Performance Management in Application-controlled Software Defined Networks

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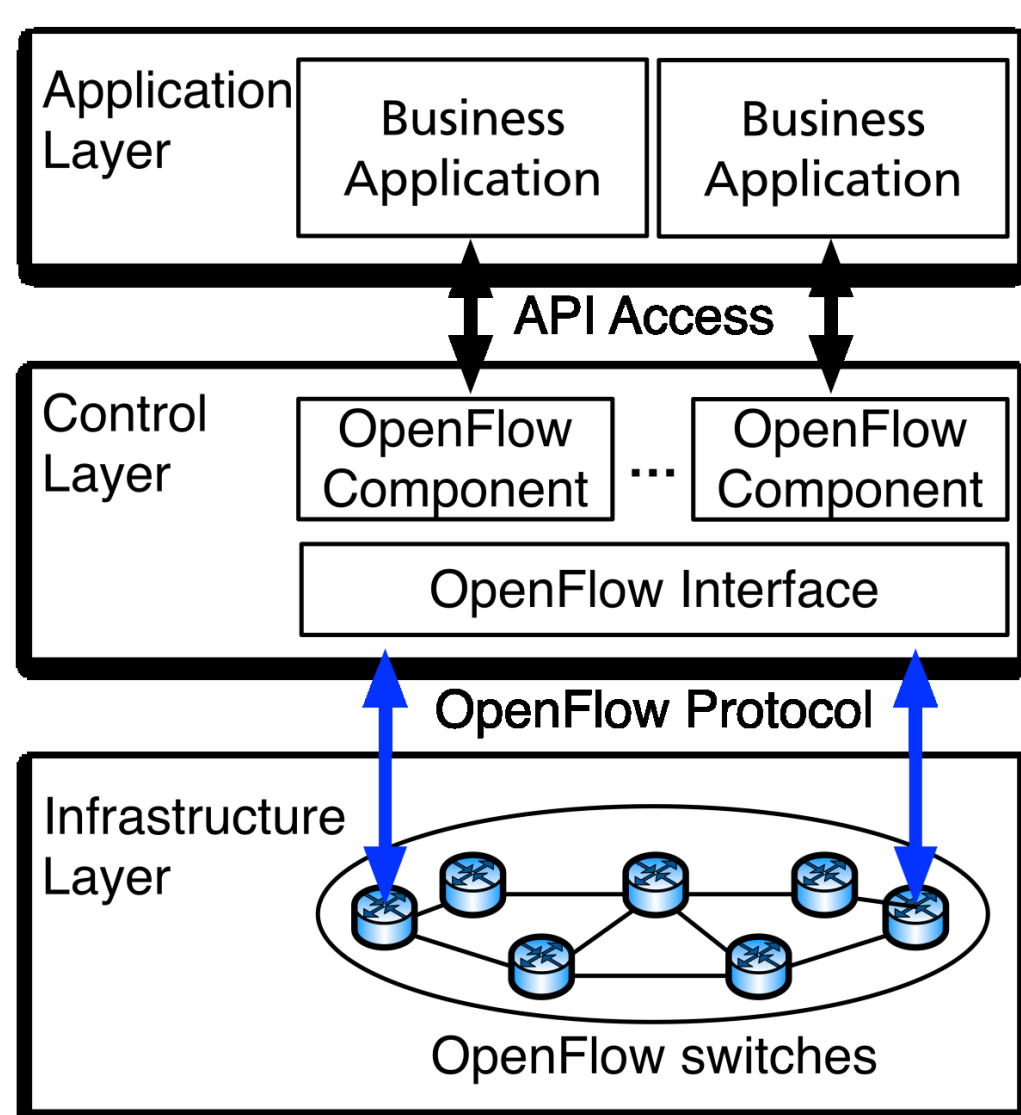TECHNISCHE
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Motivation

SDN-based Network Management

- New possibilities enabled by SDN
- Reduce OPEX through automation
- Increased flexibility

Application-controlled NMS (ANMS)

