



# Calix 2016 Investor Day

March 16, 2016

# Disclosure

This presentation includes forward-looking statements that are based upon management's current expectations and are inherently uncertain. Forward-looking statements are based upon information available to us as of the date of this release, and we assume no obligation to revise or update any such forward-looking statement to reflect any event or circumstance after the date of this release, except as required by law. Such forward-looking statements may include words such as "expect," "anticipate," "intend," "believe," "estimate," "plan," "target," "strategy," "continue," "may," "will," "should," variations of such words, or other words and terms of similar meaning. Actual results and the timing of events could differ materially from current expectations based on risks and uncertainties affecting Calix's business. The reader is cautioned not to rely on the forward-looking statements contained in this press release. Additional information on potential factors that could affect Calix's results and other risks and uncertainties are detailed in its reports on Form 10-Q for the third fiscal quarter of 2015 and Annual Report on Form 10-K for the fiscal year 2015, filed with the SEC and available at [www.sec.gov](http://www.sec.gov). While today's presentation may include forward-looking statements, we are specifically not providing any update to the financial guidance given in our last quarterly conference call on February 9, 2016.



# Today's agenda

Time	Title	Speaker
1:00 – 1:05 PM	Welcome	Thomas J. Dinges, CFA – Director, Investor Relations
1:05 – 1:45 PM	Calix Opportunity	Carl Russo – President and Chief Executive Officer
1:45 – 2:30 PM	Platform Development	Michel Langlois – Senior Vice President, Systems Products Shane Eleniak – Vice President, Product Line Leadership
2:30 – 2:45 PM	Break	
2:45 – 3:15 PM	Customer Engagement	John Colvin – Senior Vice President, North American Sales
3:15 – 3:45 PM	Solutions Positioning	David Seda – Vice President, Marketing
3:45 – 4:00 PM	Break	
4:00 – 4:30 PM	Financial Overview	William Atkins – Executive Vice President and Chief Financial Officer
4:30 – 5:00 PM	Wrap-up, Q&A	Calix Management
5:00 – 6:30 PM	Reception	Calix Management and attendees

