



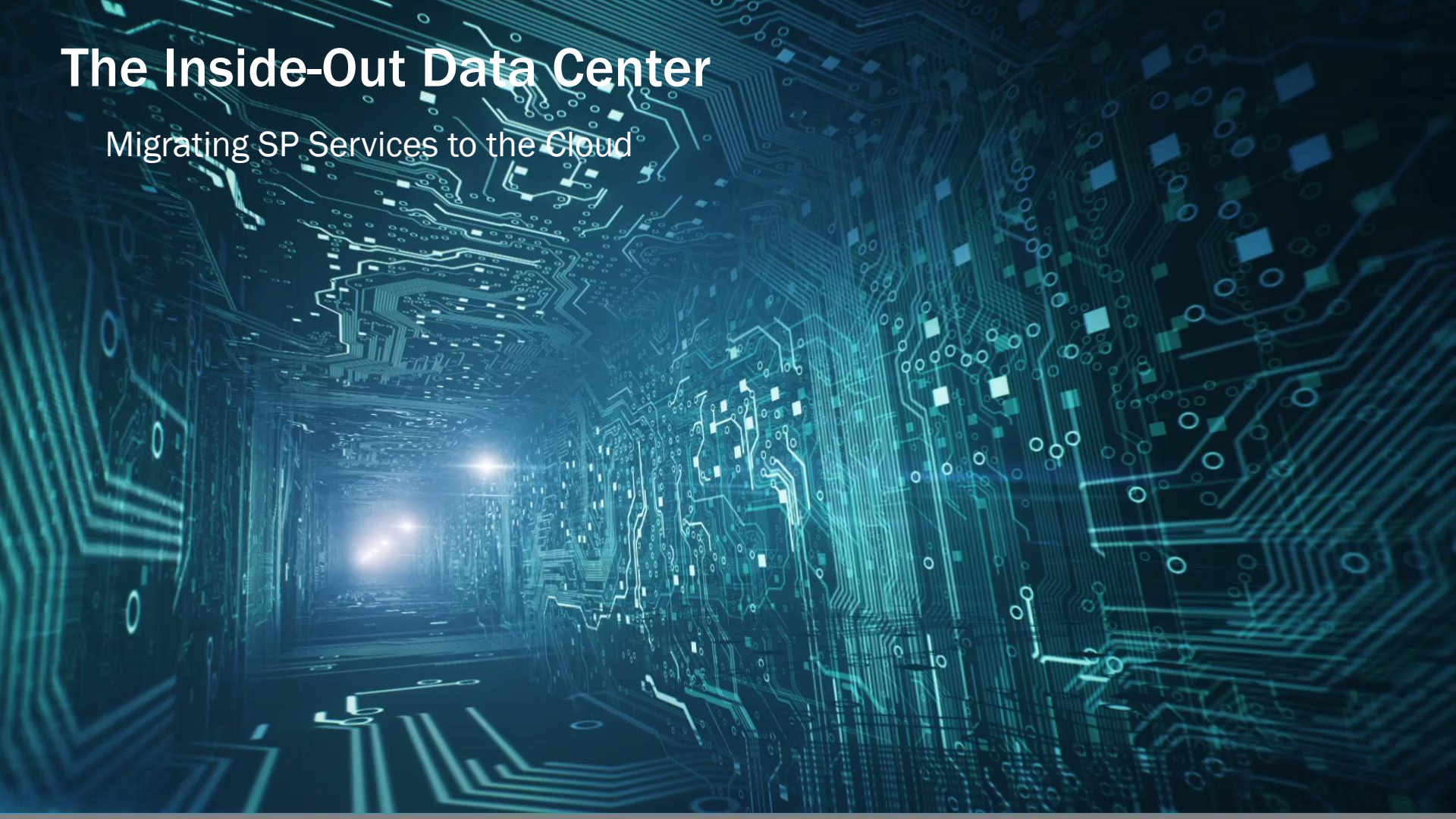
THE NEW IP : SHIFTING NETWORK PARADAGIMS with SDN & NFV

Orcun Tezel, Sr. Director, APAC Systems Engineering

2015년 2월 5일

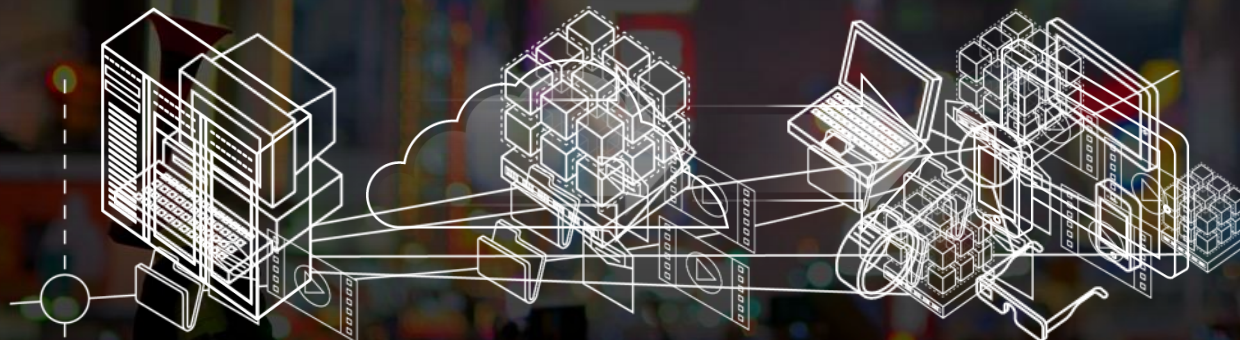
The Inside-Out Data Center

Migrating SP Services to the Cloud





THE WORLD HAS CHANGED.



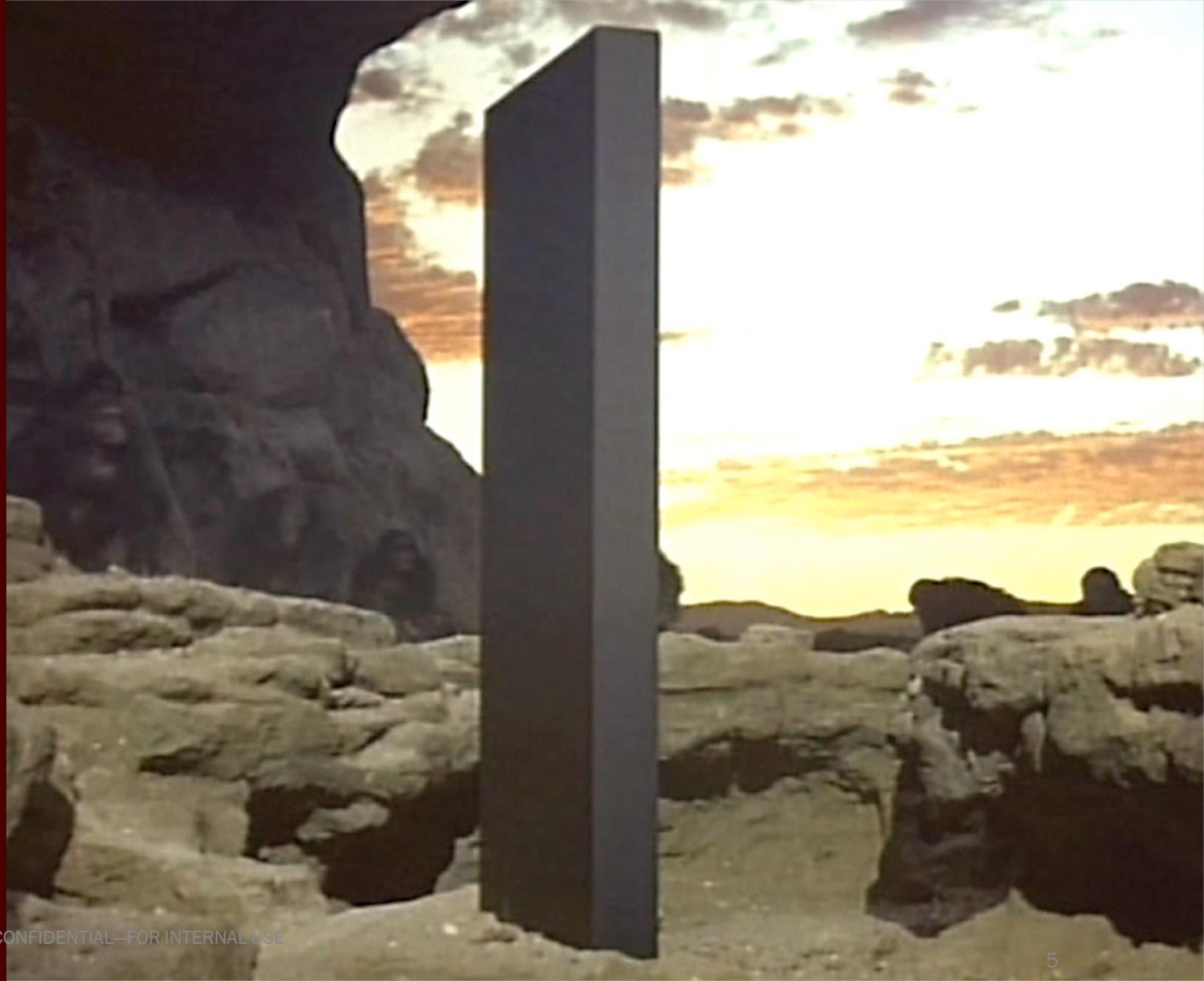
Customer environments are becoming more complex and multi-physical



