

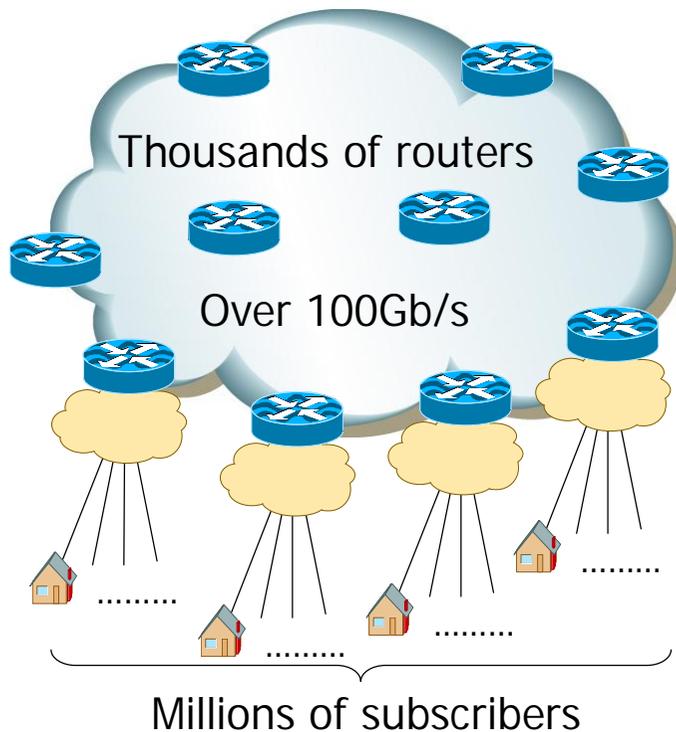
IPFIX Mediation: Problem Statement

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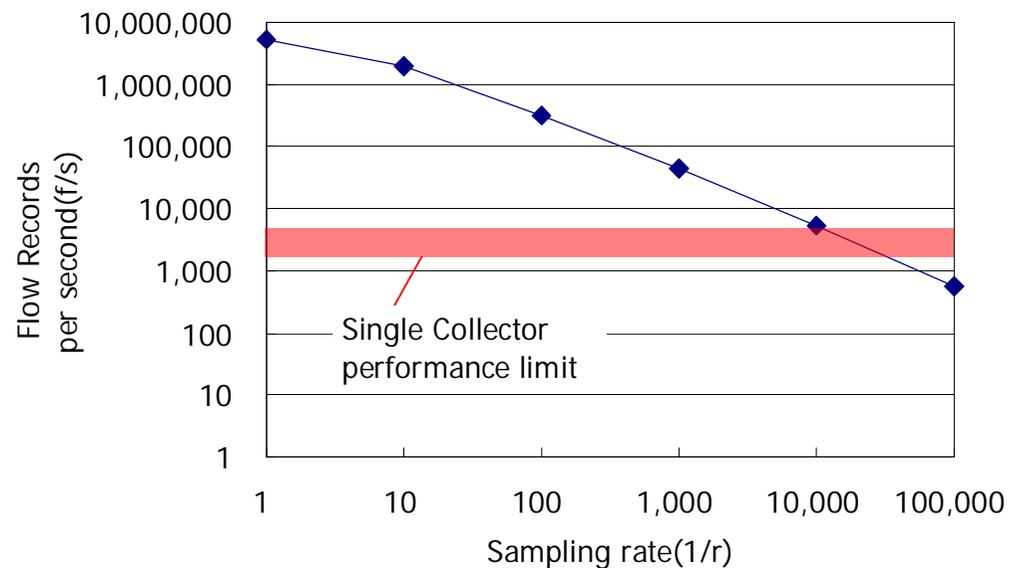
Large ISP network example

- Total traffic is over 100 Gb/s
 - Thousands of routers, millions of subscribers
 - Expect 500Gb/s or more in a few years, means single collector will not handle whole flow records anymore
- Using MPLS for both traffic engineering and VPNs
 - Backbone traffic is a mixture of VPNs and the internet
 - VPNs may share IP addresses (i.e. RFC1918)



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The number of exported Flow records on 500 Gb/s

