



coevolve™

WAN SUMMIT

# SDN, SD-WAN, NFV, VNF – I'm confused!

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# Introduction to Coevolve

Coevolve was established in 2014 to help drive enterprise adoption of next-generation networking technologies such as SD-WAN. We currently provide services to global enterprises in more than 42 countries on six continents



## Our services:

- Professional services and ongoing management services in a range of network-related practice areas
- Integrate best of breed vendors and services for our clients



## Our target market:

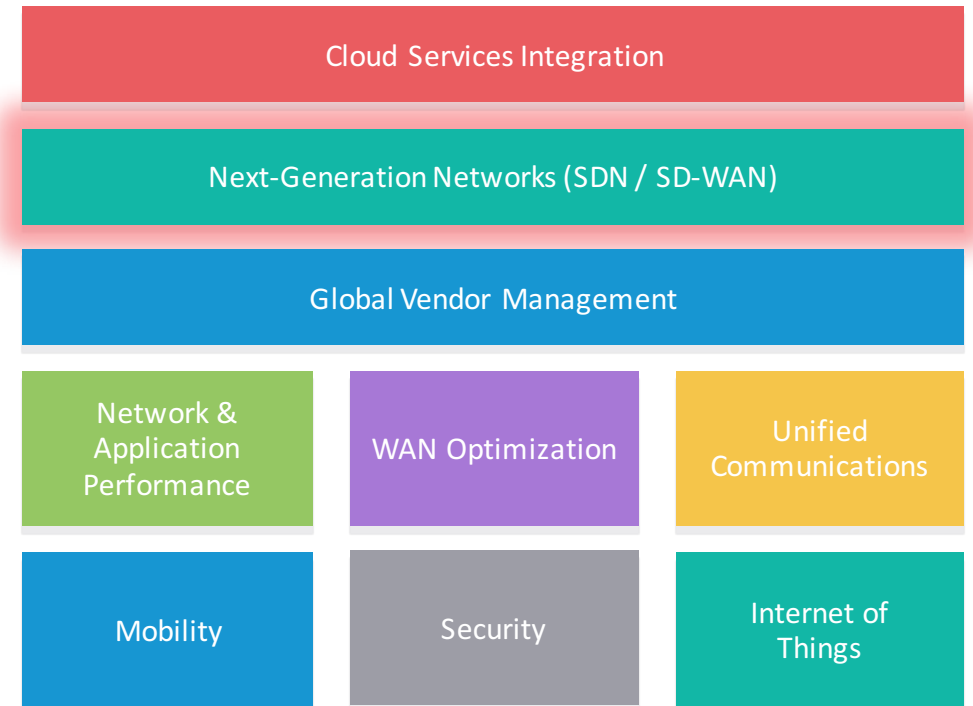
- We work directly with enterprise clients and as a specialist partner sitting behind channel partners playing a pivotal role in the SD-WAN ecosystem
- Key industry verticals: Professional Services, Manufacturing, Technology, Engineering, Construction, Mining, Logistics, Retail



## Our team:

- Experienced team based in US, Australia, Singapore & Malaysia
- Extensive global contractor network
- Enterprise network experience gained at global service providers, integrators, consulting firms, vendors, analysts

## Our Practice Areas



# ABCs of SDN – where do we start?

*What does the acronym stand for?*

*What does it mean?*

SDN

Software-Defined  
Networking

Separating the **control and data planes** to create centrally-controlled, programmable networks

SD-WAN

Software-Defined Wide  
Area Network

Loosely applying SDN concepts to the WAN to create a **centrally-controlled overlay network** that intelligently uses a variety of infrastructure options