**THE WORLD HAS CHANGED.
BUT THE NETWORK HASN'T.**

Service Provider Equipment

- **Monolithic**
- **Proprietary**
- **Manual**
- **Hard(ware)**





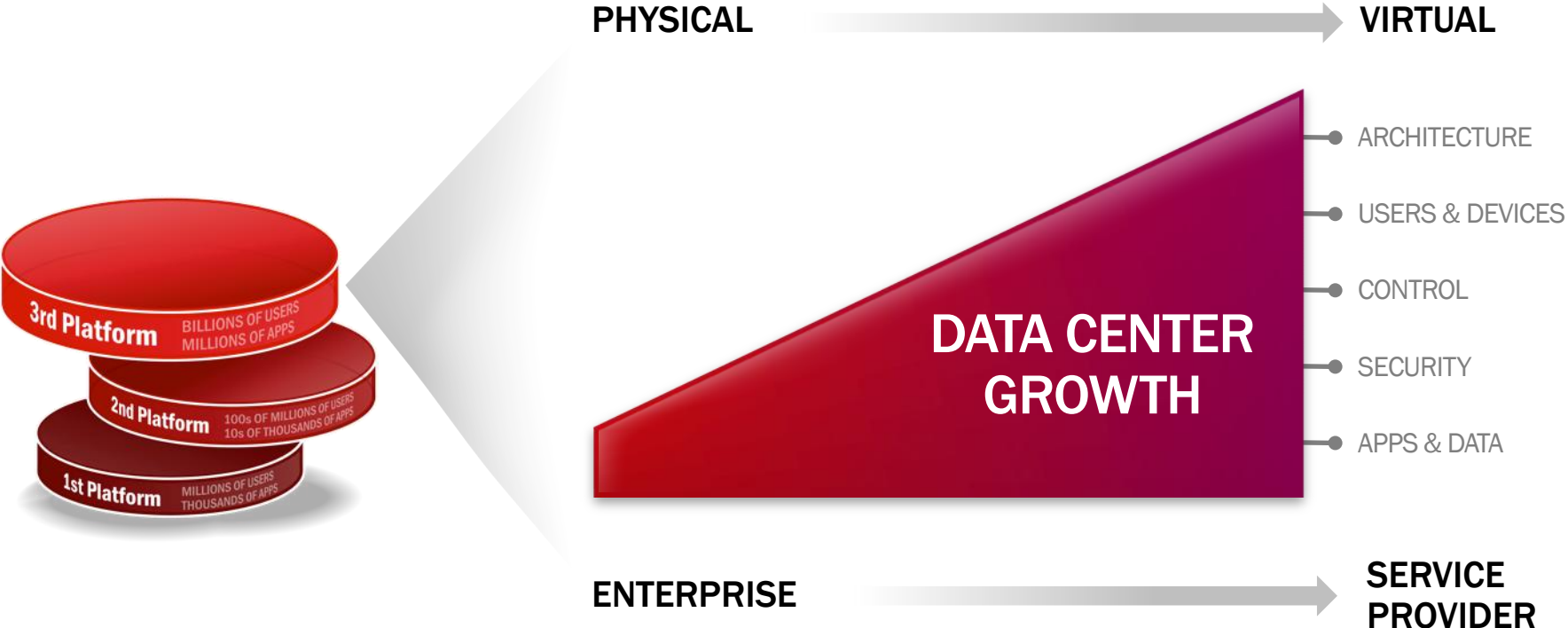
Our Destination

- **Cloud Based**
- **Open**
- **Automated**
- **Software based**
- **Hardware enabled**

CROSSING THE CHASM



Third Platform Transforms Networking

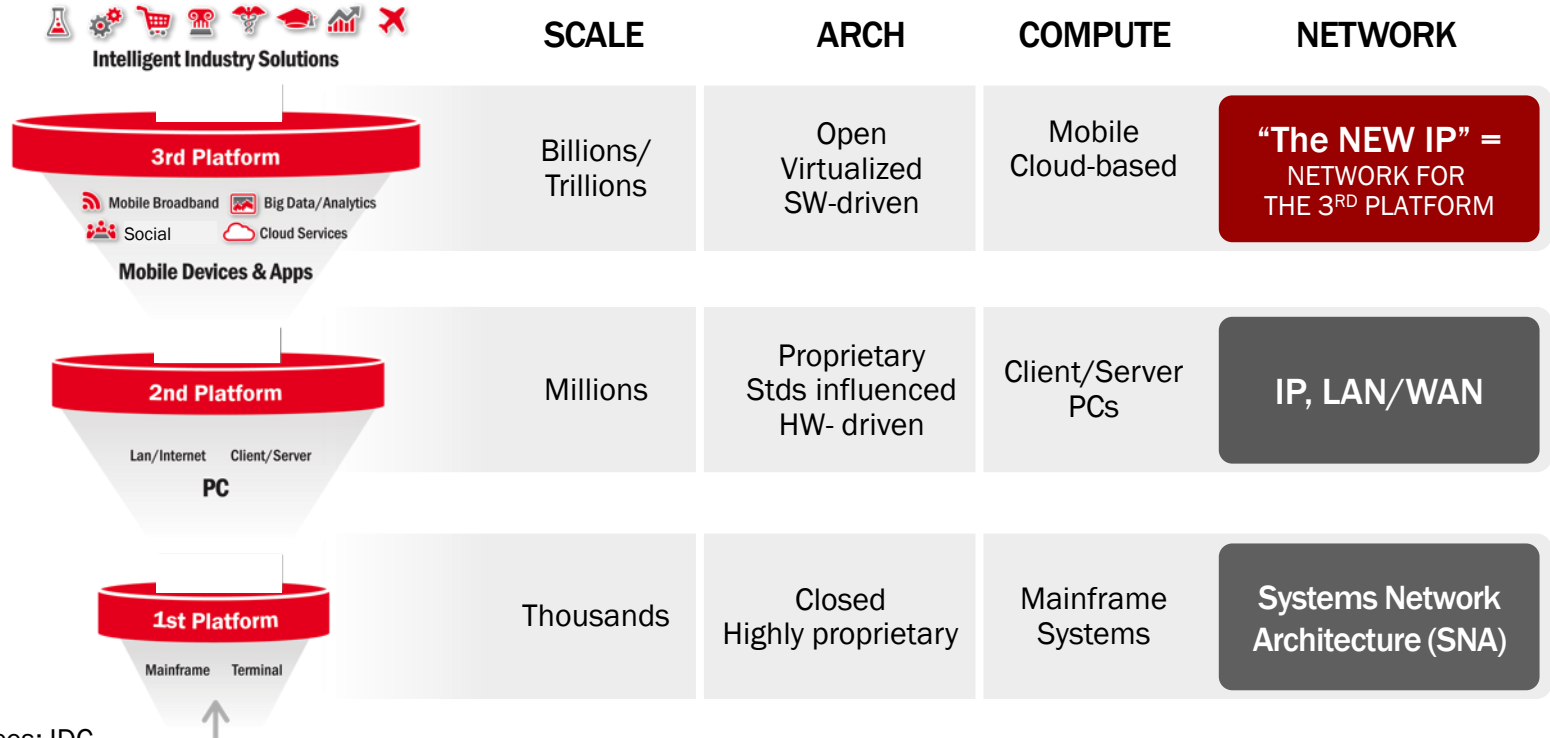


“THE NEW IP”

THE NETWORK FOR THE THIRD PLATFORM



THE NEW IP: SHIFTING THE CONVERSATION

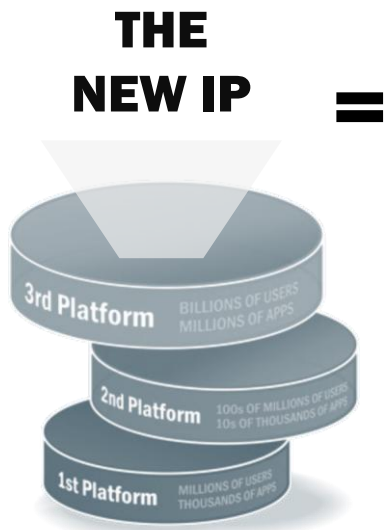


Sources: IDC,





THE NEW IP: DEFINITION



- Dynamic and Automated*
- Open and Open-Sourced*
- Network-Level Intelligence*
- Ecosystem Centric*
- Innovation Platform



Value moves from hardware system to software system

Datacenter moves from back office to front door

The data center is distributed and without walls. It is the network, and the network is the data center.

