

Problem Statement of APN

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Sent: Monday, April 24, 2023 4:17 PM
To: apn@ietf.org
Subject: [Apn] Virtual team to craft problem statement

Hi all,

We currently have this virtual team which is working to craft a problem statement that we hope will describe a problem of interest and value to the IETF, and along with that trying to clarify the problem space to be addressed. Please let us know whether you are also interested in joining us.

The current virtual team:

Adrian Farrel, Old Dog
Donald Eastlake, Futurewei
Shuping Peng, Huawei
Luis M. Contreras, Telefonica
Joel Halpern, Ericsson
Chongfeng Xie, China Telecom
Feng Yang, China Mobile
Shuai Zhang, China Unicom
Haisheng Yu, BII Group
Jiang Liu, BUPT
Lin He, Tsinghua University
Luc Fabrice, MTN
Melchior Aelmans, Juniper
Mohammed Umair, IPinfusion
Gyan Mishra, Verizon
Daniel Voyer, Bell Canada
David Lake, DELL Technologies

Best regards,
Shuping

A virtual team to
craft problem statement
was created after I16

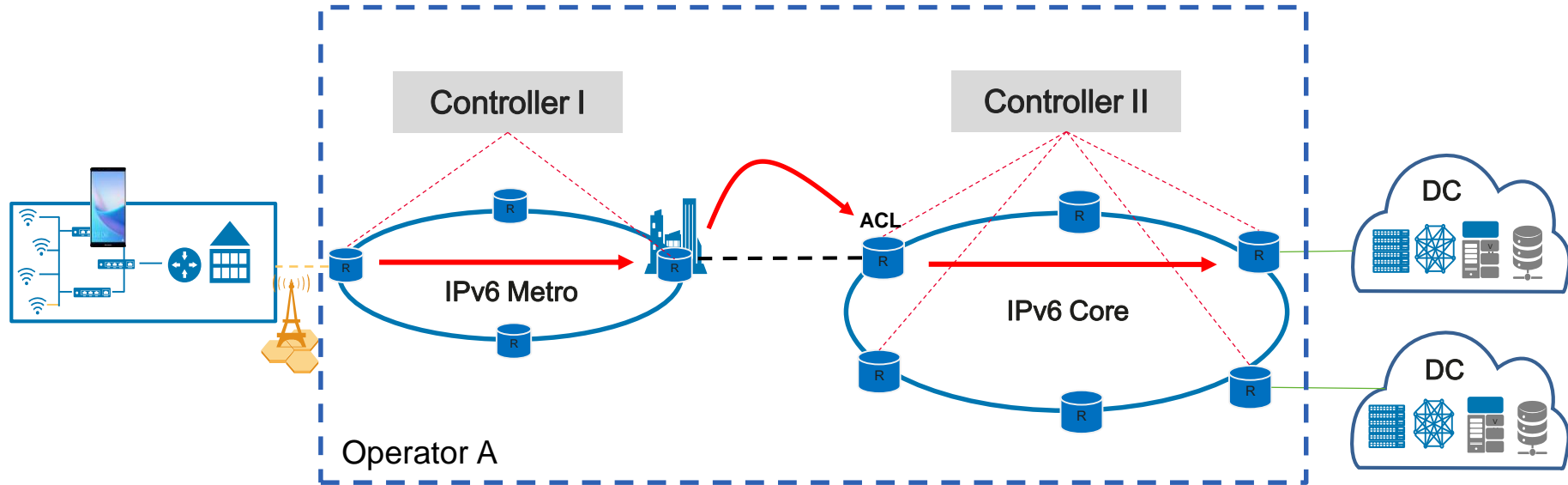
The problem

- In a network operator controlled domain, the **ingress edge** devices usually have access to **rich information**, such as VLAN/QinQ, VPN ID, and access interface, which is used to classify the packets **into fine granular virtual groups** of flows at the edge.
- However, after the packets enter the network operator's domain, **all such information is not immediately visible** at transit nodes: it may be hidden inside encapsulation, masked by encryption, mapped to other protocol fields, or stripped from the packets completely.
- Furthermore, many mapping schemes, where they are used, **lose some level of granularity** from the information available at the network edge.
- For example, when the information is **mapped into small fields** like DSCP (6 bits) or MPLS EXP (3 bits) the result is that **only relatively coarse grained QoS treatment** can be provided. MPLS EXP bits are sometimes insufficient to carry what an operator needs, even the DSCP is really too small.

The problem

- **Single-domain:** The **packet treatments needed may vary at different parts of the packet's path** within the domain, and enough information is needed to determine these treatments such as steering, triggering, and identifying in an efficient way, that is, to efficiently realize a composite network service provisioning along the path. For example,
 - at the headend to steer into corresponding path
 - at the midpoint to collect corresponding performance measurement data
 - at the service function to execute particular policies flexibly
- **Multi-domain:** Furthermore, when the packet traversing through **multiple technology domains of a single operator**, where each domain is controlled independently without a hierarchical controller being deployed and each has its own SLA mechanism, in this case, **it is difficult to achieve end-to-end consistency in service provisioning** (e.g. visualization) due to **lack of information to indicate the granularity** of traffic flow across multiple domains. The ACL configuration at the following domains' edge devices are very complex and dynamic.

End-to-end consistency through multiple domains



End-to-end service consistency (e.g. visualization) is difficult to achieve in multiple domains.

1. Each domain always has its own SLA mechanism.
2. ACL configuration at the following domains' edge are very complex and dynamic.
3. Hierarchical controller or orchestrator is not always deployed.

Q&A

- How do you think about the problem statement?
- Does the problem statement make sense?
- How do you think about the multi-domain case?
- Do you have it in your network?

- Welcome to discuss in the mailing list.