SplitArchitecture – Applying Software Defined Networking concept to carrier networks

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Outline.

1. Motivation
2. Concept of Software Defined Networking
3. SplitArchitecture
4. Conclusion

Complexity in network operation increases, while evolution of network technologies continues to accelerate.

Demands on network operation

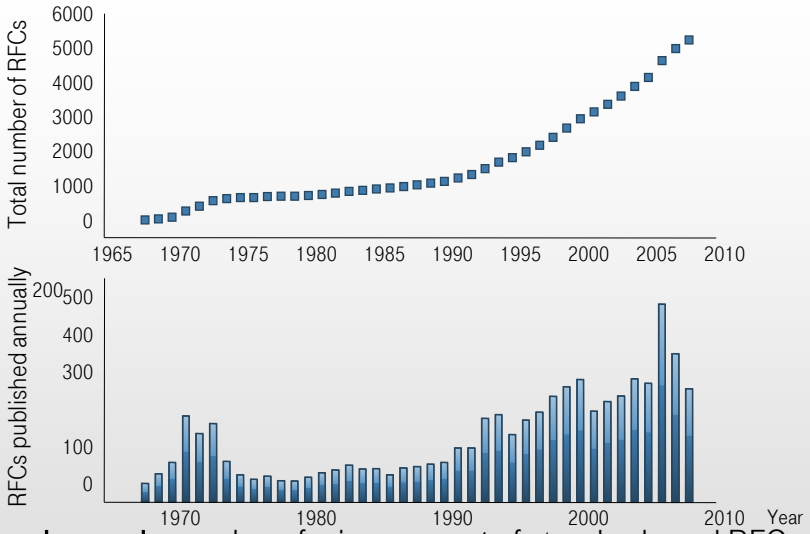
The **threats** on network operation

- **Internet traffic growth still** at 50% per year
- **Support of new services** like VoIP, IPTV
- **Multiple migration / evolution paths of technologies** with involvement of different organisations

The **consequences** for network operation

- Continuous **exchange of network devices** with increasing forwarding capacities
- Continuous **migration** of existing platforms
- Continuous **adoption of IT** and related OSS/BSS interfaces

Increase of complexity



- **Increasing** and confusing **amount** of standards and RFC
- Huge amount of **patches** for Security, QoS, MPLS, Demarcation etc.

Demand to understand interdependencies and to reduce complexity in network operation

Learn from application services of OTT service providers: Centralized generic processing platforms and open APIs.

Generic processing platforms

- OTT service providers host services in data centres
- Data centres are build based on general purpose storage and processing hardware
- In contrast, traditional network elements are based on high-performance specialized hardware

API

- Application services could be based on programmable interfaces (API)
- API could be used by various application services from different providers
- Network services could be modified by network operator intervention only

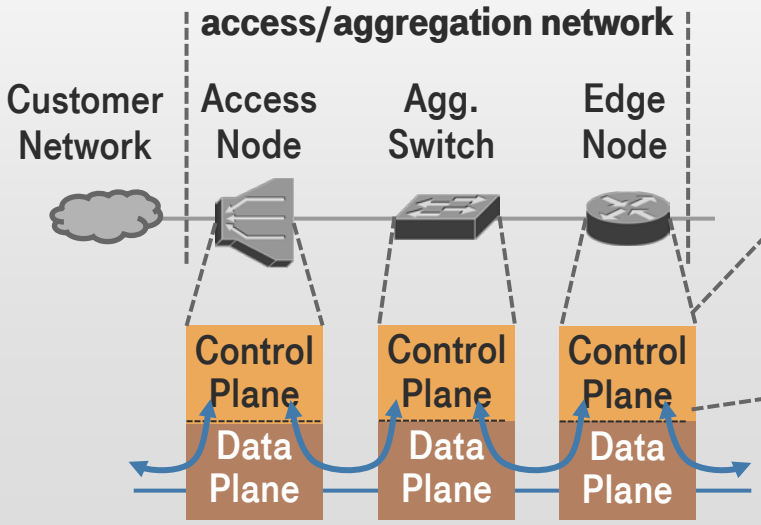
Leverage advantages of generic processing platforms and APIs

The Software Defined Networking concept* is a new approach for operation and management of networks.