The network is applications aware, applications ask for the network they need



Evolution of SDN & NFV



Protocol



Product



Platform





The Enabling Technologies for The New IP

OPENSTACK

ORCHESTRATION

VYATTA CONTROLLER

SOFTWARE-DEFINED NETWORKING

VYATTA SERVICES PLATFORM

VISIBILITY

ANALYTICS

NETWORK FUNCTIONS VIRTUALIZATION

SAN FABRICS

ETHERNET FABRICS

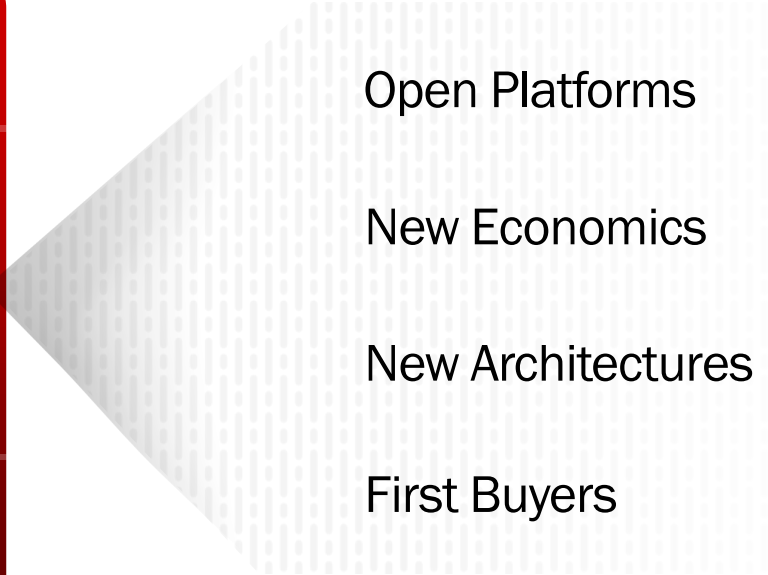
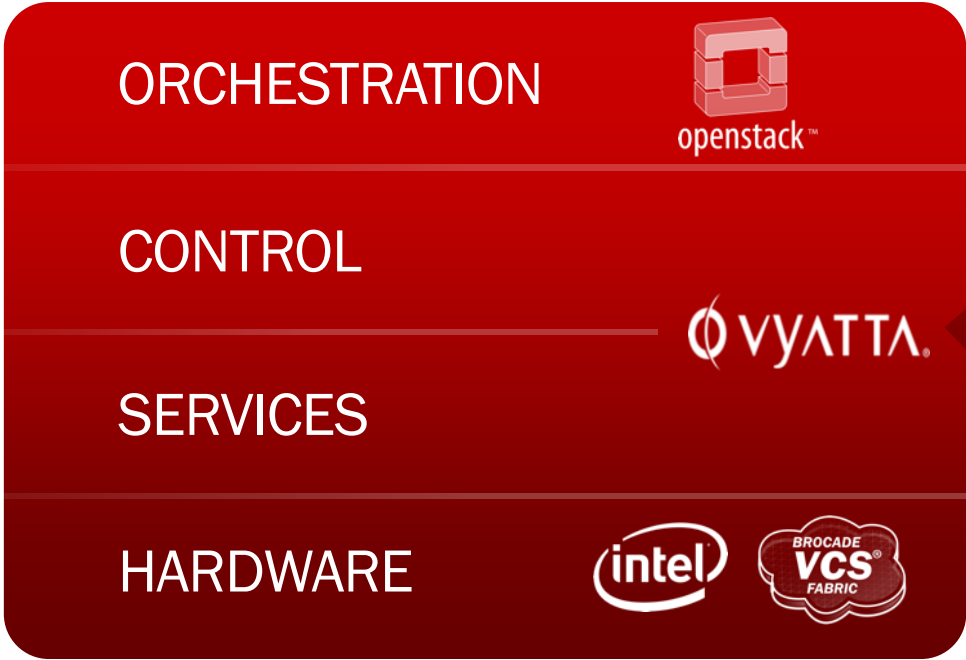
X86

COTS

PHYSICAL UNDERLAYS

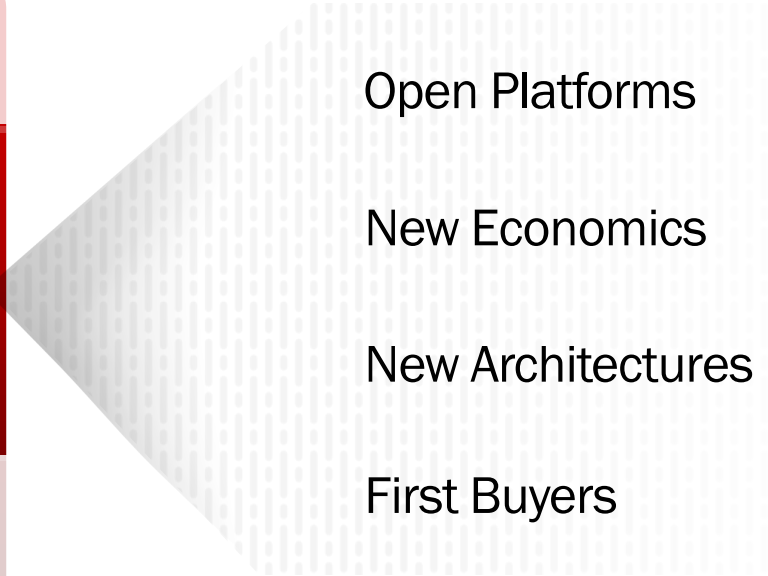
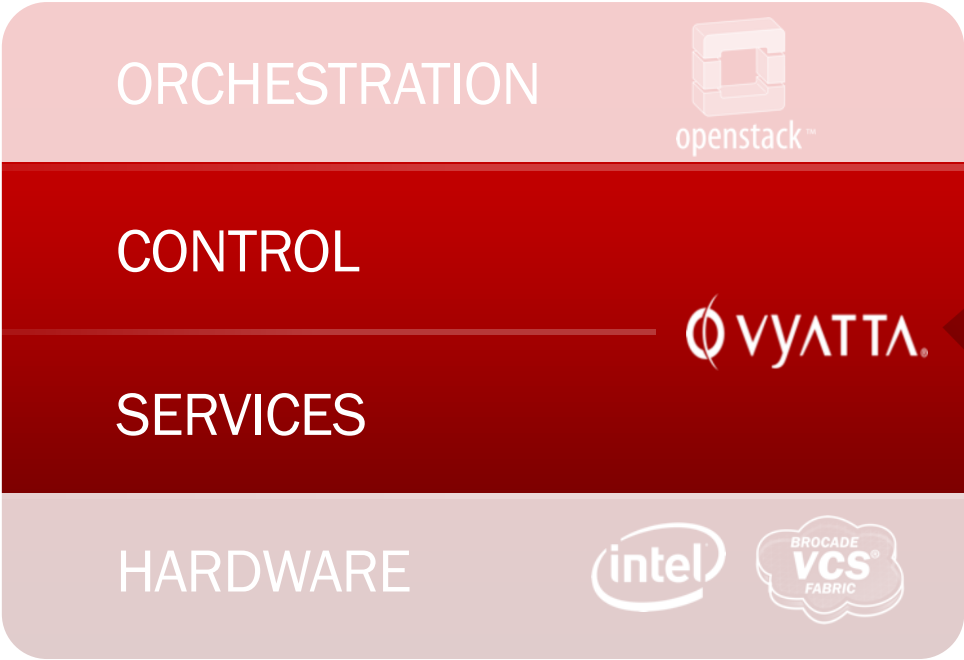


OPEN ARCHITECTURE FOR THE NEW IP





OPEN ARCHITECTURE FOR THE NEW IP



VYATTA NFV SERVICES



NFV SERVICES

L7 LOAD BALANCING

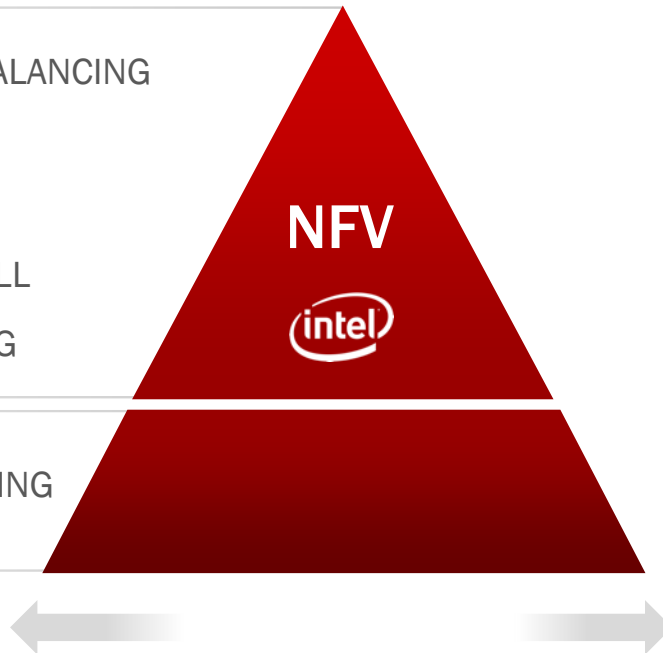
VPN

L4 NAT

FIREWALL

L3 ROUTING

L2 SWITCHING





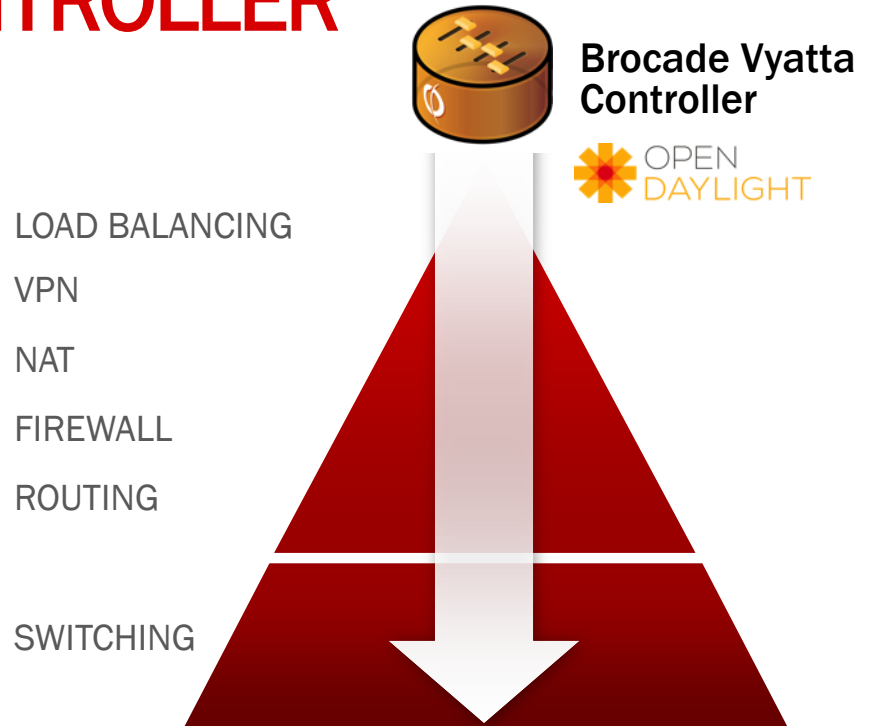
INDUSTRY FIRST: BROCADE VYATTA CONTROLLER

Innovation

- Based on OpenDaylight
- Controls entire network
- Physical and virtual
- Brocade and third parties

