDN Controller is responsible for the complex algorithm to optimize the necessary traffic upon the real network situation
- Populate traffic prefixes via different BGP sessions between peers, manipulate the path to BGP nexhop of these prefixes via PCE to different traffic forwarding path.
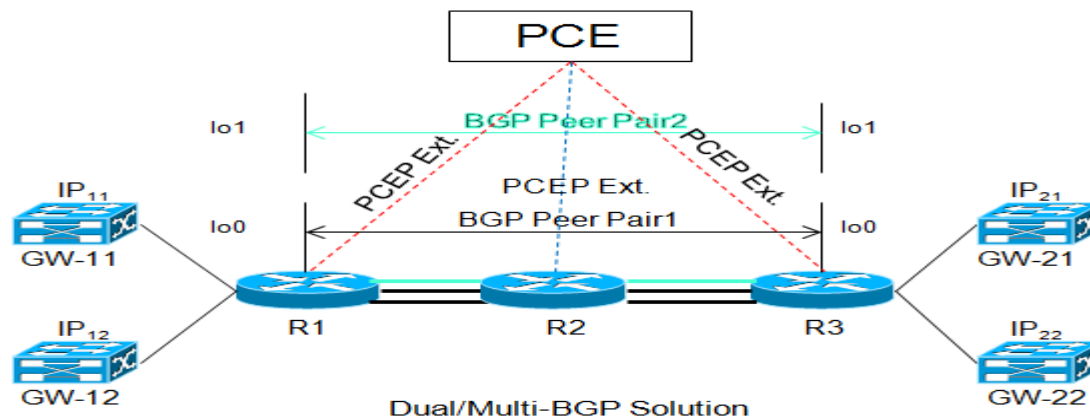
Solution Benefit

- PCE/SDN Controller has powerful capabilities to solve complex traffic engineering scenarios and we have finished the large network simulation.

- Same deployment method for intra-/inter- domain in Native IP network and easy to expand to cover other kind networks, for example for MPLS traffic optimization later.

- Exploit the advantage of central control and distributed protocol

PCE Algorithm Simulation Comparison

Related Drafts
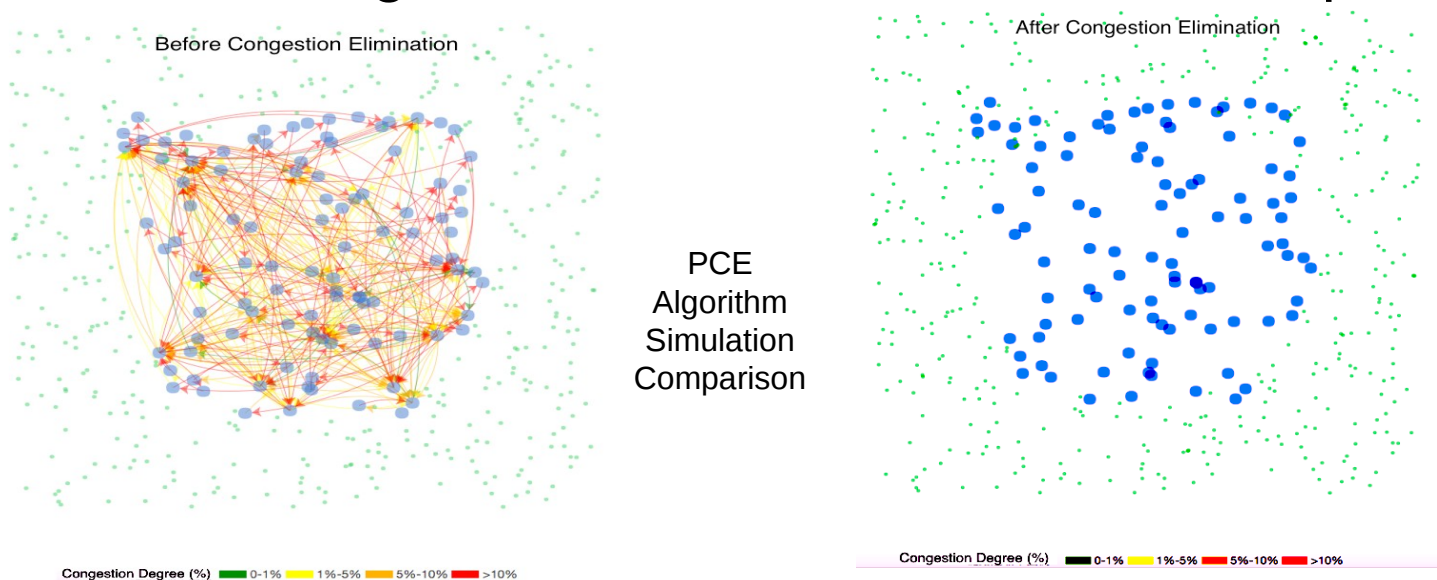
1. https://tools.ietf.org/html/draft-wang-teas-ccdr(Scenario and Simulation)
   By experts from China Telecom, BUPT, China Mobile and Tencent Company.