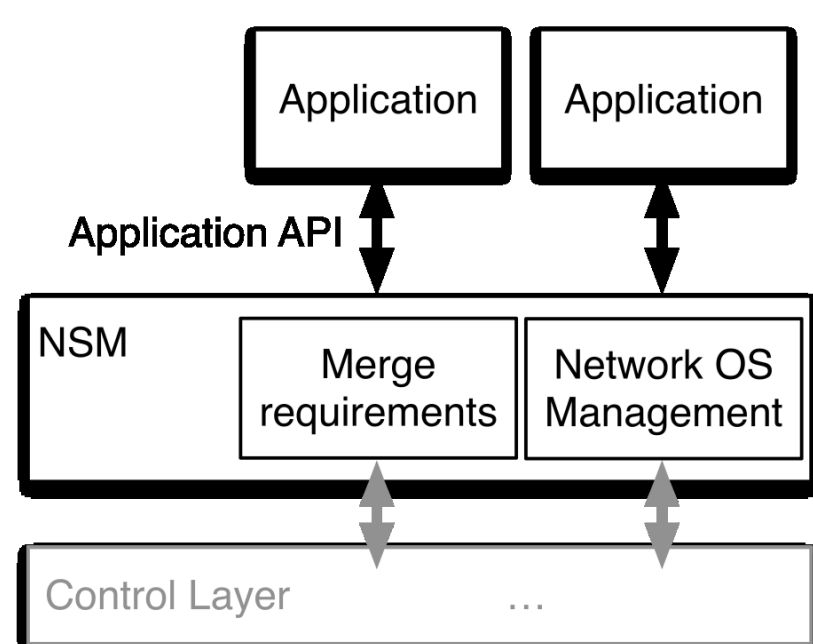- Applications to specify their requirements directly to the NMS

Requirements for ANMS

Application Interface

- Generic and agnostic of topology, size of network

Predictable performance and resource consumption

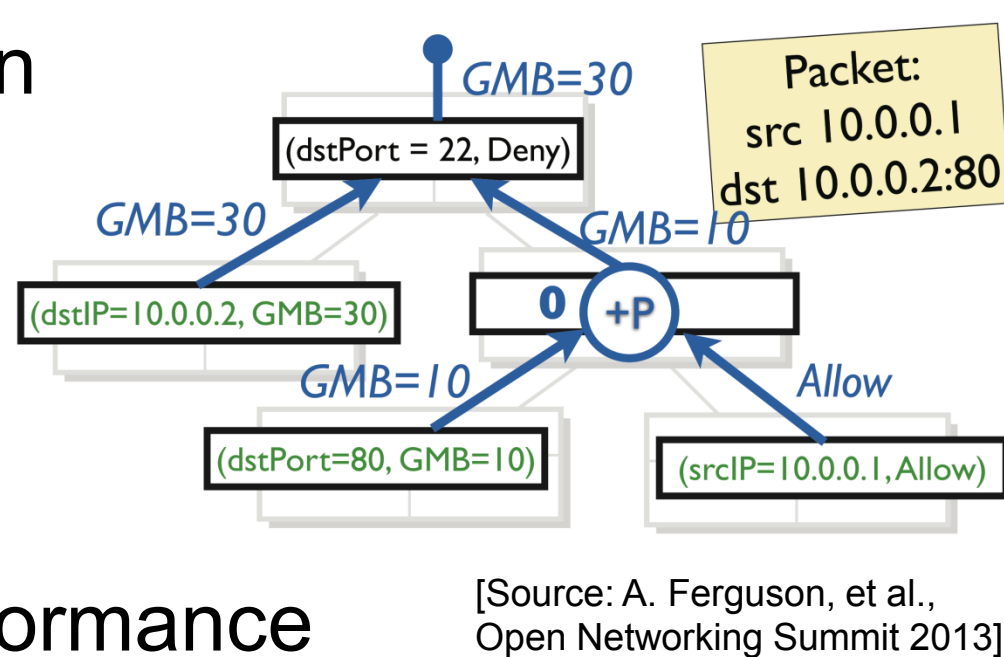- In both, control plane and data plane

Related Work

Participatory Networking (PANE [1])

- Policy conflict resolution
- Compiles n policies to O(n²) OF rules

Similar Areas

- Autonomic networking
- SDN control plane performance

[Source: A. Ferguson, et al., Open Networking Summit 2013]

References

[1] A. D. Ferguson, C. Liang, R. Fonseca, Participatory Networking: An API for Application Control of SDNs. ACM SIGCOMM 2013.