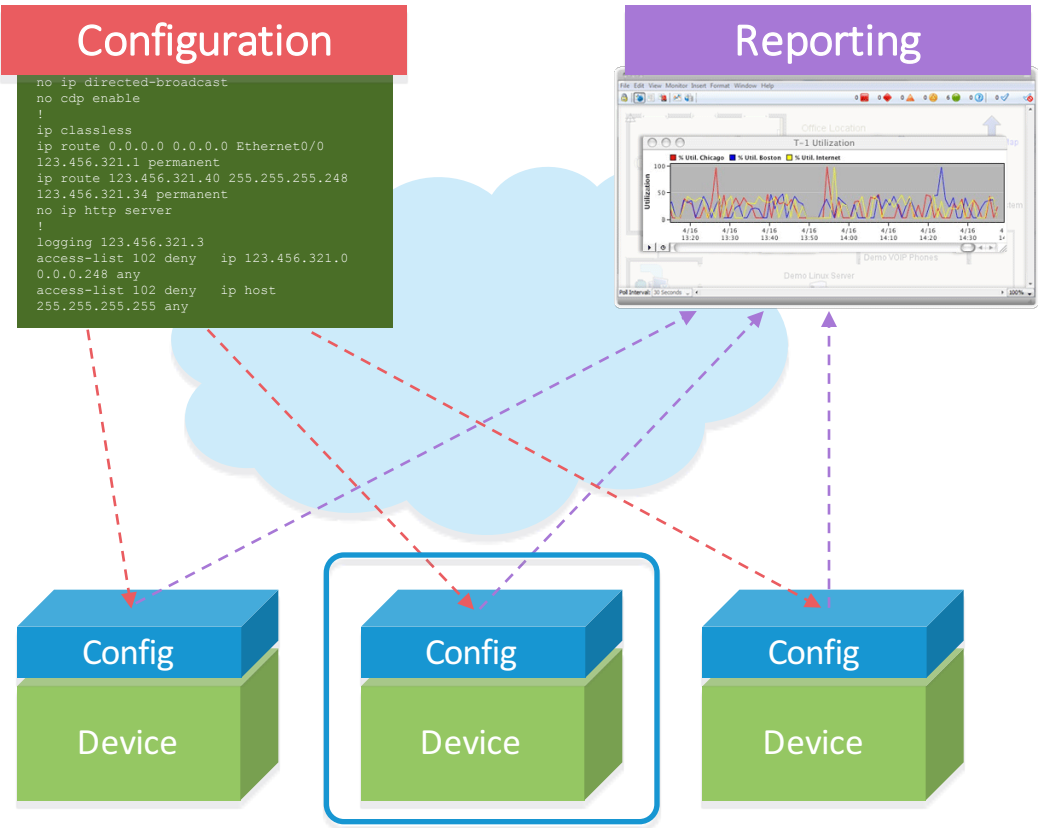
NFV / VNF

Network Function  
Virtualization / Virtual  
Network Function

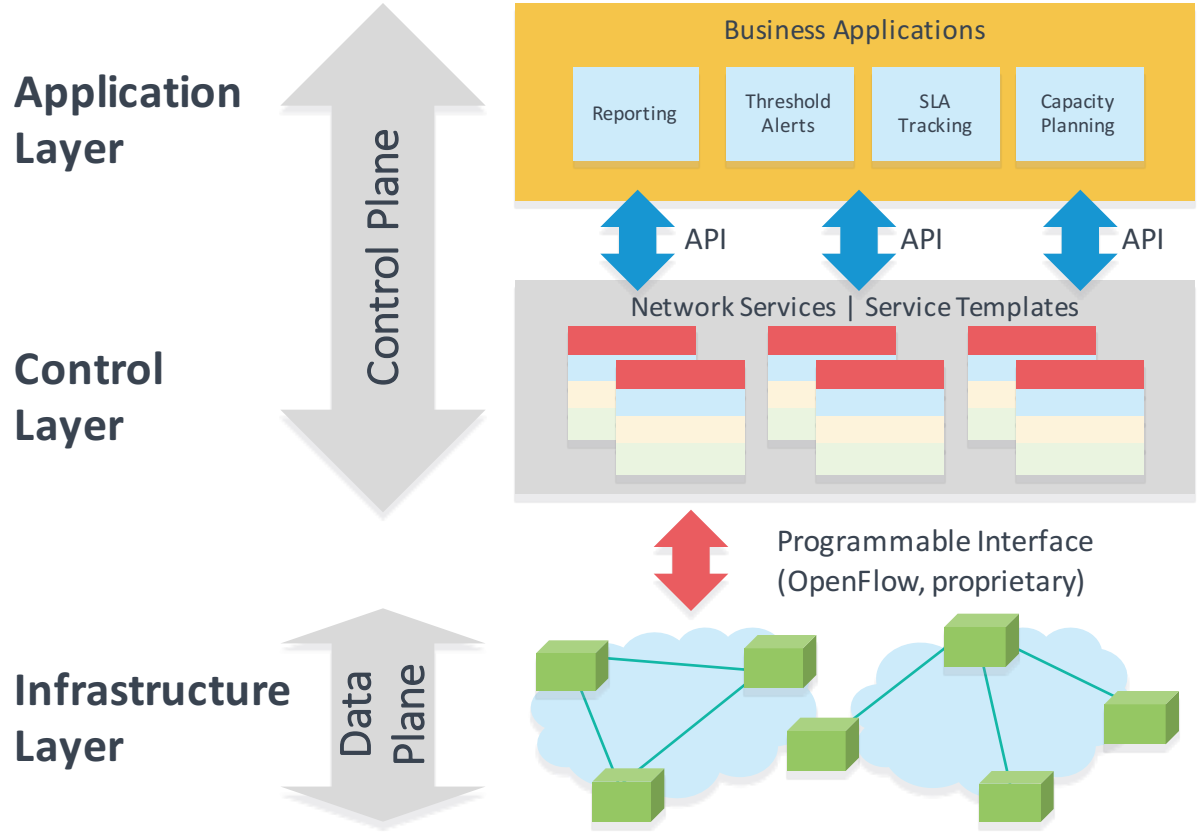
A Virtual Network Function is a **virtualized task** formerly performed on proprietary, dedicated hardware. NFV is the practice of utilizing VNFs