Open Source

- Brocade is to OpenDaylight what Red Hat is to Linux





The Benefits of Vyatta Platform, and New IP

Automated



- Scale services up and down rapidly as business demands
- Flexible and elastic deployment options
- Service continuity
- Maximized performance

Scale up or down rapidly

Efficient



- Easily consolidate resources, maximizing the utilization of underlying hardware infrastructure.
- Migration and co-existence with existing platforms

Maximized utilization

Business



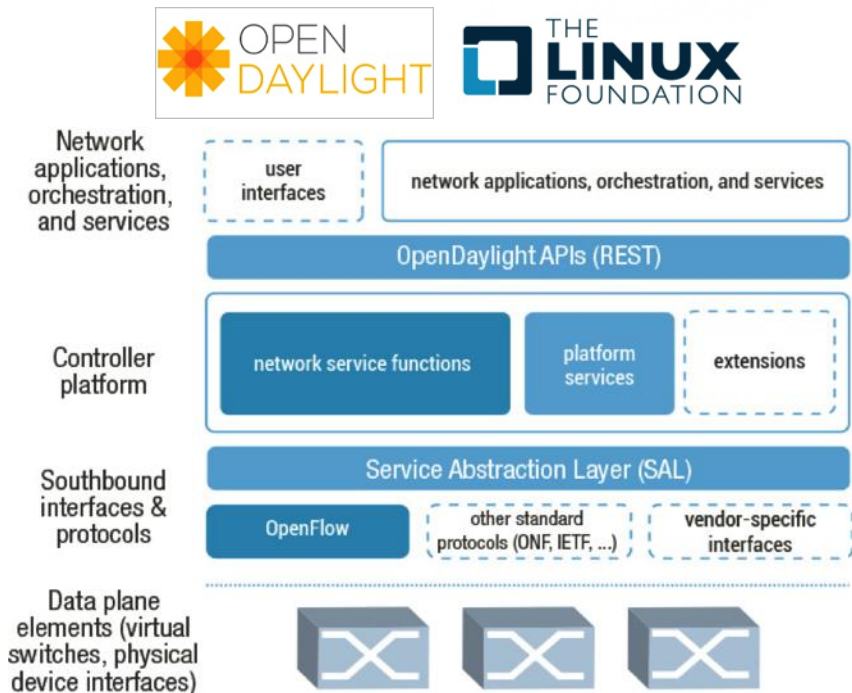
- Reduce business costs
- Increase speed of time to market
- Energy Efficiency
- Enabling innovative competitive and differentiated services

**Increase speed to market,
lower cost**

The OpenDaylight Project



The Linux Foundation's open source control plane for SDN and NFV



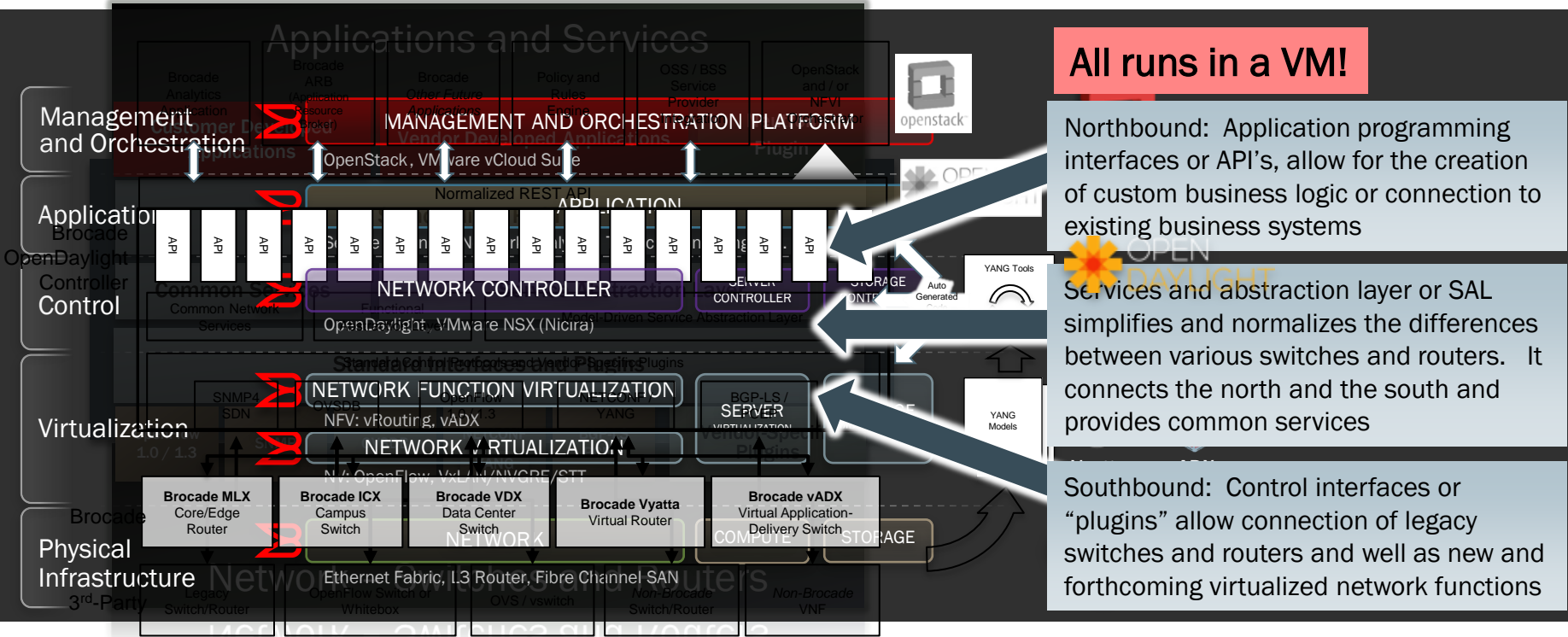
- OpenDaylight is a widely supported framework for SDN and NFV control
- Supporting vendors include: Brocade, Cisco, Arista, Juniper, Ciena, Hewlett Packard, NEC, vmware, Huawei and many others
- Important Features of the OpenDaylight Framework:
 - Standardized REST API (northbound) for application developers
 - Standard and vendor-specific plugins (southbound) allow a wide range of switch and router supplier options
 - Service abstraction infrastructure simplifies network complexity and allows sw developers to focus on business logic rather than proprietary vendor interfaces.





Network Controller Anatomy

A TOOL THAT CONNECTS THE APPLICATION AND NETWORK WORLDS



All runs in a VM!

Northbound: Application programming interfaces or API's, allow for the creation of custom business logic or connection to existing business systems

Services and abstraction layer or SAL simplifies and normalizes the differences between various switches and routers. It connects the north and the south and provides common services

Southbound: Control interfaces or "plugins" allow connection of legacy switches and routers and well as new and forthcoming virtualized network functions

Brocade Vyatta Platform: Building Our Foundation



ACTIVE WITH WORLDWIDE SERVICE PROVIDERS



PoCs and Internal Production Systems

Customer-Driven

- Telefonica: NFV Open Lab
- Tier 1 US: Virtual CE / CPE
- Tier 1 EUR: Virtual PE
- Tier 1 EUR: Dist'd Routing
- Tier 1 US: Virtual RR

ETSI

- HQoS (with BT, Intel)
- DDoS (with AT&T, SoftBank, Intel)
- Power Consumption (with Telefonica, Intel)

Partner-Driven

- Intel / Red Hat / McAfee / Verizon
- IBM SDN Routing
- Ciena Cloud Bursting
- Wind River VNF Routing

Customer Advisory Board

- Verizon
- Telefonica
- Deutsche Telekom
- NTT West
- NTT Communications
- Terramark
- Rackspace
- Verisign
- Equinix

Agility of New Services



In a test performed by Telefónica
Brocade[®] Vyatta[®] 5600 vRouter achieved 80 Gbps
on a Commercial Off-the-Shelf (COTS) Intel[®]-based x86 server.

(Deployed within a Red Hat KVM environment, the Brocade Vyatta 5600 was deployed as a single Virtual Machine (VM) and supported all of the server's available ports at line rate.)

