Pós-graduação em Ciência da Computação
Centro de Informática
Federal University of Pernambuco

SFCMon: An Efficient and Scalable Monitoring System for Network Flows in SFC-enabled Domains

COINRG - IETF Meeting 106, Singapore

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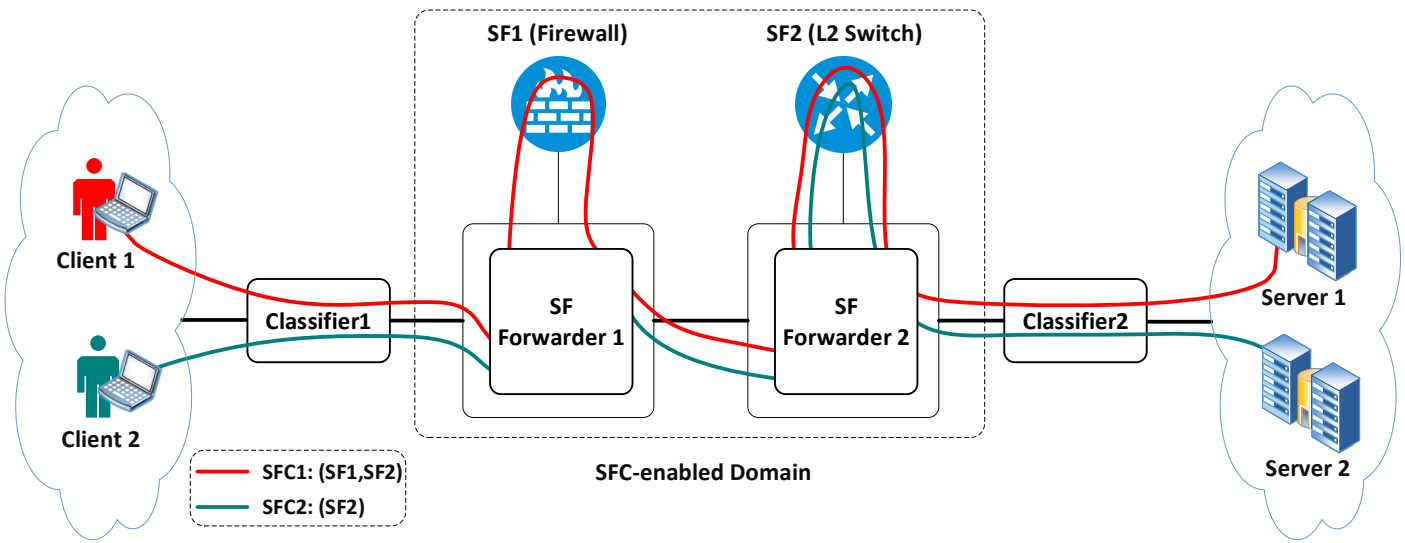
Service Function Chaining

- SFC is a key enabler for NFV [Bhamare et al., 2016].
- The SFC standardization is addressed by IETF at the SFC working group (WG)
  - RFC 7665 [Halpern and Pignataro, 2015].
  - RFC 8300 [Quinn et al., 2018].