Today's typical design concept

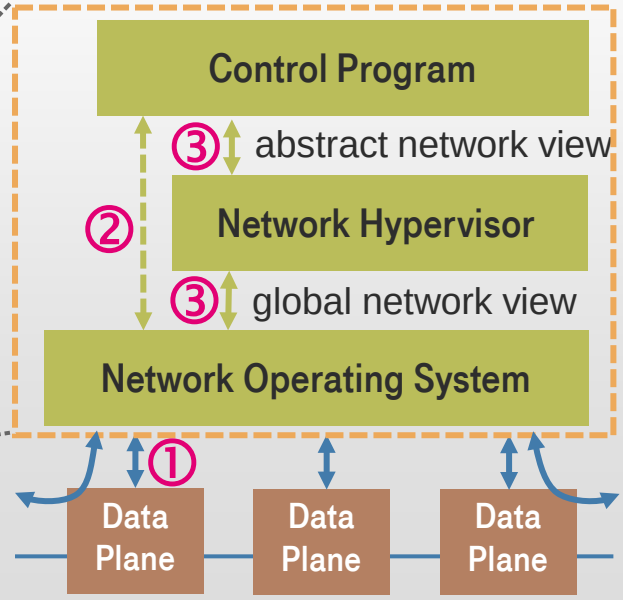
Three important aspects

- Constrained forwarding model
- Distributed state of network & customer information
- Manifold configuration aspects



Software Defined Networking*

- Split 1: Data and control plane
- Split 2: Network operation system & control program
- Split 3: Abstraction



* SDN concept defined by Scott Shenker

OpenFlow is a first step to enable SDN.

OpenFlow

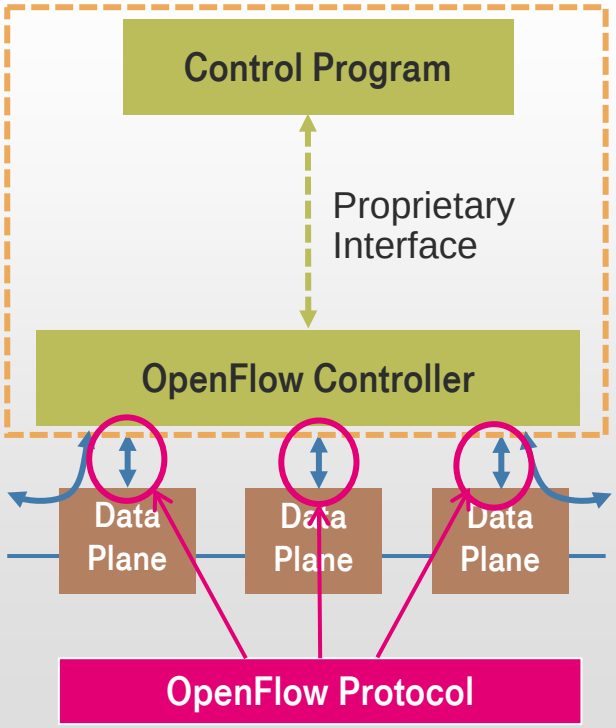
Initial development organized by Stanford University

Initial approach:

- Ethernet based
- Layer 2-4
- Rule set
- Pipeline approach
- Limited abstraction
- Extensible

Since last summer activities organized by Open Networking Foundation

Concept



A first carrier grade approach of the SDN concept: SplitArchitecture.