# What does SDN actually mean?

## Traditional networks – without SDN



## SDN-based networks



# Why separating the control and data planes matters

1. Transitions the architecture from being **device-centric** to **network-centric**

1.2. Creates the ability to **program** the network

1.3. Enables significant improvements in **control** and **visibility**

1.4. **Simplifies** the network – even as traffic flows become more complex

1.5. Facilitates the creation of **services** within the network

1.6. Establishes a framework to **virtualize** components of the network

# SDN is constantly in the news – but very little enterprise focus

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## How SDN Reduces Network Risks in Campus Settings

by Tim Kridel | Mar 22, 2017

Software defined networking (SDN) promises more agility, security and savings when it comes to managing campus infrastructure. But to maximize those benefits, IT departments first have to figure out where and how SDN addresses their organization's goals and pain points – a steep many overlook.

SDN replaces switching, security and other network hardware with software. This virtualization makes it quicker and easier to reconfigure the network for any number of reasons: to accommodate changing demand and use cases, for example, or to fend off cyber threats. In the process, SDN also can lay the foundation for automated configuration management, saving time and money by freeing the tech staff from manually changing dozens or hundreds of switches every time changes are required.

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## AT&T claims successful SDN controlled 400 GbE test

By Dan Meyer on MARCH 21, 2017 Software-defined networks (SDN)

AT&T noted successful first phase of SDN controlled testing sets the stage for faster Open ROADM trial and open router platform.

AT&T continued its push for greater software control over its network assets, announcing a successful trial of its 400 gigabit Ethernet data service guided by a software-defined networking controller.

The carrier said the trial, which is the first of a multiphase process, used a SDN controller to create a service along a 400 GbE connection between New York City and Washington, D.C. The trial then used software control to reroute the service along a second path to simulate the response to a network failure.

## VIRTUALIZATION & Cloud Review

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### Vodafone Picks Nuage for SDN Datacenter Virtualization

The Nuage Virtualized Service Platform provides policy-based automation across the datacenter and WAN.

By David Ramel | 03/16/2017

Nuage Networks, the software-defined networking (SDN) unit of Nokia, has been chosen to help telecom company Vodafone virtualize and link its global datacenters.

Nuage will lend its SDN expertise to Vodafone's "Project Ocean" cloud-centric initiative to transform its datacenter networks, with the help of another new-age technology, network functions virtualization

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- SDN/NFV-Centric Open Network Automation Platform Debuts

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## CenturyLink Advances Virtualized Network Gateway with SDN/NFV Platform

Carrier takes another step to fully virtualize its global network with next-generation technology.

By David Ramel | 03/23/2017

CenturyLink Inc. took another step in its effort to **fully virtualize** its global network with next-generation technology, yesterday announcing a deployment based on the Central Office Re-architected as a Datacenter (CORD) design.