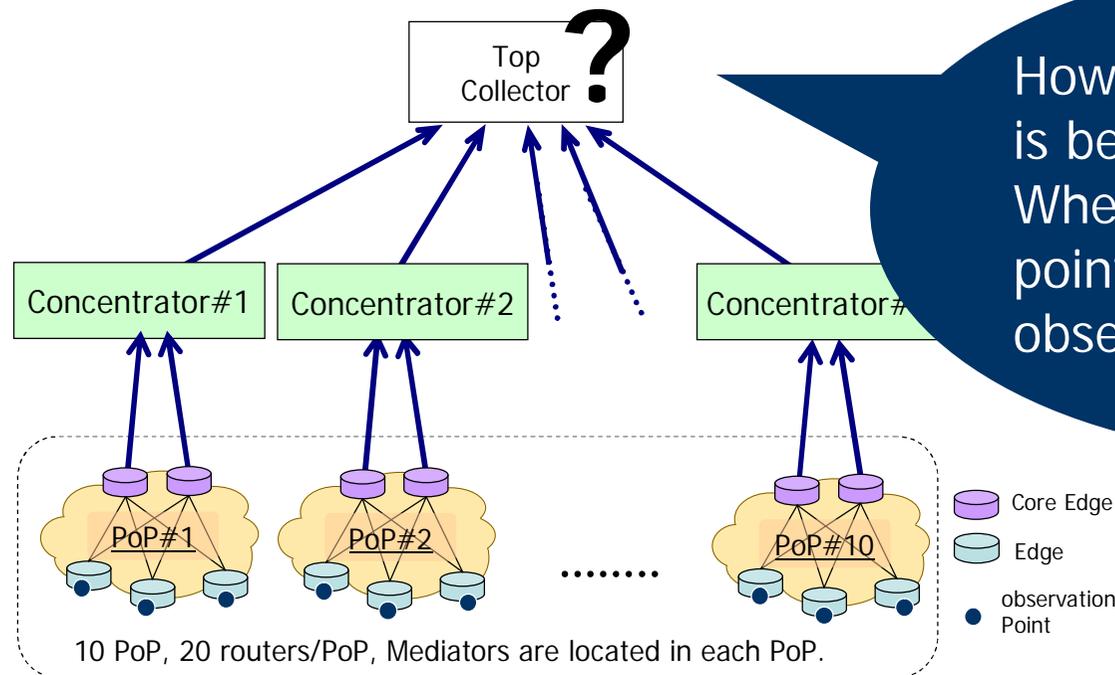


Flow Measurement in large network

- Flow measurement is already a popular method
 - Due to traffic volume, sampling is necessary
 - Mostly 1/10,000 - 1/1,000, from router's resource restriction (CPU and memory)
 - AS boarder, provider edge, and server farm routers are popular measurement points.
- The biggest challenge in a few years is scalability
 - More traffic, means more flow records
 - IPFIX's new features will increase measurement points

Approach for scalability

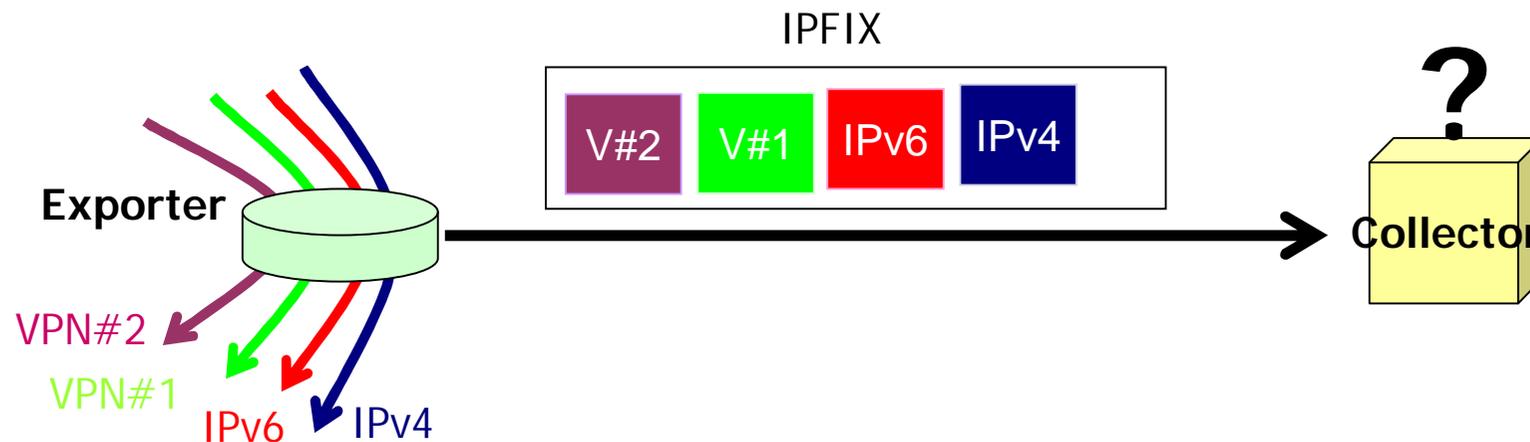
- Introducing hierarchical flow collection with concentrators
 - Will reduce a number of flow records for the final collector
- Problem 1: concentrator described in RFC3917 may drop Options and Observation Point information.
 - Options: Sampling rate, Sampling algorithm
 - Observation Point information: Exporter IP, Observation Domain, Observation Point



How much sampling rate is being applied?
Where is the observation point in which traffic observed?