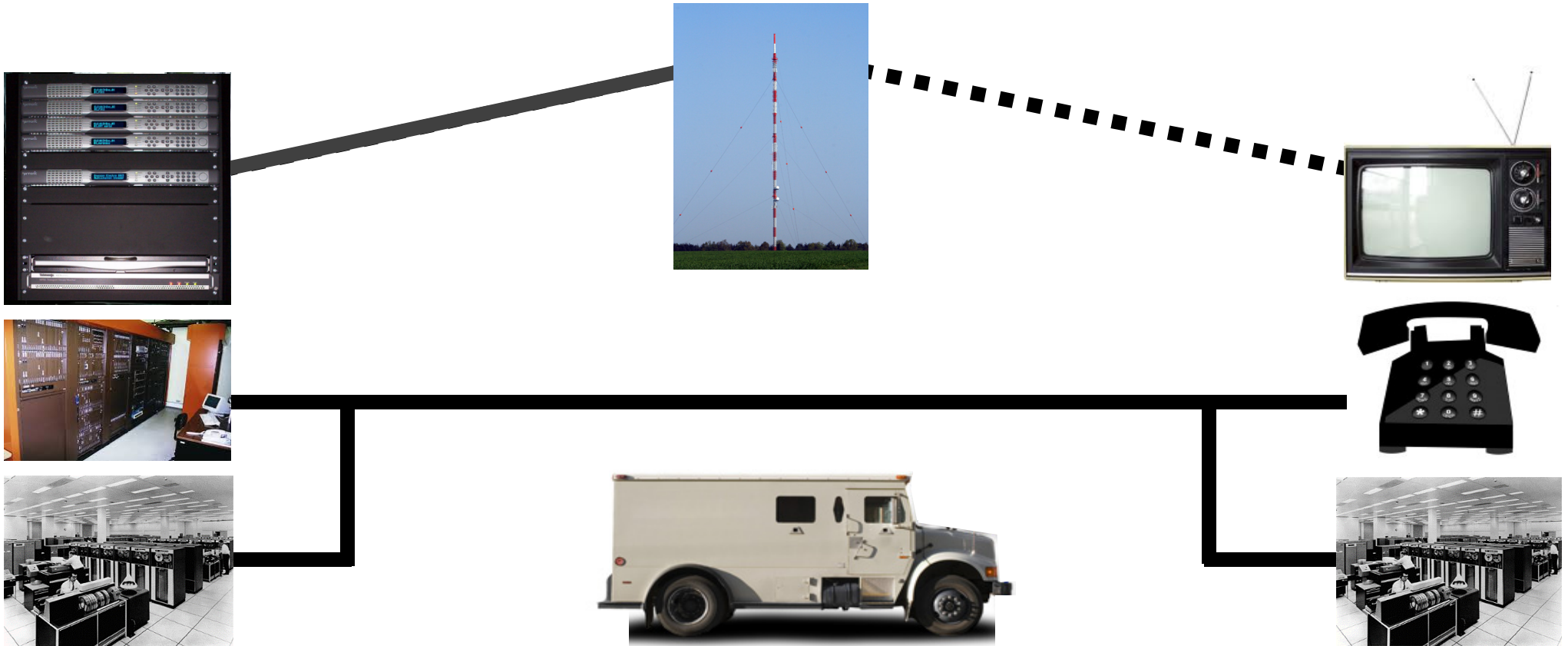
# Carl Russo

President and Chief Executive Officer

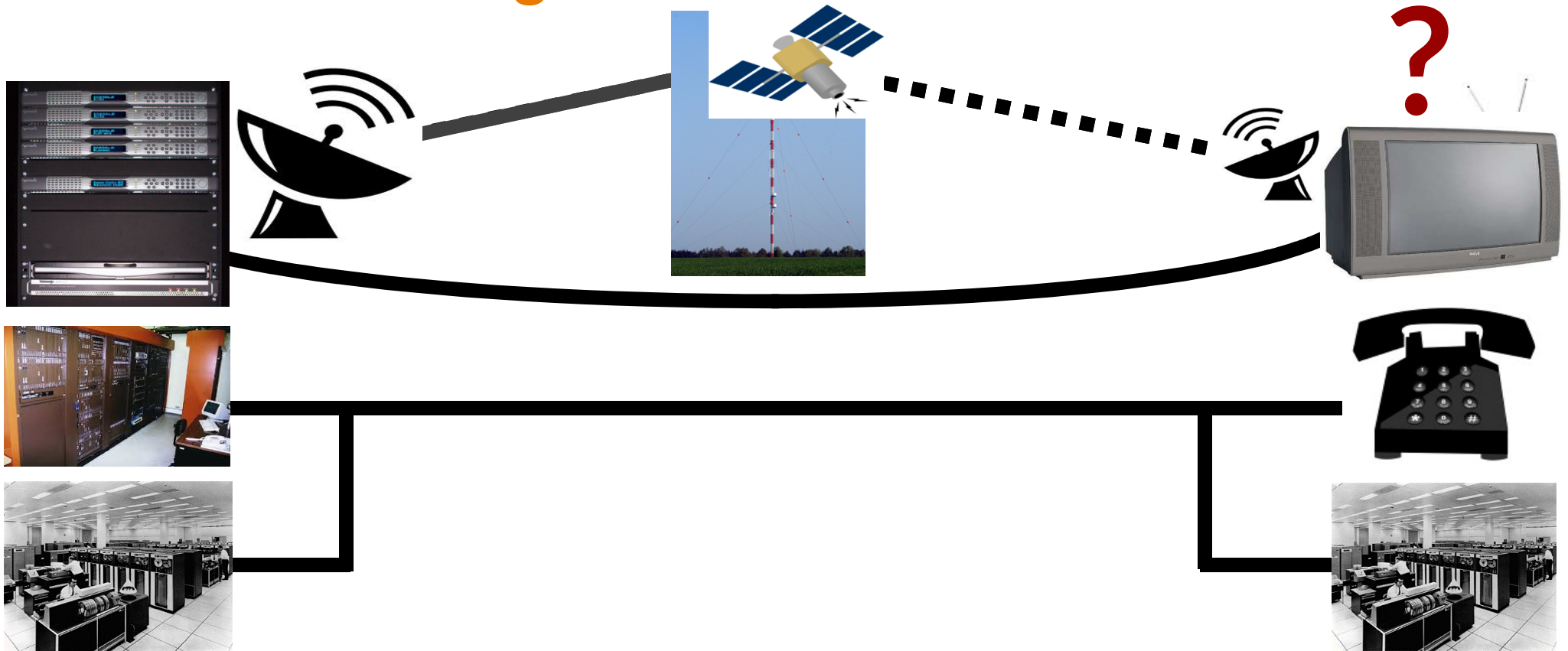
# Networks – 6 Decades of History



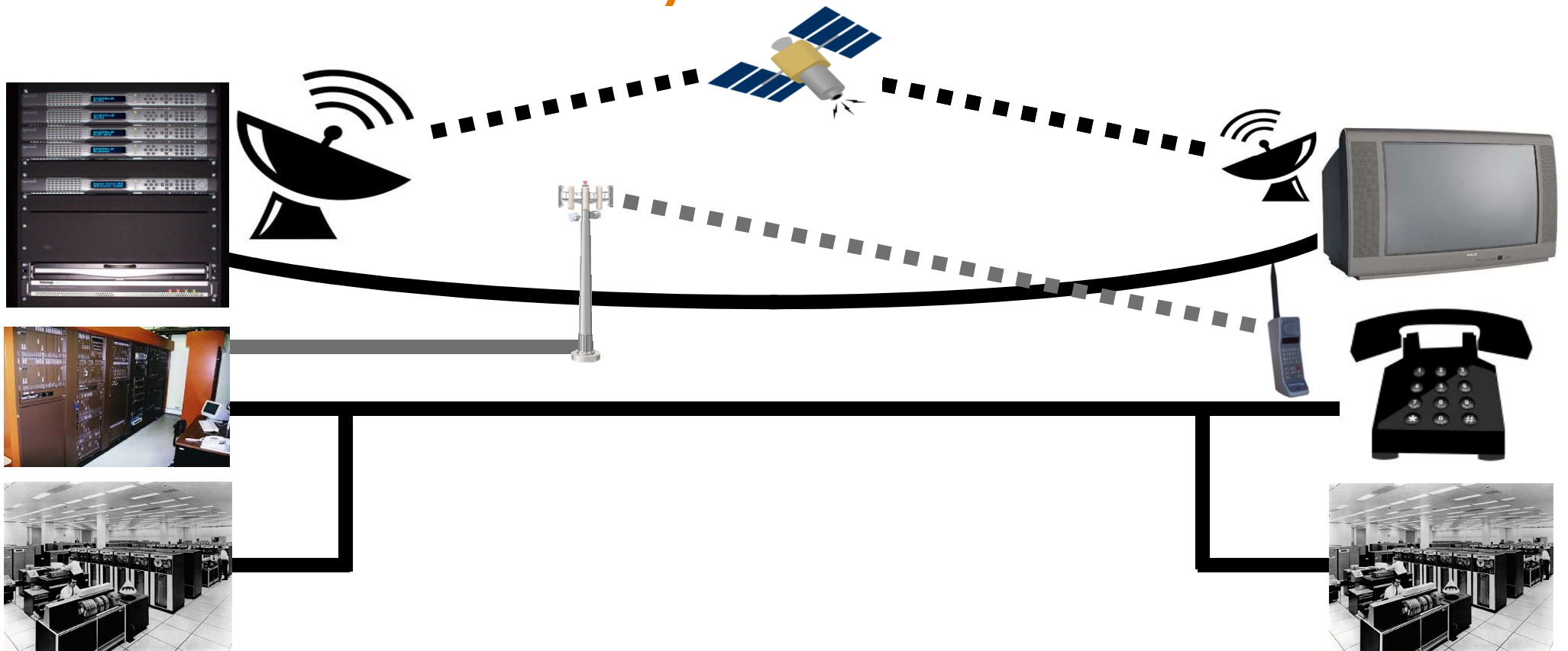
# Networks – Digitization Begins



# Networks – Digitization Continues

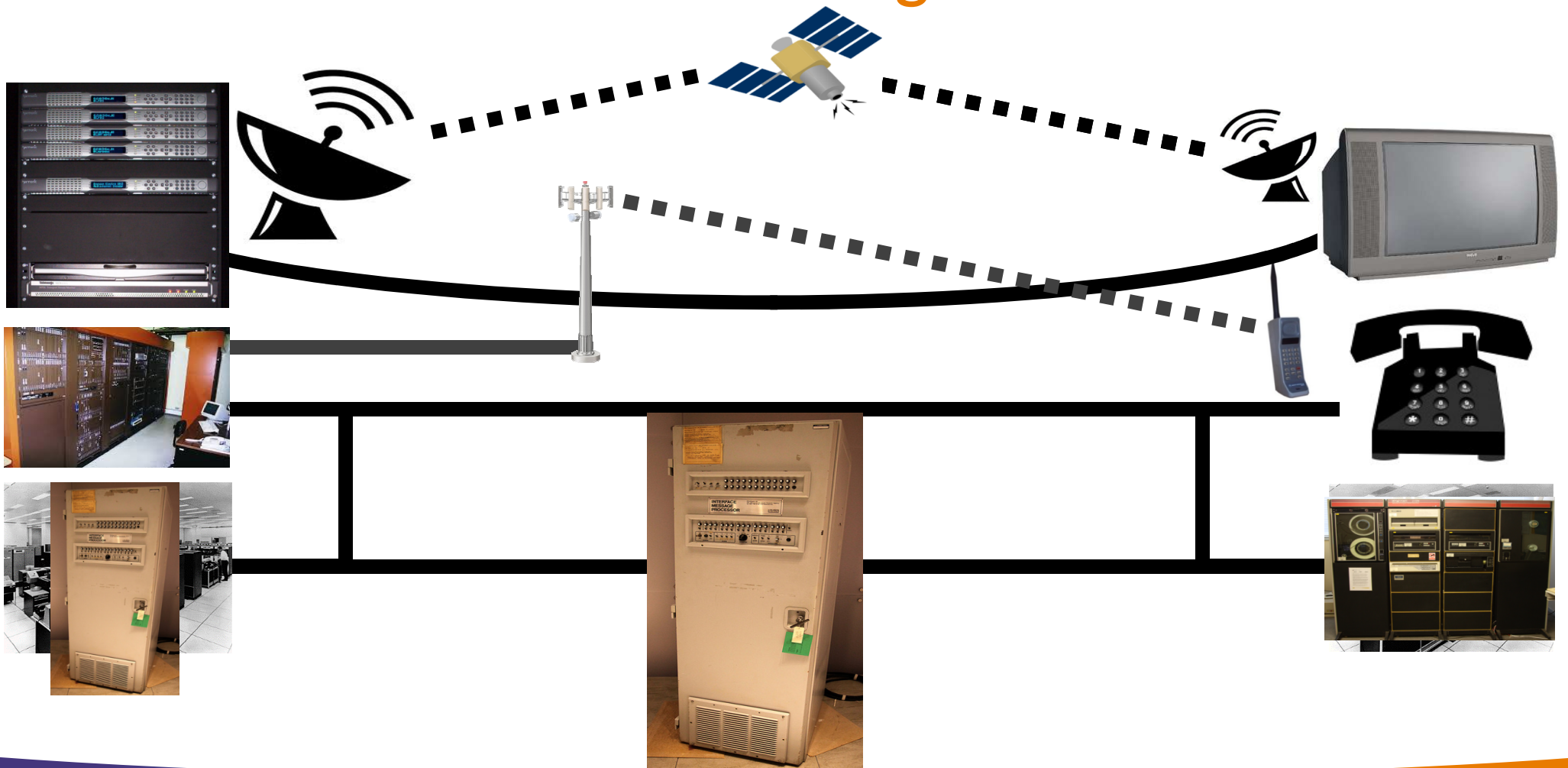


# Networks – Mobility !!

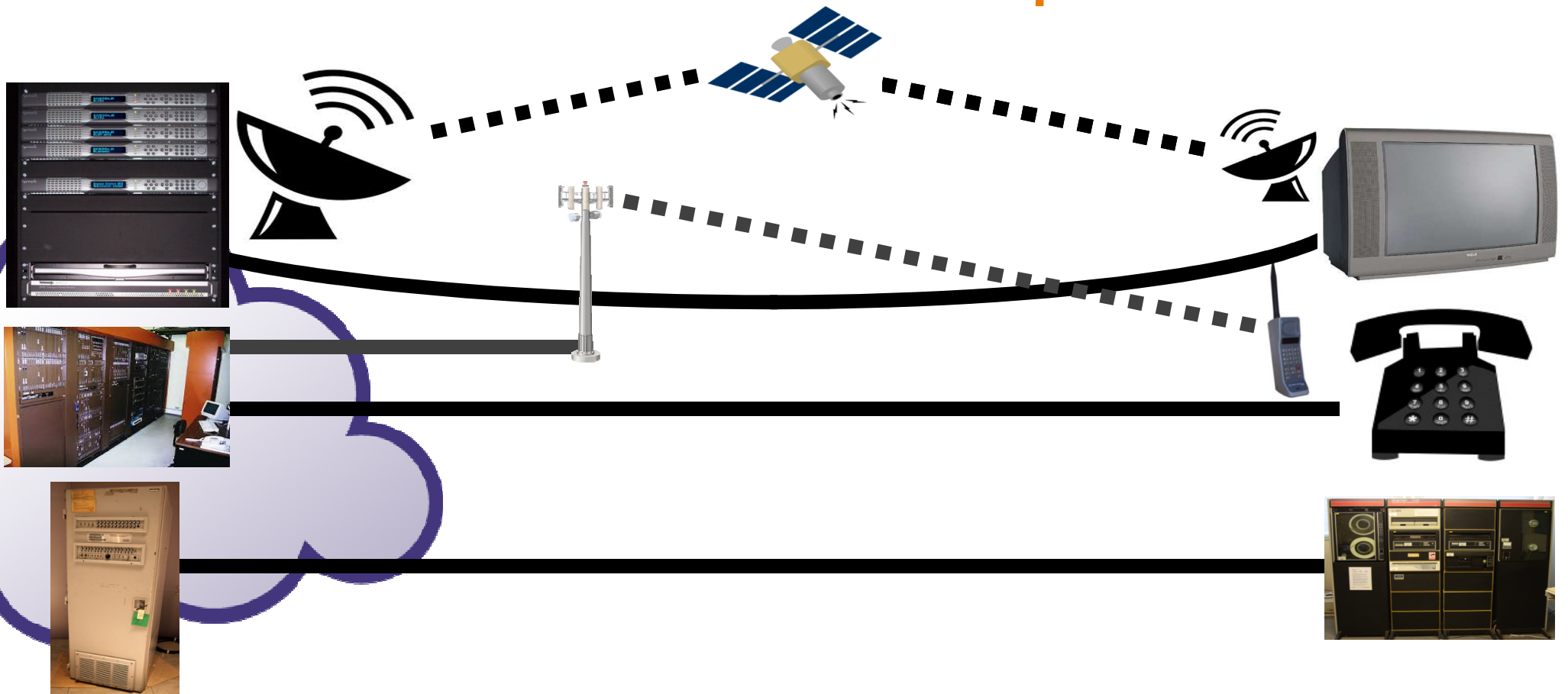




# Networks – The Internet Begins

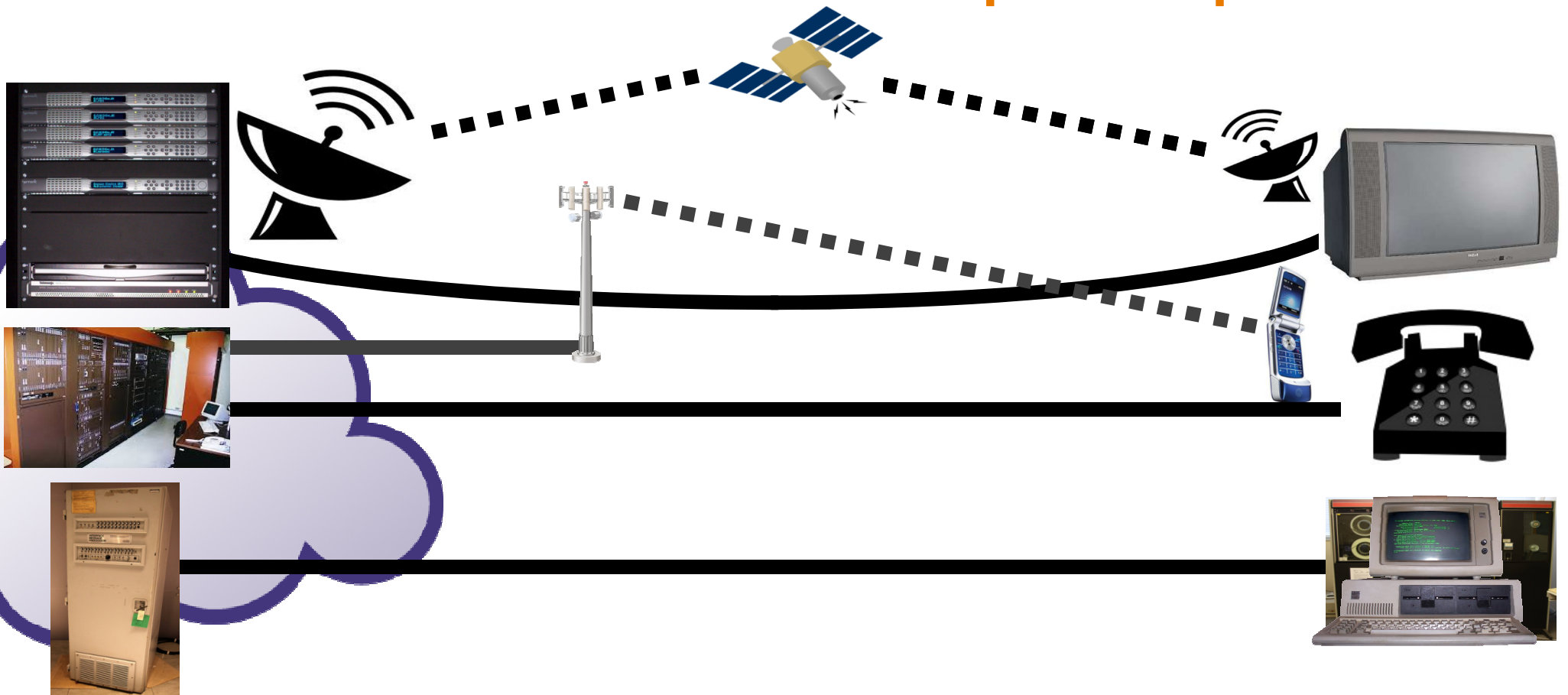


# Networks – IP Invades and Disrupts

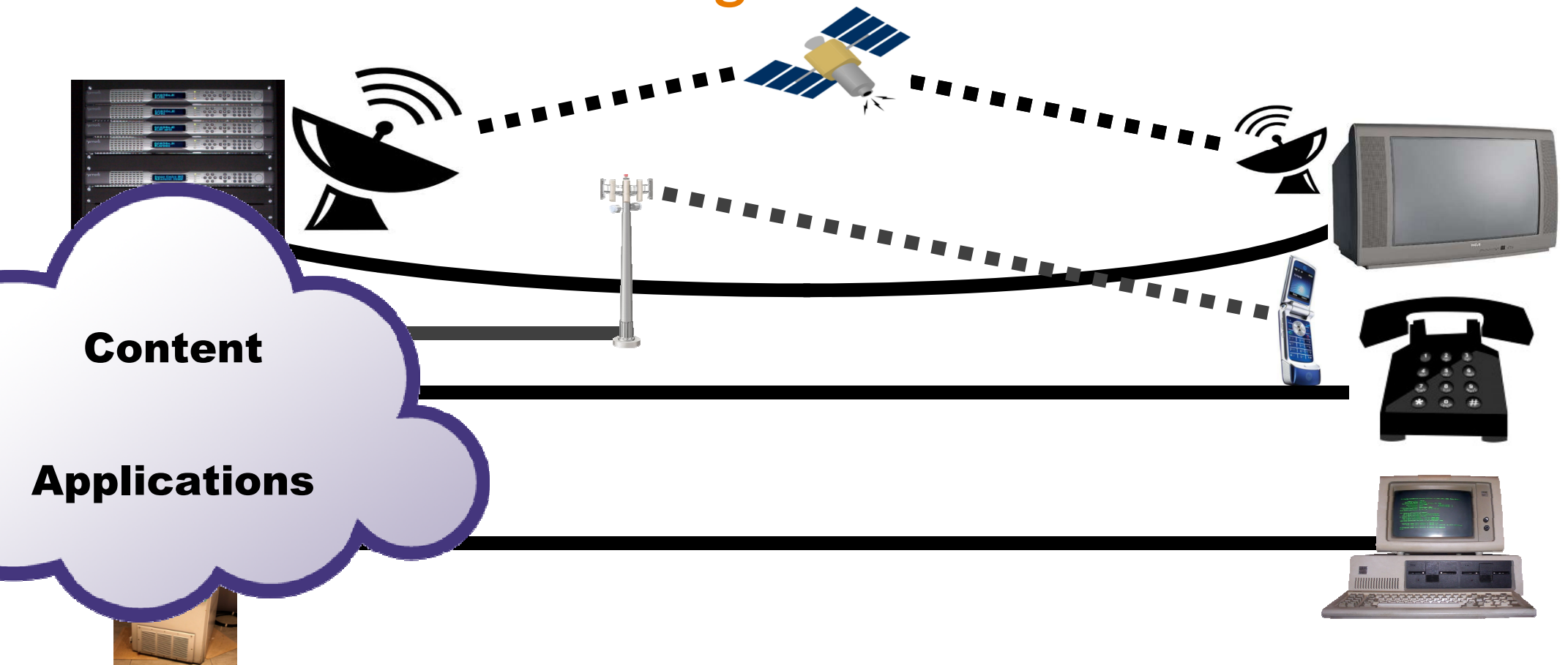




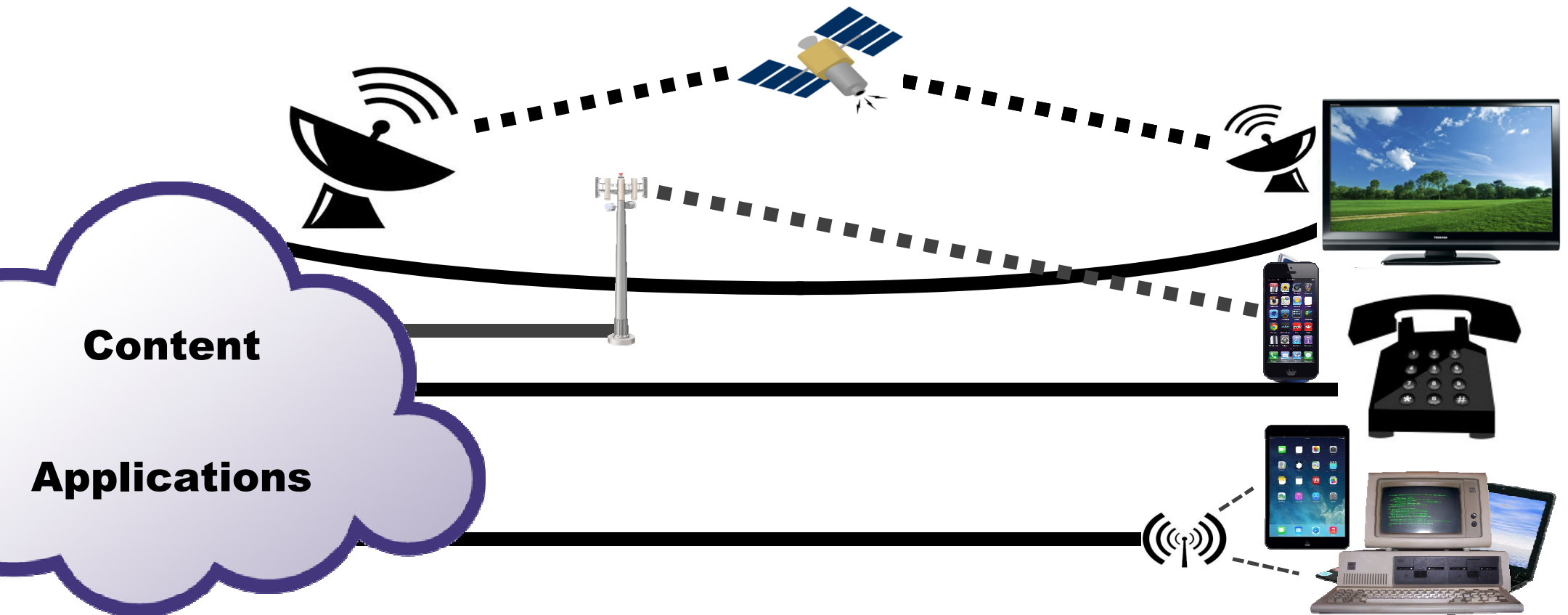
# Networks – Device Evolution Speeds Up



# Networks – Data Migrates



# Networks – Devices Evolve FASTER!!!

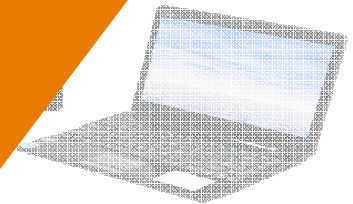
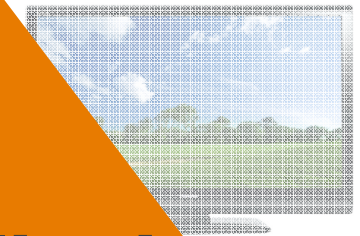


# Networks – TWO Irresistible Forces

**Economies  
of  
Scale**



**Personalized  
User  
Experience**



# Networks – TWO Irresistible Forces

One Simple Unified Access Infrastructure



**Economies  
of  
Scale**

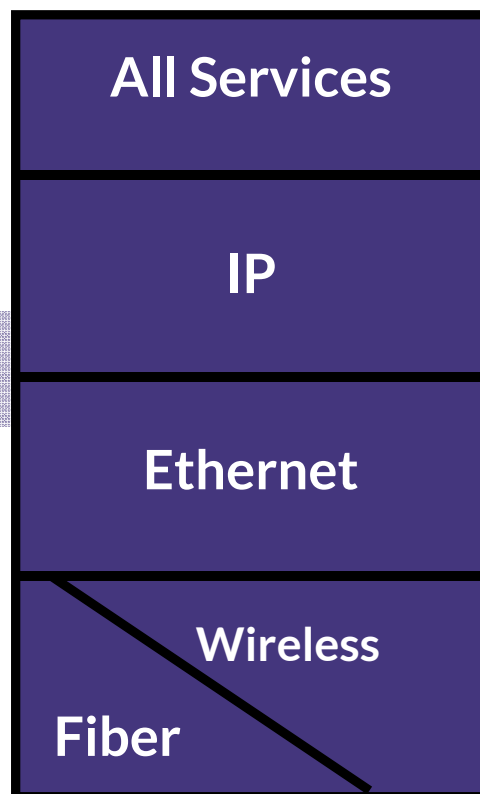
**Personalized  
User  
Experience**



# Networks – TWO Irresistible Forces

One Simple Unified Access Infrastructure

**Economies  
of  
Scale**



**Personalized  
User  
Experience**

# Access Network



# A Platform rEvolution!



# In 2011 we looked to the clouds

New Tools ... New Techniques ... New Opportunity



# In 2011 we looked to the clouds

New Tools ... New Techniques ... New Opportunity

## The Power of DevOPS

- Launched 500 major new features and services
- In one year

facebook  
vmware



# Data Center Innovations



- ◀ Linux / Open Source
- ◀ Virtualized Functions
- ◀ Containers
- ◀ Portability
- ◀ Software Defined

# Data Center Innovations What Works in Access?

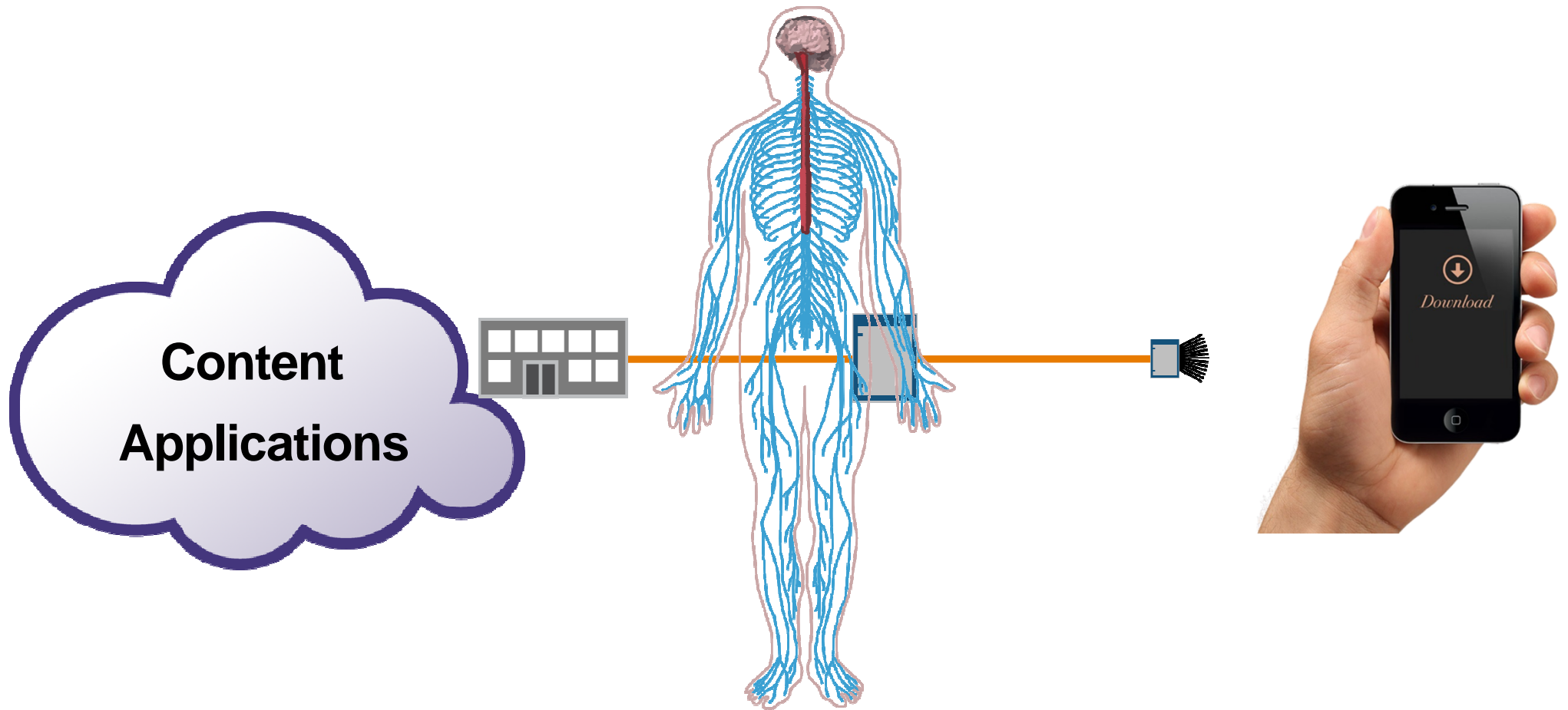


# A metaphor

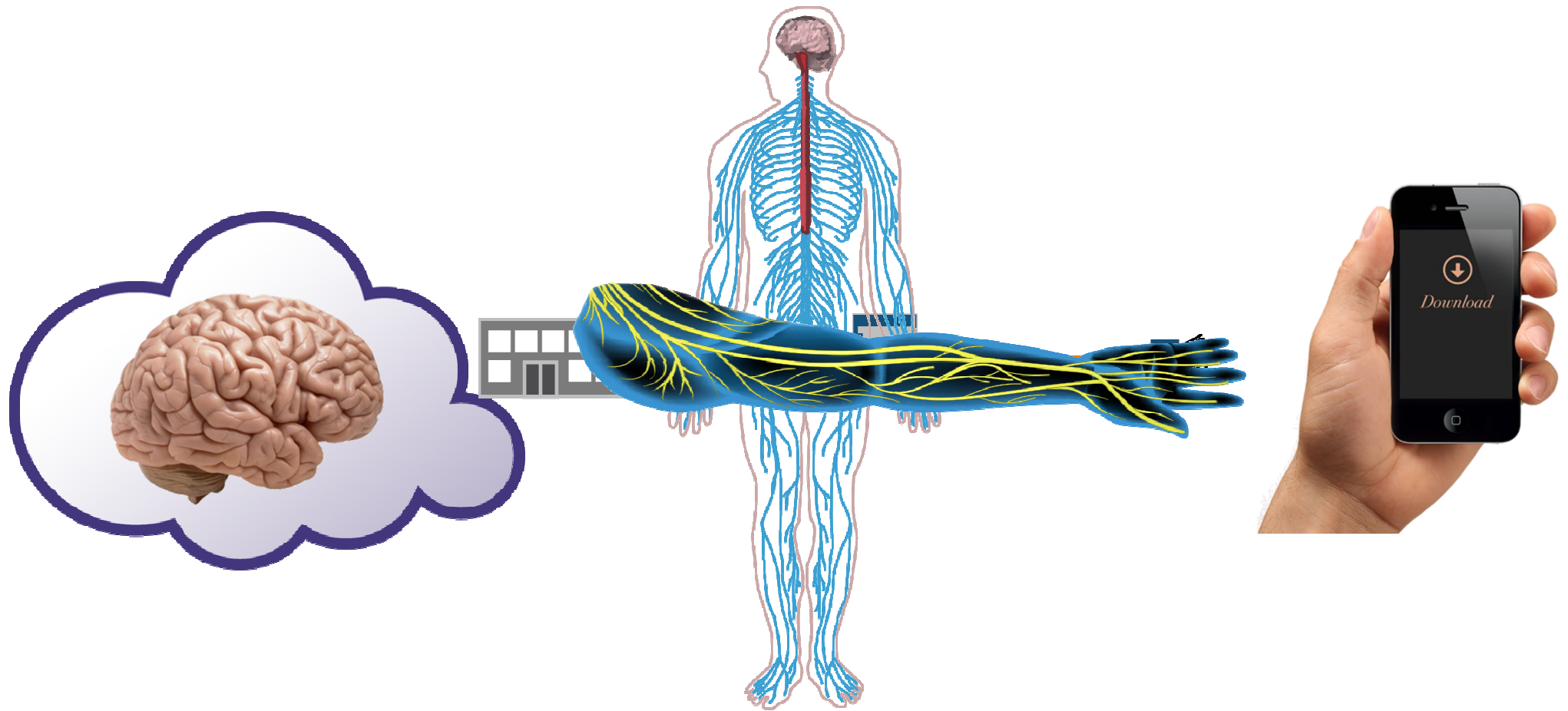




# A metaphor



# A metaphor



What's needed to complete the metaphor?

S oftware  
D eefined  
A ccess



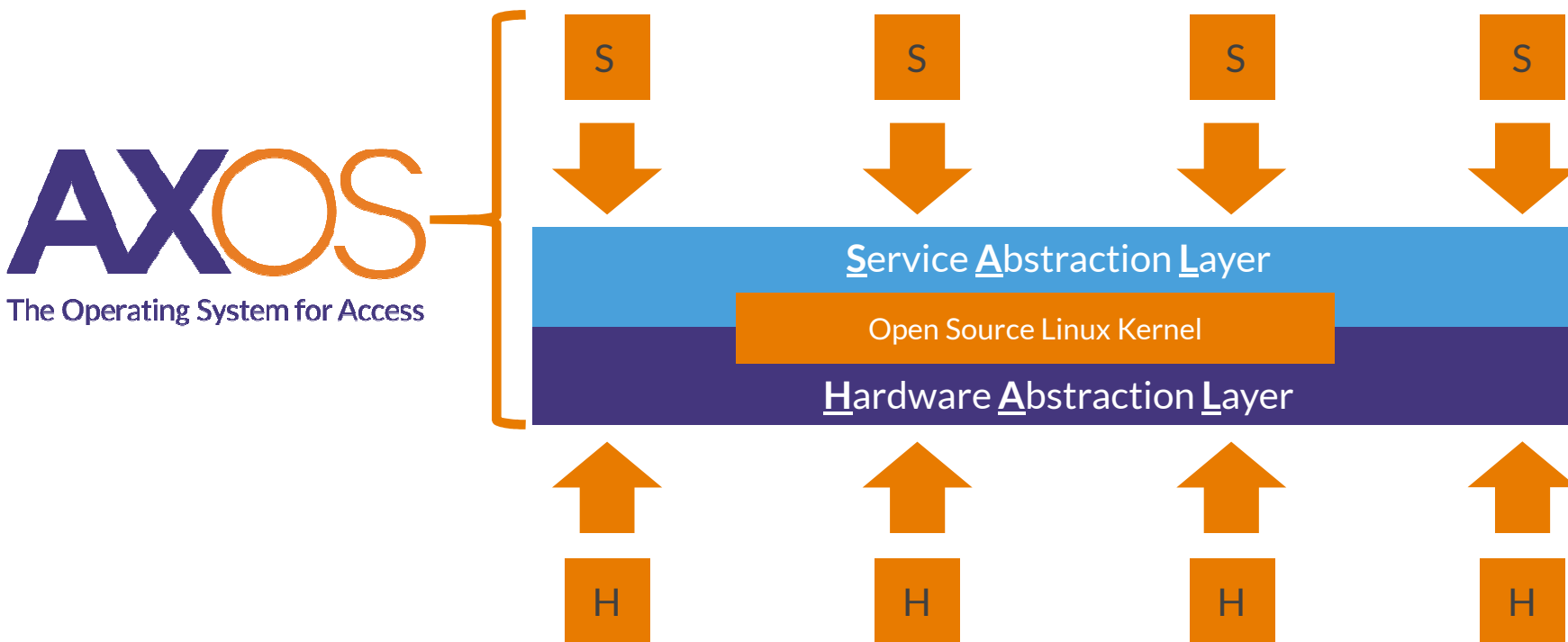
# Introducing...

**AXOS**  
Software  
Defined  
Access  
The Operating System for Access

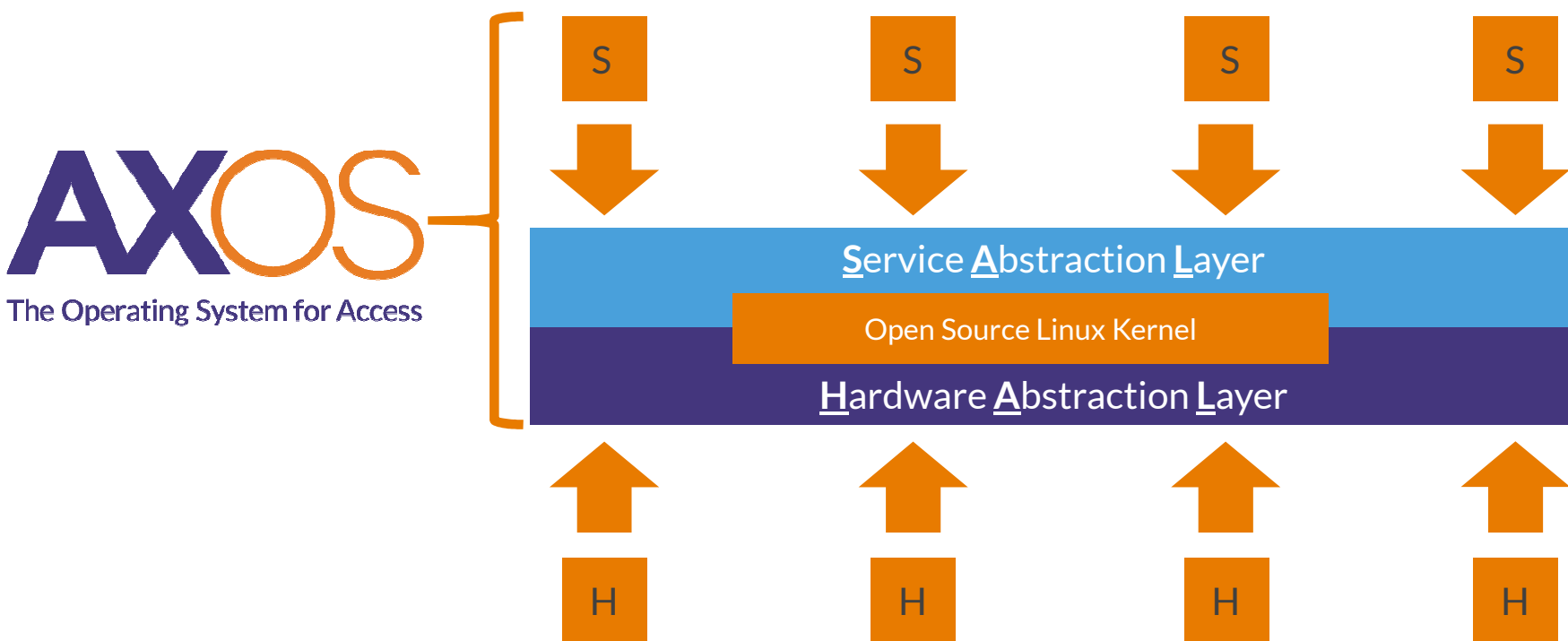
# How is it built?