**CORD** is an open community project targeting service providers that combines new-age technologies including software-defined networking (SDN) and

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## Google Giving Mobile Operators a Helping Hand with SDN, NFV

Web giant is building a next-gen networking platform for operators to run their services on.

By David Ramel | 03/09/2017

Google, an early proponent of software-defined networking (SDN) and network functions virtualization (NFV), is going to lend its new-age networking expertise to mobile operators.

Noting that mobile operators are designing next-generation networks based on some of same principles Google espouses for its own networking infrastructure – including SDN, NFV and **site reliability engineering** – the Web giant said it's supporting mobile networking efforts with multiple initiatives.

## Blog: AT&T approaches SDN tipping point

10 MAR 2017

**AUTHOR**  
Michael Carroll  
Michael doesn't want to admit that he has been a journalist and editor for close to 20 years covering a diverse set of subjects including shipping and shipbuilding, fixed and mobile telecoms, and motorcycling...More  
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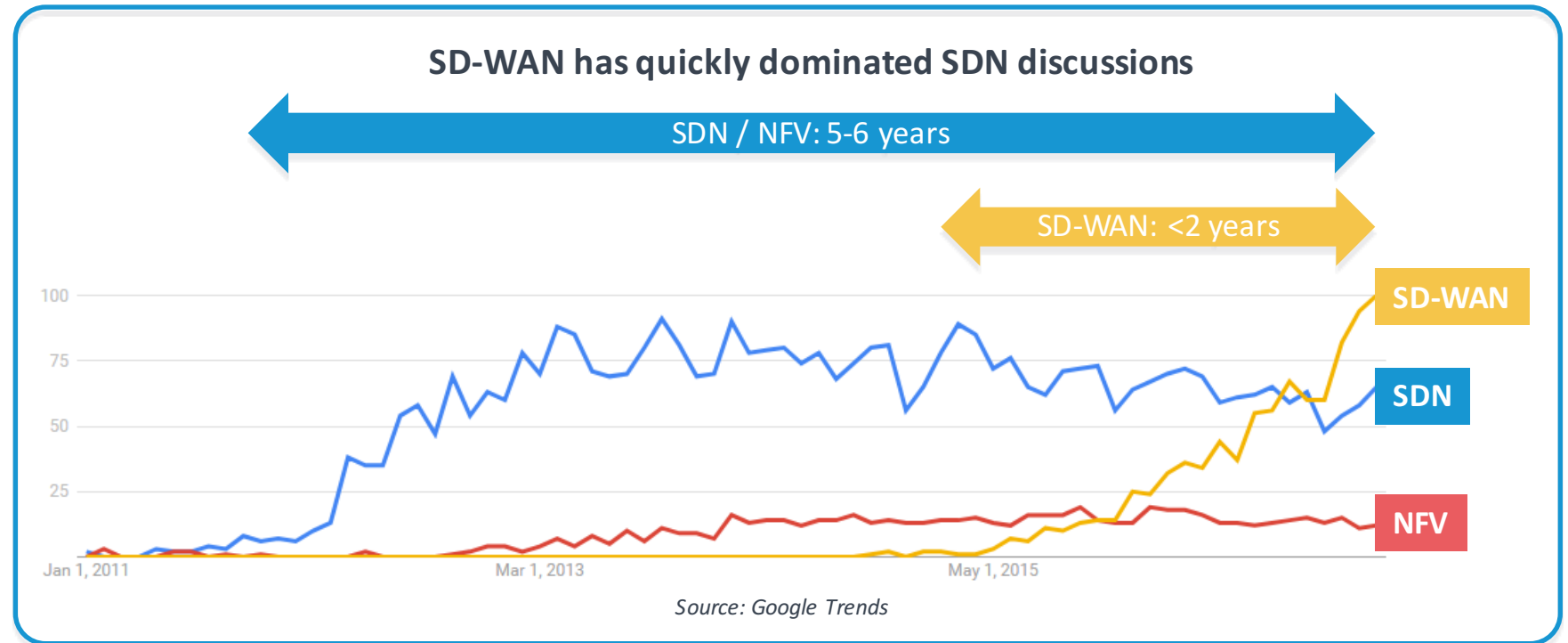
- Blog: China's spectrum auction plans come at a price

A key talking point identified by *Mobile World Live's* first annual industry survey, published in the run up to Mobile World Congress, was a split in opinions regarding the benefits of network virtualisation.