[2] J. Rückert, J. Blendin, D. Hausheer: RASP: Using OpenFlow to Push Overlay Streams into the Underlay. IEEE P2P, Demo Paper, September 2013.

[3] J. Rückert, J. Blendin, D. Hausheer: Software-Defined Multicast for Over-the-Top and Overlay-based Live Streaming in ISP Networks. JNSM Special Issue on Management of SDN, December 2014.

[4] J. C. Mogul, A. Auyoung, S. Banerjee, L. Popa, J. Lee, J. Mudigonda, P. Sharma, Y. Turner, Corybantic: Towards the Modular Composition of SDN Control Programs. ACM HotNets 2013.

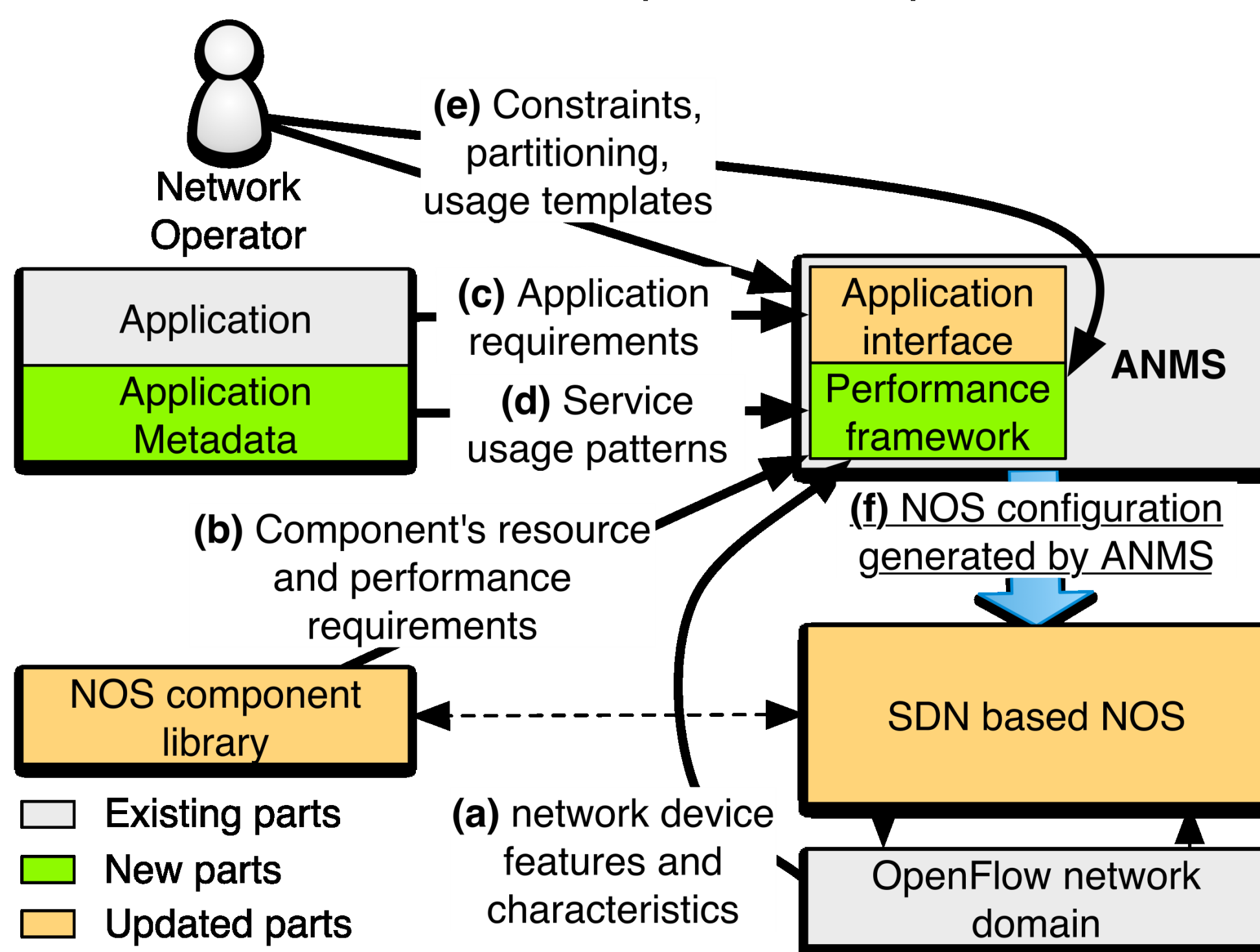## Acknowledgement
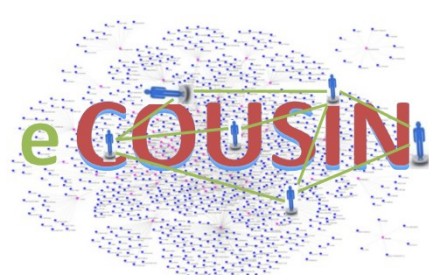
Performance Framework

