



# Data Center Innovation Day



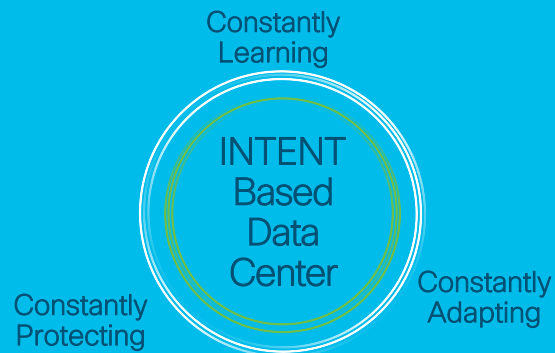


# Transform Your Network Infrastructure for Multicloud

Joseph Yap

ASEAN DC Switching Sales Lead, Cisco Systems

Jan 2019



# Digital transformation driving innovation



**None** of these are possible  
without an **efficient** underlying  
infrastructure

> Artificial Intelligence



> Internet of Things



> Autonomous Systems



> Digitized Security



> Consumption Models



# Digital transformation driving innovation



**None** of these are possible  
without an **efficient** underlying  
infrastructure

> Multicloud



> Security



> Cost and Complexity



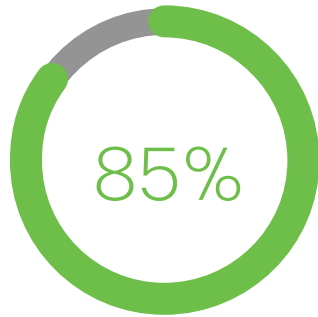
> Simplicity & Agility



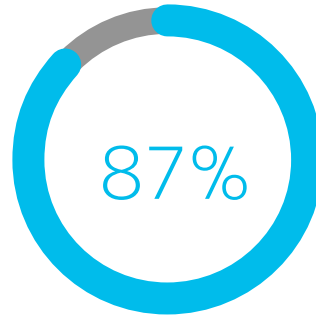
> Scalable



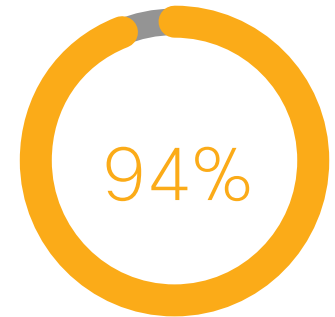
# It's a Multicloud World



Evaluating or using  
public cloud



Taken steps towards a  
hybrid cloud strategy



Plan to use  
multiple clouds

————— Among cloud users —————

Source: Cisco Global Cloud Index, Feb-18

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# Strategic Cloud Imperatives