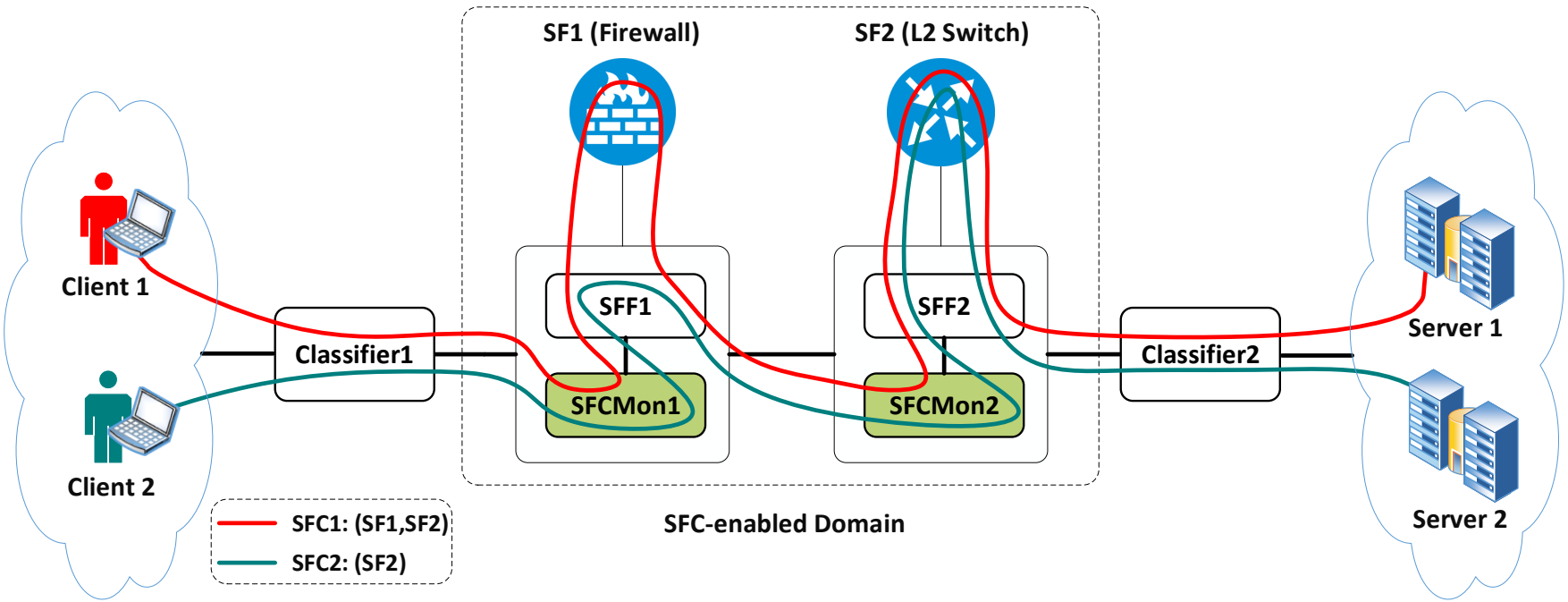


Problem

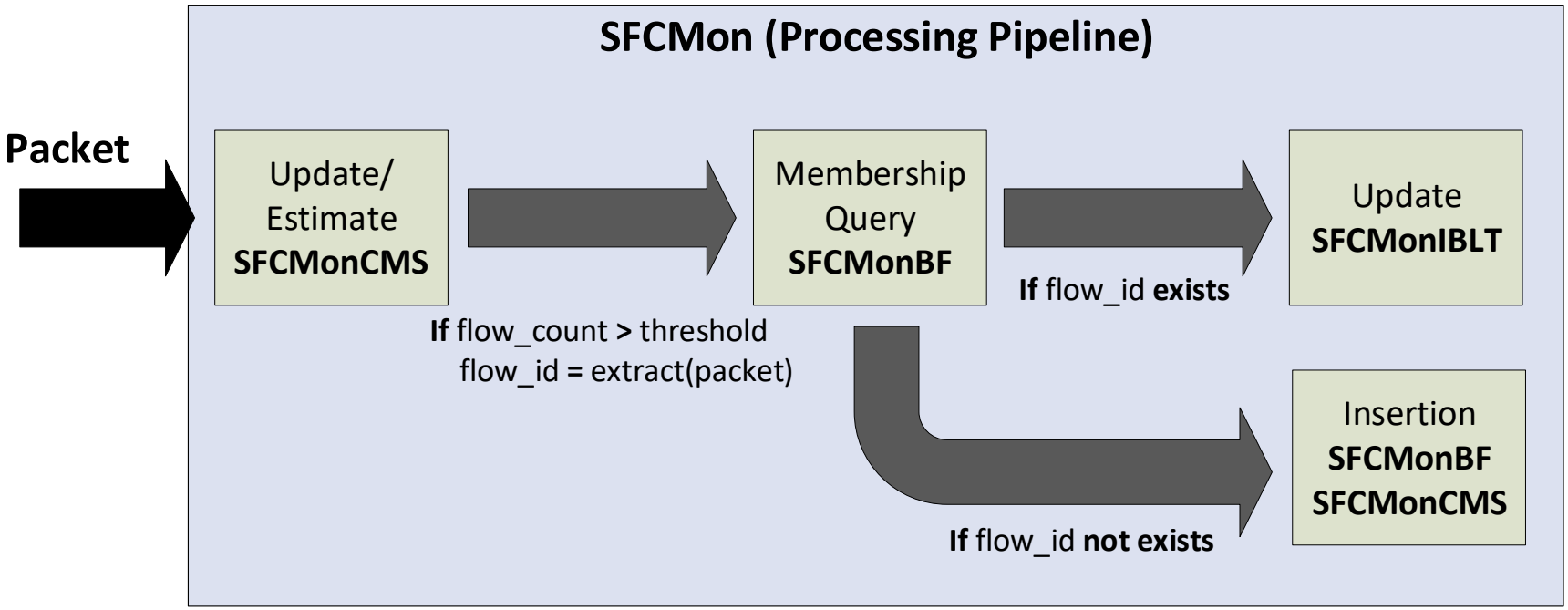
- Ideally, for SFC purposes, a monitoring task should take into account all transmitted packets at the same time that keeps memory and processing at acceptable levels.

