Moving at the speed of software

SDN & NFV: driving the information-powered network operator

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make [transformation] possible

Moving at the speed of software

A challenging landscape for network operators

Business challenges

- OTTs own revenues, networks own costs
- Enterprises moving to ITaaS & cloud
- Trend toward on-demand & agile consumption

Operational challenges

- Supporting on-demand & agile consumption
- Reducing capex & opex growth
- Boosting monetization & accelerating innovation

For network operators

- Rivals in the value chain are software-powered
- Solutions to operational challenges lie in software

Moving at the speed of software is no longer optional

SDN & NFV: what are they really all about?

| Control Plane Data Plane | → | Control Plane | Information & Policy | Analytics | → | Decision Plane | SW |
| | | Data Plane | | | | Data Plane | HW |

A partial picture
- Move network control plane to software (SDN)
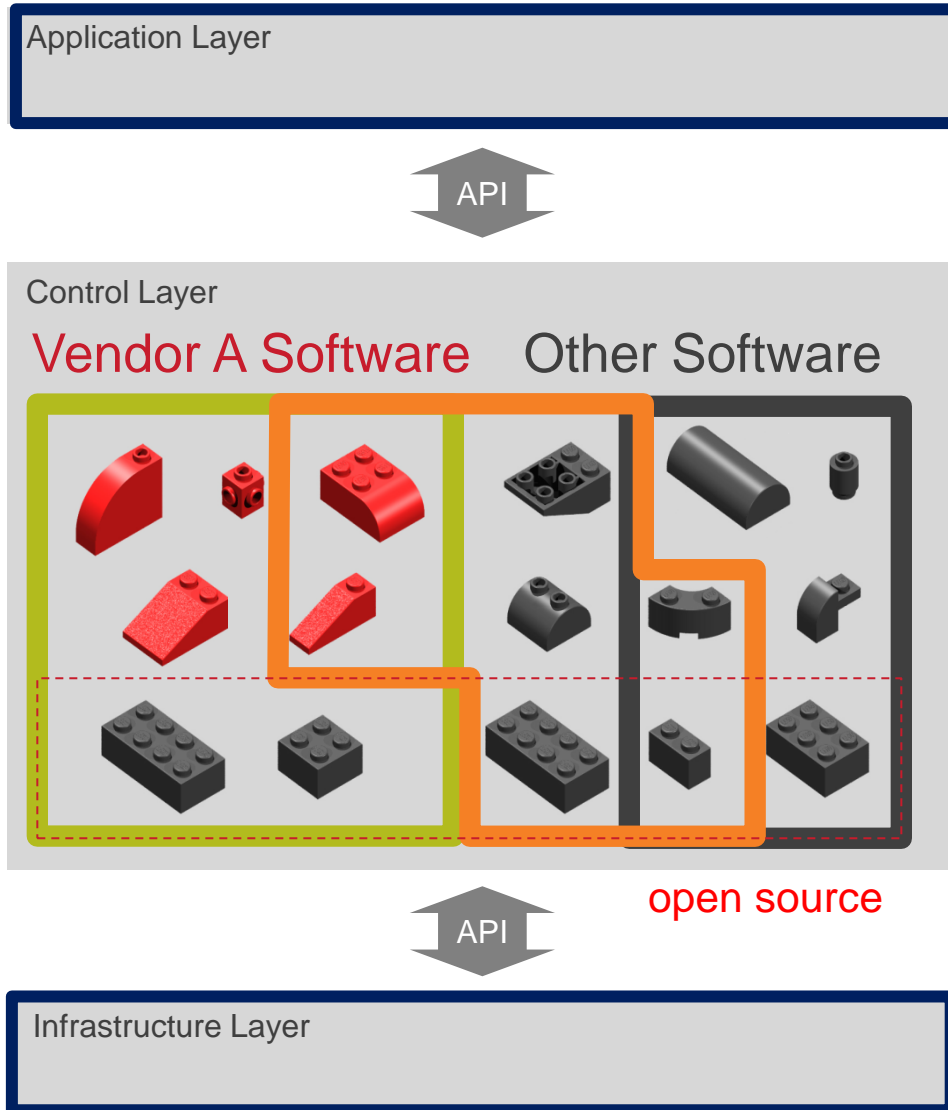- Shift data plane hardware to COTS (NFV)