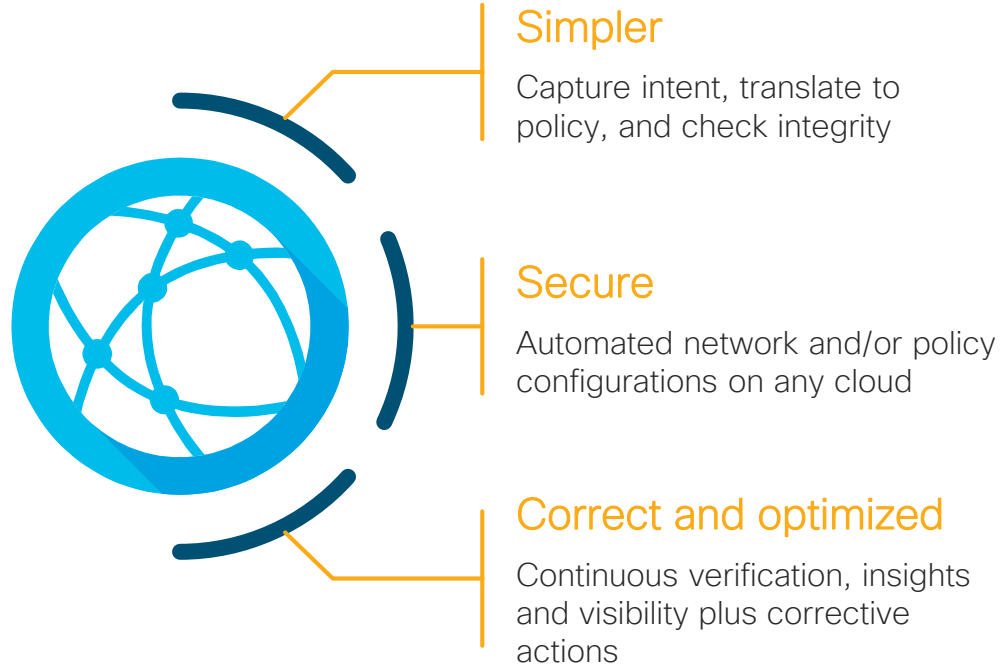
IT must adapt  
faster than ever before

- 1 Modernizing IT infrastructure
- 2 Automating & optimizing business operations
- 3 Automating & optimizing IT operations
- 4 Transforming customer interactions
- 5 Transforming employee interactions

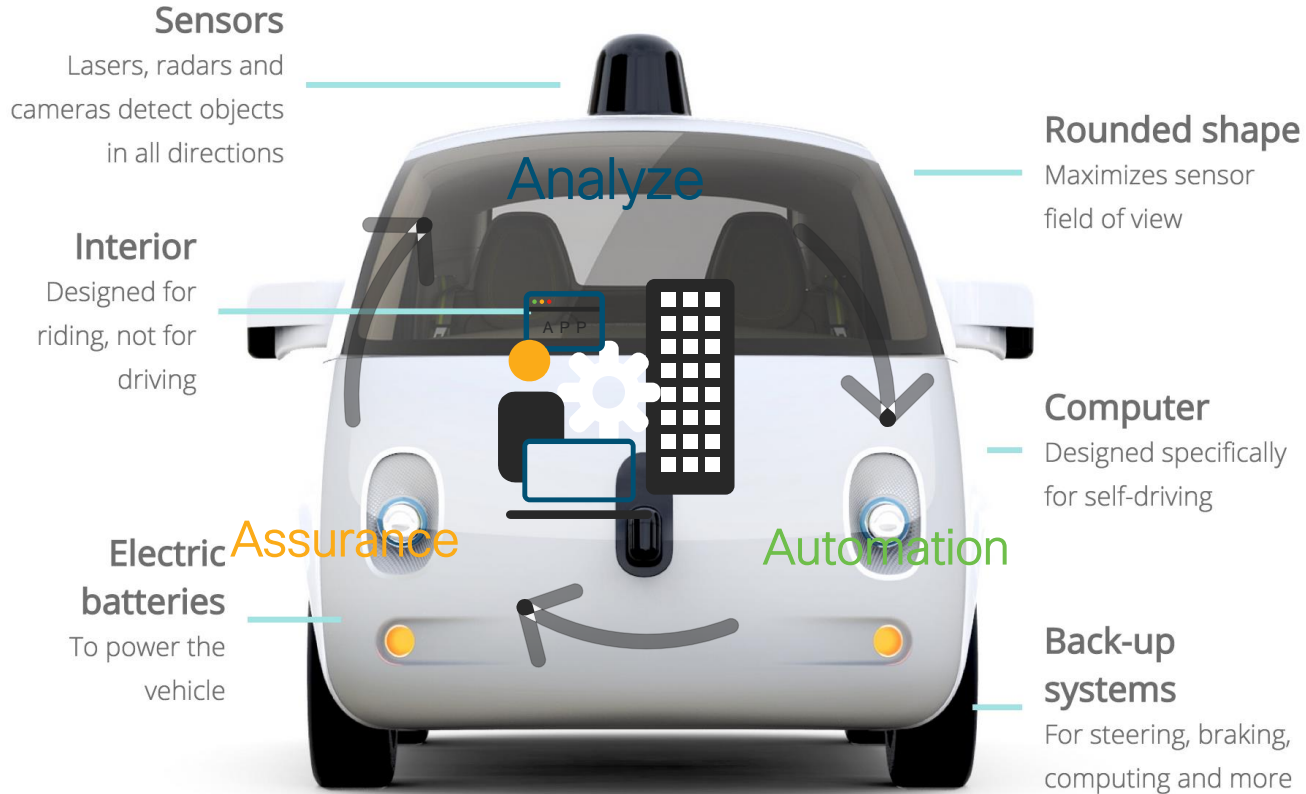
Sources: Q2 & Q3, Cisco IT Talent Survey, phone-to-web survey of 600 business and IT executives in the US and Europe (UK, Germany, France, Switzerland); fielded October 2017