SplitArchitecture

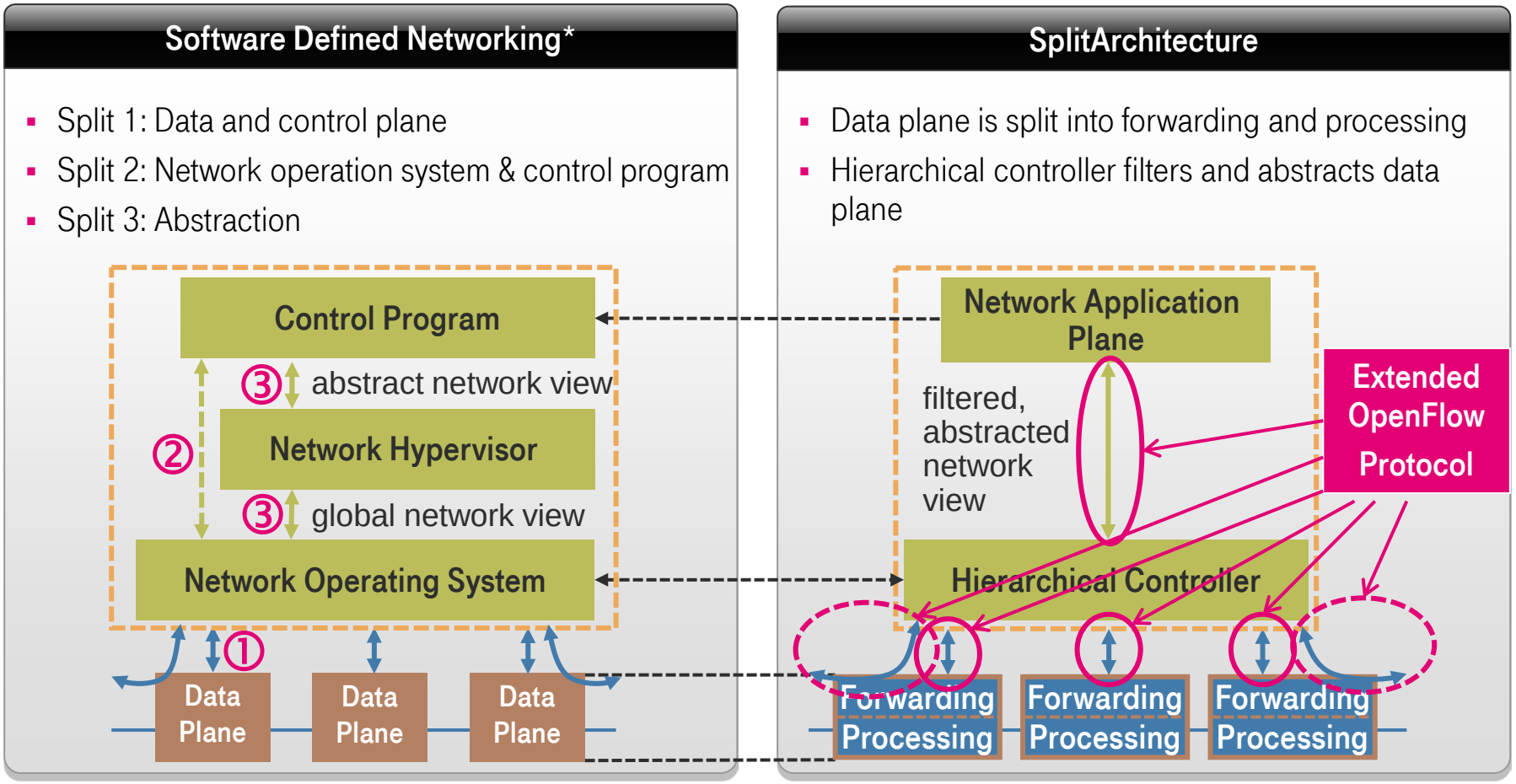
SplitArchitecture is an architecture concept and the full name of an European research project “SPARC”