Open Source Linux Kernel

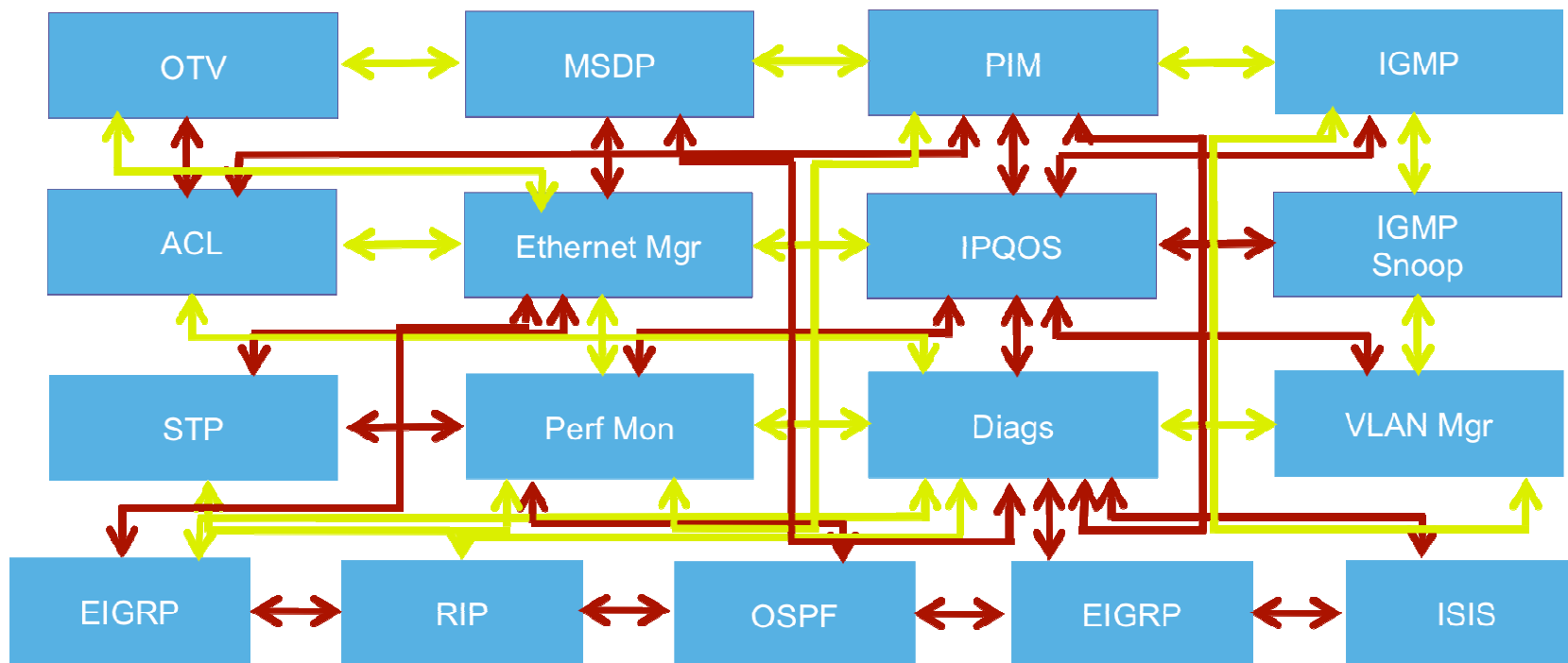
## How is it built?



# How is it different from a monolithic system?



## How is it different from a monolithic system?



# Way different!

User Interface Layer	REST	SNMP	NETCONF / YANG	CLI	VNF Hypervisor
Policy and Management Layer	License & Platform Profile Manager	PON Manager	Performance Monitoring	Audit	
	QoS Manager	Policy Discovery Manager	Platform Configuration and Upgrade	Diagnostics	
Protocol and Services Layer	OAM	Timing	Layer 3 Protocols	Host Services	future
	Topology & Discovery Protocols	Multi-service Control Protocols	Multicast Protocols	HQoS, Traffic Management	future
Protocol Framework Layer	Ethernet Interface Manager	DSL Interface Manager	L2 Forwarding DB Manager	Flow Manager	VLAN Manager
	PON Interface Manager	Multicast Resource Manager	L3 RIB Manager	MPLS DB Manager	future
Infrastructure Layer	Service Abstraction Layer				
	Hardware Abstraction Layer				



The Operating System for Access

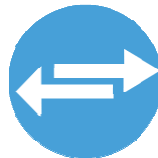
Accelerate Time to  
Revenue



~~2 years to certify  
and activate a service~~

Fast

Eliminate Service  
Disruptions



~~\$10B of Access  
downtime~~

Always On

Reduce Operational  
Complexity



~~60% of TCO related  
to Network Operations~~

Simple

# Michel Langlois

Senior Vice President, Systems Products

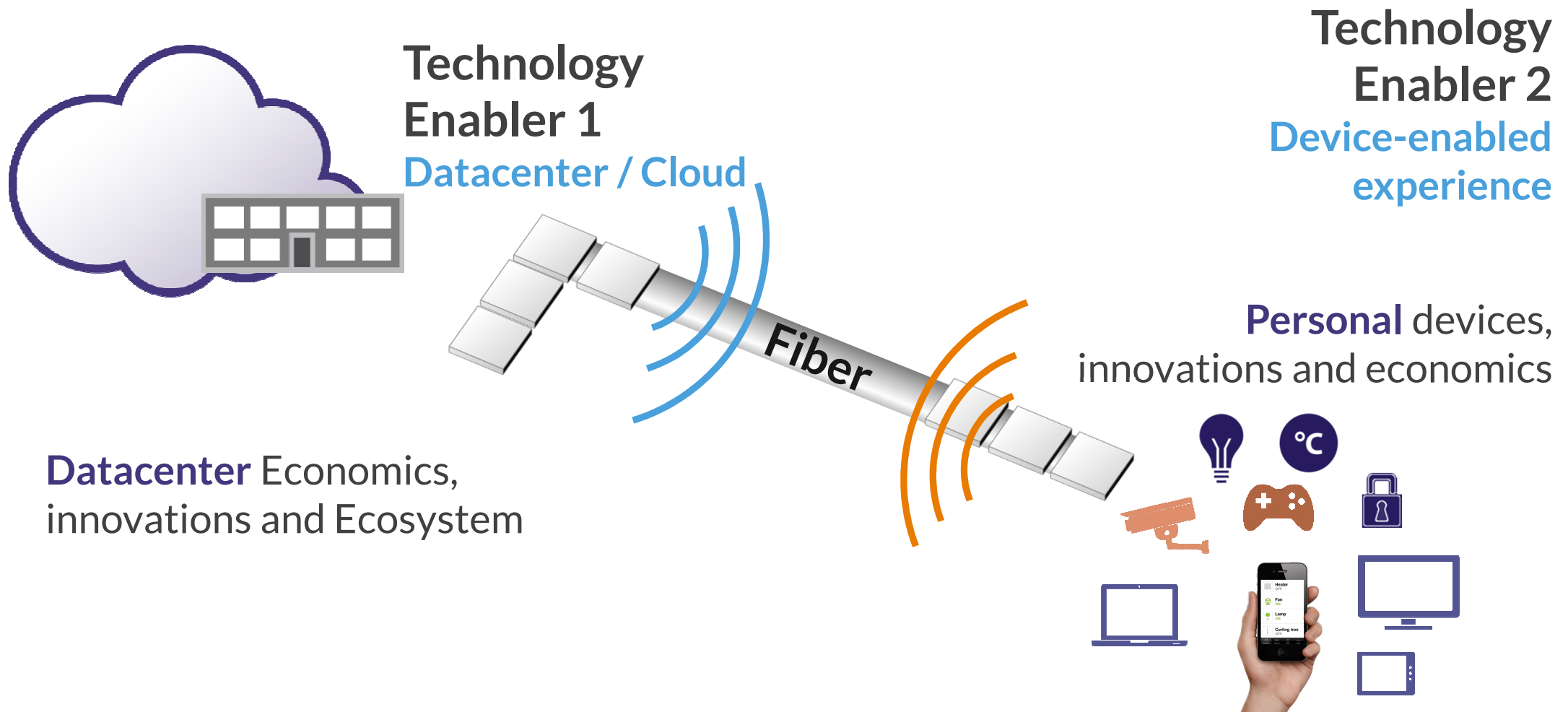


# Agenda

- 1 Macro drivers: Systems product strategy
- 2 Key tenets: AXOS strategy
- 3 Calix: Driving the network transformation
- 4 Why Calix?

# Macro drivers: Systems product strategy

# Influence of datacenter and device ecosystem



# Calix strategic axes

## Business Imperatives

- Cloud-based service model
- TCO reduction
- Elastic pool

## End of Access as you know it...

- Unified Access
- Elimination of constraints of reach, speed, costs



## Customer Experience

- Analytics and instrumentation
- Unmatched Wi-Fi performance
- Transparent gigabit experience

## Network Transformation

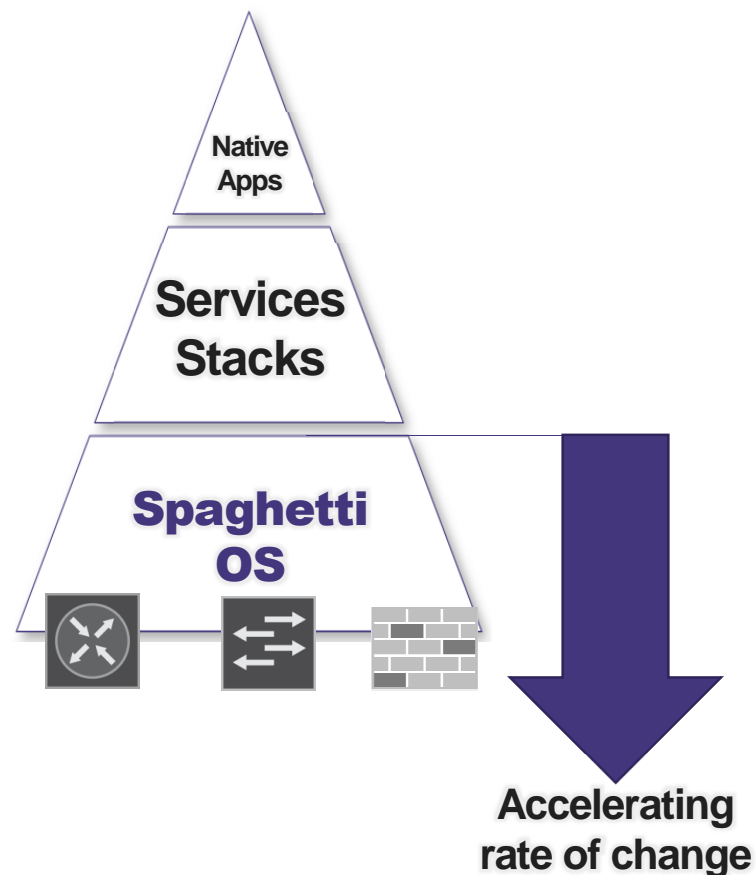
- Fiber evolution
- Copper evolution
- Wireless ( Wi-Fi + 5G )
- SDN/NFV integration

# Key tenets: AXOS strategy

# The past: Tightly-coupled networking software

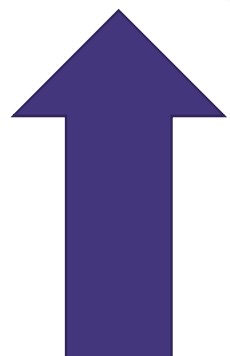
## Typical NOS Architecture

- Application enhancements require frequent base code changes
- No formalized programming interfaces (APIs)
- Private/Proprietary kernel Extension
- Large diverse systems with opposite needs
- Stateless modules
- No object model
- Deep integration with ASIC/Silicon



# AXOS software platform architecture goal

Accelerating  
rate of change



**On-box  
Off-box  
Applications**

**Services  
Modules**

**Pristine  
base  
gated  
OS**

- Structured like a disaggregated model
- Formalized programming interfaces (API)
- AXOS isolated from physical layer

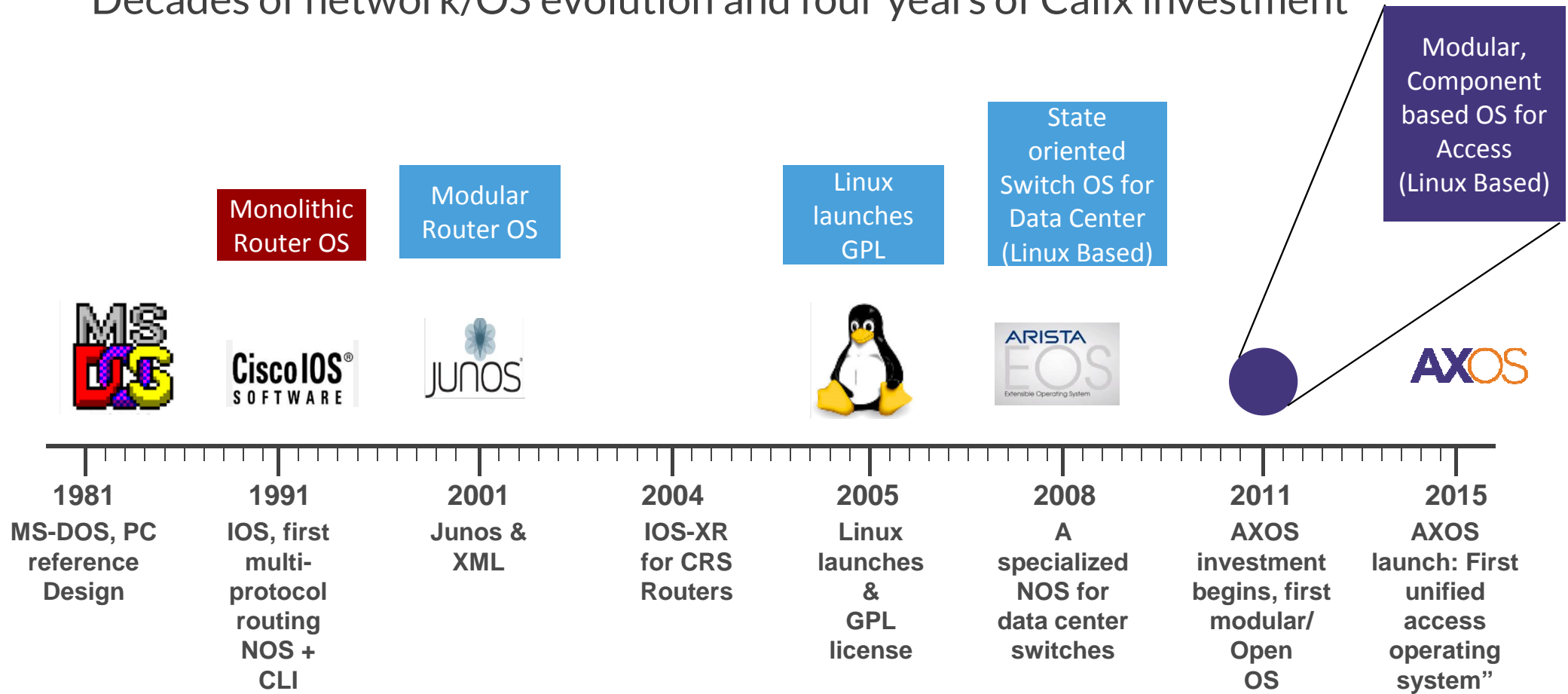
Compass/OSS/IT  
Integration

Integration	REST	SNMP	NETCONF / YANG	CLI	OF Config
MODULES	QoS Manager	Performance Monitoring	Platform Configuration and Upgrade	Diagnostics	Syslog
	OAM	Timing	Layer 3 Protocols	Host Services	Open Flow
	Topology & Discovery Protocols	Layer 2 Protocols	Multicast Protocols	Traffic Management	Multi-Service Protocols
AXOS Infrastructure	SERVICE ABSTRACTION LAYER/TRANSPARENT MOPS				
	HARDWARE ABSTRACTION LAYER				
Merchant Silicon / New Technology					



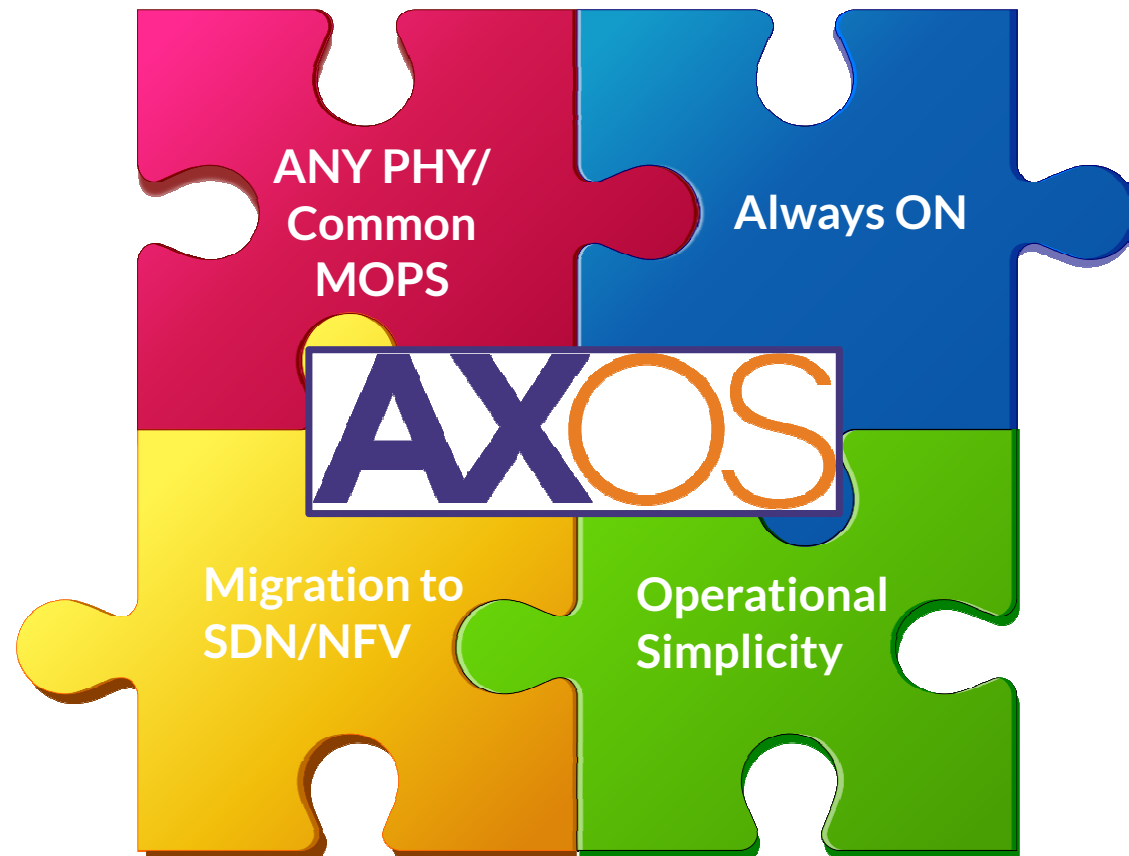
# The emergence of AXOS

Decades of network/OS evolution and four years of Calix investment

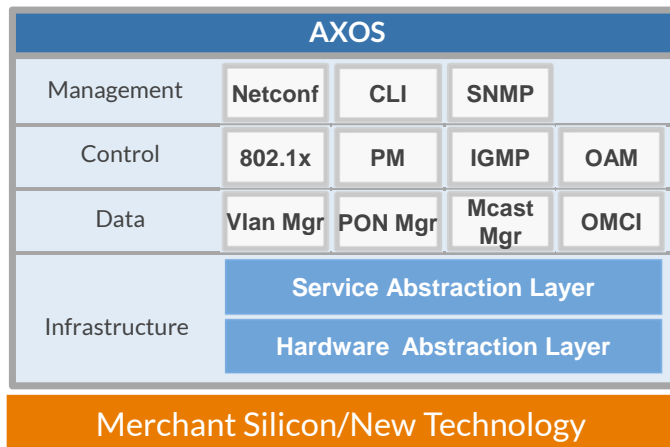




## Why is AXOS different?

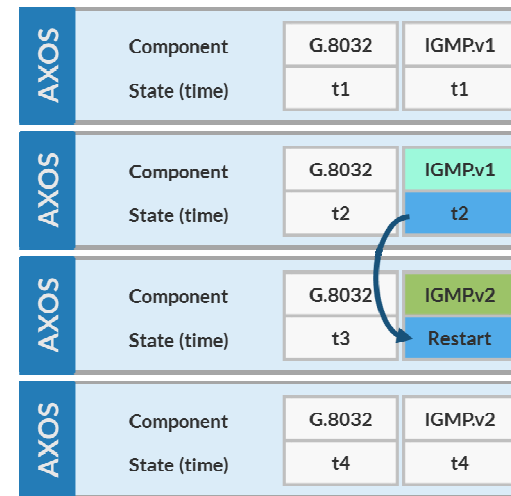


# Any PHY



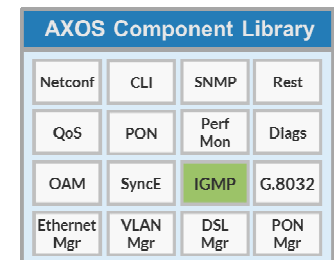
Deliver new products faster

# Always On



Stateful restart of upgraded Component IGMP

No Impact to other Component

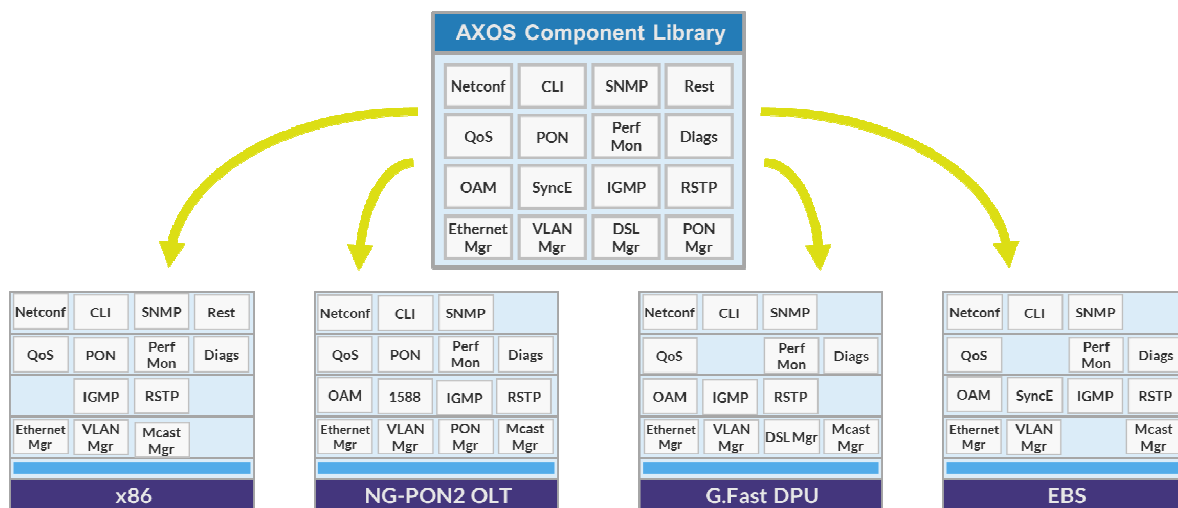


- Modular software components, upgraded independently
- Data plane decoupled from control and management planes