# Heard much about SD-WAN recently?

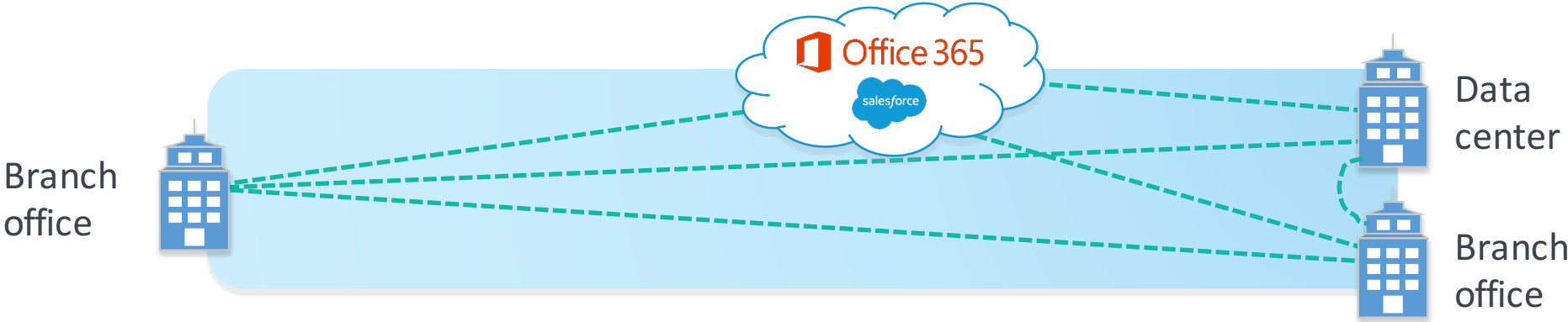
SD-WAN has quickly emerged as an easily accessible application of SDN that is relevant for the enterprise, not just in very large scale / carrier-like environments

- More than **\$500M in VC funding** in last 5 years
- More than **25 vendors** now claim to have SD-WAN products
- Existing vendors have **reinvented themselves** to focus on SD-WAN
- Several vendors claim deployments **in excess of 50,000 units**

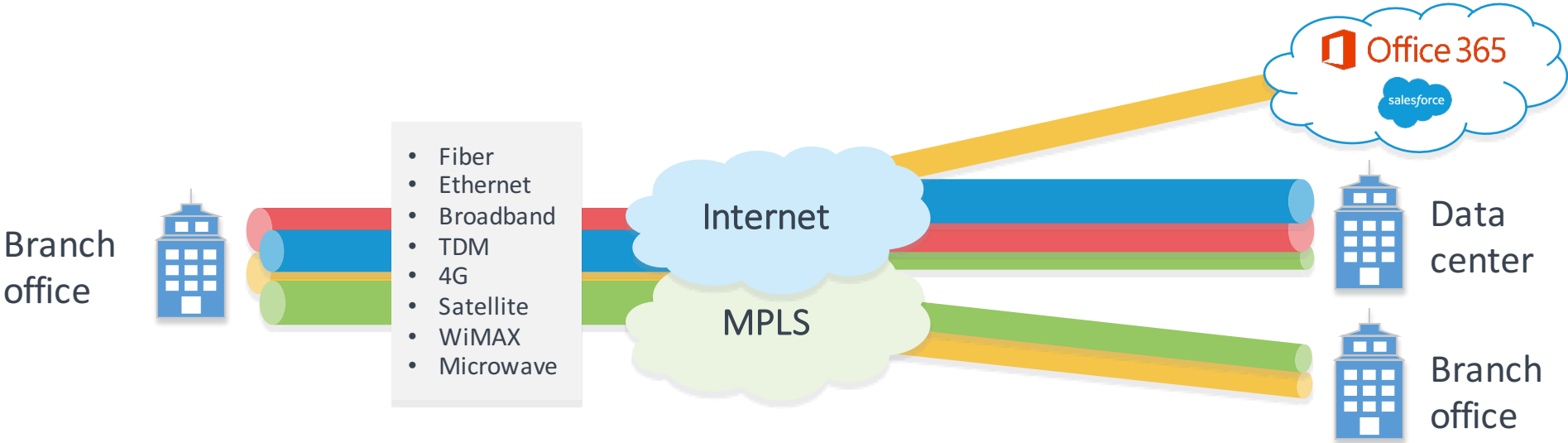


# SD-WAN: Overlay networks

Overlay



Infrastructure  
("Underlay")