# Intent-Based Networking is the future

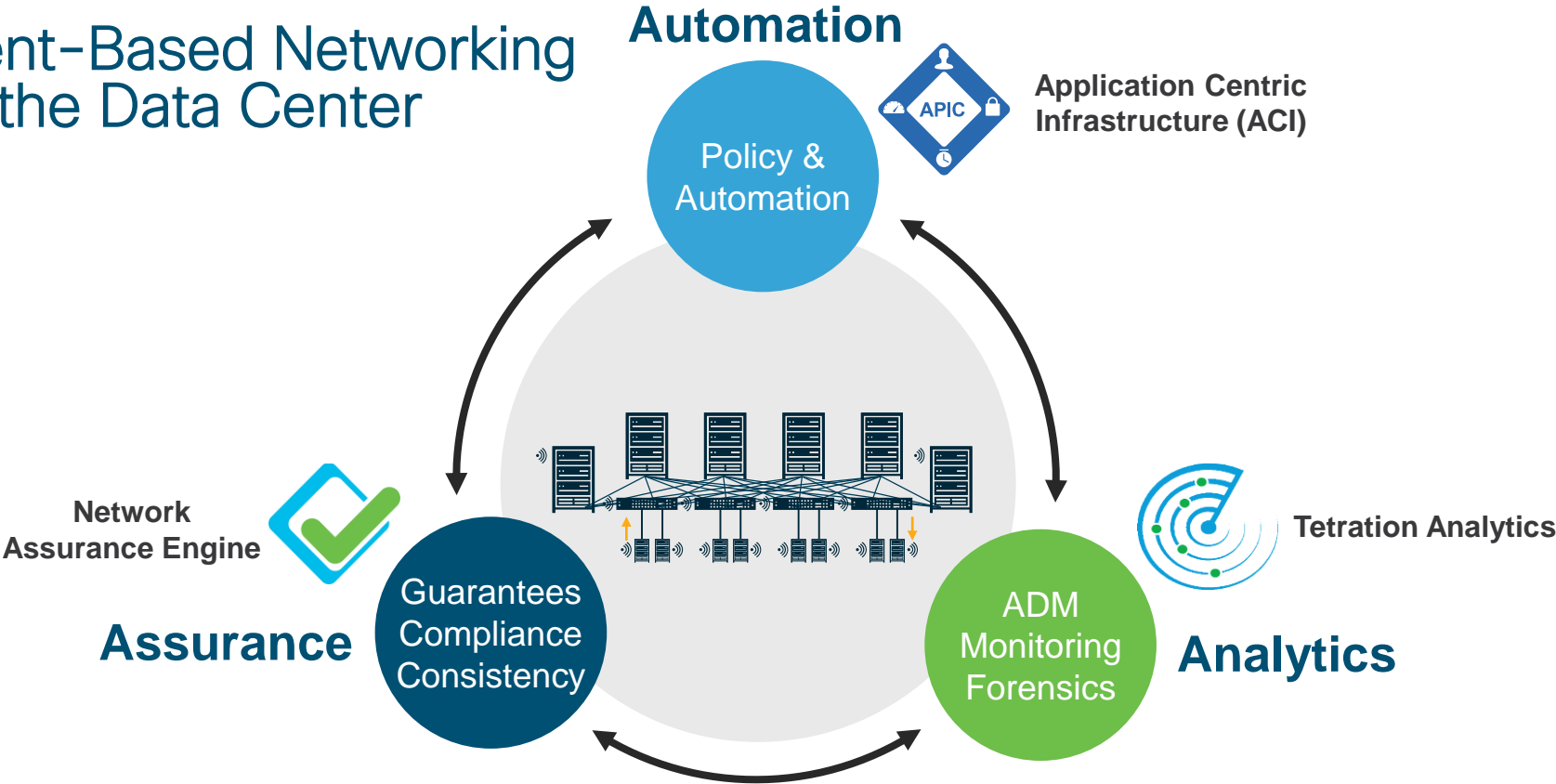
## Cisco Data Center Intent-Based Networking