“Stateful” with modular containment for service restarts

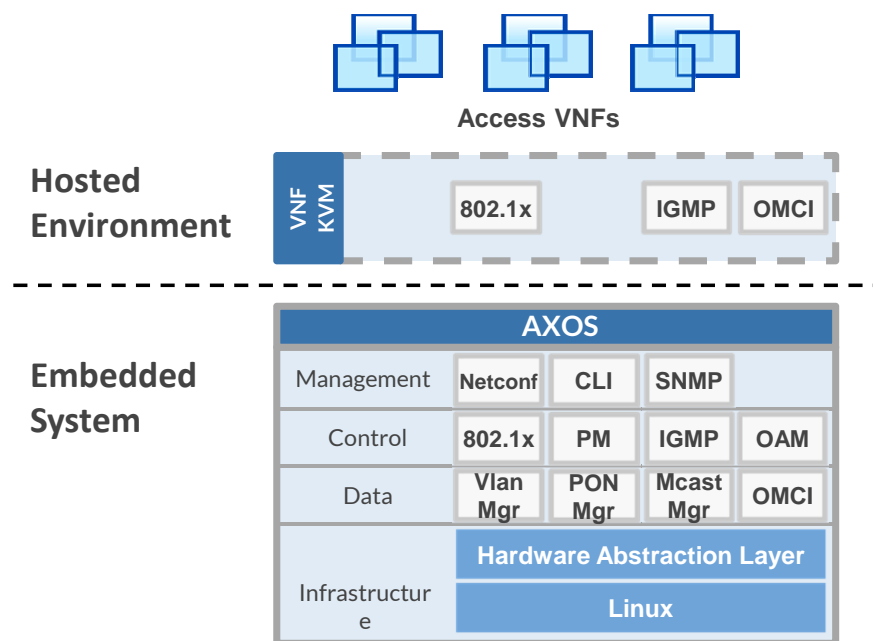
# Operational simplicity

- Common YANG models across portfolio
- Consistent customer experience
- Transparent MOPS across portfolio



Reduce total cost of ownership

# Migration on/off box



Integrated, distributed, virtualized

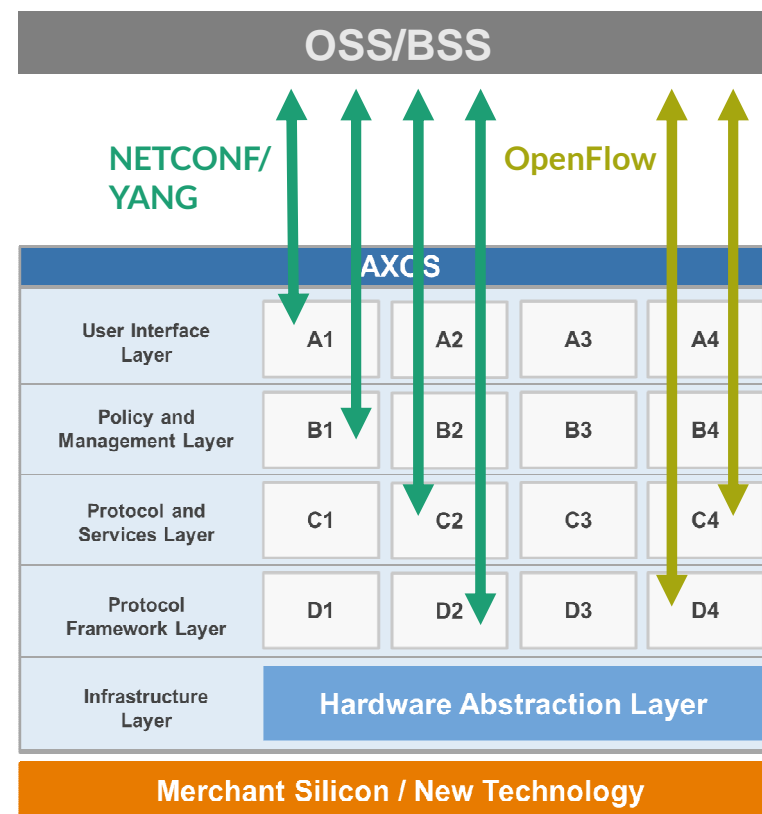
# AXOS brings an innovative path to SDN/NFV

## Adaptors for legacy OSS/BSS integration

- Support legacy OSS Interfaces (TL1, XML)
- Support new markets (OLC)

## Native SDN support

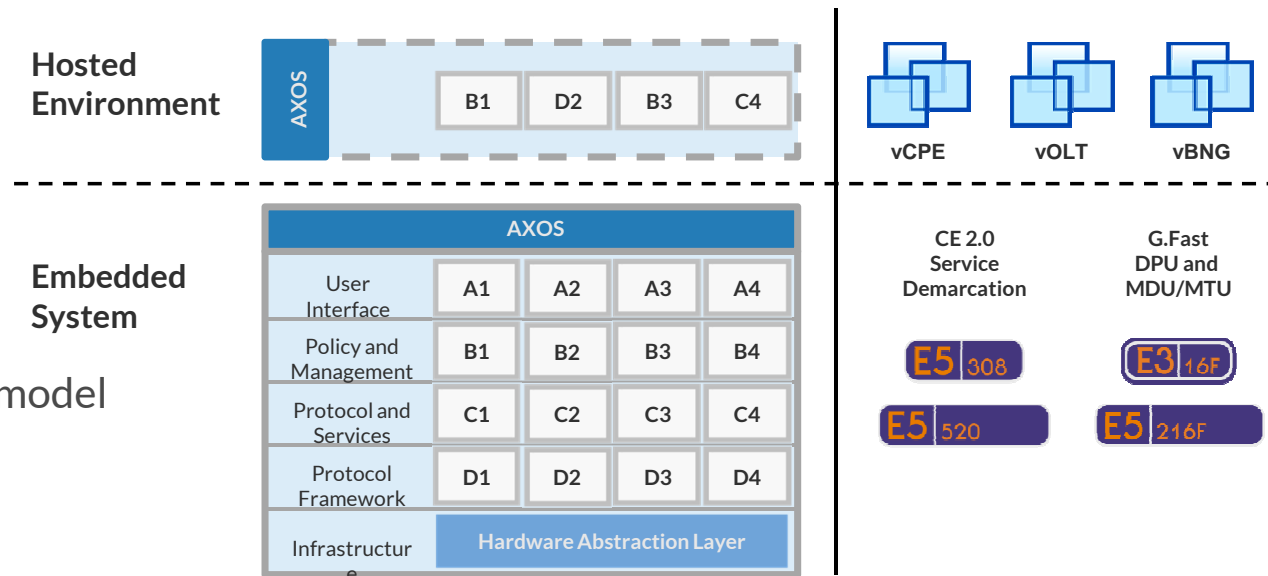
- Support multi-vendor, multi-domain, and open frameworks
  - Netconf / YANG
  - Openflow
  - ODL / ONOS support
  - SDN Controller Partners
- YANG model development
  - Ease of migration (GPON)
  - Standards (BBF)



# Our AXOS architecture is extensible

## Evolution to NFV

- AXOS portability
  - Evolution from onbox to x86
- vOLT/vBNG tenant apps
  - Increase value proposition
  - New revenue opportunities
- vNID evolution
  - Drive a new commercial services model
- vCPE evolution
  - Balance data center and CPE ecosystems

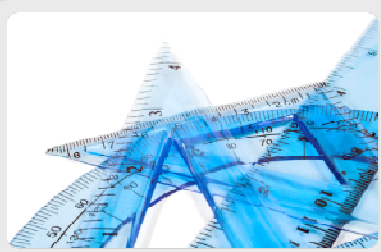


## Role of the data center

- NFV ecosystem partners
- Native x86 compute

# AXOS platform power

## VENDOR



### SPEED

- Solve a hard problem once
- Reuse successful components
- Leverage silicon innovation
- Can integrate Open Source value

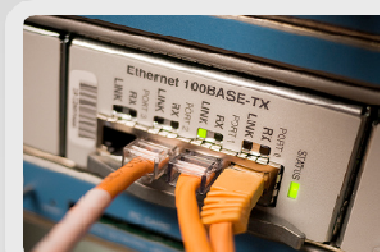
## PARTNERS



### INTEGRATION

- Tighter integration
- Broader opportunities
- Round out the portfolio
- Solution Ecosystem versus larger vendors

## SERVICE PROVIDER



### TCO

- Predictability
- Workflow Simplicity
- Extensibility (investment protection)
- Carrier class uptime
- Reduce OPEX

## CONSUMER



### EXPERIENCE

- Fast service activation
- Always ON network
- Device centric experience

# Shane Eleniak

Vice President, Product Line Leadership

# Driving Network Transformation



# Macro Trends

The SDN market could hit \$18B by 2018

## Market

Internet of Things Market to Reach \$1.7 Trillion by 2020: IDC

AT&T launches Supplier Domain Program 2.0

Tuesday 24 September 2013 | 11:36 CET | News

NFV Market to Grow More than 5-Fold Through 2019, Says IHS

## Access Technologies

PON is the leading FTTx architecture\*

G.fast, VDSL gain market share in broadband CPE market, says research firm\*\*

July 28, 2015 | By Sean Buckley

Next Generation FTTP Standard, NG-PON2, Begins to Emerge

7/17/12 at 2:56 PM by Bernie Amason

## Competition

Nokia is buying Alcatel-Lucent for \$16.6 billion

Arris to lay off 10% of its global workforce

FEBRUARY 23, 2016 20:44 EUROPE/LONDON BY ROBERT BRIEL

The Economist Chinese multinationals Who's afraid of Huawei?

\* Ovum  
\*\* IHS Infonetics

# What does this mean for Calix?

Alignment between four key areas:

## Aggressive competition:

- Own the subscriber experience across all markets

## Displacement of incumbency:

- OSS / IT Integration facilitated by SDN / NFV

## New Access Equipment purchasing cycle:

- Technology disruptions – G.fast, NGPON2, IoT, Managed Service Point

## Convergence of access architectures:

- Wireline | Cable | Wireless

Intelligent  
Service edges

+

Transparent access  
and the gigabit  
experience

+

AXOS

# Managed Service Point



Creating an unmatched quality of experience

## Carrier Class

- Unmatched performance and reliability

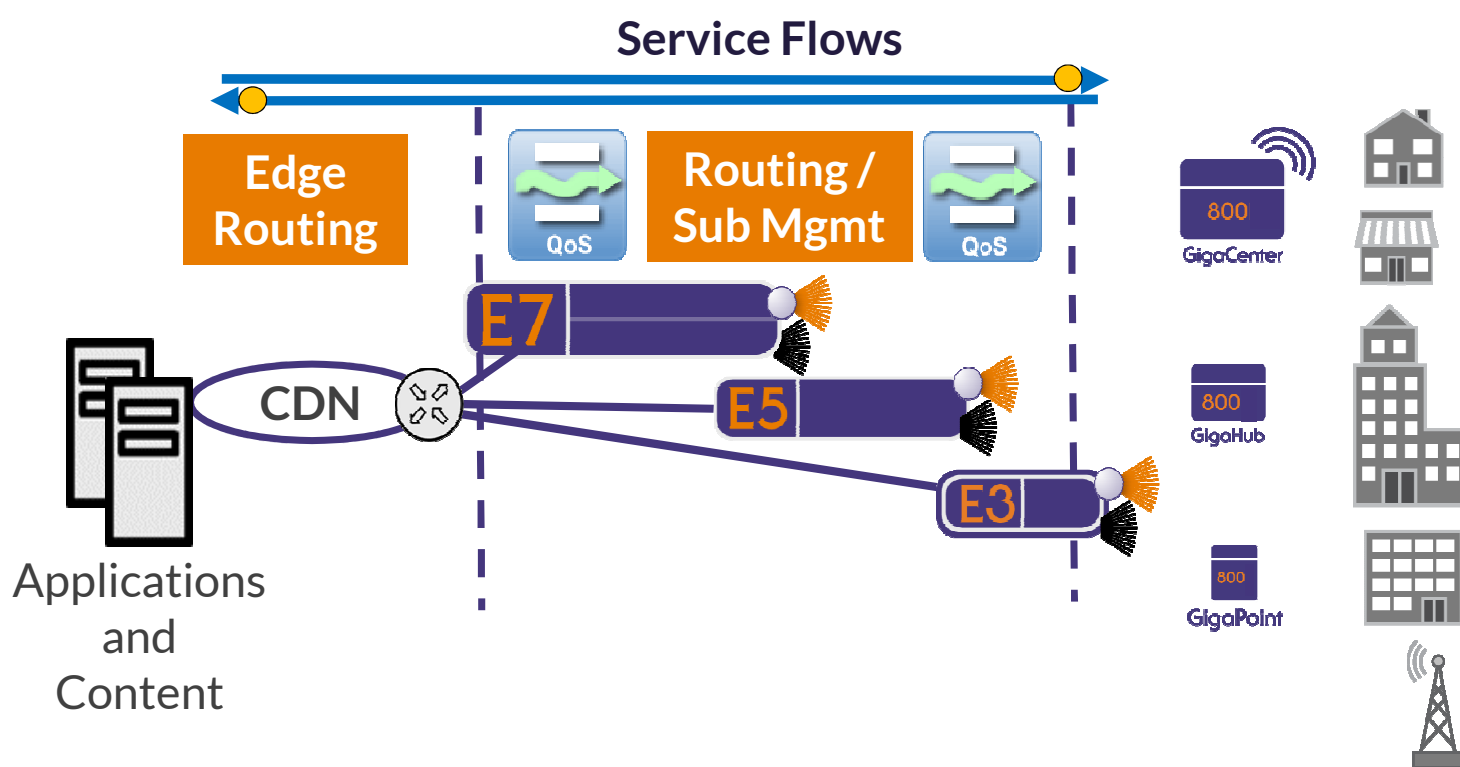
## Analytics

- Visibility into customer experience
- Wi-Fi performance, service flows, QoS and object tags

## Instrumentation and control

- Change the network based on analytic intelligence

# Increase access network intelligence



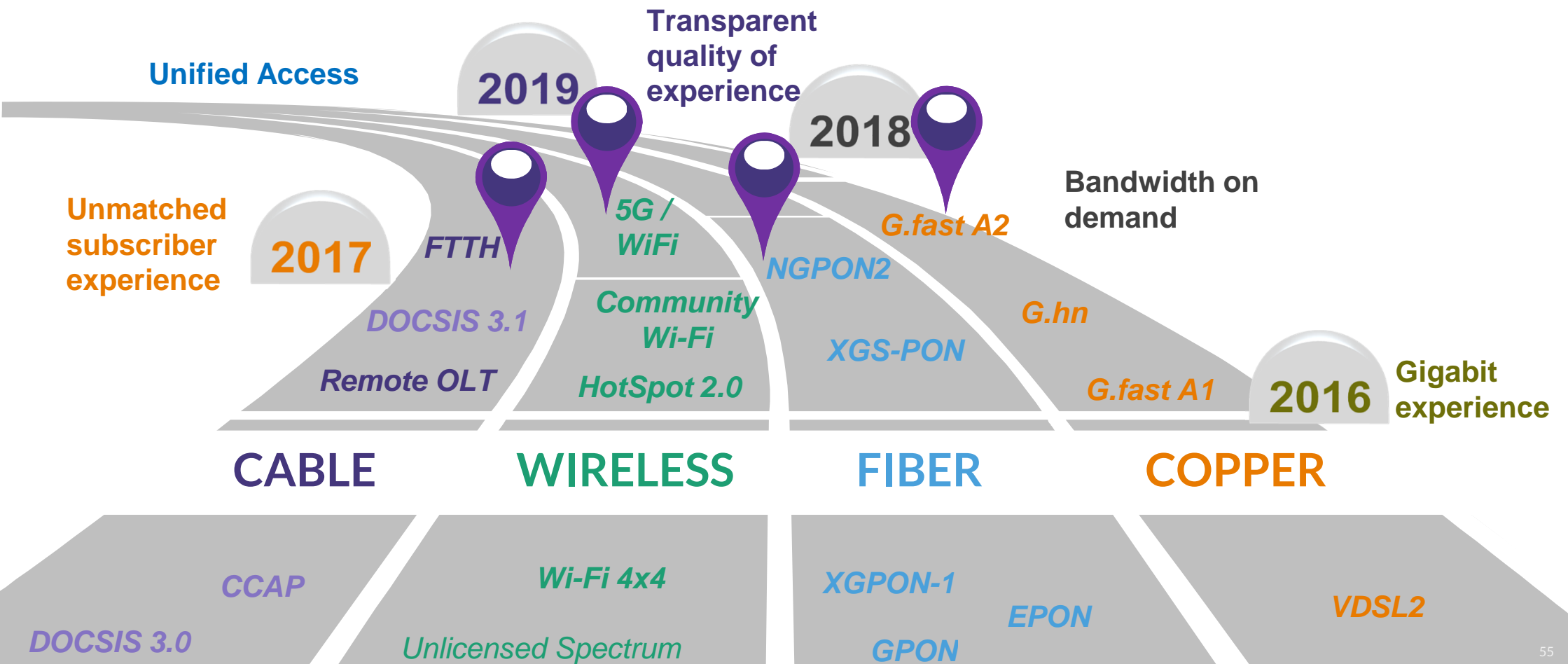
## Service flow awareness

- Basis for instrumentation and analytics
- Enable a flow-based service model

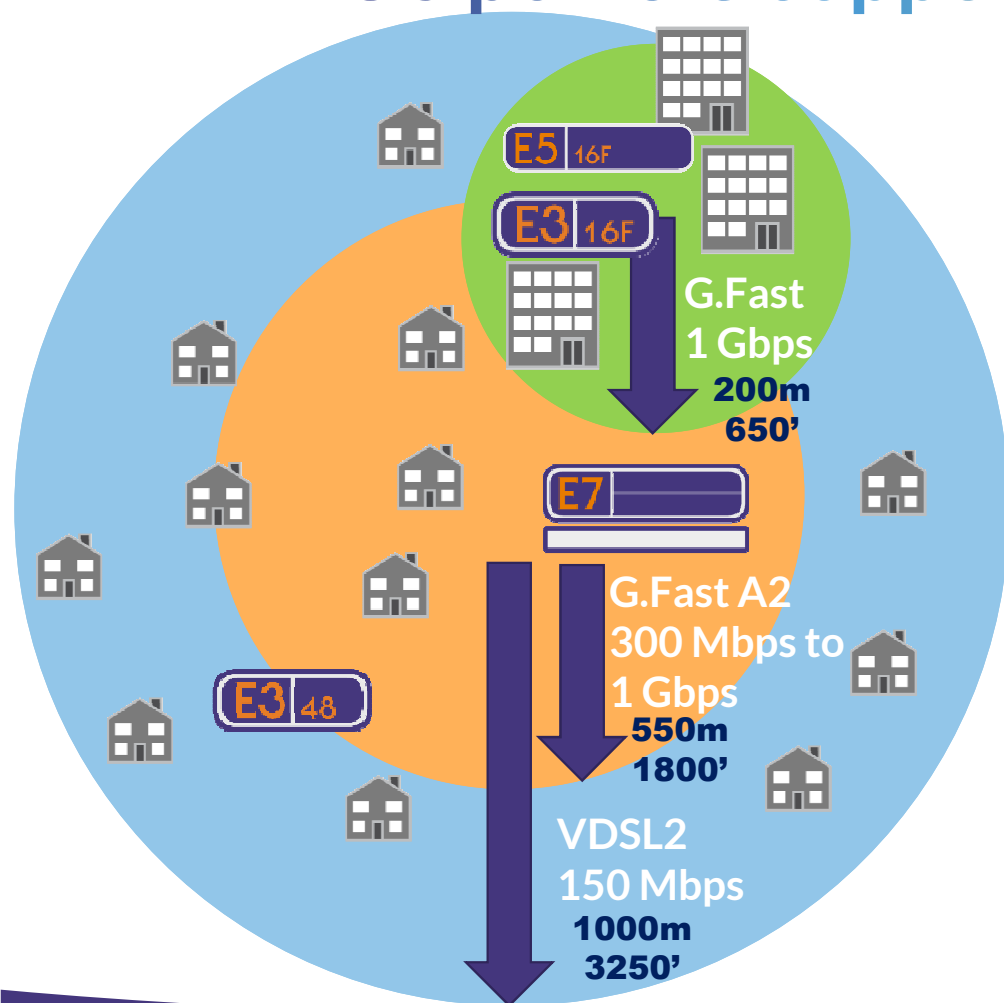
## Routing protocols

- Support consolidation of the services edge
- Enable Subscriber Management

# Network transformation



# AXOS powers copper transformation



## Best-of-breed copper technologies

- System level vectored and bonded VDSL2

## A gigabit experience over copper

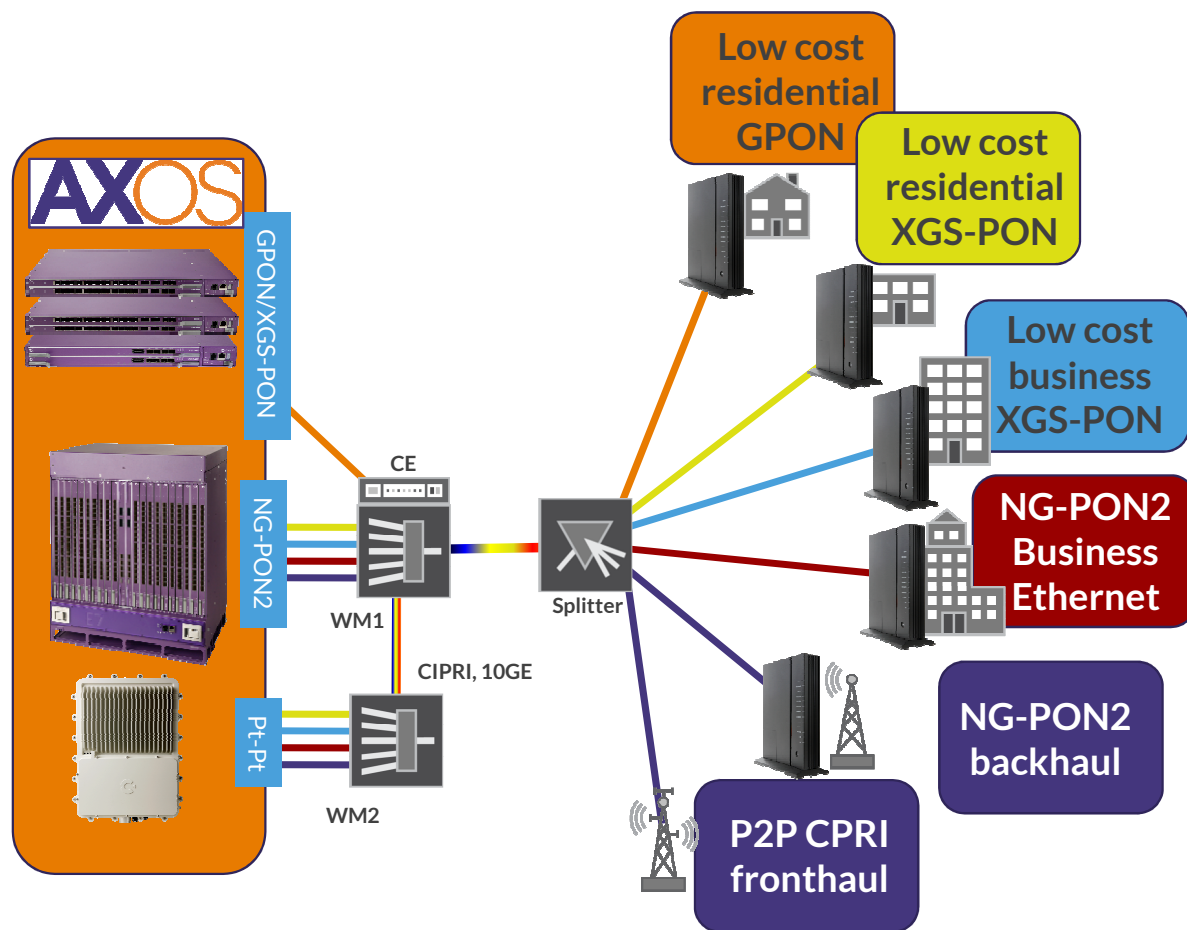
- Leverage G.fast and G.fast Amendment 2

