Use-cases for Collaborative LMAP

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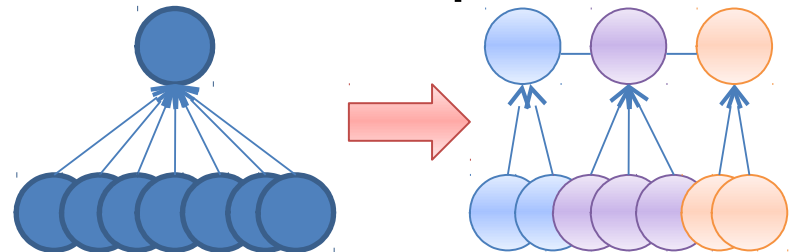CMCC   HW   MIIT

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Collaborative LMAP

- Collaborative LMAP
  - Refers to the scenario where multiple autono mous measurement systems (current LMAP) collaborate together to perform large scale p erformance measurement.

- Not currently chartered for LMAP WG
  - Breaks the single controller assumption
  - Maybe next phase

Use Cases for Regulators

- Monitor the status of overall network and interconnections to promote network development.
  - The current situation of its regional networks.
    - Rely on existing deployed LMAP systems from different organizations, e.g., LSPs, 3rd-partys.
    - Different LMAP systems need to work together to give a whole picture of a large geographic area, e.g., a whole country.
  - The peering performance between ISPs.
    - Understanding the interconnection performance could help as regulators need to formulate policies to promote information sharing between ISP networks.
  - Regulators in different countries interconnect together to perform cross-border measurements.

Use Cases for ISPs

- scalability issue with a single controller for a fairly large scale network operator.
  - Inter-Controller collaboration within a domain.
    - If the network scale of the domain is large enough, scalability of one Controller may become an issue.
    - [I-D.ooki-lmap-internet-measurement-system].
  - Multi-domain ISP network.
    - For a large ISP, it might divide its global network into several autonomous domains. E.g., 3 ISP giants in China (CMCC, CTCC, CUCC) all manage nationwide networks in China in this way.

Use Cases for ICPs

- ## Service Design and Deployment
  - To understand the practical performance and impact of various network segments (e.g. access network, transit network and Int ernet) to the application.
  - To guide the design, experimental and operational phases of a new feature/technology introduction.

- ## Troubleshooting
  - The end-to-end performance troubleshooting in users' home ne twork are likely to be initiated by ICPs which may collaborate wi th the broadband access service provider in problem demarcati on to guarantee the promised QoE for the users.

UE <=>home net<=>home GW<=>access ISP<=>transit ISP<=>Internet<=>ICP

Figure 2 Cross-Domain data traffic from home network to ICP

Derived Requirements

- LMAP extensions for collaboration between domains needed.
  - Mechanisms for task coordination.
  - Mechanisms for results aggregation.
  - Extensions for authentication and authorization for collaborative measurement tasks.
  - Minimal changes preferred.
    - Potential changes to framework, information model or protocols may be considered.

Discussion

- Do the use cases make sense enough?
- Will WG consider to do it in the next stage ?
- Welcome reviews and suggestions.

Backup

Motivations from China

- China's networks are complex
  - 31 provinces, 300 regions come to hierarchical networks deployments.
  - 3 ISP giants (CMCC, CTCC, CUCC) all manage nationwide networks.
- Regulator/ISP must know the network statuses of 3 ISP Giants in each region of a province, then province, and finally the whole country.
- Some 3rd party companies, e.g., Chinacache, Chinanetcenter are also providing nationwide network information reports.
- MIIT, as the official organization, has been issuing the report of broadband speed state every quar

It would be prohibitive for MIIT to deploy its own dedicated probes (900+).

Why is Collaborative LMAP is needed

Motivated to address **scalability** of controller, **hetegeneous MAs** issue within a large ISP, or multiple sub-domains for a large ISP.

Motivated to address **capex** issue in network monitoring for dedicated LMAP system by reusing existing systems from ISPs/3rd-party entities.
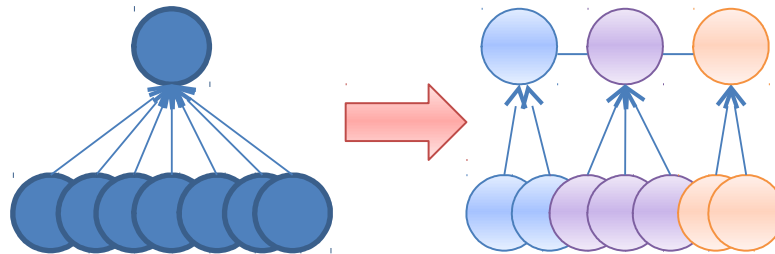
Motivated to address capex issue in **QoE monitoring** for dedicated LMAP system by reusing LMAP systems from multiple ISPs/3rd-party

Motivated to do **trouble-shooting in segmented access environment** by reusing existing LMAP systems from multiple ISPs.

Use Case For the End Consumer

- Motivations for the End-driven LMAP
  - to aid trouble-shooting in segmented access environ ment
  - problems arise either from
    - the WLAN between the end to a third-party home gateway
    - the LAN between the home gateway to the ISP's CPE devic

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Figure 2 Cross-Domain data traffic from home network to ICP

  - potential collabration between various measurement

What collaborations are needed?