In less than two hours, we deployed the Brocade Vyatta 5600 vRouter from a memory stick and completed our performance tests in our NFV Reference Lab. These results are allowing us, as network operators, to aggressively change our perspective regarding what is possible with software-driven networking in order to accelerate the adoption and deployment of these revolutionary technologies,"

- Francisco-Javier Ramón, Head of Telefónica NFV Reference Lab.



AT&T Domain 2.0 기사



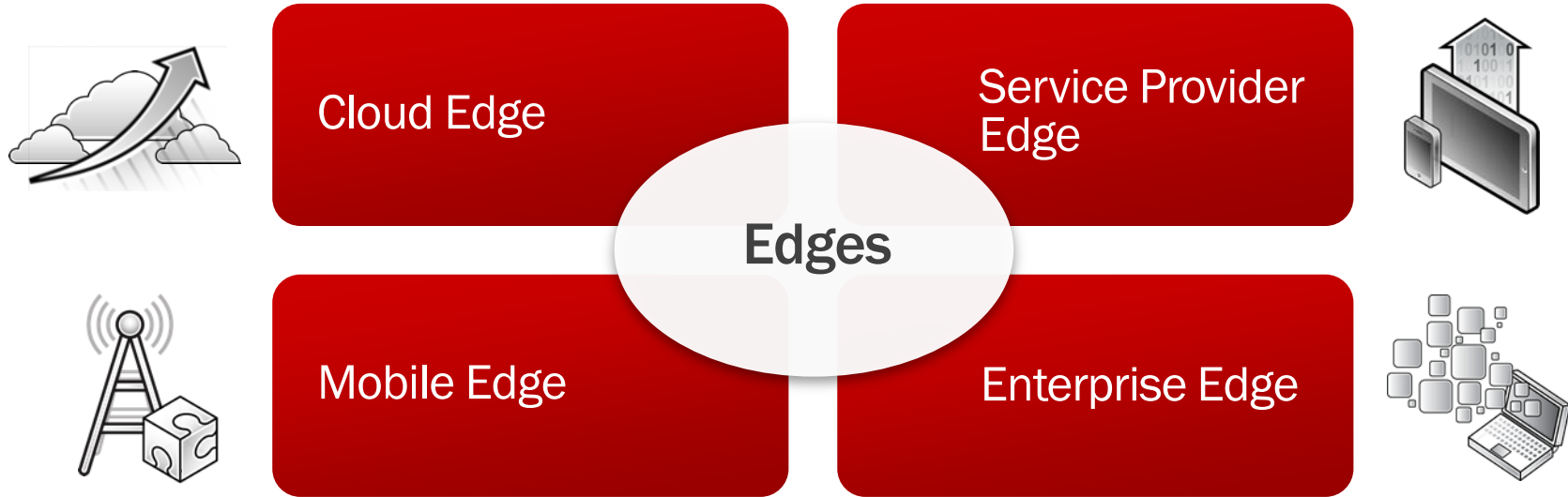
The screenshot shows the AT&T Newsroom website. At the top, there are navigation tabs for 'Personal', 'Business', and 'About AT&T'. Below this is a blue navigation bar with links for 'About Us', 'News', 'Wireless', 'Network', 'Innovation', 'At Home', 'Business', 'Investor Relations', and 'Site Map'. A search bar is also present. The main content area is titled 'AT&T NEWSROOM' and features a 'Filter by category' dropdown menu set to 'Innovation'. On the left, there is a 'LATEST NEWS' sidebar with four items: 'AT&T and Mobilite Enhance All-Star Mobile Internet Coverage at Nationwide Arena', 'The Magic of Technology Through the Eyes of a Child', 'Exclusive, Behind-the-Scenes View of Bonnaroo's 2014 SuperJam', and 'Black Enterprise Names AT&T One of the 40 Best Companies for Diversity'. The main article is titled 'AT&T Adds Brocade, Ciena and Cisco to its Domain 2.0 Supplier Program' and is dated 'DALLAS, December 10, 2014'. The article text includes: 'Earlier this year, AT&T announced plans for its next-generation network that includes the latest design techniques from software-defined networking and network function virtualization to make our network faster, simpler and more scalable. The vision places customers at the center of the network with a modern, cloud-based architecture, a global first at this scale. This initiative builds on the company's best-in-class network status and is expected to accelerate time-to-market with technologically-advanced products and services, providing customers with more control and ability to add new services on-demand and in near real-time. "With Domain 2.0, we are seeking out agile and disruptive suppliers to help us innovate more quickly as we drive forward towards our next-generation network vision," said Susan Johnson, senior vice president, AT&T Global Supply Chain. Since the first announcement, AT&T revealed additional suppliers' involvement in Domain 2.0 in April and July, with 10 vendors in the program to date. These companies play various roles to drive the creation of the next-generation network.'

출처: http://about.att.com/story/att_adds_companies_to_its_20_domain_supplier_program.html