15<sup>th</sup> Annual  
**Broadband**  
WORLD FORUM 2015

## Complete portfolio of MDU, DPU, and cabinet-based products

- Calix E7-2, E5, E3 Access Systems and nodes

# Ubiquitous next generation PON solutions



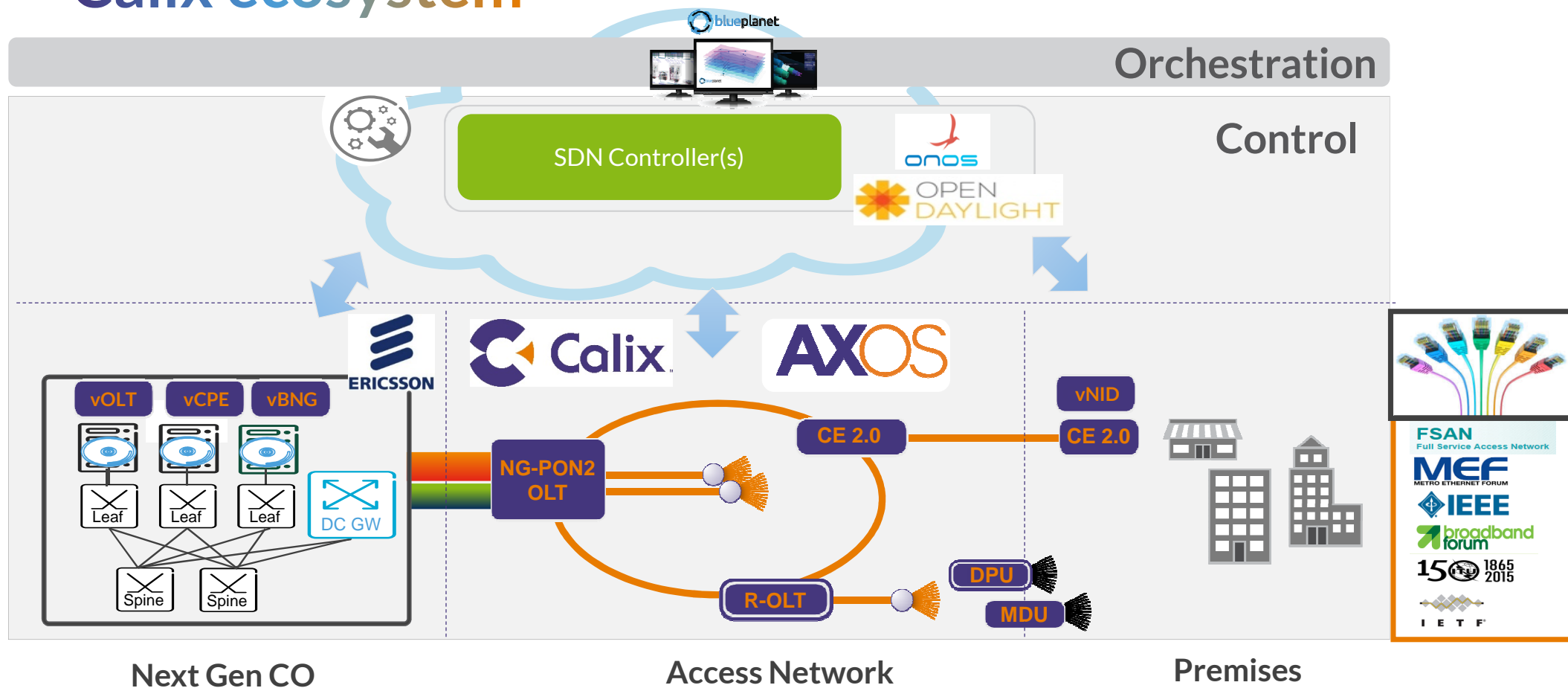
## Enable a transparent, converged network

- Bandwidth on demand
- PON agnostic
- Seamless migration
- Single converged network

## Complete family of products

- Central office / data center
- OSP
- Premises

# Calix ecosystem





# Why Calix?

# AXOS platform power

## Consistent Implementation



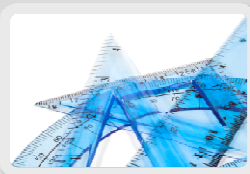
## Unified Architecture



## Extensible Interfaces



### VENDOR



#### SPEED

- Solve a hard problem once
- Reuse successful components
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- Can integrate Open Source value

### PARTNERS



#### INTEGRATION

- Tighter integration
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- Round out the portfolio
- Solution Ecosystem versus larger vendors

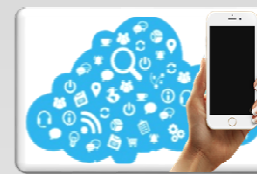
### SERVICE PROVIDER



#### TCO

- Predictability
- Workflow Simplicity
- Extensibility (investment protection)
- Carrier class uptime
- Reduce OPEX

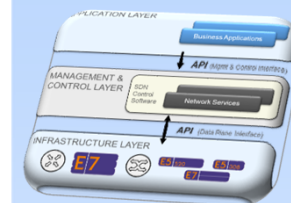
### CONSUMER



#### EXPERIENCE

- Fast service activation
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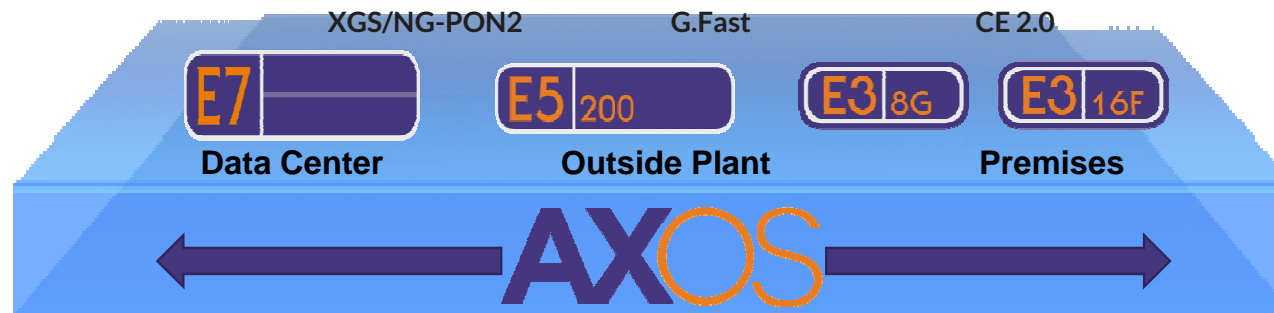
## SDN Native



## Standard-based

IETF RFC 6241  
YANG, Netconf  
TR-69

## Proven Resilience



# Systems product strategy tenets

## Intelligent Service edges

### New products

- Disaggregated and distributed systems
- Native SDN and NFV
- Portable across the access network and the cloud
- Flow based

## Transparent access and the gigabit experience

### Copper migration strategy

- Gigabit experience on copper

### Fiber migration strategy

- Converged network
- On demand capacity

### Premises strategy

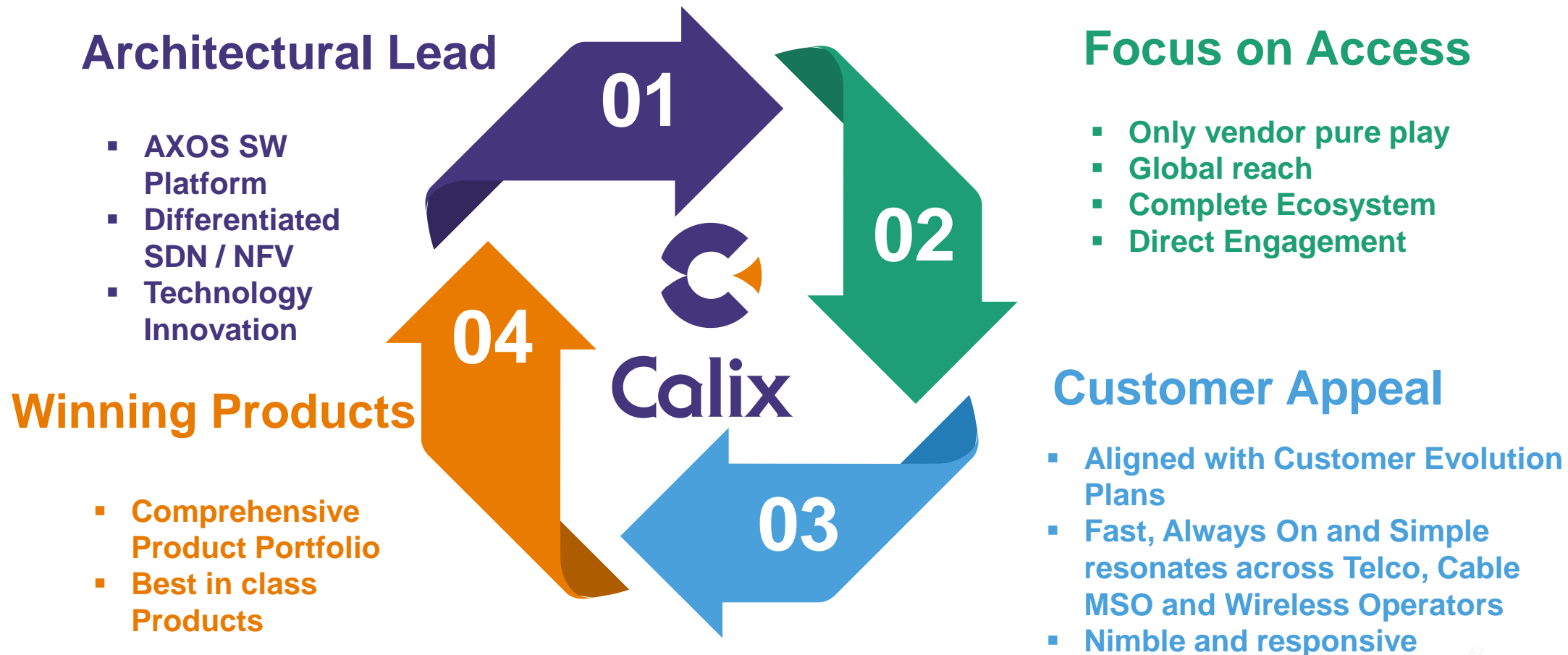
- Instrumented, controlled, managed services



### AXOS SW Platform

- Full hardware and service abstraction
- Activate new functions individually
- Live upgrades
- Self-diagnosis, self-healing and process auto-restart
- Open standards, open interfaces

# Calix Winning Strategy



## Three key platform development takeaways

AXOS changes the rules for how service providers can win in the future

Calix innovations are well-suited to take advantage of disruptive forces influencing the access network

Calix is driving changes to the access domain

# John Colvin

Senior Vice President, North America Sales

# Agenda

- 1 Calix sales engagement
- 2 Engaging with customers
- 3 Key customer needs
- 4 2016 initiatives

# Calix Sales Engagement

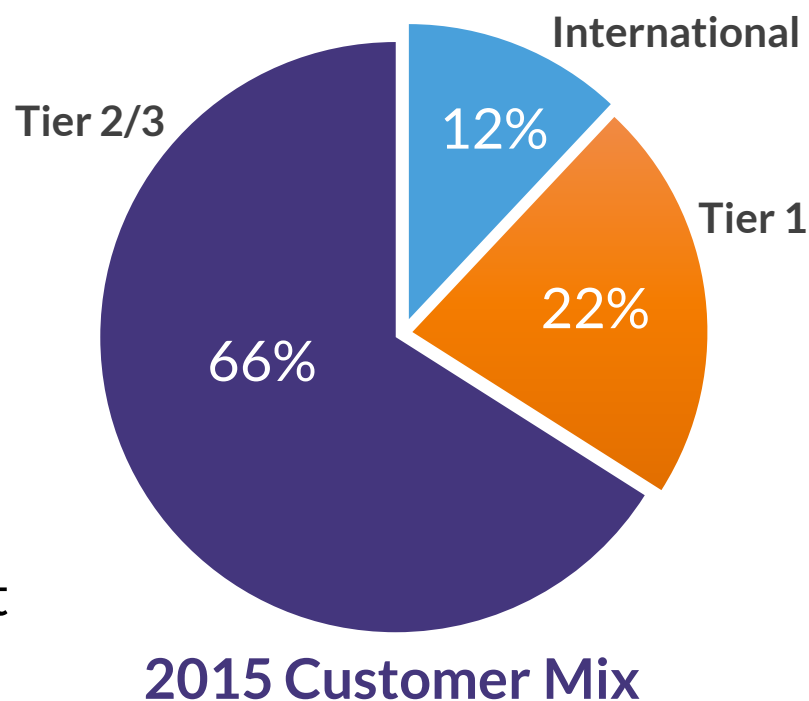


# Customer engagement leadership

Focus: Strategically aligned bookings



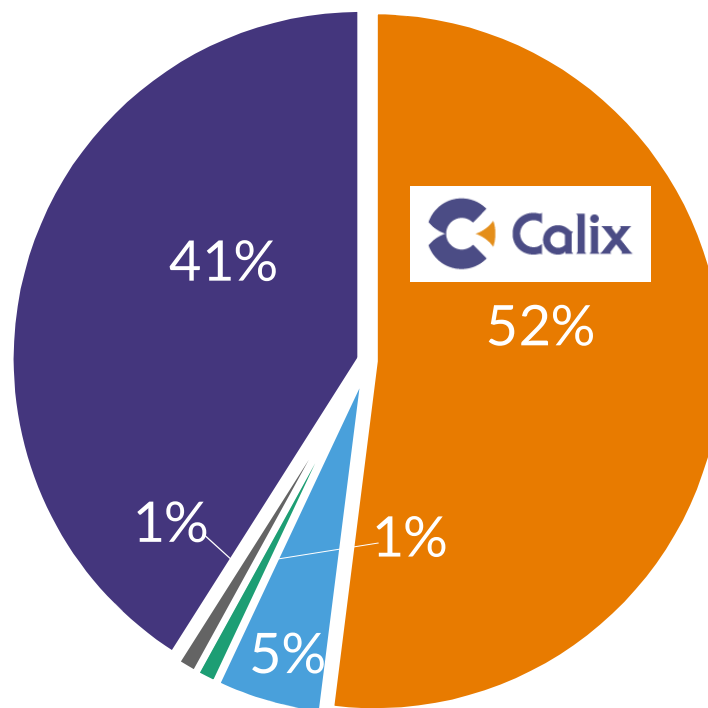
**John Colvin**  
Senior Vice President  
North America Sales



**Andy Lockhart**  
Senior Vice President  
International Sales

## Service providers love to work with Calix...

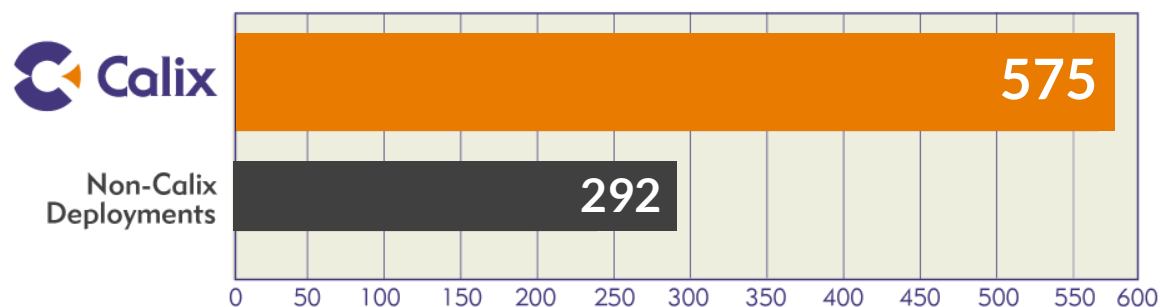
We are the North American market share leader in GPON OLT revenue...



*Infonetics, September 2015*

## Service providers love to work with Calix...

We have nearly twice as many FTTP deployments in North America as all other vendors combined...

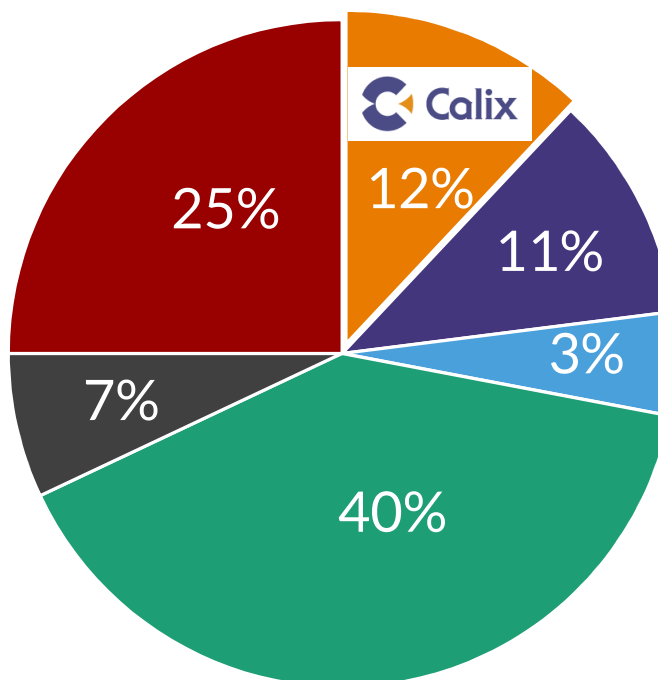


*Broadband Communities, November 2015*

## Service providers love to work with Calix...

We have grown to become a “Top 3” FTTP vendor globally over the last 5 years...

Worldwide FTTP  
(GPON) OLT  
Q3 2015, Revenue



Infonetics, September 2015

We have 1300+ customers globally ... and growing



Calix is deployed in over 100 countries

# How? An unwavering focus on alignment

Calix processes aligned with customer and market needs

## Customer focus—CEP

Customer Engagement Process

- **Goal:** Simplify
- **Metric:** Customer satisfaction
- **Execution:** Ensure customer success



## Product focus—AIM

Agile Innovation Methodology





Visionary



Consultative



Engaged

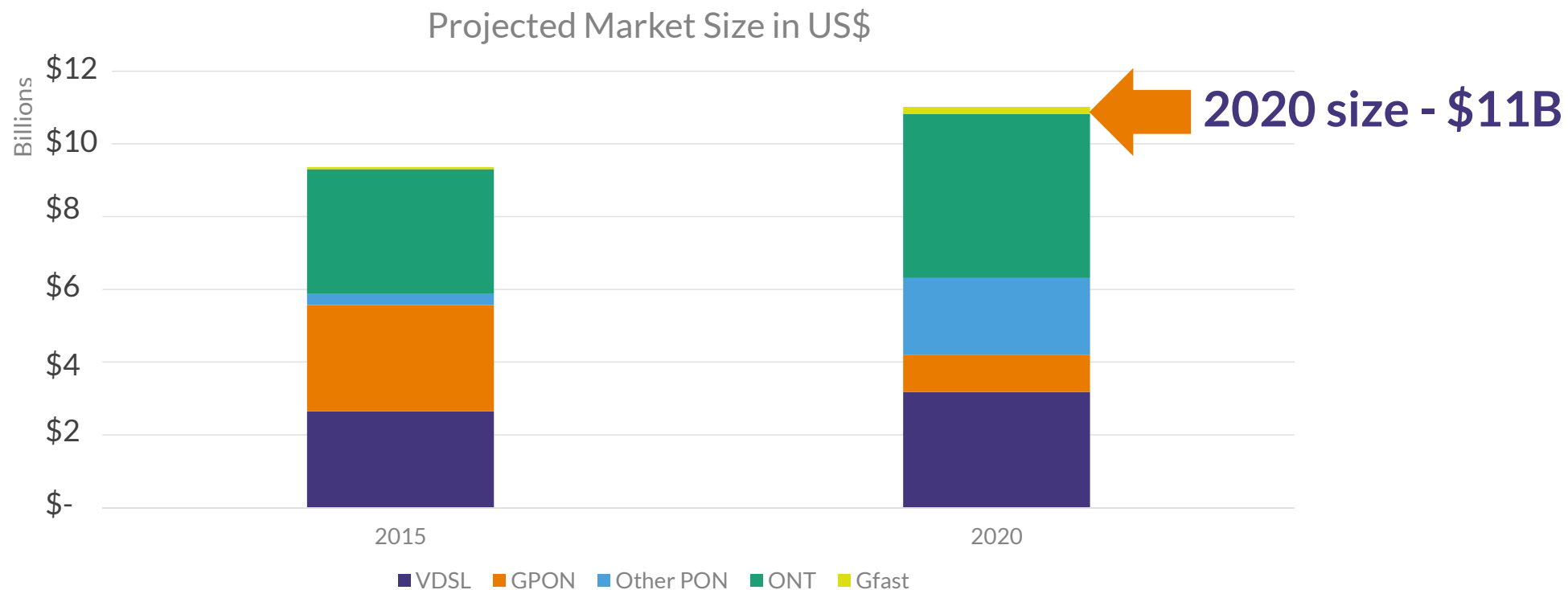


Expert

# Access is a large and growing market

Calix customer engagement process positions us to win

## Global access TAM by technology – IDC estimates 2015-2020





# CEP models vary by geography

## North America

A team of 300+ professionals dedicated to serving our customers predominantly **DIRECT**

### Direct

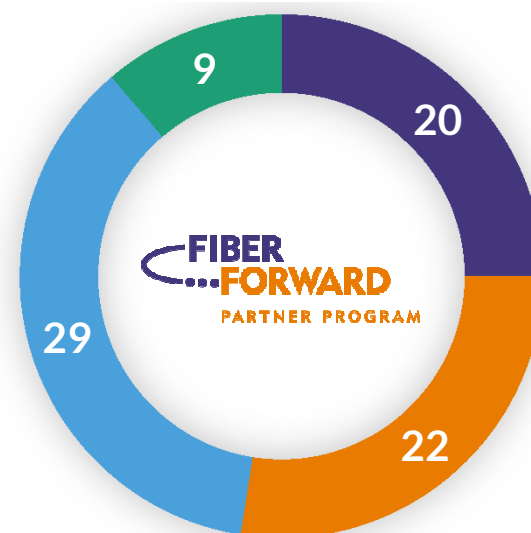
- Majors
- Nationals
- Regionals
- CALA
- Canada