Starting point: Initial definition of OpenFlow

Extension under investigation for carrier-grade approach

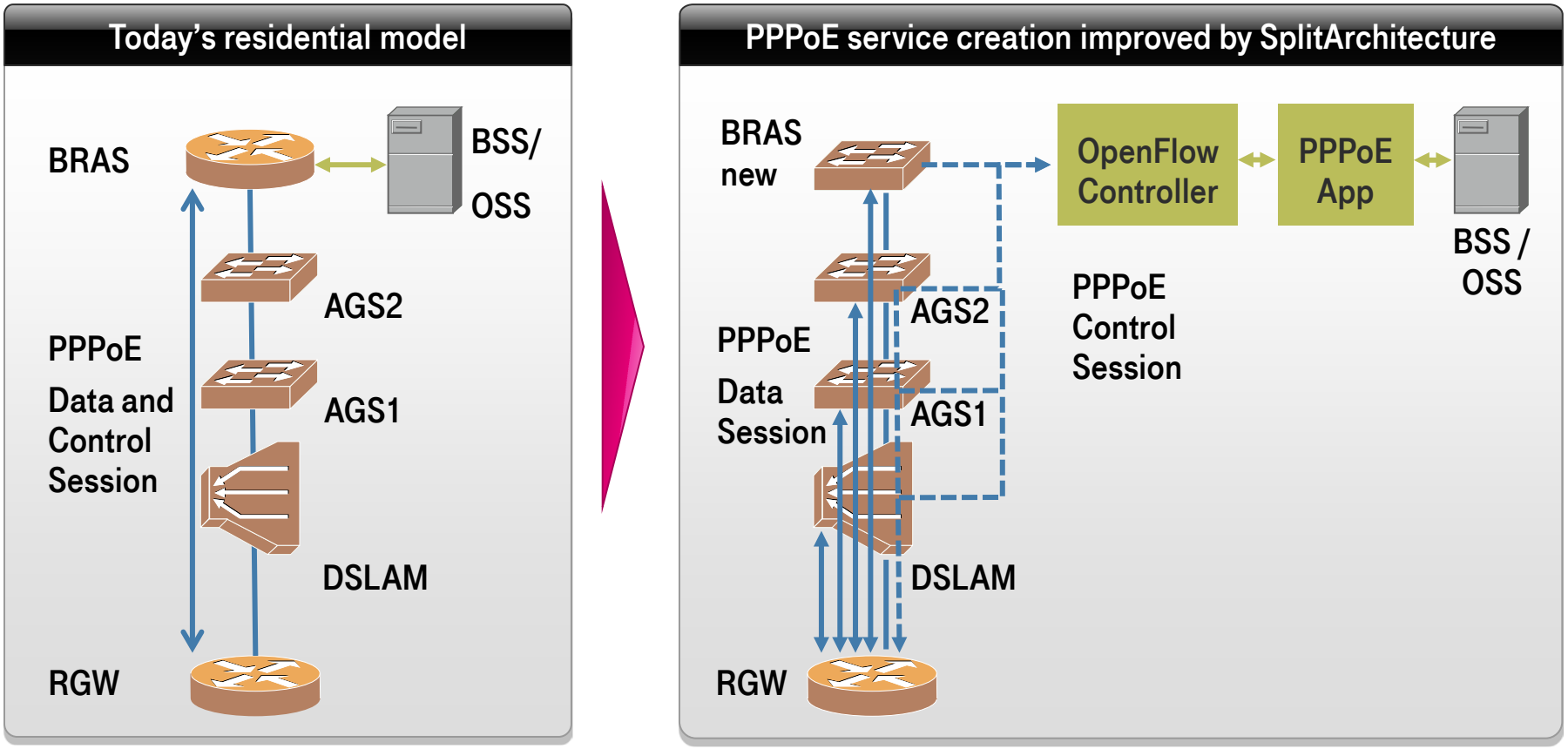
- MPLS support
- IPv6
- Service creation
- Restoration and resiliency
- etc.

SplitArchitecture extends the SDN concept with abstraction layer and split between forwarding and processing.



* SDN concept based on Scott Shenker

Example: Service creation based on PPPoE.



