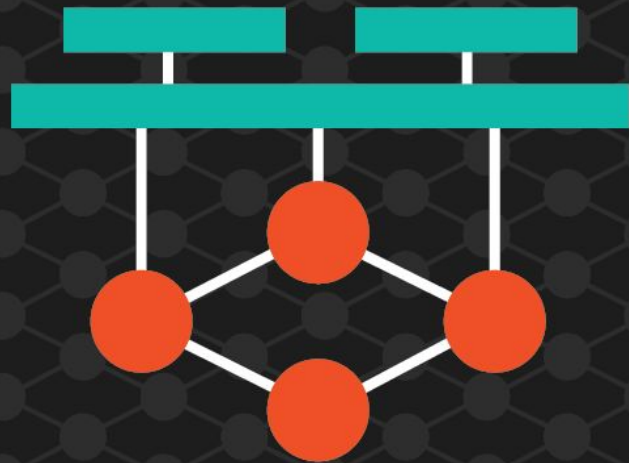


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Dynamic On-Demand QoS

A Practical Approach to Intent-Based Networking



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The Arqueopterix Project

- Objective: Improve user experience in interactive video applications
- Technologies
 - Dynamic On-Demand QoS
 - Q4S: Real time e2e Quality Monitoring
 - Logarithmical Hopping Encoder (Ultra Fast Video encoder/decoder)


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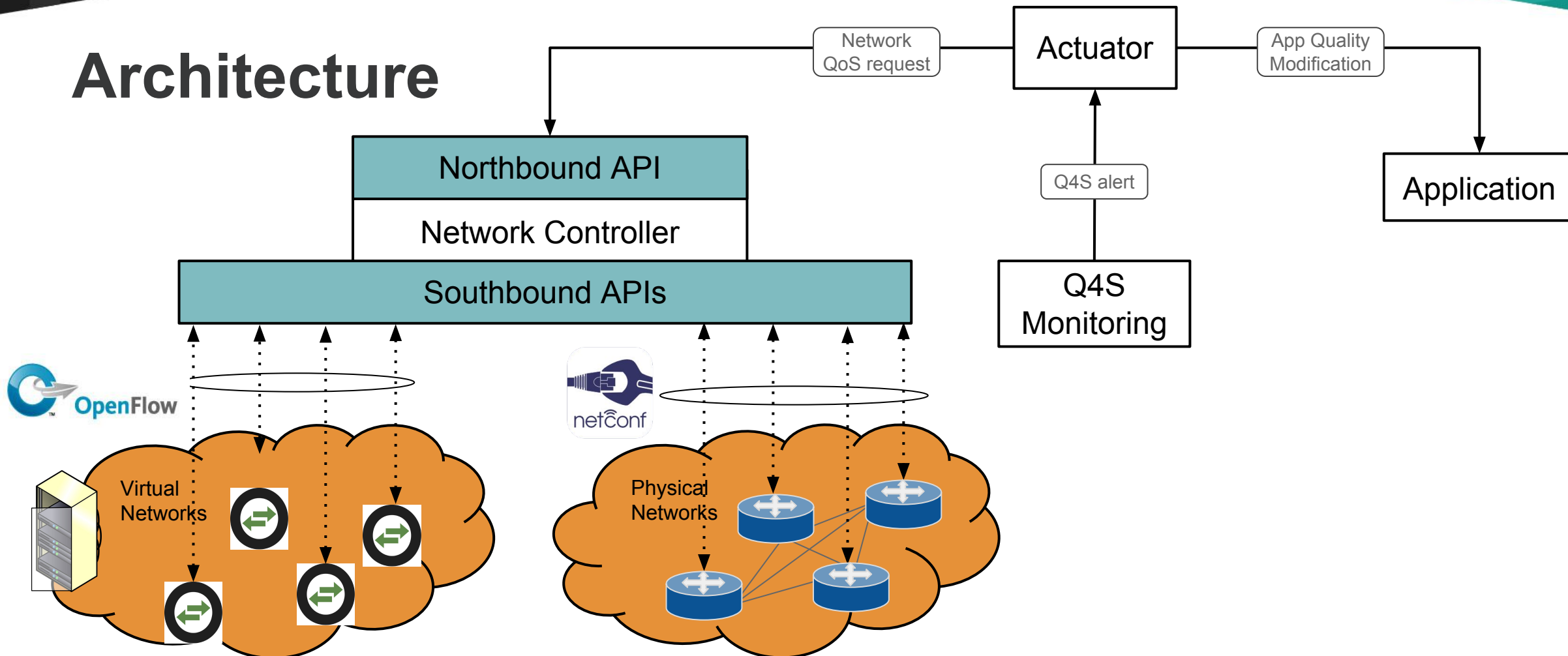