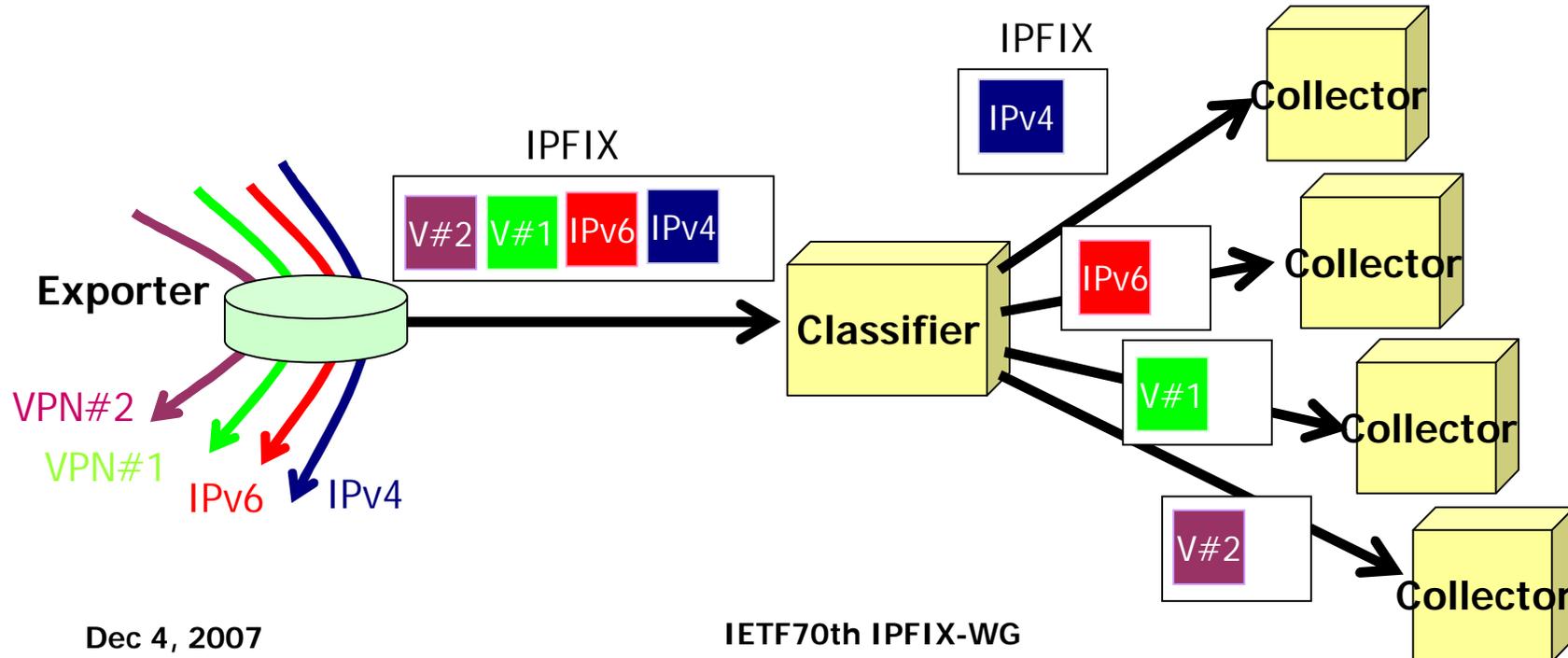
Distinguish each network flows

- VPNs and the Internet share a network
 - Because network natures are different, they require different measurements
- MPLS IE will help to distinguish which network/VPN does the packet belong
- Problem 2: There is no way to use individual collector for each network



Flow classifier

- Original exporter send all flow records to the same destination
- Each network may requires individual collector
 - Flow Classifier in intermediate device will help
 - It also work as collector load balancer
 - In some case, aggregation after classification will be needed



Conclusion

- Hierarchical model using IPFIX Concentrator is useful in large-scale NW
- Two Problems found:
 - Using IPFIX Concentrators might lose some data from original Exporter
 - A device between Exporter and Collector needs more function other than Concentrator.
 - Needs Flow classification function based on Flow contents.

Next step (on problem statement)

- Problems not addressed yet (need contributions)
 - Exchanging Flow data between Networks
 - Anonymization