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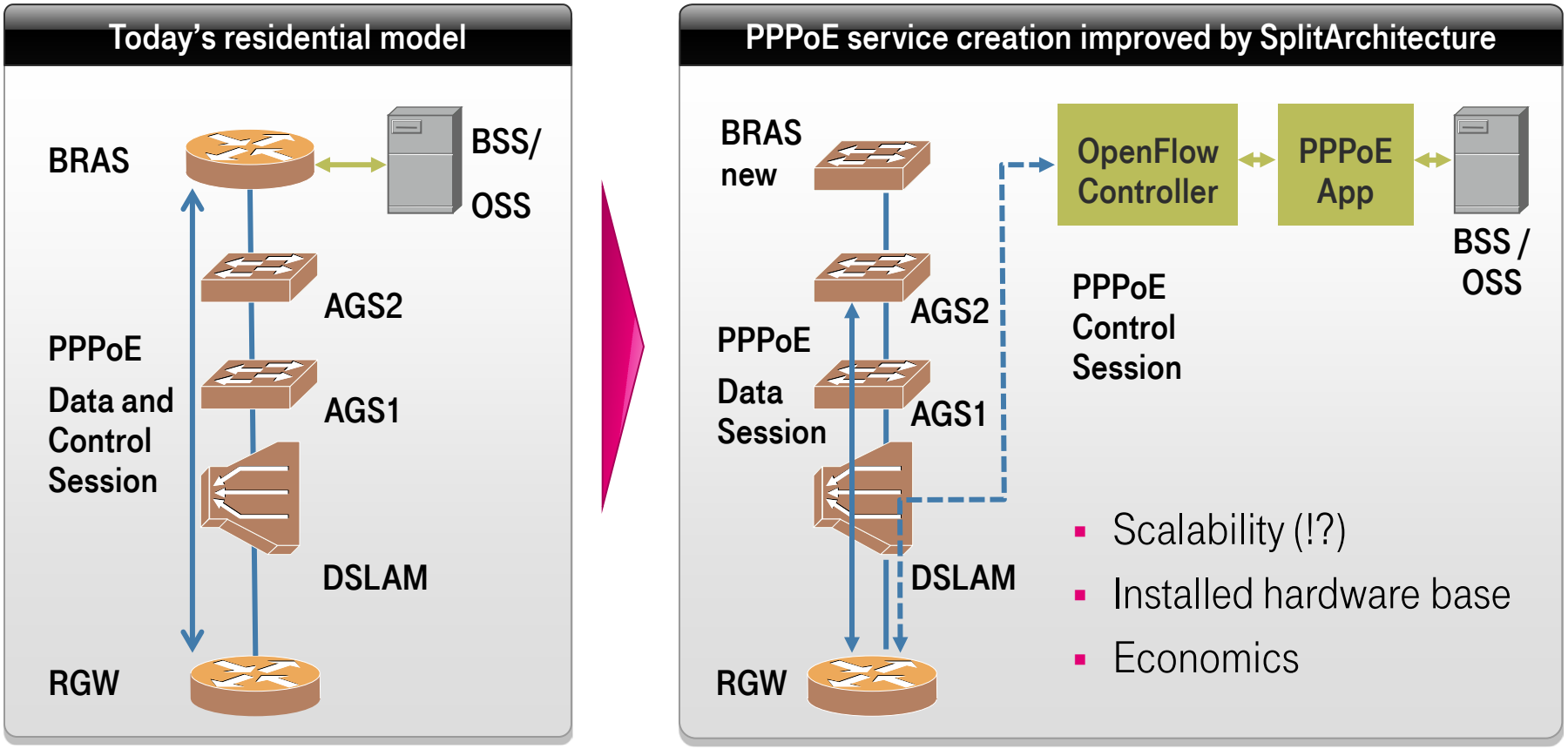

Numerous deployment options require careful analysis !

Conclusion and outlook.

Conclusion

- First generic concept: Software Defined Networking
- OpenFlow is a basic approach with first implementations
- Open Networking Foundation will develop further

- SplitArchitecture
  - Initial approach to develop a carrier-grade SDN
  - Concept / architecture
  - Proof-of concept of basic functions

Next steps

SDN and OF

- Standardization
- Extensions of data and control plane
- Specification of “advanced” interfaces

SplitArchitecture

- Scalability analysis
- Revised architecture
- Additional service creation concepts

More Information

WTC2012 workshop 2 (Wednesday): Software Defined Networks and OpenFlow

Project SPARC: http://www.fp7-sparc.eu

Thank you!

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