2. https://tools.ietf.org/html/draft-wang-teas-pce-native-ip(Framework)
   By experts from Huawei, China Telecom, Tencent, Juniper and ZTE

3. https://tools.ietf.org/html/draft-wang-pce-pcep-extension-native-ip(Solution)
   By experts from Huawei, Juniper, ZTE and China Telecom.

```
TEAS Working Group                                      A.Wang
Internet Draft                                   China Telecom
                                                Xiaohong Huang
                                                          BUPT
                                                    Caixia Kou
                                                          BUPT
                                                      Lu Huang
                                                  China Mobile
                                                    Penghui Mi
                                               Tencent Company

Intended status: Information Track          October 24, 2017
Expires: April 23, 2018

            CCDR Scenario, Simulation and Suggestion
                  draft-wang-teas-ccdr-02.txt
```

```
TEAS Working Group                                      A.Wang
Internet Draft                                   China Telecom
                                                   Quintin Zhao
                                                 Boris Khasanov
                                                    HuaiMo Chen
                                            Huawei Technologies
                                                     Penghui Mi
                                                Tencent Company
                                             Raghavendra Mallya
                                                Juniper Networks
                                                    Shaofu Peng
                                                ZTE Corporation

Intended status: Standard Track             October 24, 2017
Expires: April 23, 2018

                    PCE in Native IP Network
               draft-wang-teas-pce-native-ip-04.txt
```

What The Proposal Needs in the End?

- Select PCEP protocol to transfer the policy to router.

- There are also lots of discussion about this within PCE WG, please refer the discussion thread
  [PCEP as the most suitable southbound protocol for SDN controller](#)
  ------we support this direction.

- Only the key parameters needs to be transferred:

New PCEP Objects	Key Parameters	Usage
Peer Address List (PAL)	List of Peer Addresses	PCC uses this information to build BGP connection with the appointed peer
Peer Prefix Association (PPA)	Relation between Different Prefixes and their associated peer	PCC advertises different prefixes via different BGP peer.
Explicit Peer Route (EPR)	Explicit Routes to Peer Address	PCC builds the explicit routes to the peer address

Contents

- Scenarios Summary and Requirements
- Proposed Solution
- Comparison with current technologies
- Further Action

Comparison with other technologies

We have also investigated the following current technologies, but seems none of them can meet the requirements/expectation for the mentioned scenarios

Solutions	Our Worries
Segment Routing	1. Not the same solution for intra-/inter- domain 2. Require the change of forwarding behavior on PE router. 3. Require Map server for coexisting with Non-SR router.
RSVP-TE	1. Signaling Burden/State Pressure on routers
Openflow	1. Can't cope with the pressure from large amount prefixes differentiation requirements. 2. Only central control, not acceptable by network operator
NETCONF/YANG	1. Detail Elaborate Configuration Style is not easy understood by Software Engineering of PCE/SDN Controller, they prefer simple/abstract command. 2. Efficiency Consideration(Text vs. Binary) 3. Initial Configuration(YANG) vs. Dynamic Adjustment(PCEP)

Contents

- Scenarios Summary and Requirements
- Proposed Solution
- Comparison with current technologies
- Further Action

Further Action

- Adopt scenario draft CCDR as WG draft?
- Adopt solution draft PCE in Native IP network as WG draft?
- Discuss the detail PCEP protocol extension draft at PCEP WG.
- More scenarios and contribution are welcome.
- Comments?

Nov.14 2017

IETF100@Signapore