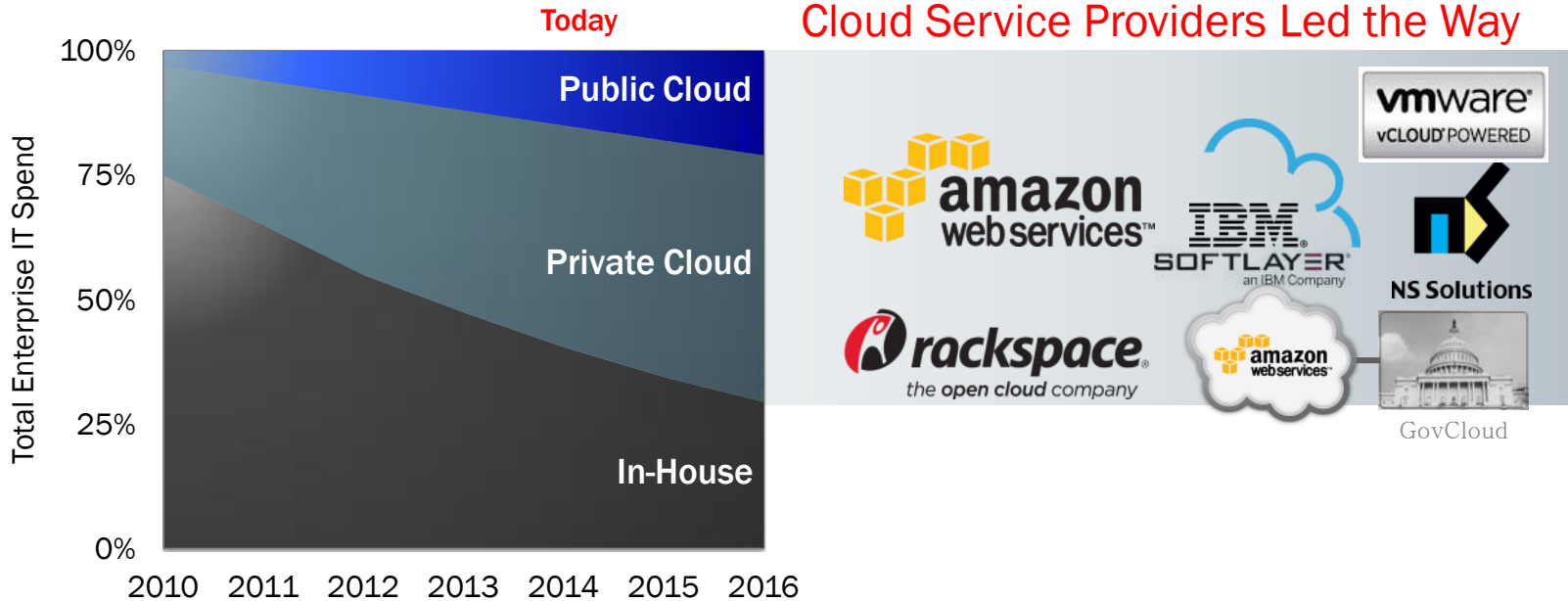
THE FOUR EDGES



The Packet Torture Chamber



Cloud SPs are Early 3rd Platform Leaders



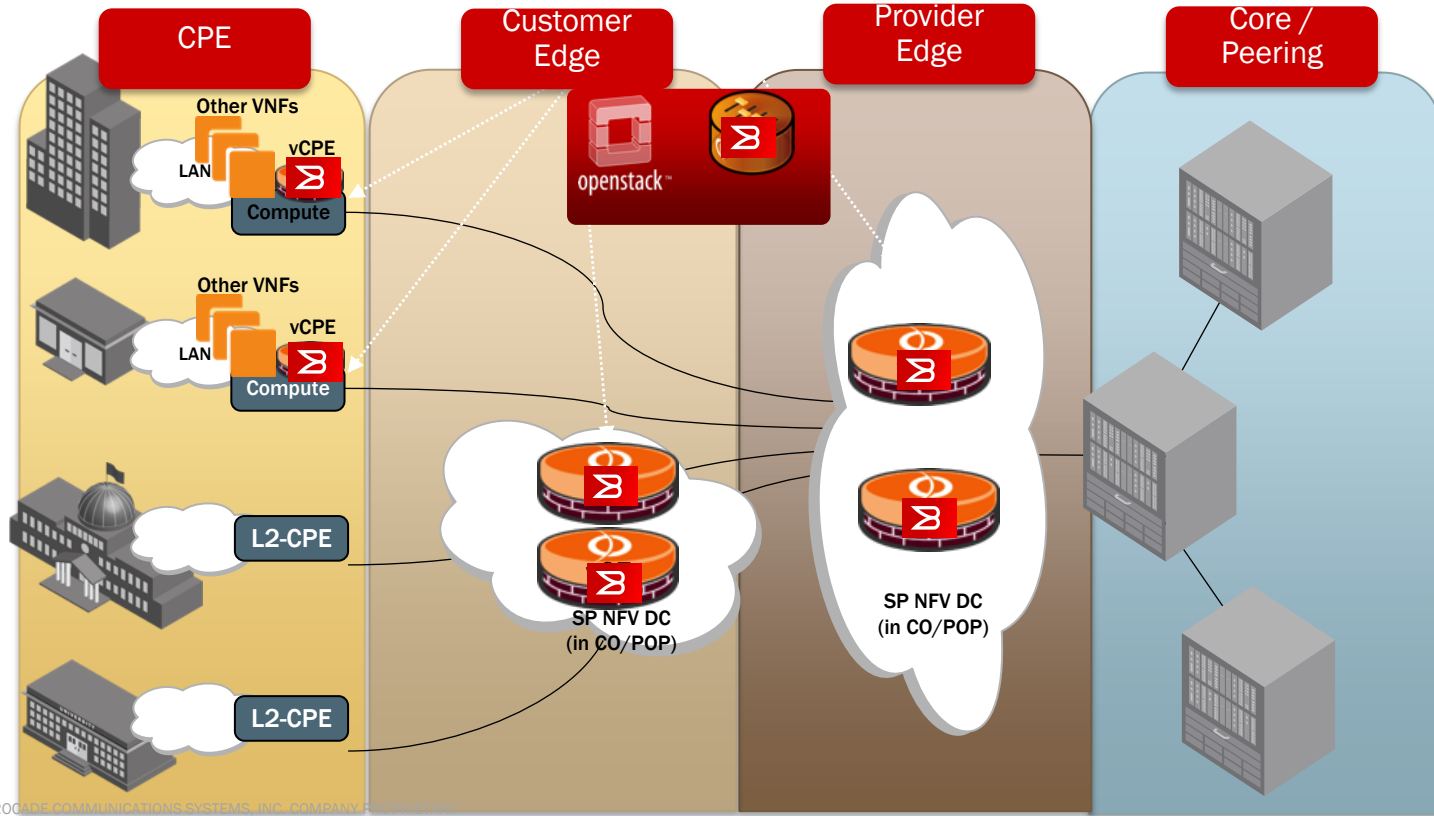
BROCADE VYATTA IS IN ALL MAJOR PUBLIC CLOUDS

Source: Industry data and Brocade analysis



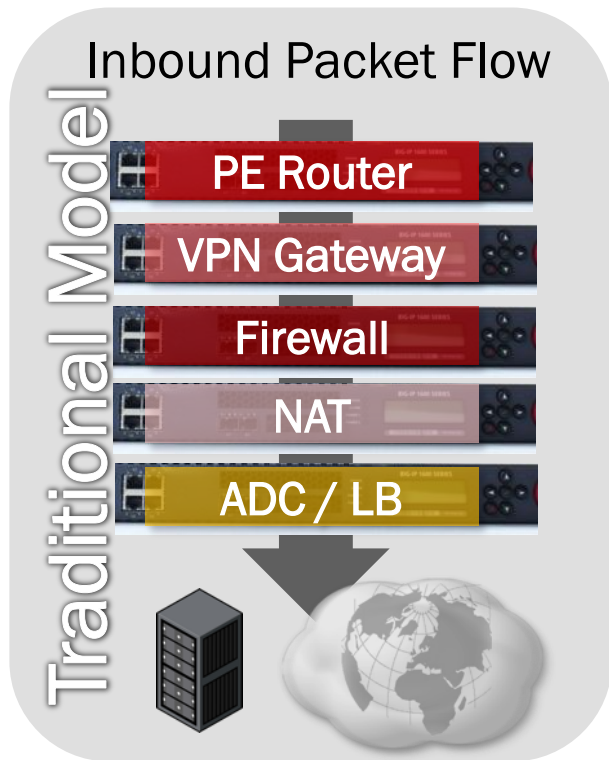


THE SERVICE PROVIDER EDGE





Turning the Data Center Inside Out



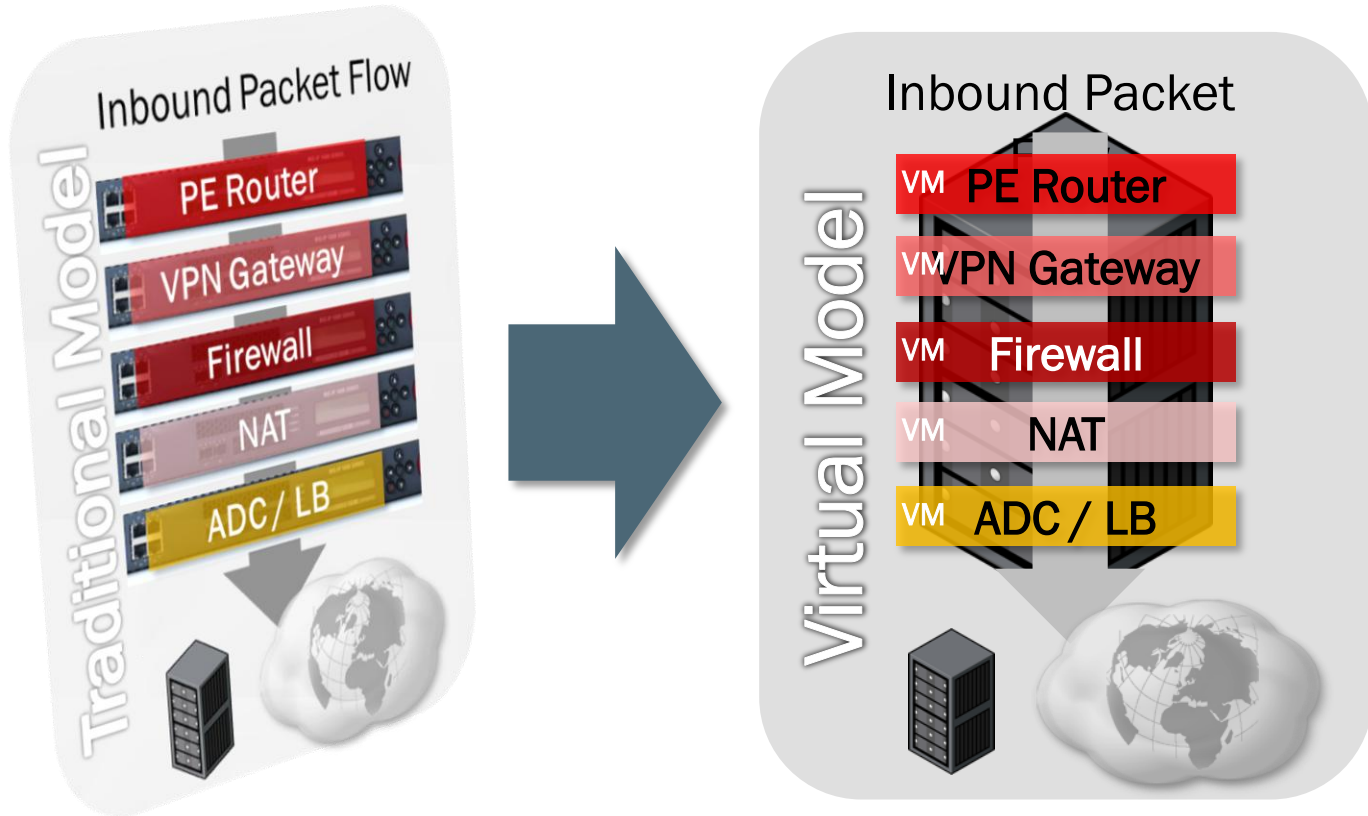
Today

Traffic is passed through a series of expensive devices before connectivity to Data Center and network resources is provided