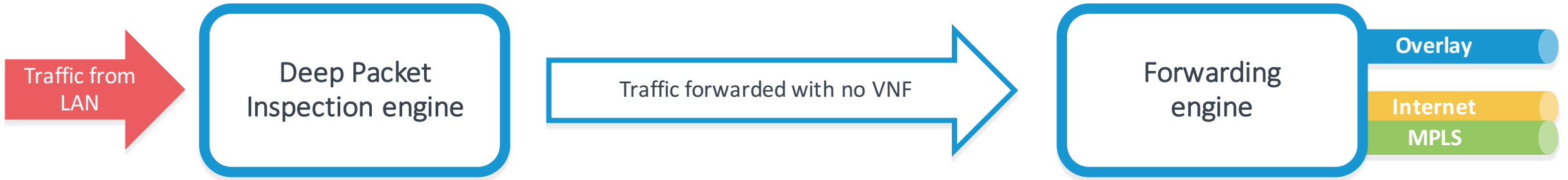


# What's driving enterprise interest in SD-WAN?

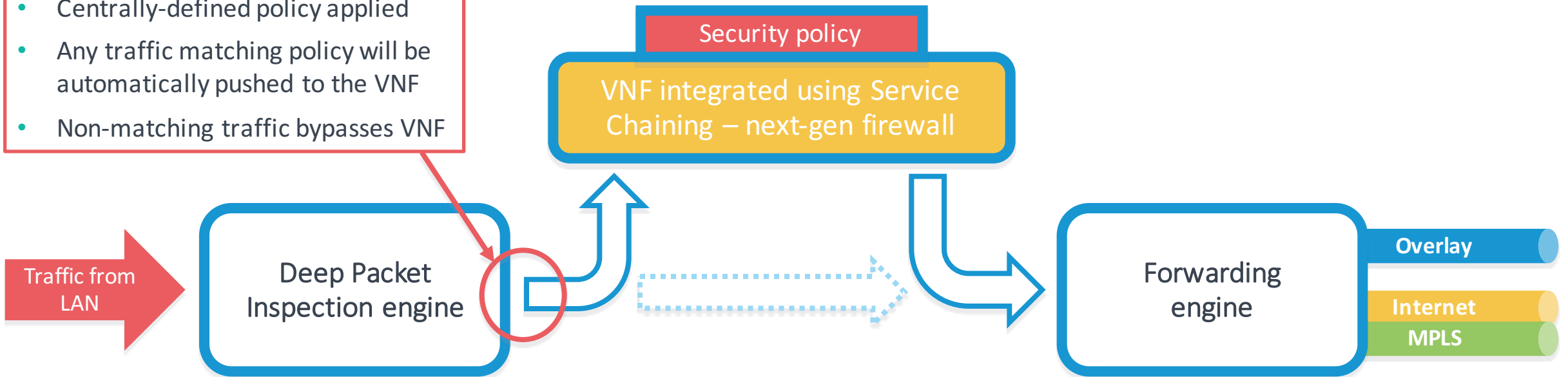
Many SD-WAN benefits come from better packaging! It's not all new. We hear the following drivers on a regular basis:

1. **Cost savings** from the ability to use low-cost Internet circuits for enterprise WAN
2. **Simplified, secure branch office connectivity** over any (and all) transport types
3. **No manual VPN key / certificate / IP address management**
4. **Transport agnostic, with the ability to intelligently use circuits simultaneously** without traditional PBR / ACLs / object tracking complexity
5. **Application-layer policies** and forwarding decisions
6. **Centralized configuration and management** of entire WAN
7. **Detailed insights** into path performance, application usage, top talkers, etc.