The bigger picture
- Create an information-powered decision plane in software
- To drive a programmable data plane in hardware

Decision plane
- Heart of network business value creation
- Ecosystem-based innovation & operator differentiation require open system architectures

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Ecosystem not ego-systems:
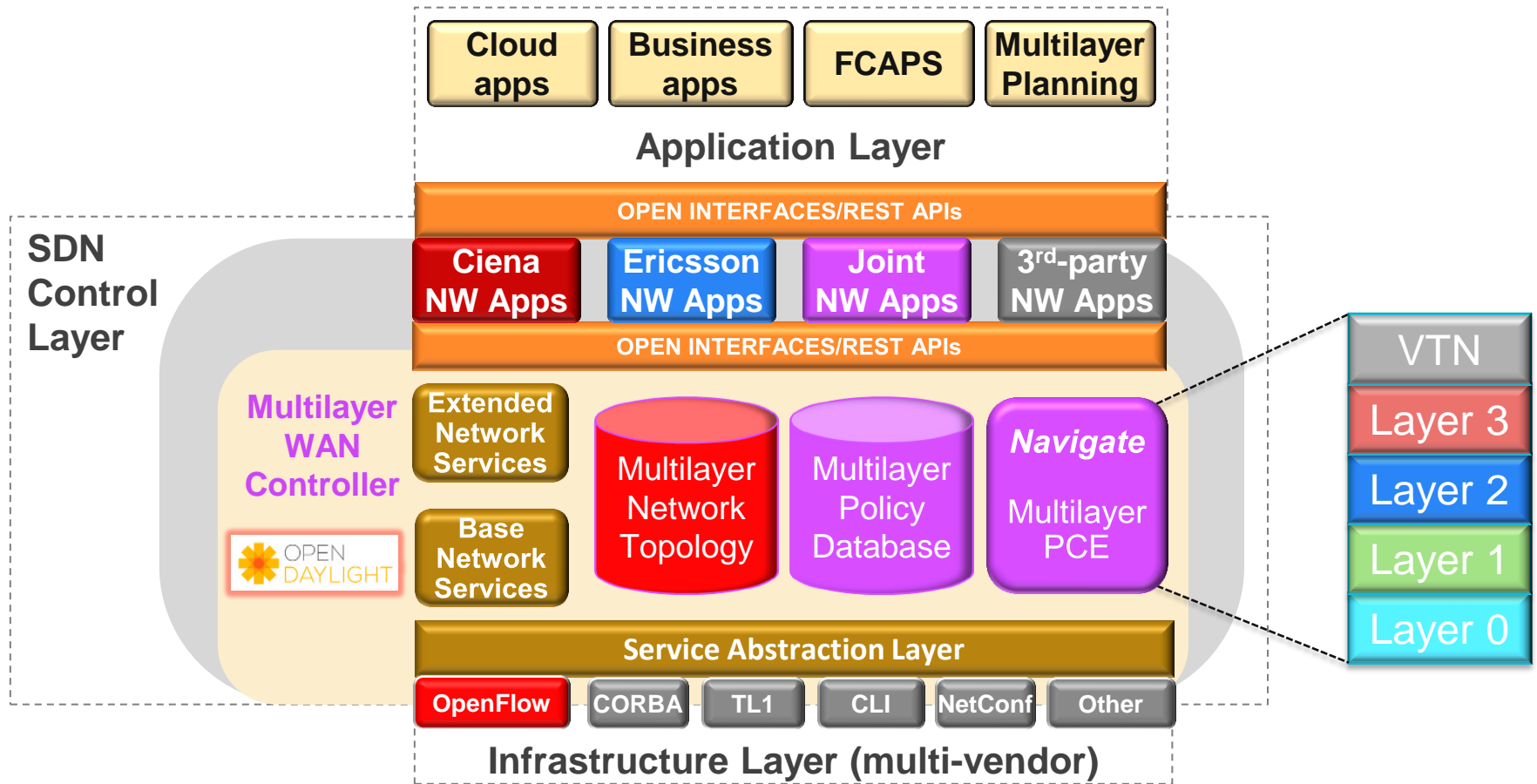## a key "techno-commercial" design point