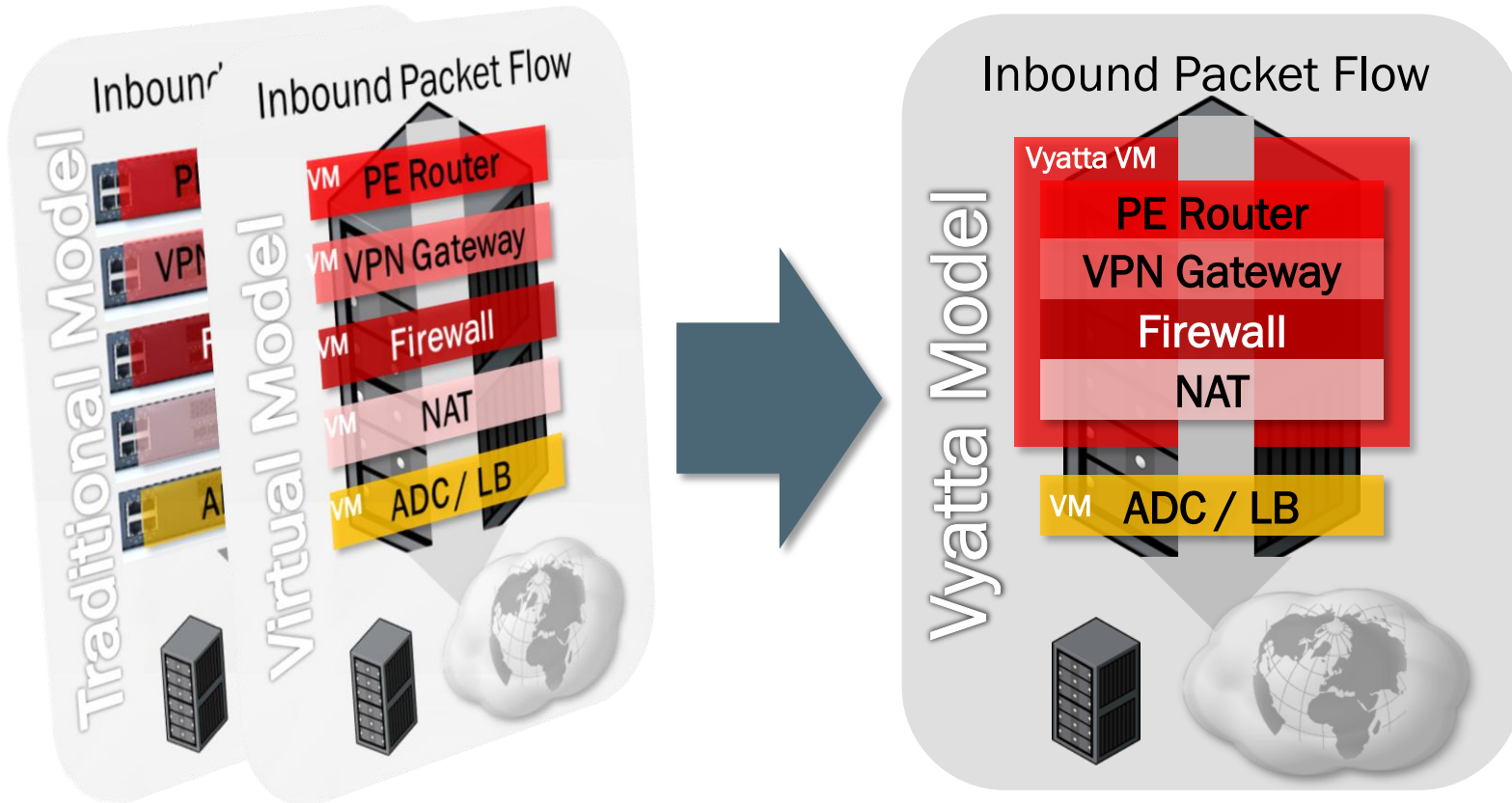
Turning the Data Center Inside Out



Functionality of each physical box replicated as a Virtual Machine inside a server