Approach

- Complementary to PANE
- Based on a component-based Network Operating System (NOS), e.g. Corybantic [4]
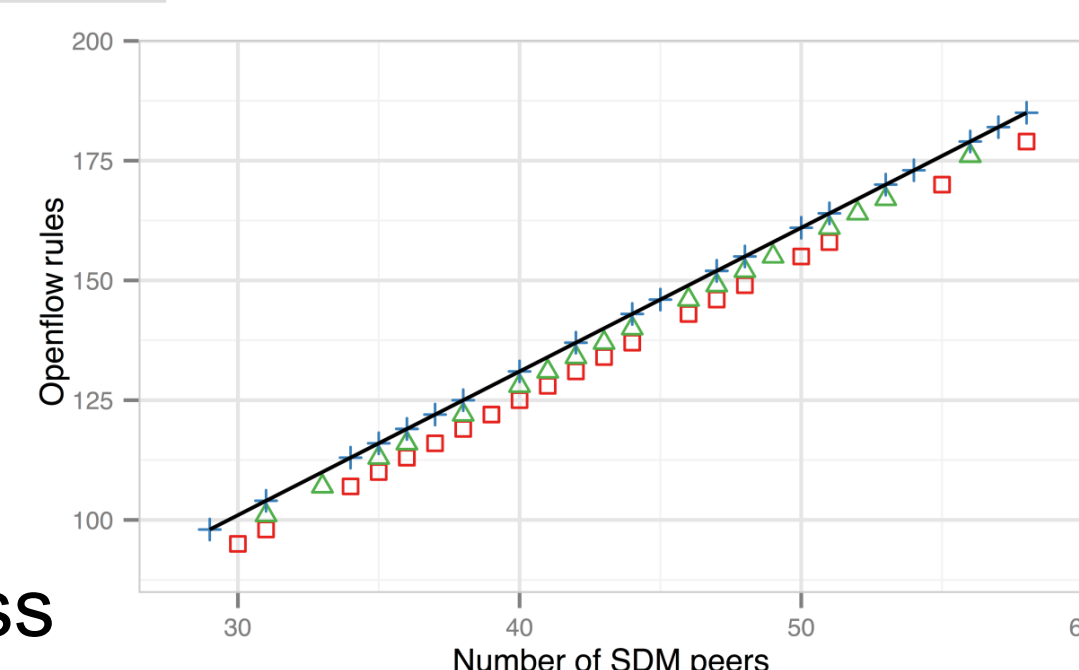- Based on OpenFlow

Goal

- Model, measure, and match resource requirements and available resources
- Enable ANMS to deliver predictable performance

Preliminary Conclusion

First Results

- Development of Software Defined Multicast (SDM) [2,3]
  - High-level API
  - Resource awareness is important

Next Steps

- Apply a multicast use case on ANMS with SDM as an example component
- Create a network operator API

Contact

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