Application Layer

API

Control Layer

Vendor A Software   Other Software

open source

API

Infrastructure Layer

Operator 1

Operator 2

Operator 3

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Open control systems: leveraging OpenDaylight

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Application Layer

Cloud apps	Business apps	FCAPS	Multilayer Planning

OPEN INTERFACES/REST APIs

SDN Control Layer

Ciena NW Apps	Ericsson NW Apps	Joint NW Apps	3rd-party NW Apps

OPEN INTERFACES/REST APIs

Multilayer WAN Controller

OPEN DAYLIGHT

- Extended Network Services
- Base Network Services
- Multilayer Network Topology
- Multilayer Policy Database
- *Navigate* Multilayer PCE

Service Abstraction Layer

OpenFlow	CORBA	TL1	CLI	NetConf	Other

Infrastructure Layer (multi-vendor)

- VTN
- Layer 3
- Layer 2
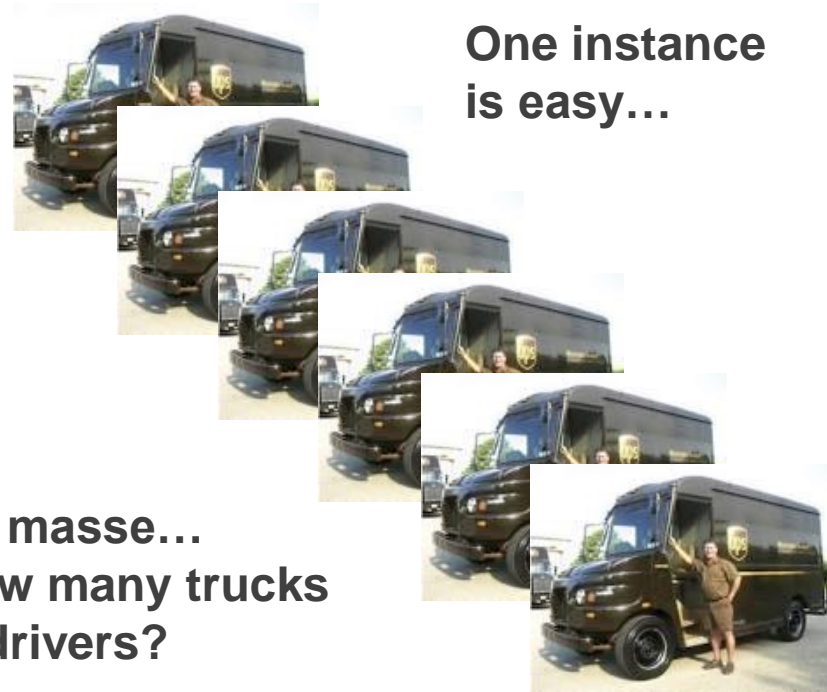- Layer 1
- Layer 0

Multilayer WAN Controller

- Built on the OpenDaylight open framework & platform
- Able to support single- or multi-layer SBIs, esp. OF
- Supports NBIs for SP and 3rd party app development