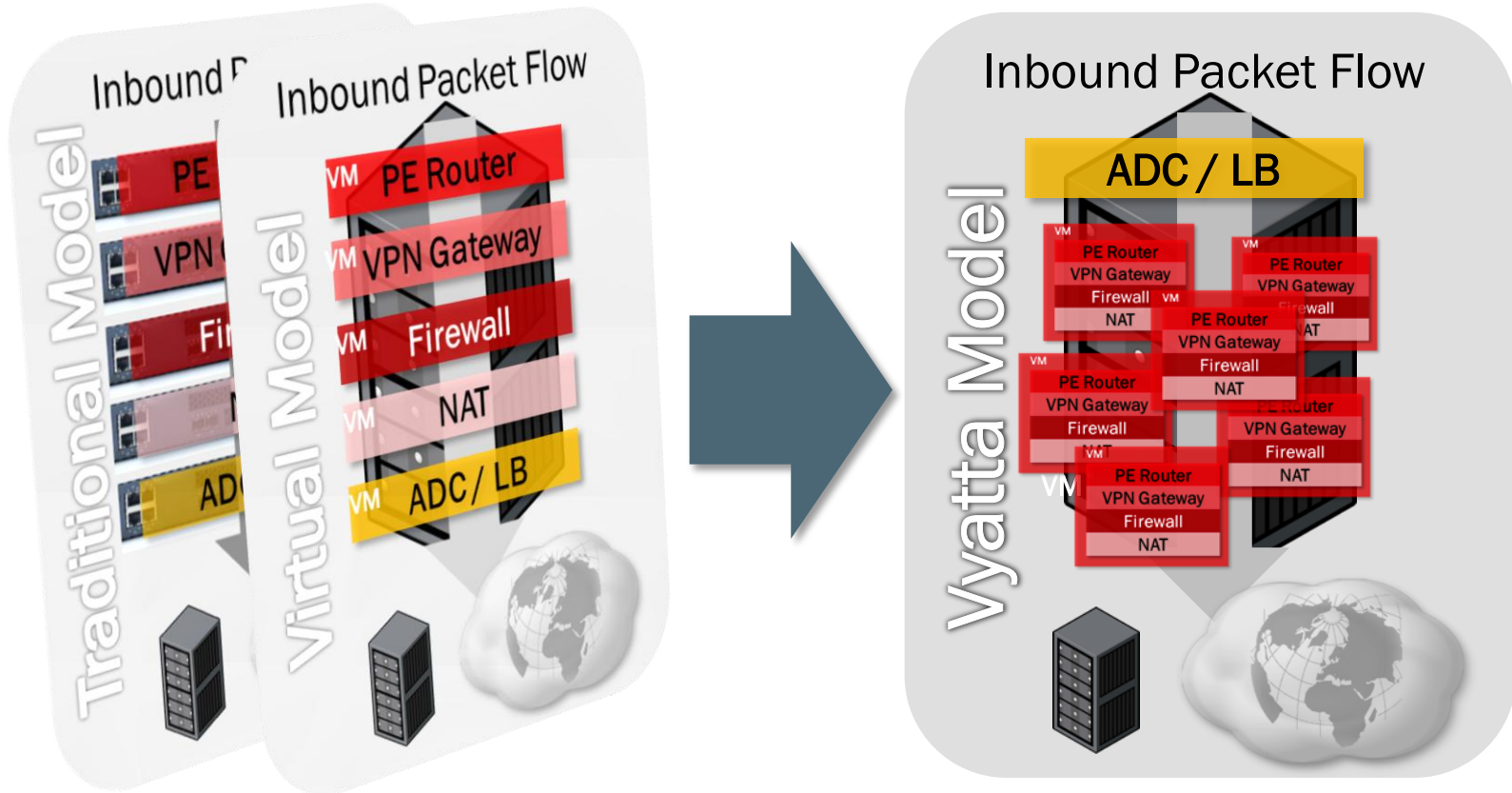


Turning the Data Center Inside Out



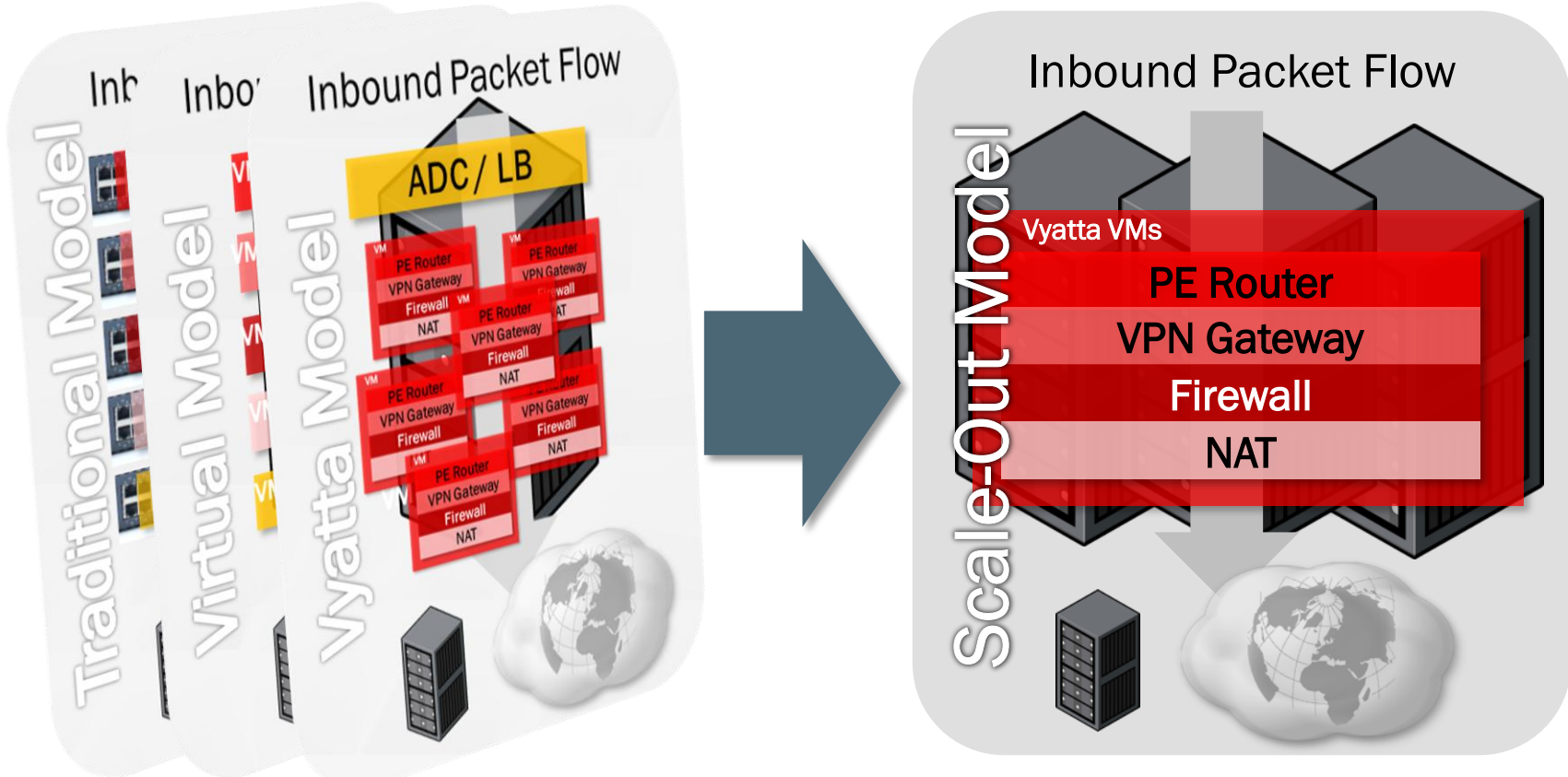


Turning the Data Center Inside Out





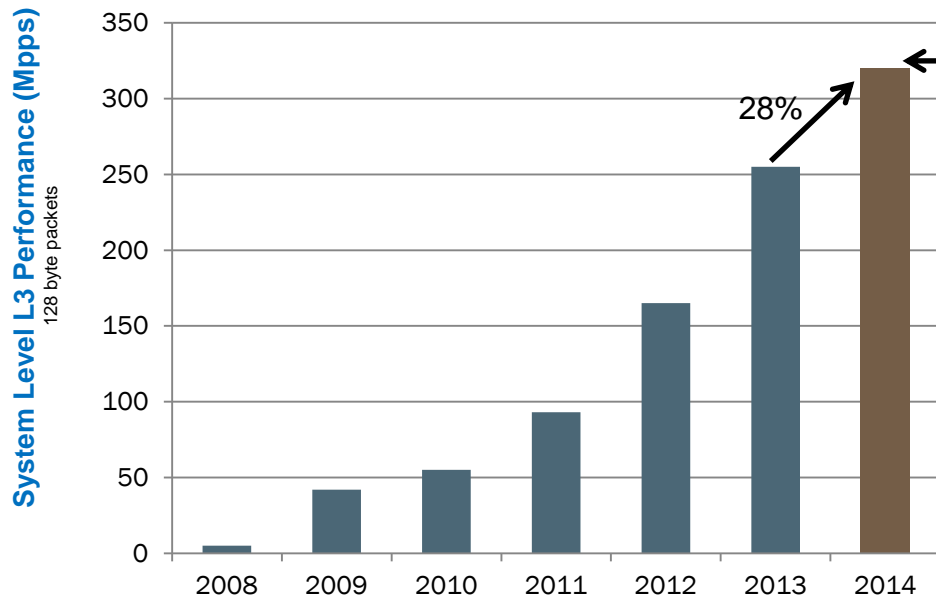
Turning the Data Center Inside Out



EXPONENTIAL GROWTH OF X86 PERFORMANCE..



- HUGE LEAPS IN THROUGHPUT DRIVING SHIFT



Intel® Xeon® Processor E5-2699 v3 with DPDK 1.7

- vEPC
- vAppliances
- vRoute Reflector
- vRouter
- vCPE
- vNFVaaS

Disclaimer: Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products.





Brocade Vyatta Controller Use Cases

Software that connects the network to your business processes



Custom
Analytics and
Compliance



Big Data



Security



QoS and
Traffic
Management



Service
Configuration
and Policy



Research and
New Protocols



Fault and
Disaster
Recovery



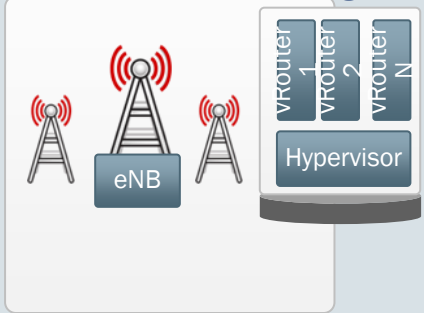
WAN
Optimization



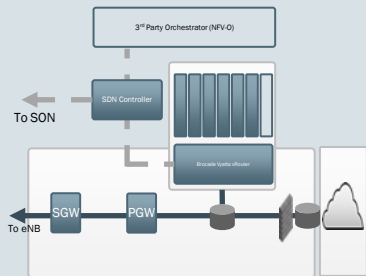


MWC Brocade Mobile 네트워크 솔루션 데모

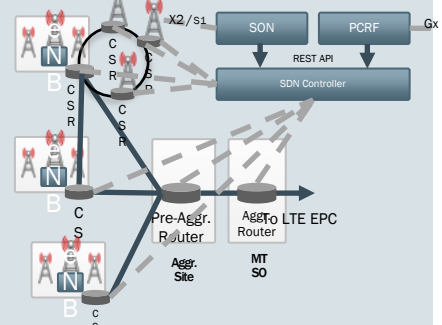
Brocade Virtual Cell Site Router & Mobile Edge



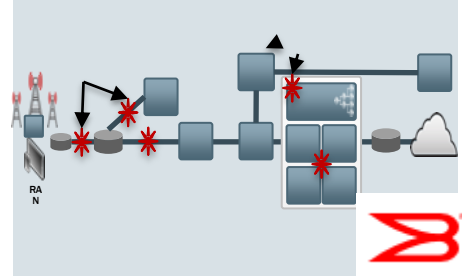
Brocade Vyatta VGiLAN Solution



SDN-Enabled Mobile Backhaul



Network Analytics Platform



MWC Brocade 부스

Stand 2G29, Hall 2

Brocade Hospitality Space 2G29 - Hall 2

1700 square feet

4 meeting rooms

Ad hoc meeting space

Tech Playground

Lounge with food, beverage

Activities:

Customer, Partner, Analyst Meetings

Latest Demonstrations

'Tech Top of Mind' Sessions

Executive Roundtables

Hospitality Events

Social Media Engagement



Hospitality Space Hours: 07.00 - 22.00



Why Are SDN All-Stars Heading to Brocade

Company assembling impressive lineup of software-defining heavy hitters



- Line up includes David Meyer, current Chairperson ODL and Colin Dixon, the Technical Steering Committee Chair of ODL
- “Working at Brocade is attractive compared to doing SDN at, say, Cisco, where whatever it is it isn’t strategy No.1,” says Peter Christy, director of networking research at 451 Research
- “It helps that Brocade has leveraged open-source projects, including OpenStack and OpenDaylight, so extensively” says IDC analyst Brad Casemore



감사합니다.



**GOODBYE
STATUS QUO
IP NETWORK.**

Back Up Slides

Brocade Vyatta Controller

Base Edition

- Free download for up to 5 managed nodes for 1 year – 60 days of free support
- Free web-based training
- 1-year and 3-year subscription licenses for larger deployments
 - Linear, per-node pricing – buy only what you need
- Contract application development to support unique customer needs
- Range of support services: online community, tiered TAC, Installation services for complex deployments
- 1 and 2 day in-person training sessions, Introductory to Advanced levels



Brocade Vyatta Controller Developer Edition



Application and Developer Support Options

- 1 and 3-year subscription licenses
- ODL developer training and comprehensive training offers
- Access to Brocade ODL SME or Engineers for application developers
- Software Test and Certification for OpenDaylight Applications and Plugins
- Program for delivery of weekly developer builds for your software engineers
- 1- and 2-day in-person Developer training, Introductory and Advanced Options





Brocade Vyatta Controller Roadmap

Phase	Data Center Automation		Developer Partner Ecosystem, Tools		Applications		SDNaaS
Calendar Half	1H 2015		2H 2015		1H 2016		2H 2016
Controller Releases	OPEN DAYLIGHT	Lithium Release <small>3 Lithium (#.938; 6.997)</small>	Brocade Vyatta Controller 2.0	Beryllium? <small>Be Beryllium (#.975; 9.979)</small>	Brocade Vyatta Controller 3.0	Boron? <small>3 Boron (#.979; 10.911)</small>	Brocade Vyatta Controller 4.0
Controller Core	Clustering Improvements	Overlay, Underlay Manager	Service Function Chaining	Multi-Tenancy	L3 / MPLS VPNs	YANG Normalizer	
Interfaces	NEUTRON Plugin ML2	PCE-P, BGP-LS	OVSDB	VXLAN, NV-GRE	I/O Optimization	Multi-Domain Federation	API Manager
Developer Tools	Build Environment Improvements	Maven Archetypes and Tools	DevOps Tools Integration	Application Developer's Framework	Network Simulator		
Applications	Analytics	MFM, VTA, TSA	VNF Manager	Data Center Energy App	Application Res Broker	Provisioning and Config	Enhanced Path Explorer
Supporting Programs	BVC Community Launch	Application Catalog	Interoperability Lab and Testing	Partner Program Launch	Application Certification	Application Store	

Brocade is leading the industry with disruptive networking solutions



25%

DATA CENTERS WILL USE
ETHERNET FABRICS BY 2015



1900+
ETHERNET
FABRICS DEPLOYED

93%

GLOBAL OPERATORS PLAN
TO IMPLEMENT NFV



VIRTUAL ROUTER IS **40x**
FASTER THAN COMPETITORS'

72%

ENTERPRISES WILL HAVE
SDN DEPLOYED BY 2015



1.3M OPENFLOW
ENABLED PORTS SHIPPED