### Indirect

- 10 resellers

## International

80 local resellers dedicated to serving our customers **INDIRECT**



- Provide local expertise and support
- Local systems integration services

VAR agreements per theater

■ Europe ■ ME/NE/A ■ APAC ■ South America

# Calix global reseller partnership

Ericsson strategic partnership



**ERICSSON**

## Acquisition and global reseller agreement

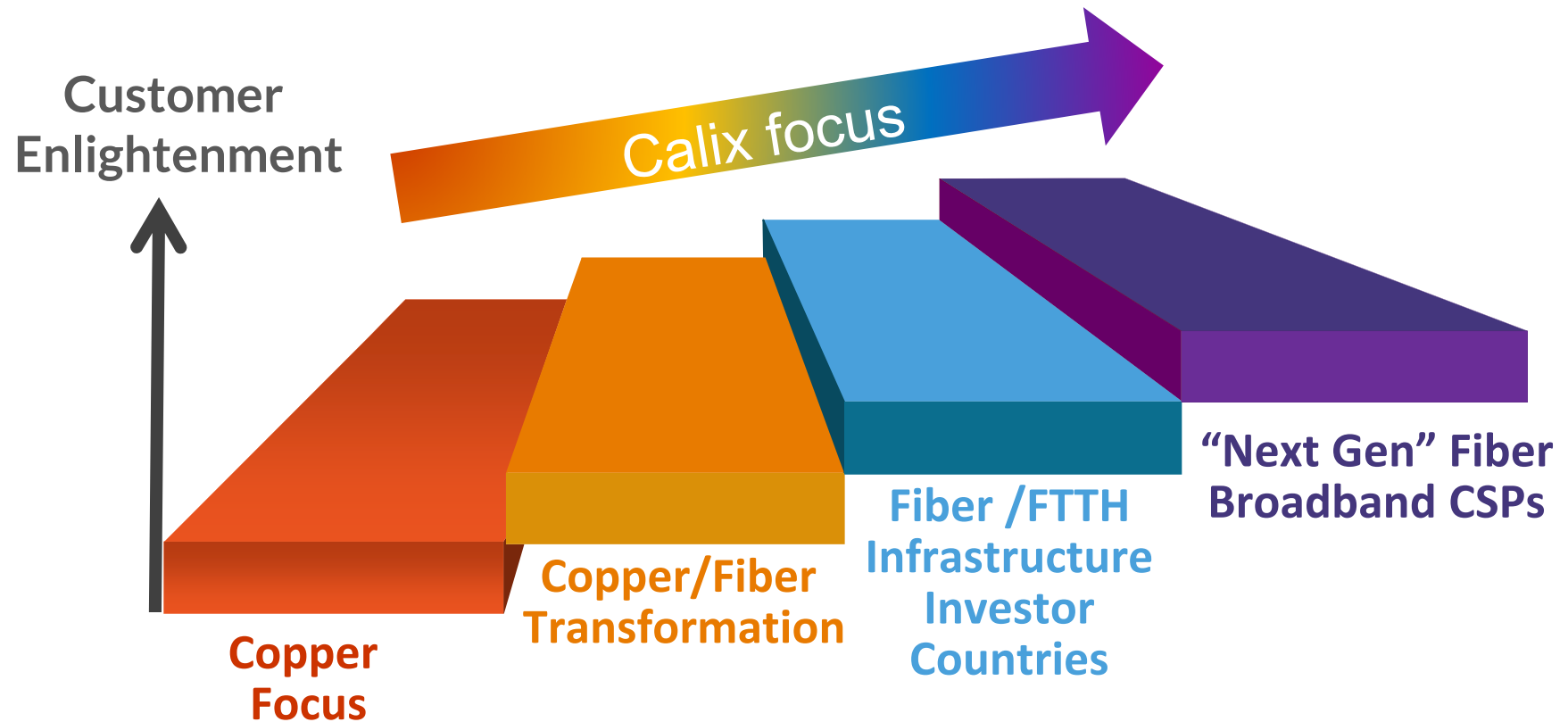
- Established November 5, 2012
- Calix acquired all Ericsson fiber access assets

## Calix is Ericsson's preferred broadband access vendor globally

- Extends into 180 countries worldwide

# Finding the right Calix solutions fit

Global customer transformation stages



# Engaging with Customers

# Engaging with purpose – Choosing the right method

## Direct engagement – Consultative, trust building

- Customer acquisition, securing new projects

## Mass engagement – Awareness, vision, thought leadership

- Calix User Group, Calix Roadshows, Partner Summit, trade shows

## Virtual engagement – Transactional efficiency, education, self-service

- Calix web platform, My Calix, configurator, storefront

# Mass engagement – Calix events

## Fall: Calix User Group

- Purpose: Vision
- 1600+ attendees
- Industry's premiere access-focused event
- Educational focus
- Product debuts



## Spring: Calix Roadshows

- Purpose: Deployment
- 1200+ attendees
- Case studies
- 30 North America stops



## Spring: Partner Summit

- Purpose: Motivation
- 100+ attendees
- Educational focus
- Awareness and value selling



# Daily virtual engagement: Calix Web Experience

Frictionless transactions

**Debut: 11/2015**

- Educational focus
- Communities
- Self-service tools
- Mobile responsive

**Next: Transactions**

- Storefront
- Configurator
- Quote generator
- Take order 24/7



# Key Customer Needs



# Top of mind for service providers

Global gigabit experience leadership

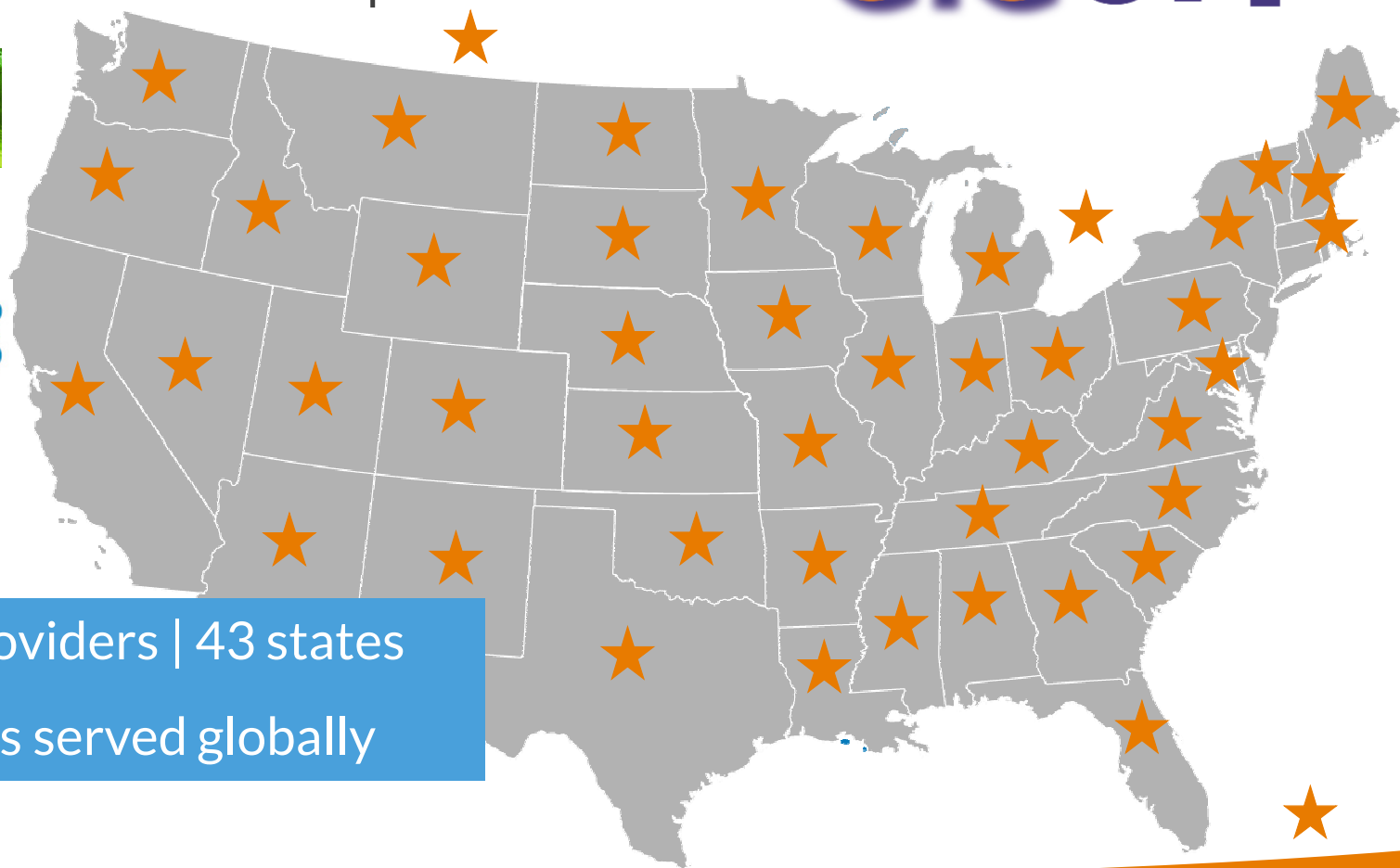
# GIGUP!



## GIGAZONE™



## WHAT'S YOUR GIGALIFE?



U.S. today: 131 service providers | 43 states

Thousands of communities served globally

# Focusing on next wave of technology innovations

10G PON and G.fast present insertion points in new accounts

## Leading the charge in cutting-edge demonstrations

- Gigabit speeds over copper with bonded G.fast (Broadband World Forum)
- 10G tunable optics and coexistence demos – NG-PON2, XGS-PON, GPON



### Calix Announces Innovations in G.fast and Vectoring at Broadband World Forum

*Live bonded G.fast demo to surpass gigabit threshold; VDSL2 system level vectoring to set new standard for deployment economics over copper*

**LONDON – October 20, 2015** – [Calix, Inc.](#) (NYSE: CALX), the world leader in gigabit fiber deployments, today announced the expansion of its copper solutions portfolio to be highlighted at the Broadband World Forum (BBWF) this week in London. Among the new innovations are:

- Live demonstrations of G.fast bonding technology delivering broadband speeds in excess of 1 gigabit per second (1 Gbps) over existing copper infrastructure up to approximately 250 meters
- Live demonstrations of interoperability between Calix G.fast DPUs and modems and those of other vendors at the Broadband Forum Interoperability Pavilion
- The debut of breakthrough VDSL2 system level vectoring (SLV) solutions on the Calix E7-2 modular access systems that deliver up to 96 vectored ports without the economic and operational burden of a dedicated vectoring control processor card (VCP)
- The introduction of new VCPs on the E7-2 modular chassis that can scale from 97 to 384



Aggregate Port L1 Rx Rate



# Government broadband initiatives

Provides CAPEX floor for our U.S. service providers, opportunity globally

## US: Connect America Fund

### Price Cap – Copper focus

- \$1.6B+ per year

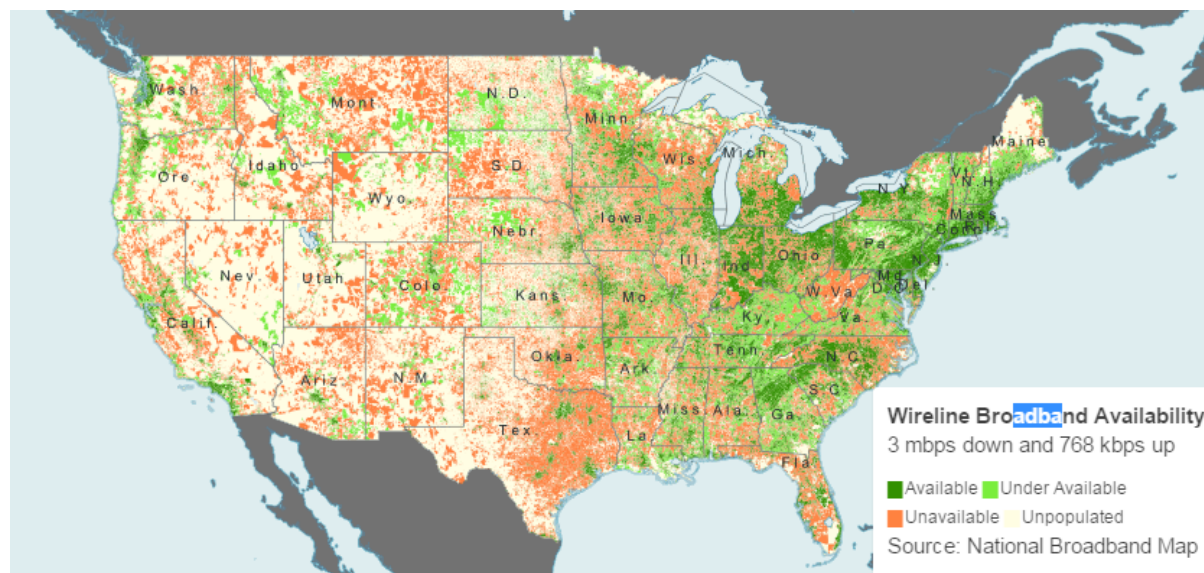
### Rate of Return (TBD)

- \$2B+ per year

### CAF2 auctions (TBD)

- \$200M per year – early 2017 – Overbuild uncommitted areas

Many more country-specific broadband modernization initiatives



# 2016 Initiatives

# Expanding what Calix can sell

## New technologies provide insertion points

- Next generation PON, G.fast, Software Defined Access (SDN/NFV), Compass

## New world-class solutions already in deployment

- AXOS
- GigaFamily solutions:
  - New GigaCenters, GigaHubs, GigaPoints
- Cable solutions: E3 Sealed Access Nodes

## Advanced solutions coming to market soon

- NG-PON2 solutions: E7-20 and E7-2 Access Systems



# Continued global expansion

Becoming local globally

## Strategy

- **Enter attractive country markets with a focused Calix presence and local partners**
  - Capture market share
  - Balance between mature and developing higher growth countries
- **Consultative customer engagement**
  - Right customer fit
  - Right Calix solutions
  - Right cooperation with local partners
- **Leverage key global partners**



## Three key customer engagement takeaways

Calix has powerful and proven customer engagement processes

Customers and prospects are resonating with Calix solutions

We are poised to find new insertion points in growing markets

# David Seda

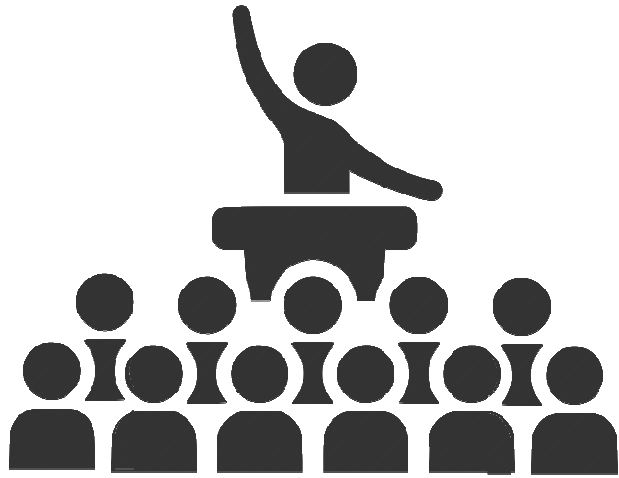
Vice President, Marketing



# Agenda

- 1 Marketing vs. Sales
- 2 Calix product positioning
- 3 AXOS
- 4 Industry leadership

## Marketing



## Sales



One-to-many . . . . . **Communicate** . . . . . One-to-one

Create . . . . . **Needs** . . . . . Fulfill

Routes-to-market . . . . . **Relationships** . . . . . Routes-to decision

# Marketing Different

□ BIG

- **Premium brand**
  - Comprehensive portfolio (*end-to-end*)
  - Breadth of resources and services
  - Safe choice

✓ □ CALIX

- **Premium brand**
  - Most effective, innovative and cost efficient solutions (*best-in-class*)
  - Specialists in Access and Market segments
  - Strong communities, exchanges and partnerships

# Calix App for planning Gigabit services

8:33 PM 93%

Back New Market Packages Output Export

Year 1	Year 2	Year 3
4,667	4,667	4,667
Subscribers Served		
\$11,260,208.52	\$23,221,298.16	\$35,182,387.80
Sub-Total		
\$816,092.52	\$2,366,668.31	\$5,147,503.57
Cost of Broadband		
\$59,230,986.72		
Broadband Total		

New Market Summary

	DOWN (Mbps)	UP (Mbps)	Pkg. Price	Incentive	Take Rate%
<input type="radio"/> Residential Broadband Package 1	2	0.768	\$22.95	\$19.95	22.00%
<input type="radio"/> Residential Broadband package 2	5	0.768	\$29.95	\$24.95	28.00%
<input type="radio"/> Residential Broadband package 3	10	1	\$34.95	\$29.95	16.00%
<input type="radio"/> Residential Broadband package 4	20	2	\$39.95	\$34.95	
<input type="radio"/> Residential Broadband package 5	30	5	\$49.95	\$44.95	
<input type="radio"/> Residential Broadband package 6	50	10	\$54.95	\$49.95	5.00%
<input type="radio"/> Residential Broadband package 7	50	10	\$59.95	\$54.95	12.00%

8:37 PM 91%

Reset Settings Done

Residential Bandwidth

Bandwidth Multiplier Ratio (all models)	Down(\$)	1.00	Up(\$)	0.20
Yearly Bandwidth Growth (all models)	45.00%			

BW Note: Bandwidth multiplier for bandwidth consumed - downstream and upstream. (ex: 1.00 = 100%, 1.50 = 150%, .20 = 20% etc.) Ratio between downstream and upstream is relative over-subscription ratio. (ex: downstream 1.00 and upstream 0.20 would equate to a 5:1 ratio)

NECA Tariffs

	Cost per Link
<= 10 Mbps DOWN / 10 Mbps UP (Tier 1)	\$13.00
> 10, up to 100 Mbps DOWN / 100 Mbps UP (Tier 2)	\$18.00
> 100, up to 1 Gbps DOWN / 1 Gbps UP (Tier 3)	\$23.00

NECA Tariff Payments Settings

Existing - Current	<input checked="" type="checkbox"/>
Existing - Simplified	<input type="checkbox"/>
New Market - Modeled	<input checked="" type="checkbox"/>

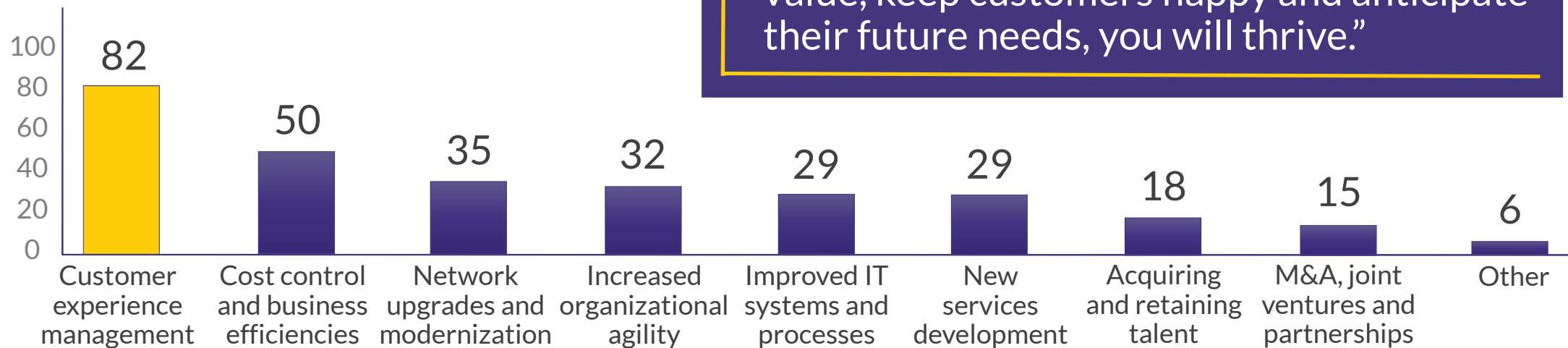
■ Helping our customers market and win

# Calix Product Positioning

# EY 2015 Global Telecommunications Study

What are your organization's most important strategic priorities over the next 3 years (top 3 reasons)?

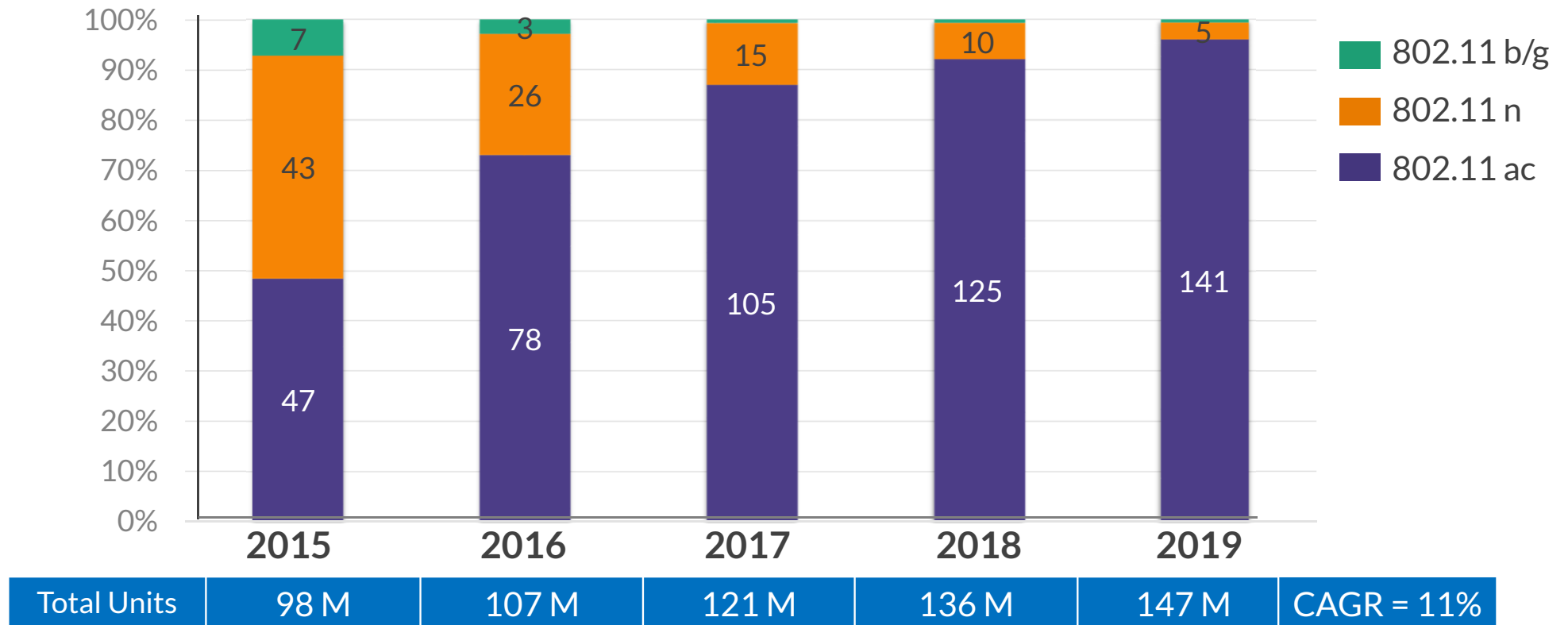
% Respondents



“If you are customer-centric and provide value, keep customers happy and anticipate their future needs, you will thrive.”