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Architecture





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Dynamic On-Demand QoS

- SDN: enabler for Dynamic QoS
- sub-second response to a QoS Requests
- Flow level QoS Requests
- Billing and Accounting Impact



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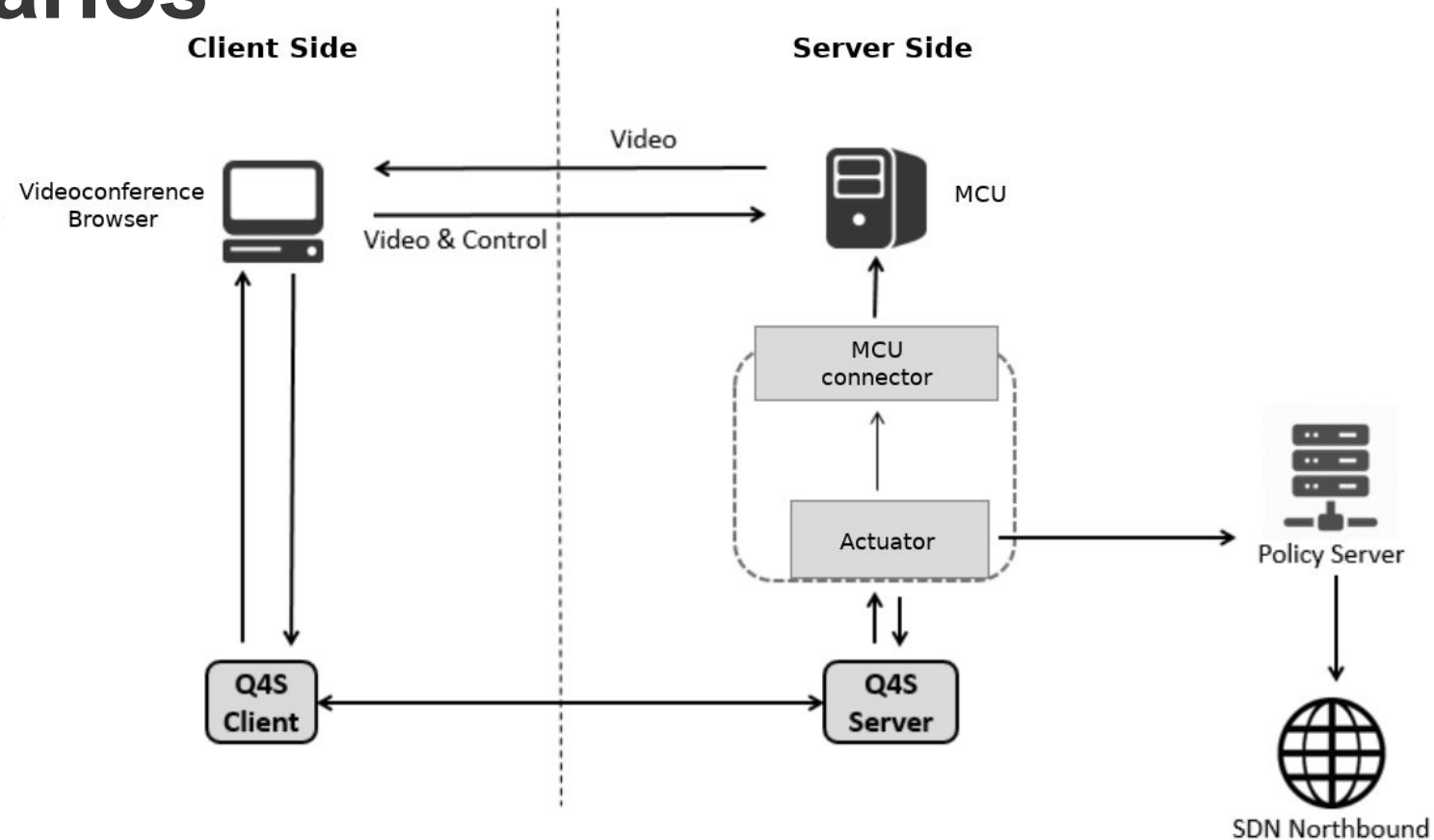
Dynamic **On-Demand** QoS