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Another multi-layer, multi-domain control example: joint OIF/ONF demonstration
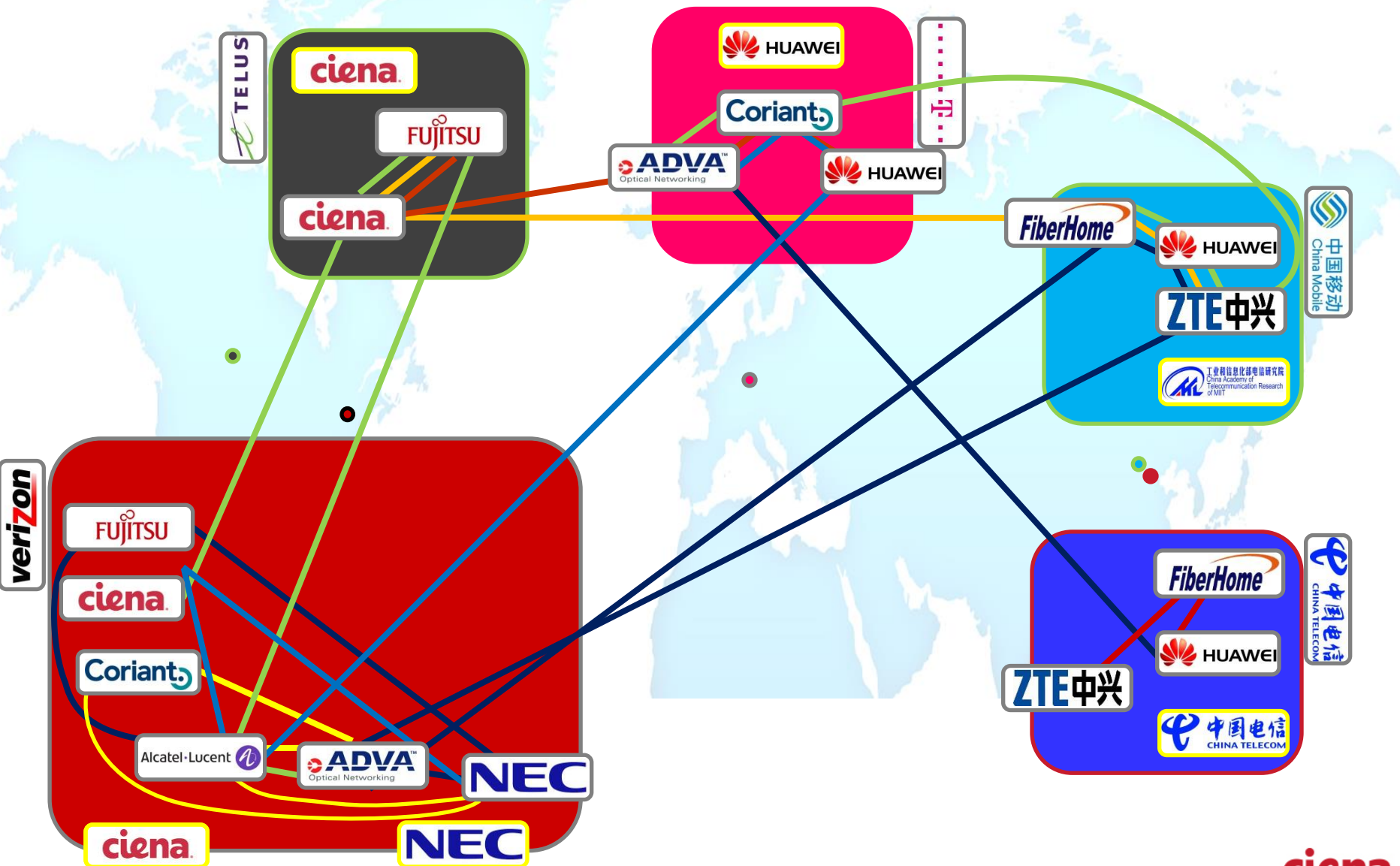