# 2016-2017: 123% increase in 11ac shipments (58 million units)

Broadband CPE technology transition – Global



Source: Infonetics 3Q15, Broadband CPE Forecast



# The Challenge to Meet Subscriber Demands

Growing customer frustration with WiFi and rising support costs

Up to **43%** of support calls are Wi-Fi issues

**63%** of subscribers have issues with WiFi performance

- Subscribers connect new devices to the network every day
- WiFi extenders, old devices, out-of-date software — all impact subscriber experience

## Issues for the Service Provider

- Lack of **remote visibility** to consumer's devices, reduces **control** over subscriber experience
- Increasing costs of support calls and truck-rolls to resolve issues
- Decline in customer satisfaction

Sources: 2015 Arris Consumer Entertainment Index; Pivot Group 2014; Parks & Associates 2014



Illustration by William V. Cigliano



2 WiFi Advisor in the cloud performs analysis on the data



COMPASS

Device Type	Host Name	IP Address	Model	DS PHY	US PHY	Packets Dropped DS	SNR	Signal
			802.11ac	600	1170Mbps	0	67dBm	
Tablet	Bens-iPad2	192.168.20.21	11	802.11n	2Mbps	0	67dBm	
Tablet	KatiesiPadAir2	192.168.20.23	802.11ac	g150	88Mbps	0	9dBm	
Smart Phone	Bens-iPhone-5s	192.168.20.20	802.11n	g150	14Mbps	0	0dBm	

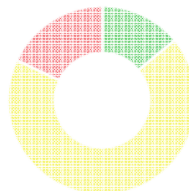
Throughput issues

Old devices

Weak signal

1 GigaCenter gathers data

Airtime Analysis



- Free
- Used
- Interference

3 Shows recommendation and analysis to remote technician

#### ! Observations and Recommendations

High Radio Interference - 5.0 GHz

- Turn on DFS channels if DFS is not enabled.
- Note: While not all clients can use DFS channels, DFS channels cause interference of all Wi-Fi Channels.
- If you cannot turn on DFS, manually switch channels or set Channel Power. Performance improves.

## 2 WiFi Advisor in the cloud performs analysis on the data



COMPASS

Device Type	Host Name	IP Address	Mod	DS PHY	US PHY	Packets Dropped DS	SNR	Signal
			802.11ac	g150	1170Mbps	0	67dBm	
Tablet	Bens-iPad2	192.168.20.23	802.11ac	g150	2Mbps	0	67dBm	
Tablet	KatiesiPadAir2	192.168.20.23	802.11ac	g150	88Mbps	0	9dBm	
Smart Phone	Bens-iPhone-5s	192.168.20.20	802.11n	g150	14Mbps	0	0dBm	

Throughput issues

Old devices

Weak signal

## 1 GigaCenter gathers data

### Airtime Analysis



- Free
- Used
- Interference

Visibility

Control

## 3 Shows recommendation and analysis to remote technician

### ! Observations and Recommendations

High Radio Interference - 5.0 GHz

- Turn on DFS channels if DFS is not enabled.
- Note: While not all clients can use DFS channels, DFS channels cause interference of all Wi-Fi Channels.
- If you cannot turn on DFS, manually switch channels or set Channel Width to 20MHz. Performance improves.

# Market Impact of Next Gen Fiber and Copper

## NG-PON2

- Early application drivers are business services (symmetrical)
- Backhaul applications (e.g. G.fast) and fiber exhaust will also drive adoption
- Critically enables convergence of Business and Residential networks

## G.fast

- Impact begins 2H 2017
- Volumes in Europe, N. America
- Targeting Multi-unit buildings
- Over time affects VDSL2
- Like vectoring, many variables:
  - Competitive pressures on operators
  - Distance of premise from distribution point
  - Quality of in-building copper
  - Wildcard: Impact of G.hn

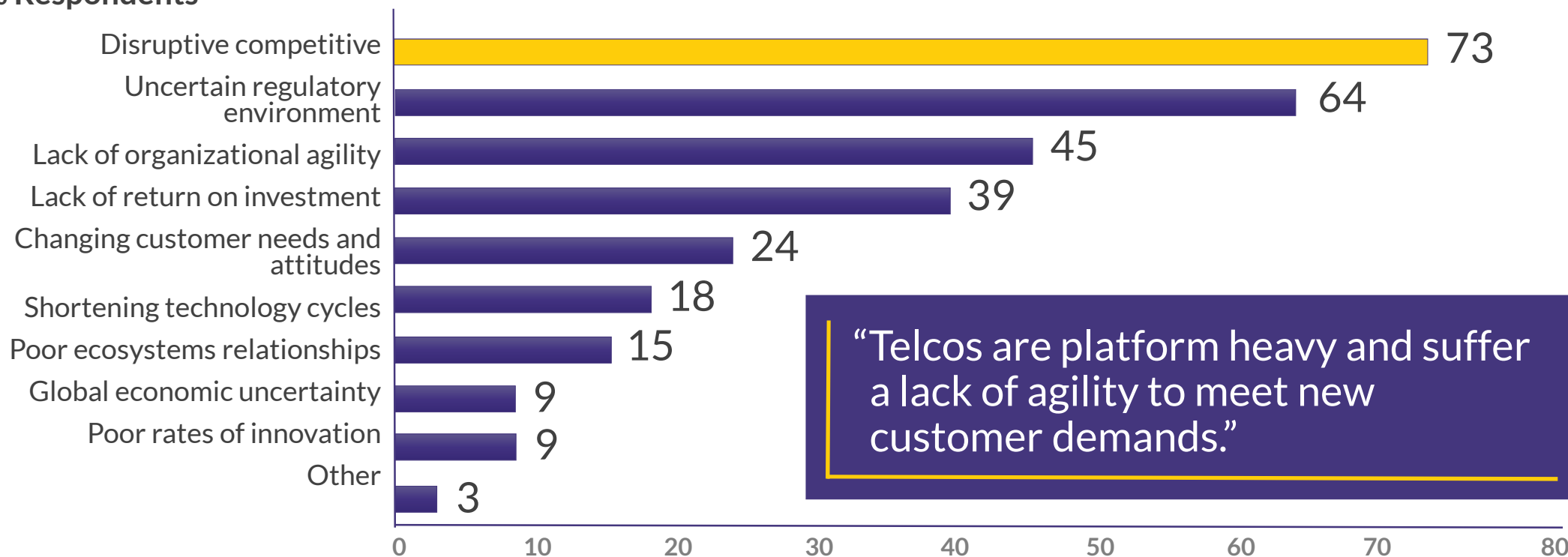
# AXOS

The World's Most Advanced Operating System for Access Networks

# EY 2015 Global Telecommunications Study

What are the most important significant challenges facing the industry?

% Respondents



# Top of mind for service providers

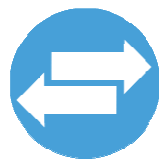
## Accelerate time to revenue



**Fast.**

- Rapidly deploy new services across the access network
- No proprietary architecture
- Validate new features against deployment use cases
- Reduce time to qualify new systems and software

## Eliminate service disruptions



**Always On.**

- Eliminate service outages
- Design for no maintenance windows
- Constrain failures from new features
- Eliminate side-effects caused by new fixes

## Reduce operational complexity



**Simple.**

- Reduce time to integrate with IT OSS systems
- Standards based multi-vendor interoperability
- Automate workflows
- Reduce complexity to qualify new hardware

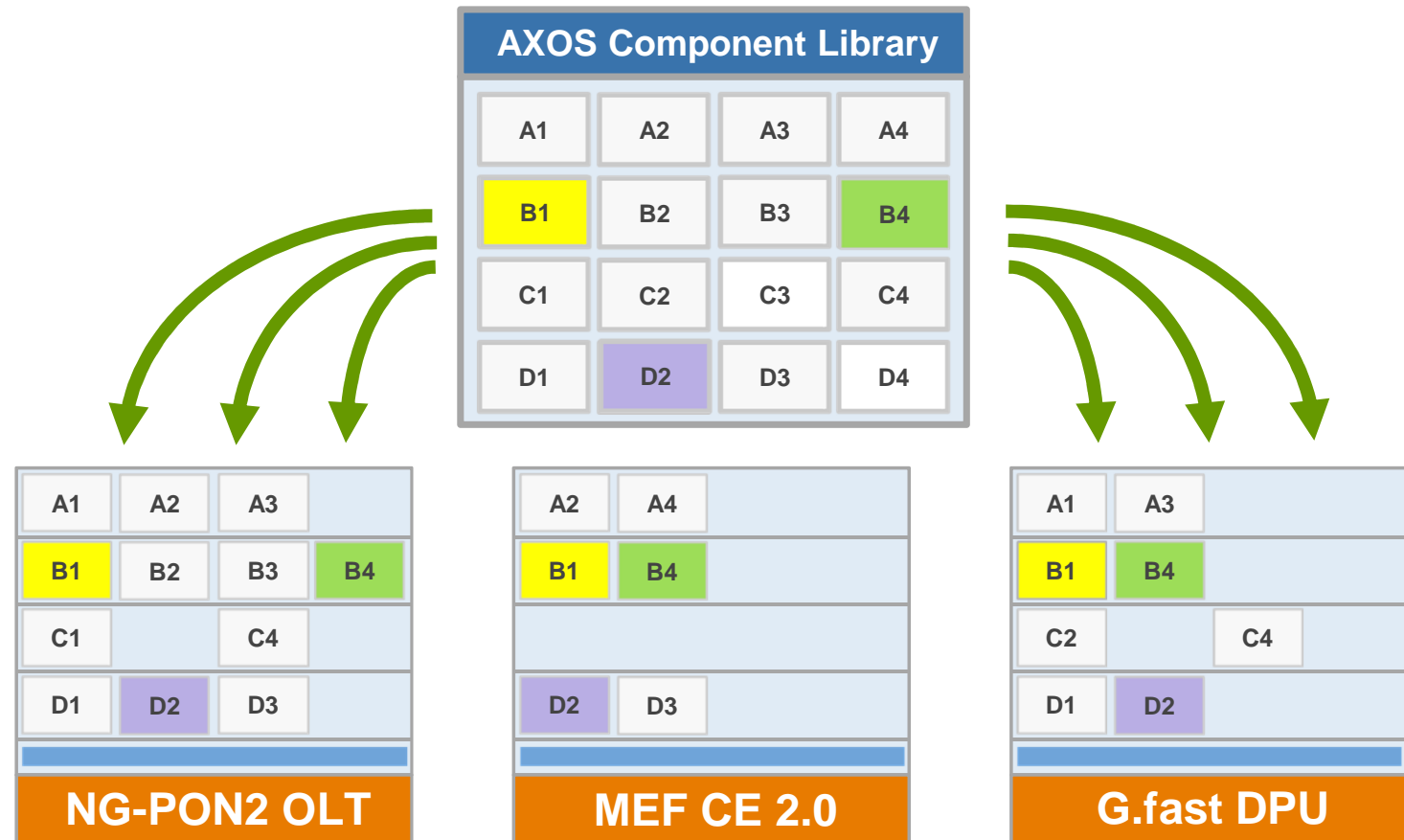


# Fast. Architected for faster time-to-revenue

Agile DevOps  
environment

One component,  
many locations

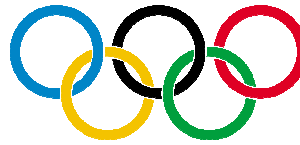
Faster qualification  
with no re-test of  
known components



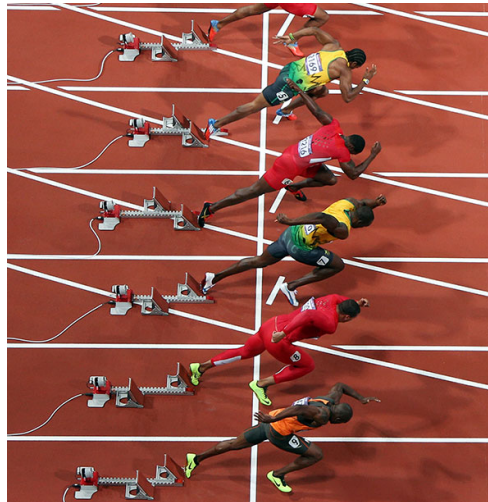
# Always On. Eliminates maintenance windows

## Live Upgrade Scenario

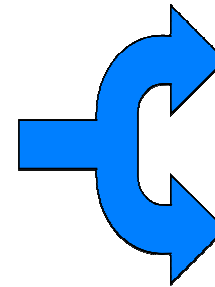
- Faulty video code (IGMP module) needs upgrade
- AXOS
  - Stops current video code
  - Removes current code
  - Loads new video code
  - Starts new code
- AXOS data and voice services uninterrupted
- AXOS maintains all video channels during upgrade, so all subscribers are restored to channel they were watching



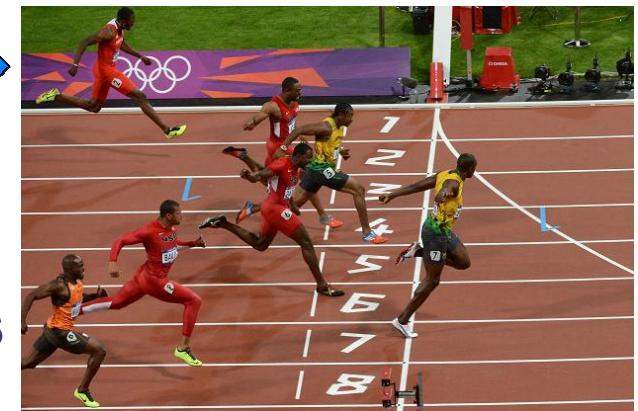
Non-AXOS



Go!!!



Are you kidding me!?!?



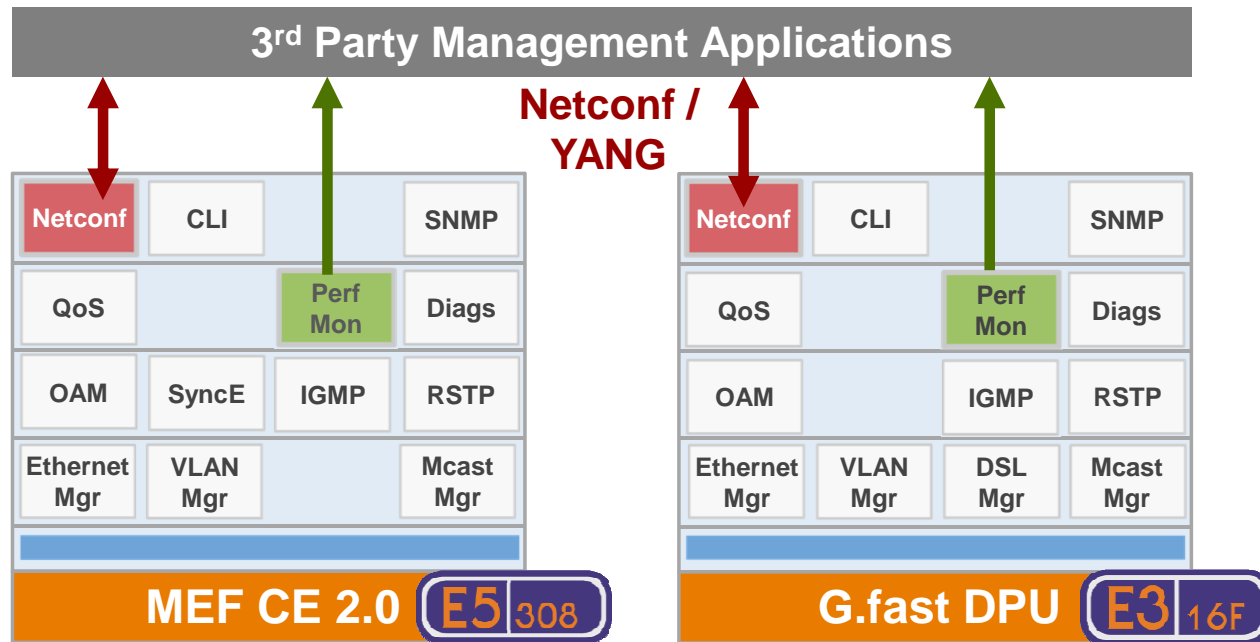
AXOS



1  
2  
3

# Simple. Multivendor interoperability reduces OPEX

Open standards for orchestration and management



Easy to integrate using open, standard interfaces

Fully programmable management and control APIs reduce operational complexity, enable dynamic service creation and service monitoring

- API for configuration (Netconf / YANG)
- API for performance monitoring ("Push" model vs. "Pull")

# Industry Leadership

# Calix leads and contributes in the major bodies

## FSAN



- Calix recently hosted FSAN meeting in San Jose
- Over 30 Calix contributions to FSAN and ITU over last 24 months
- Calix proposed G.984.5 update: NG-PON2 /GPON coexistence; accepted as Amendment 2
- Calix wrote Section VIII.3 of G.989.2, the ONU tuning time definition for NG-PON2

MEF



**Outstanding Contributor**  
**Industry Leadership**  
China, March 2015

**Circle of Excellence**  
**G.fast Test beds**  
Portugal, September 2015

**Work Area Director**  
**Fiber Access Networks**  
March 2016

## Marketing Takeaways

Use expertise in Market Segments and Access Networks to help our customers win and improve Calix win rate

Position Calix products based on Subscriber Experience Management and a differentiated AXOS platform

Showcase industry leadership and innovation

# William Atkins

Executive Vice President and Chief Financial Officer

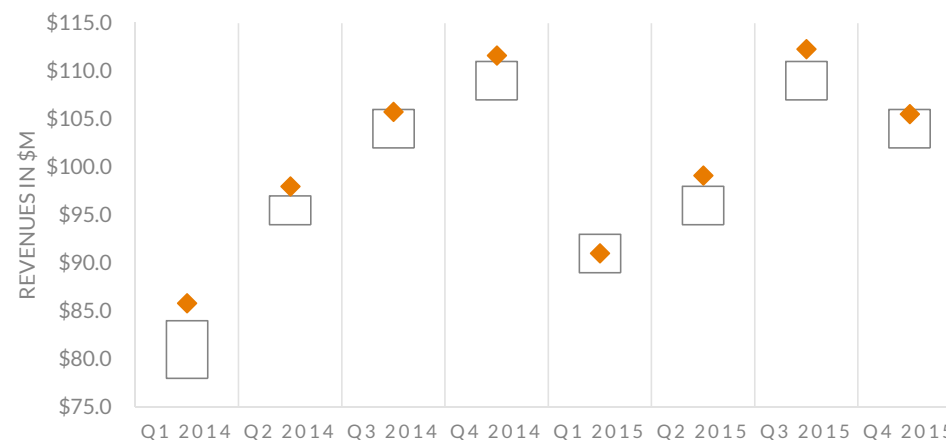
# Agenda

- 1 Predictable performance
- 2 Higher level of profitability
- 3 Accelerated growth rate
- 4 Target financial model

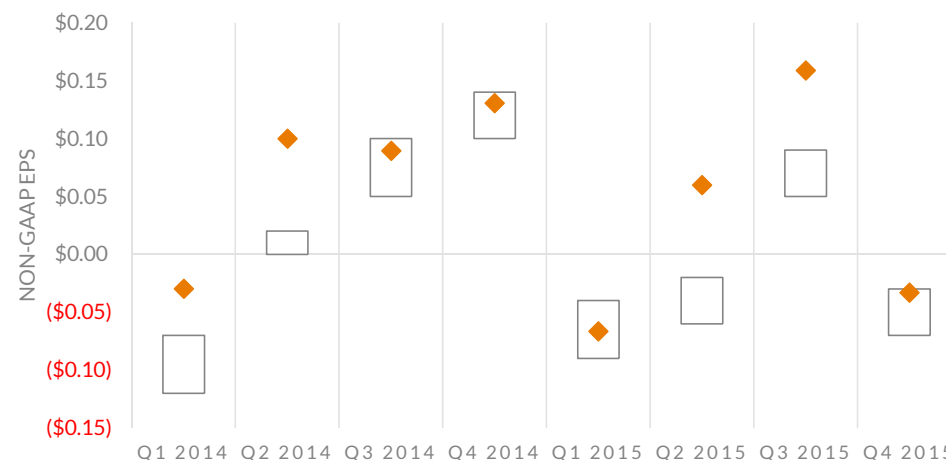
# Predictable Performance

# Consistency relative to guidance

Eight consecutive quarters of reported revenues in-line or better than guidance



Non-GAAP EPS at or above guidance for eight consecutive quarters





## Q1 2016 operating performance guidance\*

Revenues	\$95-\$99M
Gross margin	47.0-48.0%
Operating expenses	\$52.0-\$53.0M**
Non-GAAP EPS	(\$0.15) – (\$0.11)
Cash flow from operations	Negative