# The Autonomous Network

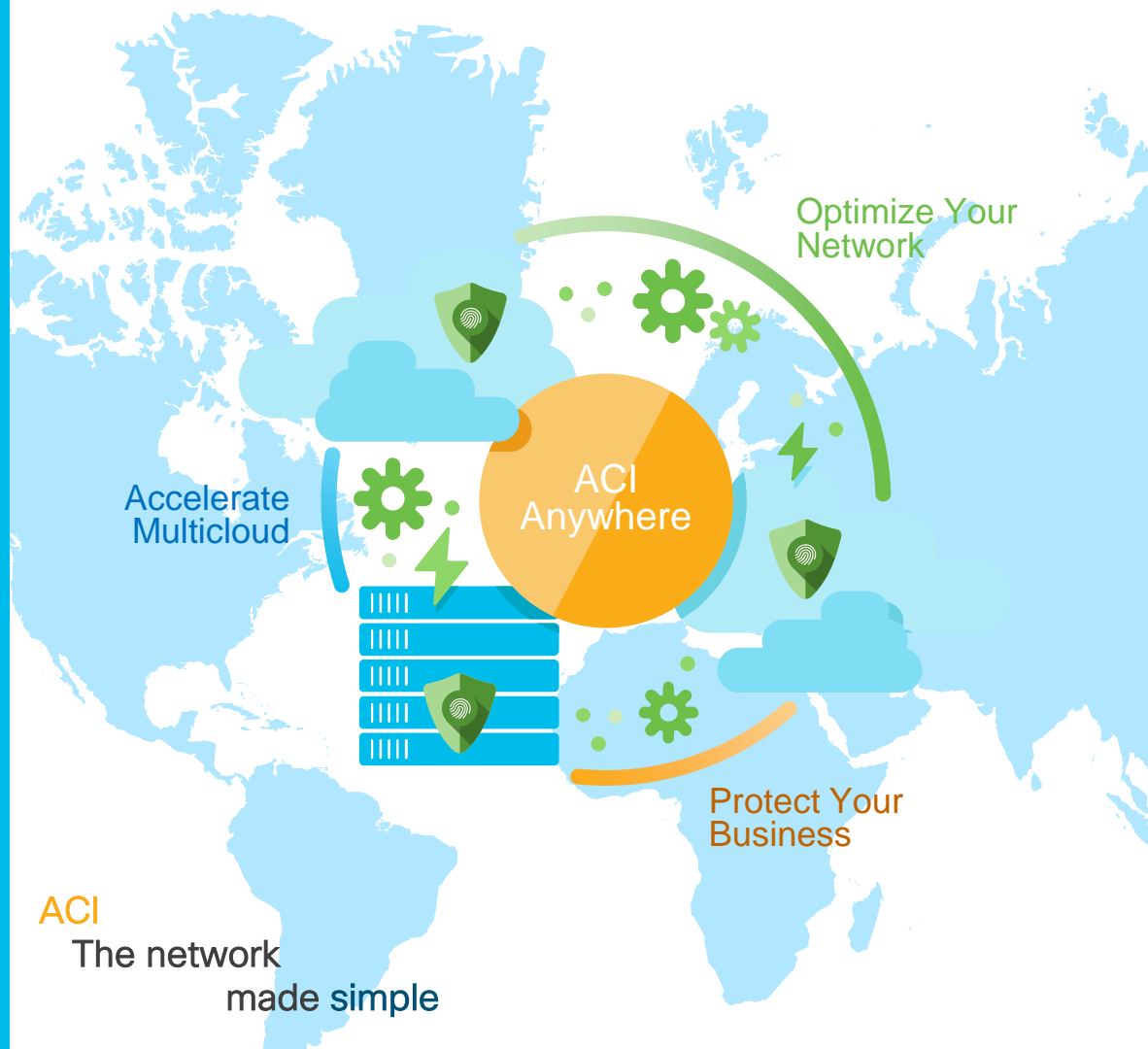


# Intent-Based Networking for the Data Center



# Cisco ACI

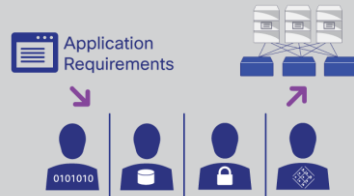
- Simpler & better networking for your business
- Any DC network: Any Size, Anywhere, Any form
- Based on Nexus 9000 covering any bandwidth (100Mbps – 400Gbps)



ACI  
The network  
made simple

## Without ACI

New Application



IT administrators  
work in silos.