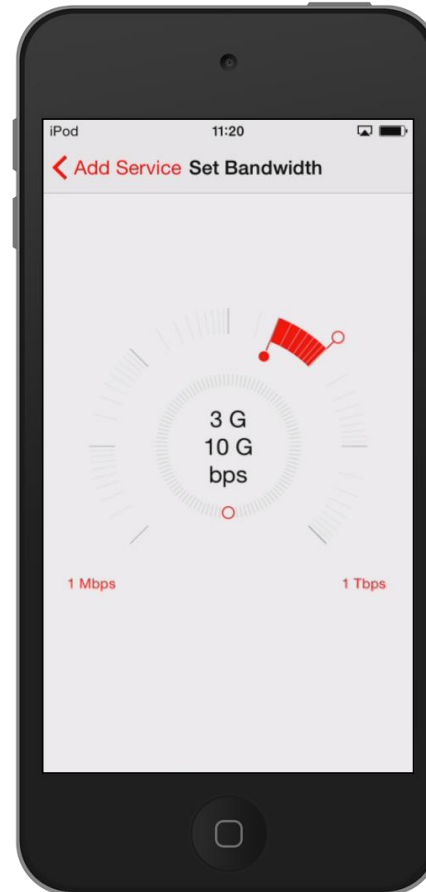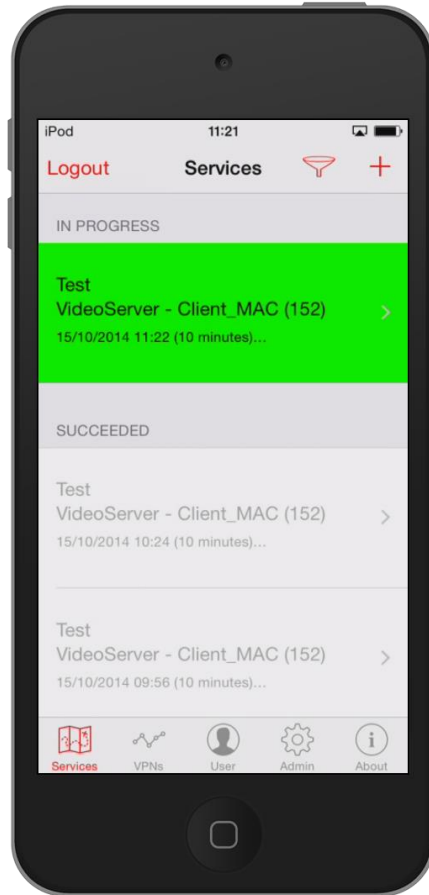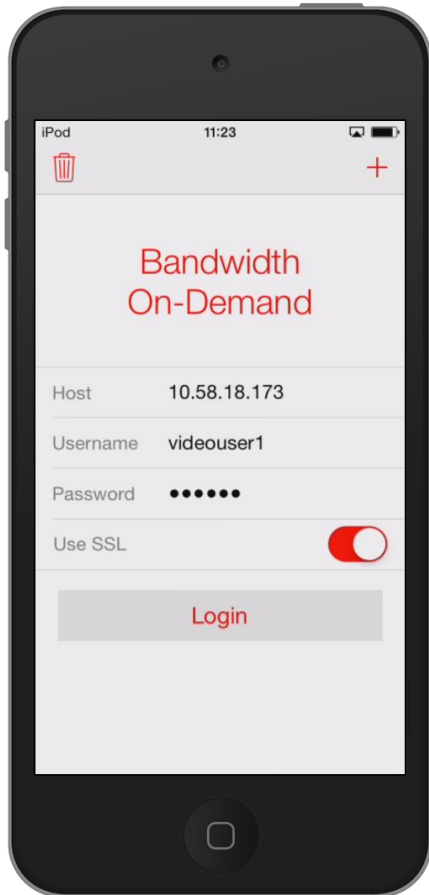
Information + policy + analytics = … on-demand