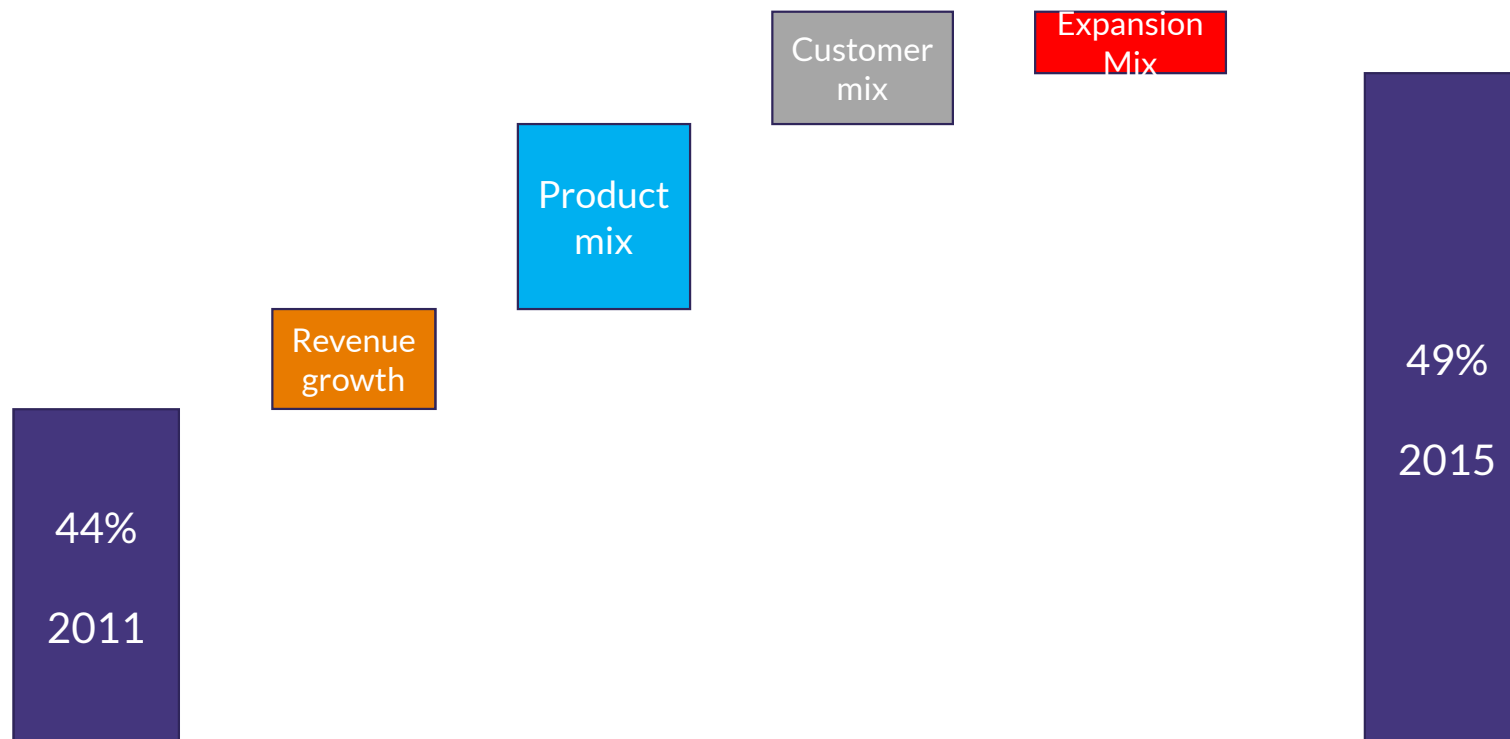
\*As issued on February 9, 2016

\*\*Includes approximately \$2.6M of litigation-related expenses

# Higher Level of Profitability

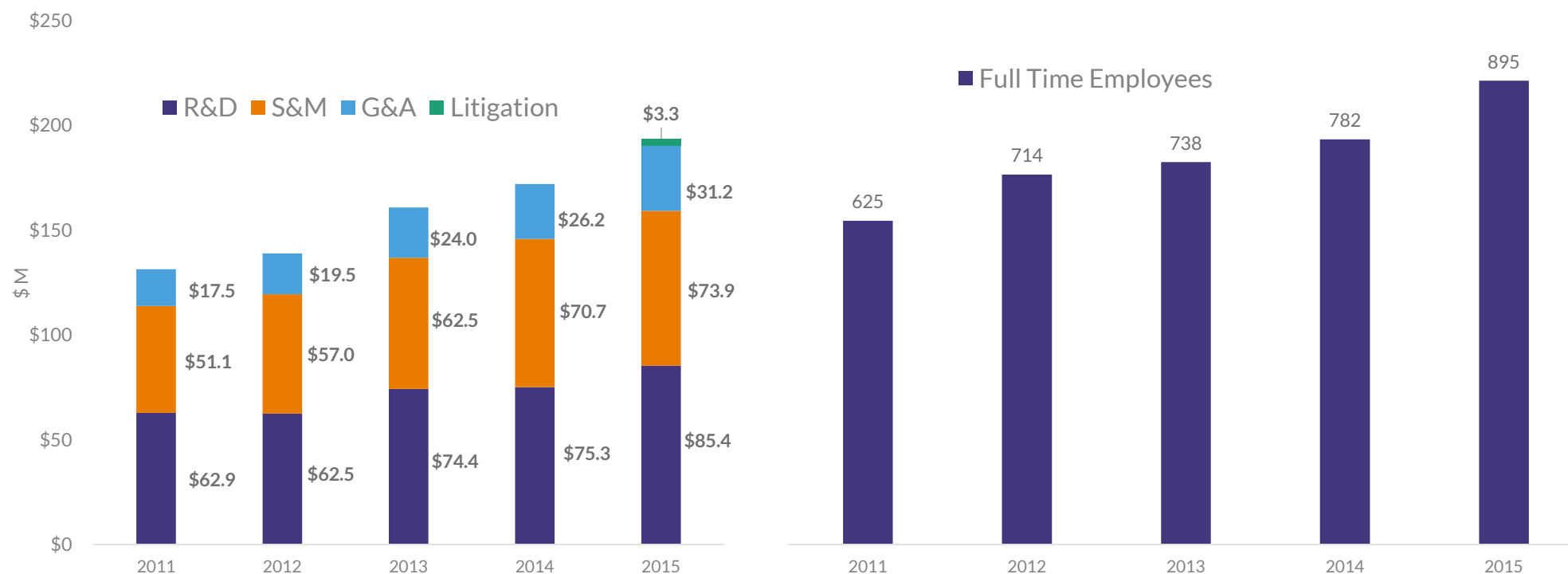
# Gross margin drive towards 50% long-term model

2016 marks a period of pause towards this target



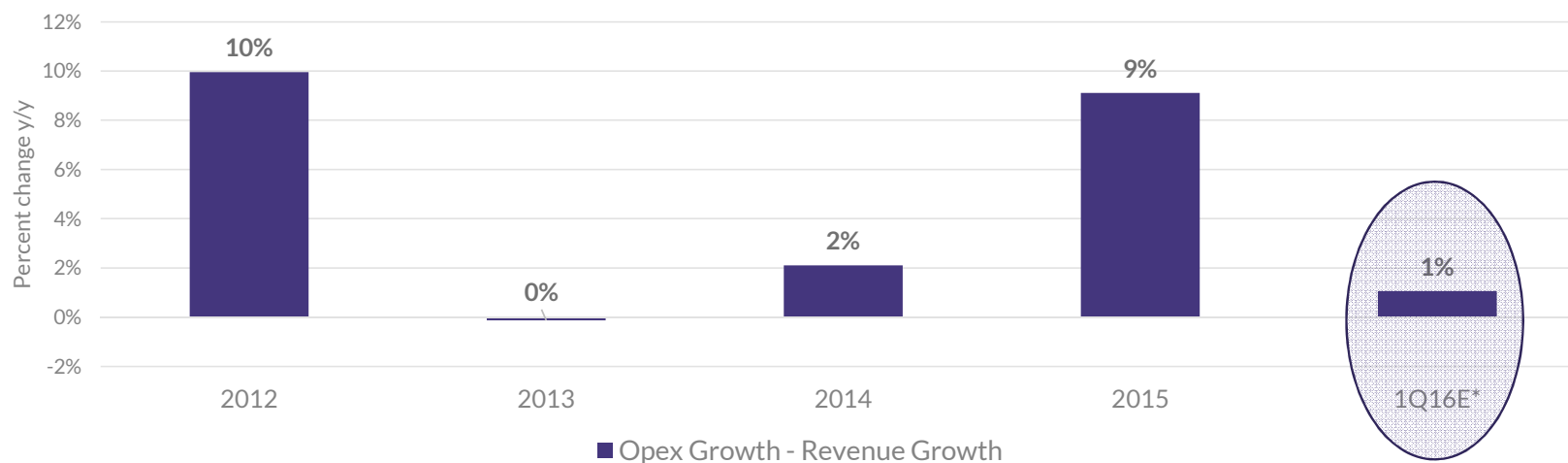
# Operating expense increase reflects headcount

Significant investments to accelerate revenue growth



# Slowing rate of growth in operating expenses

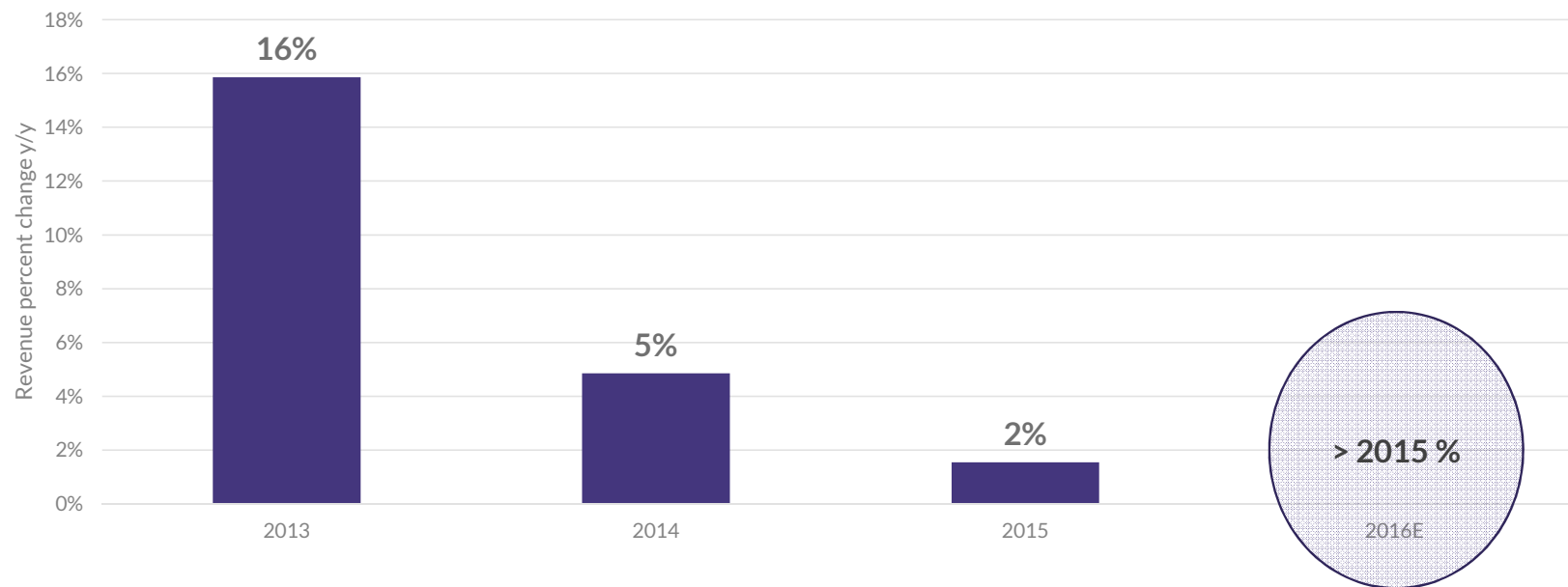
Operating income leverage as the y/y change in operating expenses decreases



\*Mid-point of guidance as issued on February 9, 2016 excluding litigation expense of \$2.6M

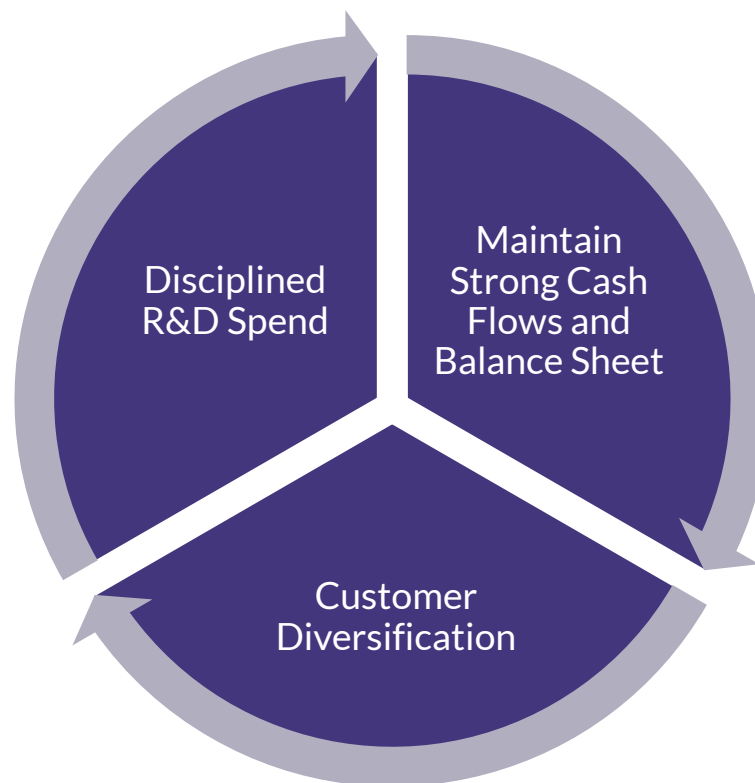
# Accelerated Growth Rate

# 2016 revenue growth > 2015 revenue growth



# Cornerstone principles to accelerate growth

Led by technology transitions and increased broadband deployments





# Platform increases leverage

Shift from product-driven spend to platform-driven investment

One market connecting subscribers to the information and content cloud

2015 to Target  
R&D spend to increase less than revenue growth

Platform

AXOS

Market

Market

Market

Market

2011-15  
R&D spend 2x faster than revenue growth

Products

R&D \$

R&D \$

R&D \$

R&D \$

R&D \$

R&D \$

R&D \$

# History of strong cash flow generation

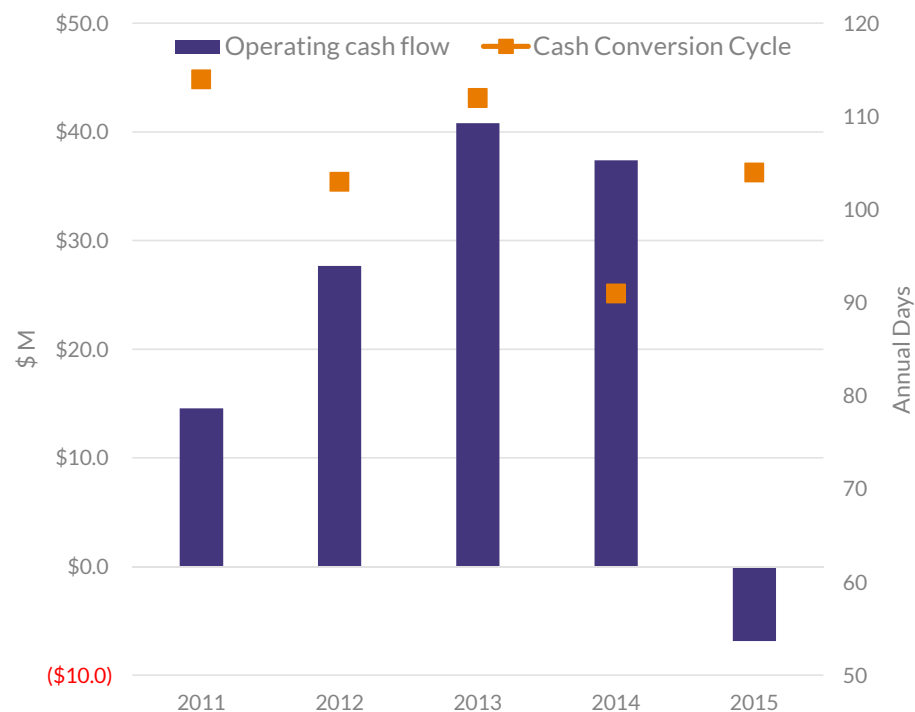
Working capital velocity drives cash flow in 2016

## 2011-15 Operating cash flow generation

- Cumulative operating cash flow of more than \$110M or more than \$2.25 per share
- 2015 cash flow negatively impacted by timing of shipments

## Cash conversion cycle drives cash flow

- Historic cash conversion cycle just over 100 days
- Working capital excluding cash averages less than 10% of revenues

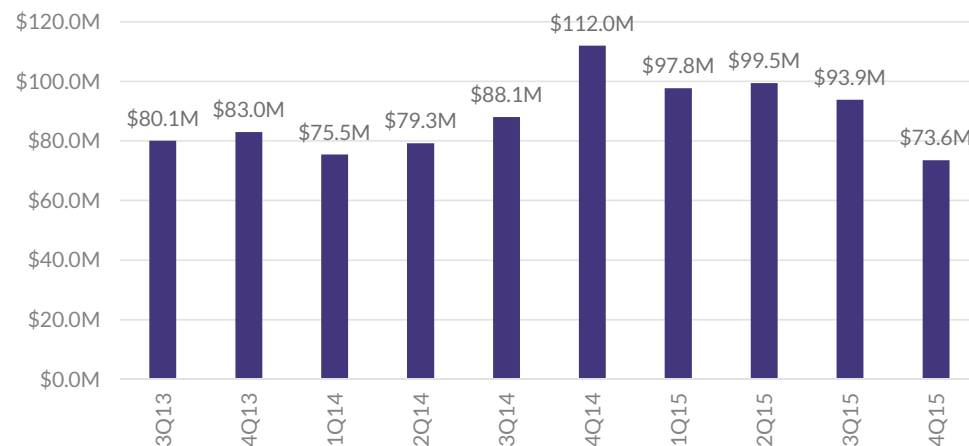


Cash Conversion Cycle = Days Sales Outstanding plus Days Sales in Inventory less Days Sales in Payables

# Balance sheet and cash flow highlights (2015)

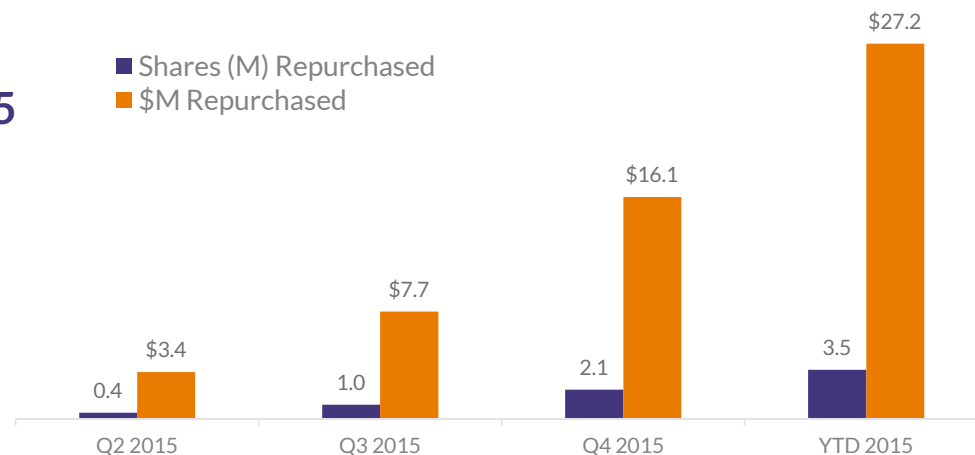
## Cash and equivalents of \$73.6M (\$1.45/share)

- Debt-free balance sheet with undrawn \$50M revolving line of credit (expires September 2018)
- More than 90% of cash is domestic cash



## Buyback activity accelerated throughout 2015

- Primary usage of cash in 2015 was stock repurchase activity
- In 2015, repurchased 3.5M shares and \$12.8M remains on original \$40M buyback authorization with no time limit on purchases



# Focus on customer diversification

Expect continued growth among core customer base

## Increased market share within existing medium and large accounts

- Turnkey network improvement projects
- CAF II related professional services engagements
- Next generation copper and optical technologies on the AXOS platform
- Subscriber edge device adoption combined with Compass suite

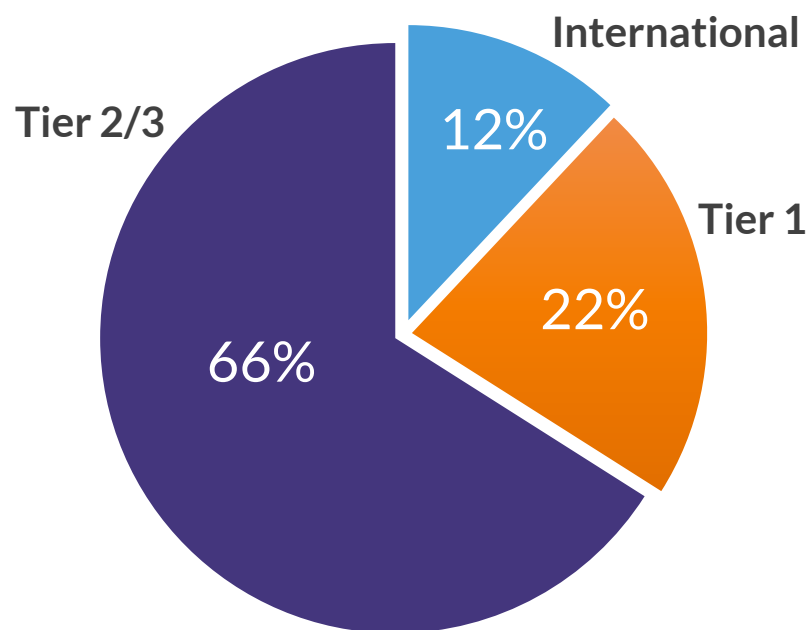
## Opportunities with new medium and large accounts

- Next generation copper and optical technologies on the AXOS platform
- Subscriber edge device adoption combined with Compass suite
- Leverage Ericsson partnership for both international and domestic opportunities

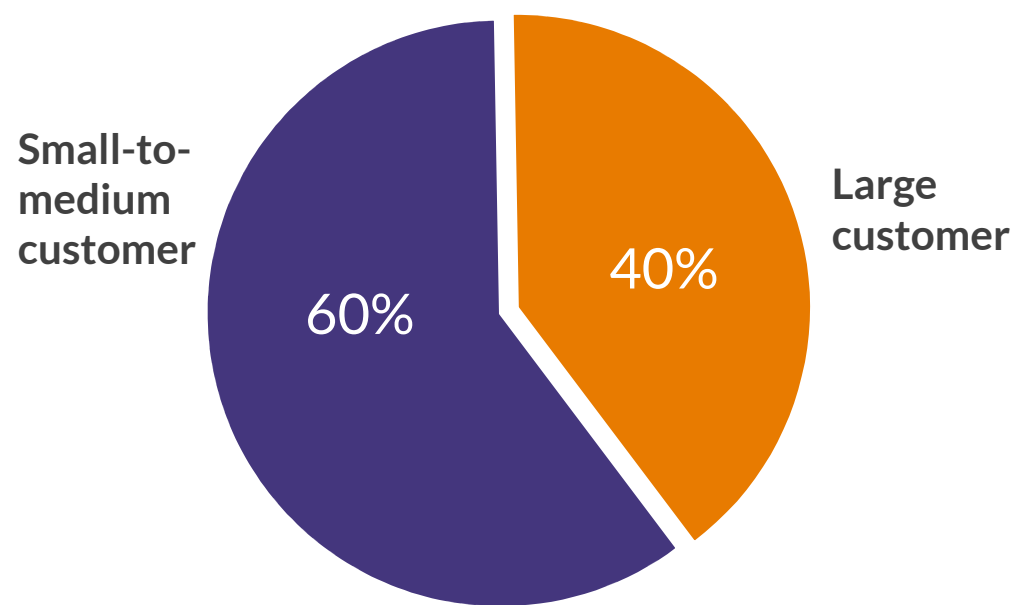
# Target Financial Model

# Customer mix drives target model

Industry and location no longer the key distinction between customers



2015 Customer Mix



Target Customer Mix

# Target Financial Model

(\$ in millions, except per share amounts)

	2015	Long-Term Target
Revenues	\$407.5	\$600.0
Non-GAAP gross margin	49.0%	>50%
Non-GAAP operating expenses (%)	47.4%	38-42%
Non-GAAP operating margin	1.5%	>10%
Non-GAAP EPS	\$0.12	>\$1.25

## Three key financial takeaways

Predictable performance

Higher level of profitability and accelerated growth rate

We are the innovation pure play connecting the subscriber to the cloud



Q&A



ACCESS INNOVATION