Weeks

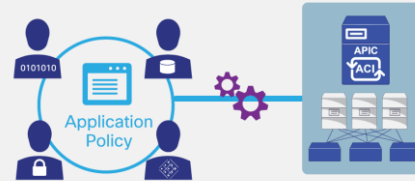
There is no shared  
architectural model.



## With ACI

New Application

Simpler



Faster

IT admins work at  
the application level.



Hours

Efficient

Shared model for  
policy automation.



# ACI / N9k - Strong Adoption in the Marketplace

30,000+

Nexus 9K  
Customers Globally

5,800+

ACI  
Customers

65+

Ecosystem  
Partners

\$3B

Business  
Run Rate

## ECOSYSTEM PARTNERS



# Nexus 9000

Financial  
Services  
Customers

## The platform is proven at scale in Global Financial Customers

JPMorganChase  citi  BARCLAYS  Santander  Bank of America

 USAA  DTCC  BNP PARIBAS  CREDIT SUISSE  Goldman Sachs  TWO SIGMA

 State Farm™  NASDAQ OMX  SCHOOLSFIRST FEDERAL CREDIT UNION  AIG  WESTERN UNION WU  IBRD

Morgan Stanley  BBVA  Robert Bosch Stiftung  GE  Scottrade  CITADEL

 mashreq  المشرق  AMERICAN FINANCIAL GROUP, INC.  SAMSUNG LIFE INSURANCE  MACQUARIE  Fidelity INVESTMENTS  E\*TRADE FINANCIAL

The Blackstone Group®  THE GREAT-WEST LIFE ASSURANCE COMPANY  Westpac  MetLife  SET The Stock Exchange of Thailand  Vistaprint

 Standard Life  lyondellbasell  FIRSTRAND  بنك الخليج الاول  London Stock Exchange Group  Erie Insurance

 HDFC BANK  MARKEL  Peoples United Bank  BCA  HALKBANK  Australian Government Australian Taxation Office



# Bank Central Asia accelerates service innovation with application-centric, software-defined infrastructure

Size: 25,000 employees | Industry: Financial services | Location: Jakarta, Indonesia

Bank Central Asia (BCA) is one of the leading private banks in Indonesia, offering business transactions, credit loans, and financial solutions for more than 16 million corporate, commercial, and individual customers. BCA services are delivered through 1213 branches, 17,207 ATMs, more than 400,000 electronic data capture (EDC) machines, and 24-hour Internet and mobile banking.

## Challenges

- Accelerate service innovation
- Increase operational agility and responsiveness
- Protect sensitive client and financial data
- Maintain high availability

## Solutions

- Application-centric, software-defined networking
- Centralized, automated infrastructure management

## More Information

- Visit: [cisco.com/go/aci](https://cisco.com/go/aci)

## Results

- Faster infrastructure deployments and changes
- Better data segmentation and security
- Easier IT monitoring and troubleshooting

### Products

**Cisco® Application Centric Infrastructure**  
(Cisco ACI™)

**Cisco Application Policy Infrastructure Controller**  
(Cisco APIC)

## BCA Task

## Before Cisco ACI

## After Cisco ACI

Server connectivity

Configuration on each switch or router

Configuration through centralized management console (Cisco APIC)