One instance is easy…

**En masse…
How many trucks & drivers?**

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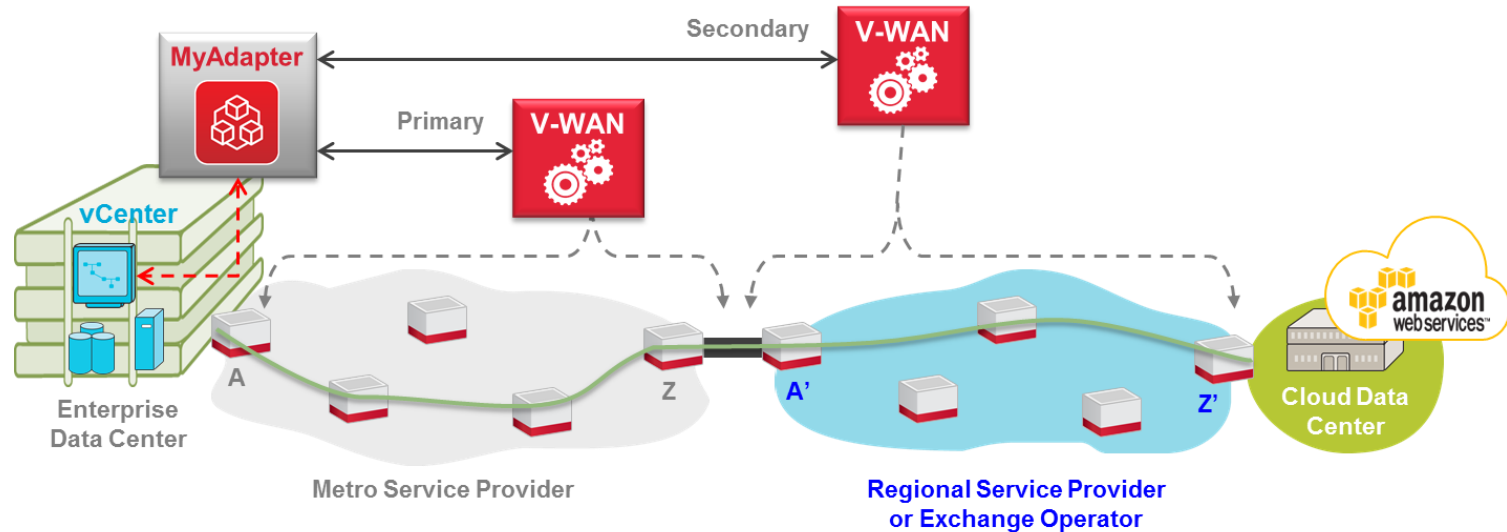# Information + policy + analytics = … on-demand

V-WAN

MyPortal

MyAdapter

On-demand cloud bursting… in an open cloud provider market
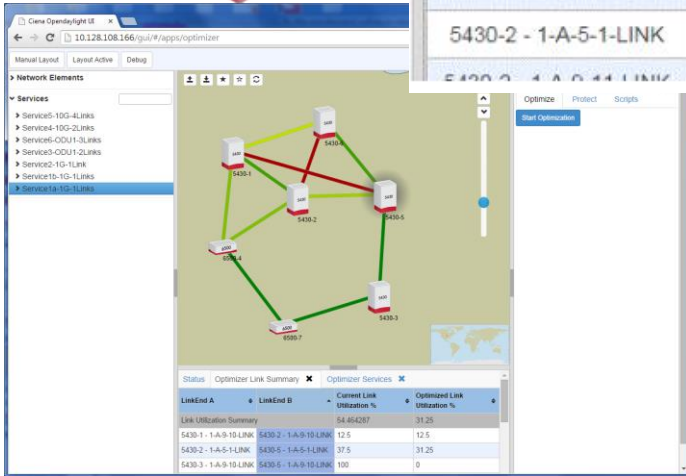

MyAdapter in enterprise DC

- Enables enterprise to connect to multiple cloud providers without dedicated connections – even to those not connected to their local metro provider
- Detects vMotion or *VM Import to EC2* events
- Orchestrates on-demand connections bridged across two networks

Information + policy + analytics = … network optimization

Optimize

Link Utilization Summary		Current Utilization: 50.961536 %	Optimized Utilization: 27.884615 %
LinkEnd A	**LinkEnd B**	**Current Link Utilization %**	**Optimized Link Utilization %**
5430-1 - 1-A-9-10-LINK	5430-2 - 1-A-9-10-LINK	0	100
5430-1 - 1-A-9-11-LINK	6500-4 - OTU2-Link-10509	100	0
5430-1 - 1-A-9-9-LINK	5430-6 - 1-A-9-9-LINK	12.5	12.5
5430-2 - 1-A-5-1-LINK	5430-5 - 1-A-5-1-LINK	31.25	31.25
5430-2 - 1-A-9-11-LINK	5430-6 - 1-A-9-11-LINK	100	0

Agility software portfolio apps

Get ready for open innovation with **SDN** and **NFV**

Introducing the **Agility** software portfolio

Demos in Exhibition Hall

Navigate

V-WAN

MyPortal

MyAdapter

Optimize

Protect

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