- Northbound API to request QoS
- Request Originator: Client vs OTT Provider
- Billing and Accounting Impact



Use Cases & Scenarios

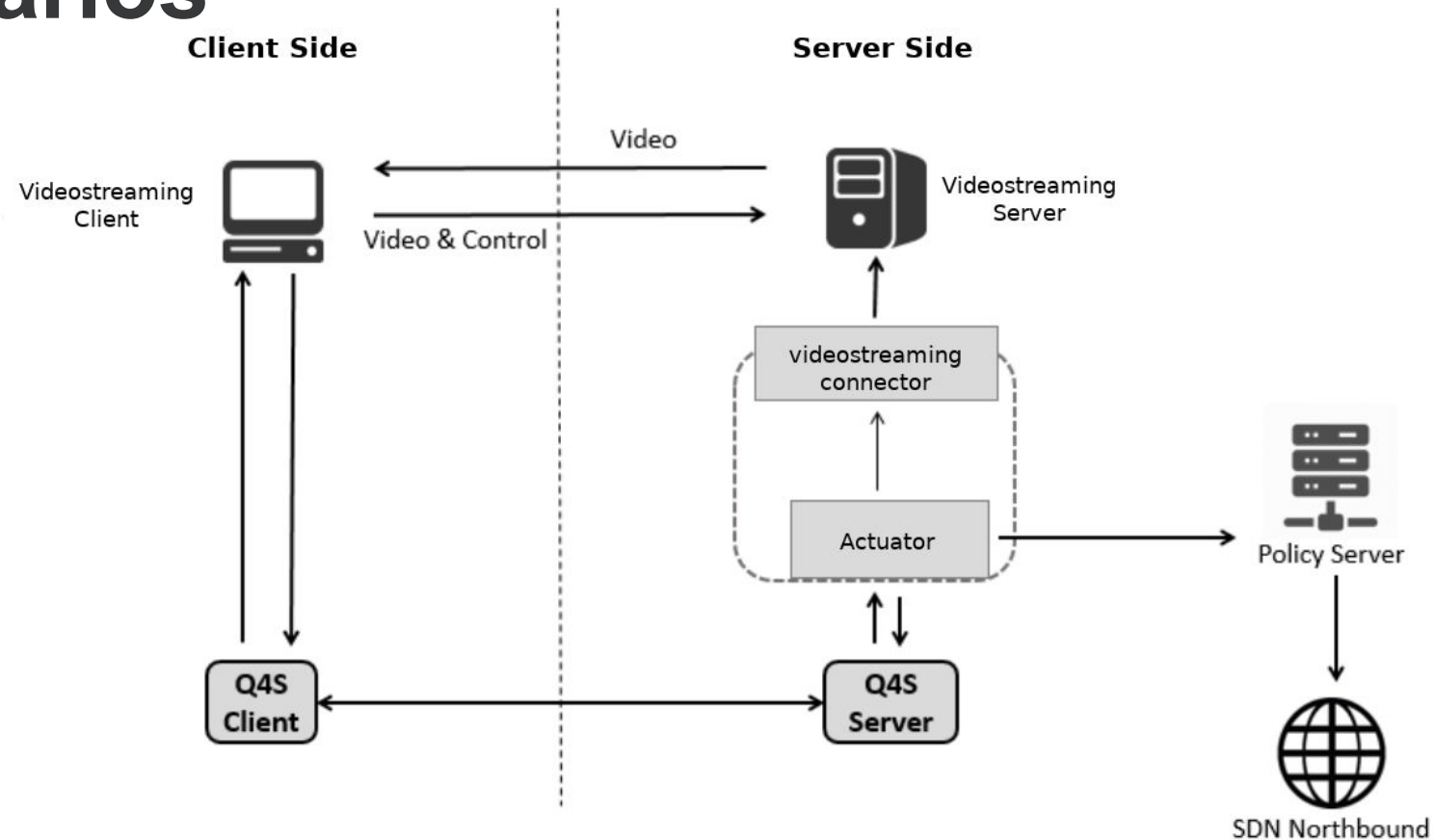
- Video Conference





Use Cases & Scenarios

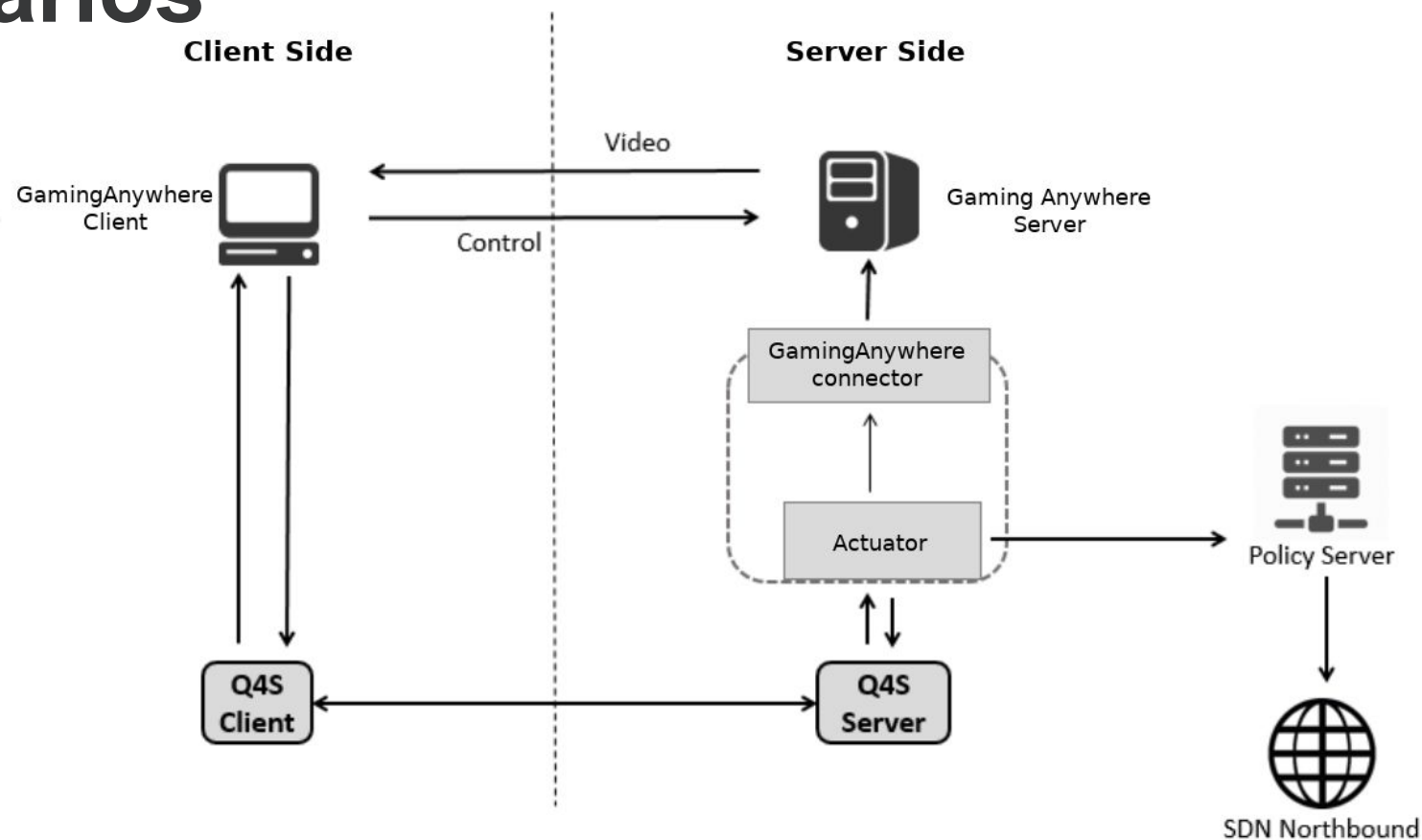
- Video Streaming





Use Cases & Scenarios

- Cloud Gaming





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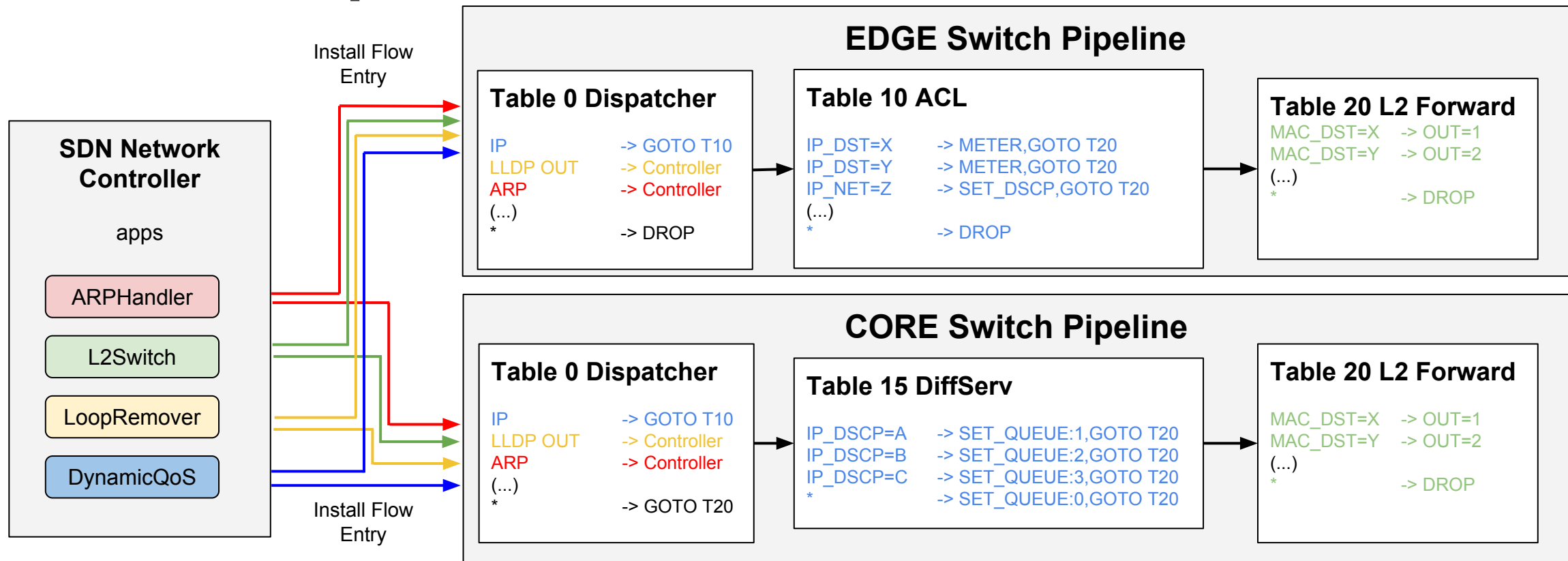


QoS with OpenFlow 1.3

- Multiple tables and pipelining to support independent SDN applications
- Scalability through packet marking @edge and Traffic Class Queueing @core
- Traffic Shaping through OF Meters @edge



QoS with OpenFlow 1.3





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Northbound QoS API

- Simple requests answering two questions:
 - What do we need?
 - Differentiated services
 - Which traffic should be treated differently?
 - Flow-application granularity (match by IP, transport protocol, port ...)



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Northbound QoS API

- QoS petitioners don't know about network topology nor hardware capabilities.
- SDN controller maps QoS request into low-level QoS commands:
 - OpenFlow 1.3 rules
 - Netconf requests



Northbound QoS API

- HTTP REST API: [OpenAPI Definition](#)
- Intent-Based: High Abstraction Level
 - Flow-level resolution
 - Service level defined as a single integer

Pros	Cons
Network Technology independency	Accounting and Billing for QoS
Simple QoS Requests: Give me more/less Quality	Cannot set detailed QoS Requirements in Request