Virtual Machine (VM) connectivity

5 manual processes

3 manual processes

New VM server for existing application

10 to 20 minutes

10 seconds

Endpoint physical port tracing

5 to 10 minutes

30 seconds

Capacity measuring

10 to 30 minutes

20 seconds

Network configuration

Manual

XML/JSON scripting through API

**“Moving from traditional networking to application-centric networking has made us all faster and more efficient.”**

**Lily Wongso**

Data Center Network Manager, BCA





441% ROI

**\$145M** In business benefits

11 month payback

**87%** faster application development cycle

**83%** more efficient network operations

**40x** improvement in bandwidth



513% ROI

**\$7.8M** in discounted business benefits

6.4 month payback

**85%** reduction in staff time for provisioning

**75%** reduction in staff time for hybrid deployment

**0** unplanned downtime since deployment



368% ROI

**\$3.73M** in discounted business benefits

9 month payback

**90%** less staff time to provision hosted svcs.

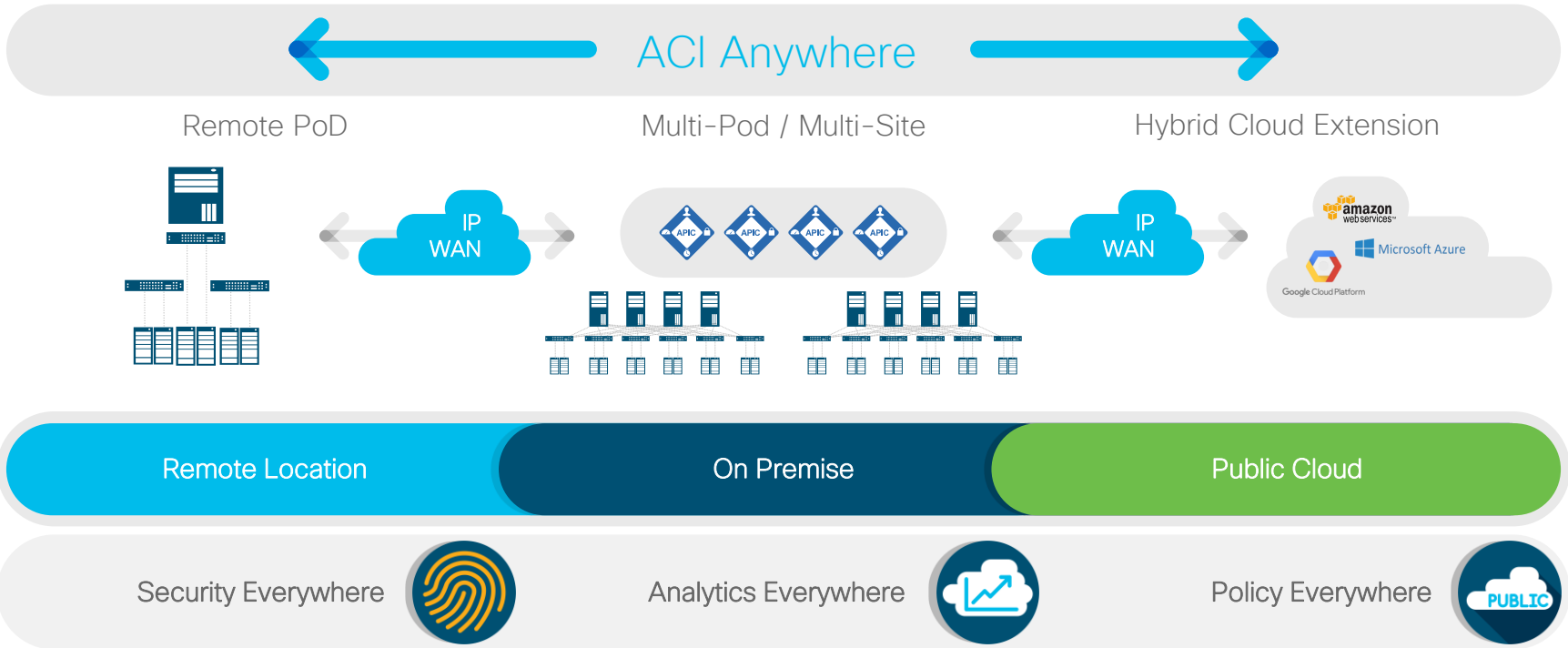
**29%** more efficient network operations