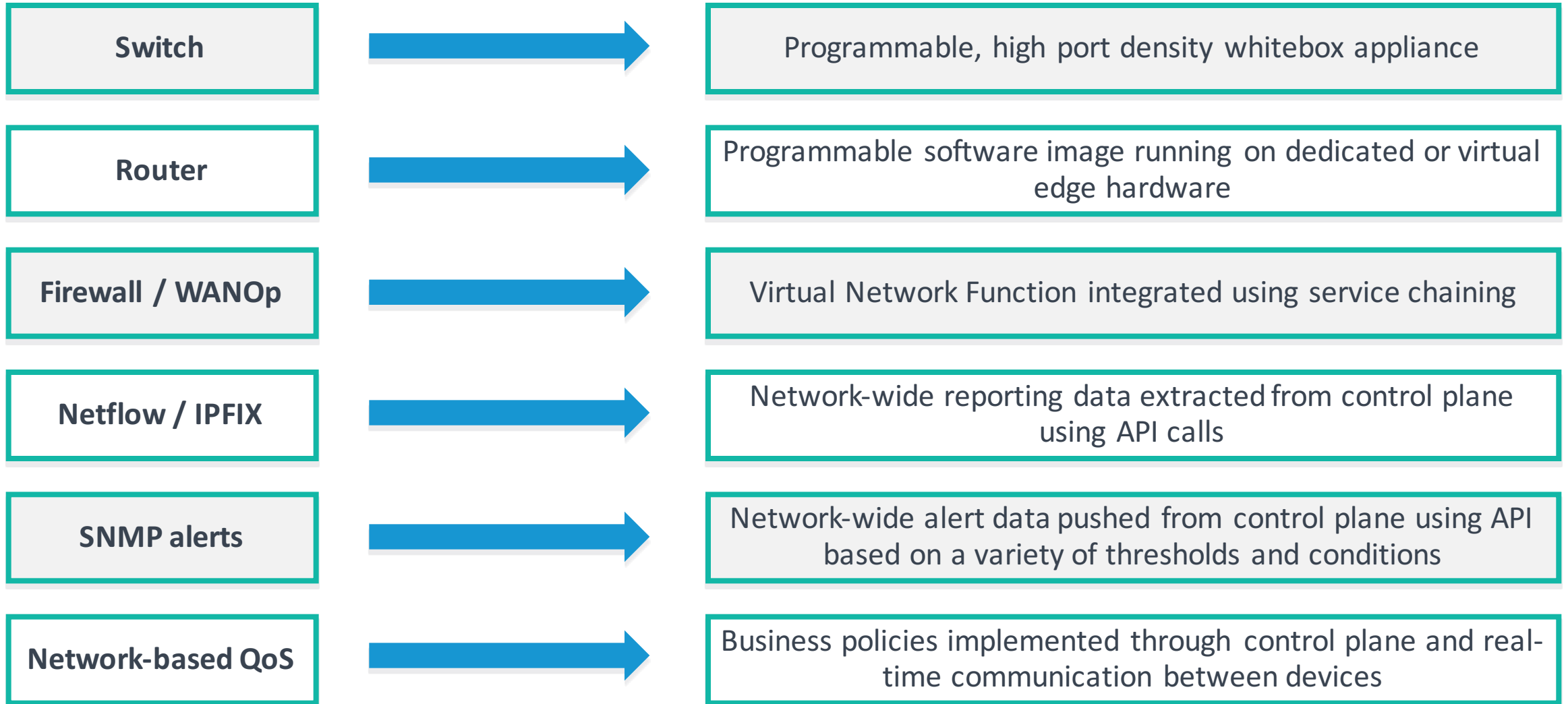
# VNFs and service chaining



- Centrally-defined policy applied
- Any traffic matching policy will be automatically pushed to the VNF
- Non-matching traffic bypasses VNF



# Old vs. new world of networking



# Conclusion

- SDN is driving significant changes in how networks are **architected, managed and updated**
- “True” SDN deployments have mostly been in carrier or very large enterprise environments where there is a return on the engineering investment
- SD-WAN has seen a **rapid increase in enterprise adoption** but is only loosely related to the textbook definition of SDN; it is delivering a different set of benefits in many cases
- Virtualization in the network is **long overdue** – it is one of the last components of the IT stack to see this change
- Network-based services will become **increasingly sophisticated** as enterprises adopt more SD-WAN at the edge, combined with other NFVs for common functions





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