- We propose **SFCMon**, an efficient and scalable monitoring solution to keep track network flows in SFC-enabled domains;
- It implements a pipeline of **probabilistic data structures** to keep track **large flows** directly inside the network switches, thus reducing both overall latency and signaling overhead.

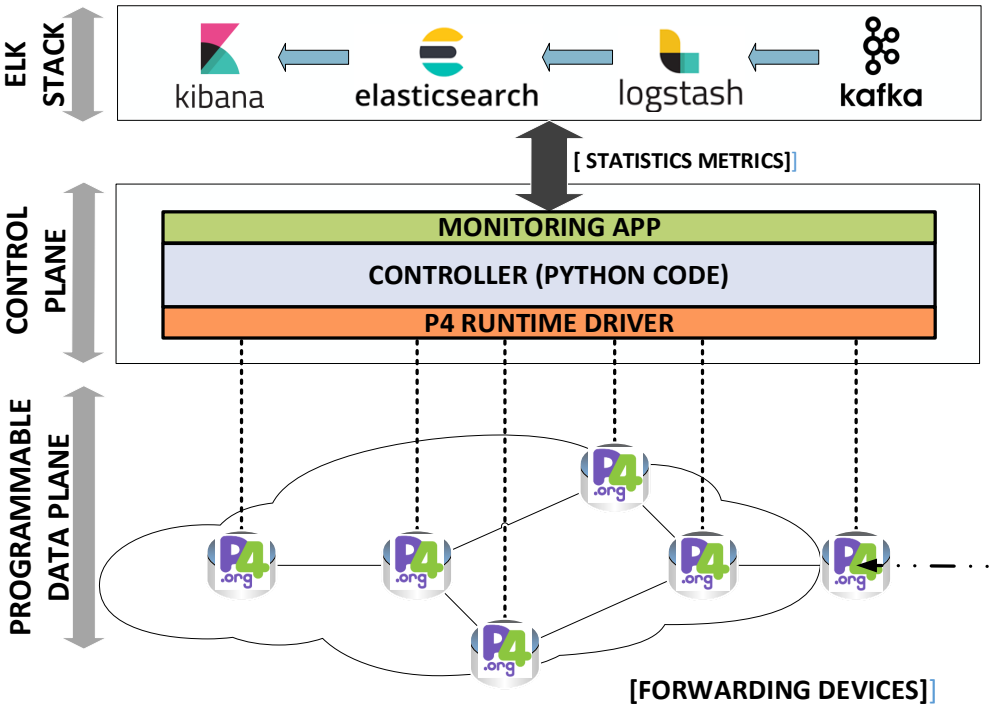
SFCMon as an SFC Component



SFCMon Processing Pipeline



SFCMon's Prototype Overview

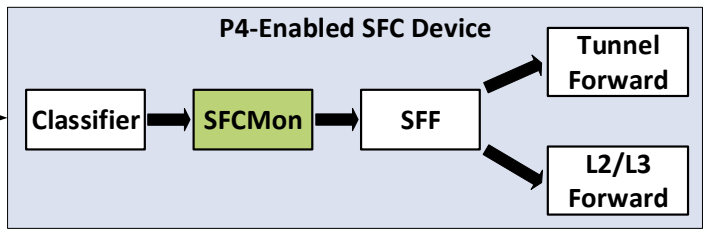


Classifier

```
table sfc_classifier {
  key = {
     hdr.ipv4.srcAddr: lpm;
  }
  actions = {
     sfc_encapsulate;
     drop;
     NoAction;
  }
  size = 1024;
  default_action = NoAction();
}
```

SFF

```
table sfc_Sf_forwarder {
  key = {
     hdr.nsh_sp.spi: exact;
     hdr.nsh_sp.si: exact;
  }
  actions = {
     sfc_forward;
     sfc_desencapsulate;
     drop;
     NoAction;
  }
  size = 1024;
  default_action = drop();
}
```



Conclusion

- The SFCMon as new SFC component.
- The Proof-of-Concept (PoC) framework, which provides a reference P4-based SFC switch and a Python-based SFC controller.
- Initial experiments demonstrate that SFCMon introduces a negligible performance penalty while providing significant scalability gains.
  - Refers to https://sol.sbc.org.br/index.php/wpietf/article/view/6581/6477
- **Source Code:** https://github.com/michelsb/SFCMon

References I

[Bhamare et al., 2016] Bhamare, D., Jain, R., Samaka, M., and Erbad, A. (2016).
A survey on service function chaining.
Journal of Network and Computer Applications, 75:138 – 155.

[Halpern and Pignataro, 2015] Halpern, J. M. and Pignataro, C. (2015).
Service Function Chaining (SFC) Architecture.
RFC 7665.

[Quinn et al., 2018] Quinn, P., Elzur, U., and Pignataro, C. (2018).
Network Service Header (NSH).
RFC 8300.

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