**Supports growth** of new cloud-based hosted pbx svc.

## Five year cumulative benefits – IDC ROI spotlight

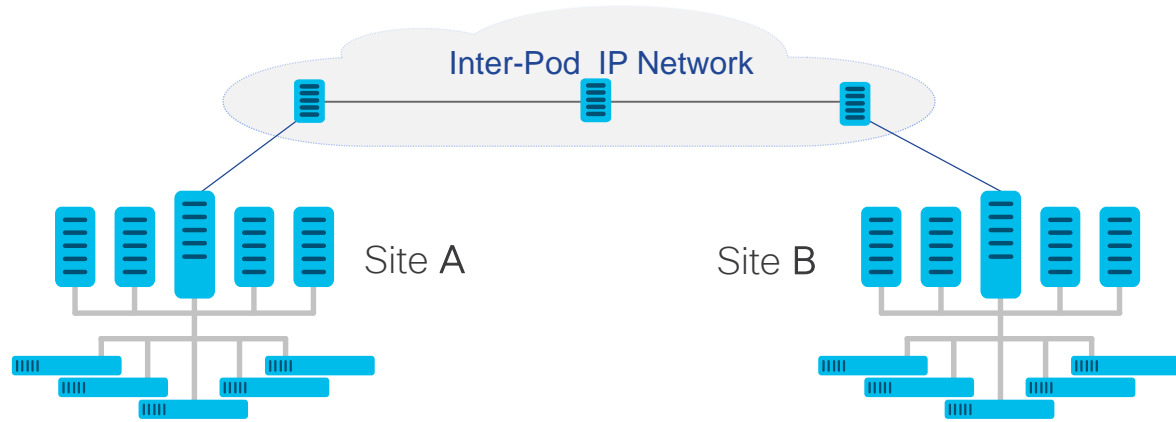
# ACI with ACI Anywhere

Any Workload, Any Location, Any Cloud



# ACI MultiPod

Single APIC Cluster Extends Network Virtualization, Policy, Services to Multiple PODs



Active-Active  
Datacenters

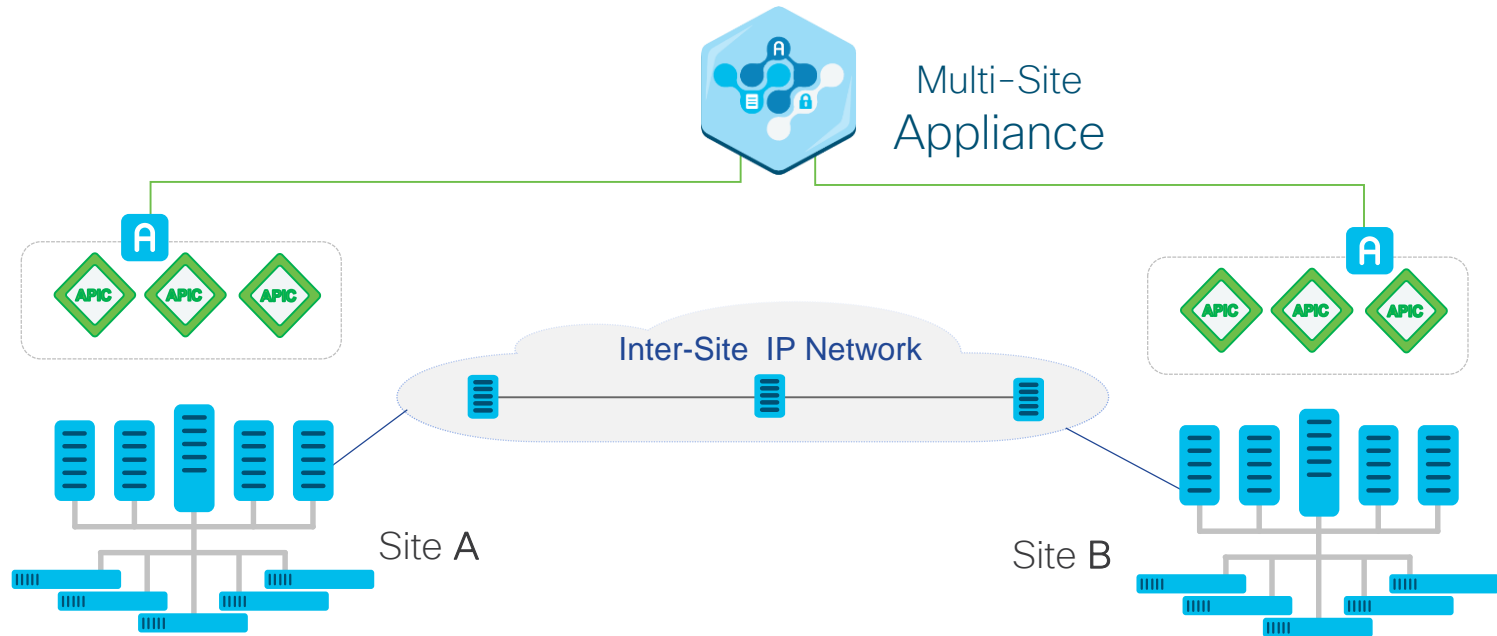
Virtual Metro  
Clusters

Stretch VRF, EPG, BD  
Across PoDs with VXLAN

Up to 50ms  
Latency

# ACI Multisite

Extends Network Virtualization, Policy, Services to Multiple Fabrics



Geographically Dispersed  
Active/Active Data Centers

Active/Standby Data Centers  
For Disaster Recovery

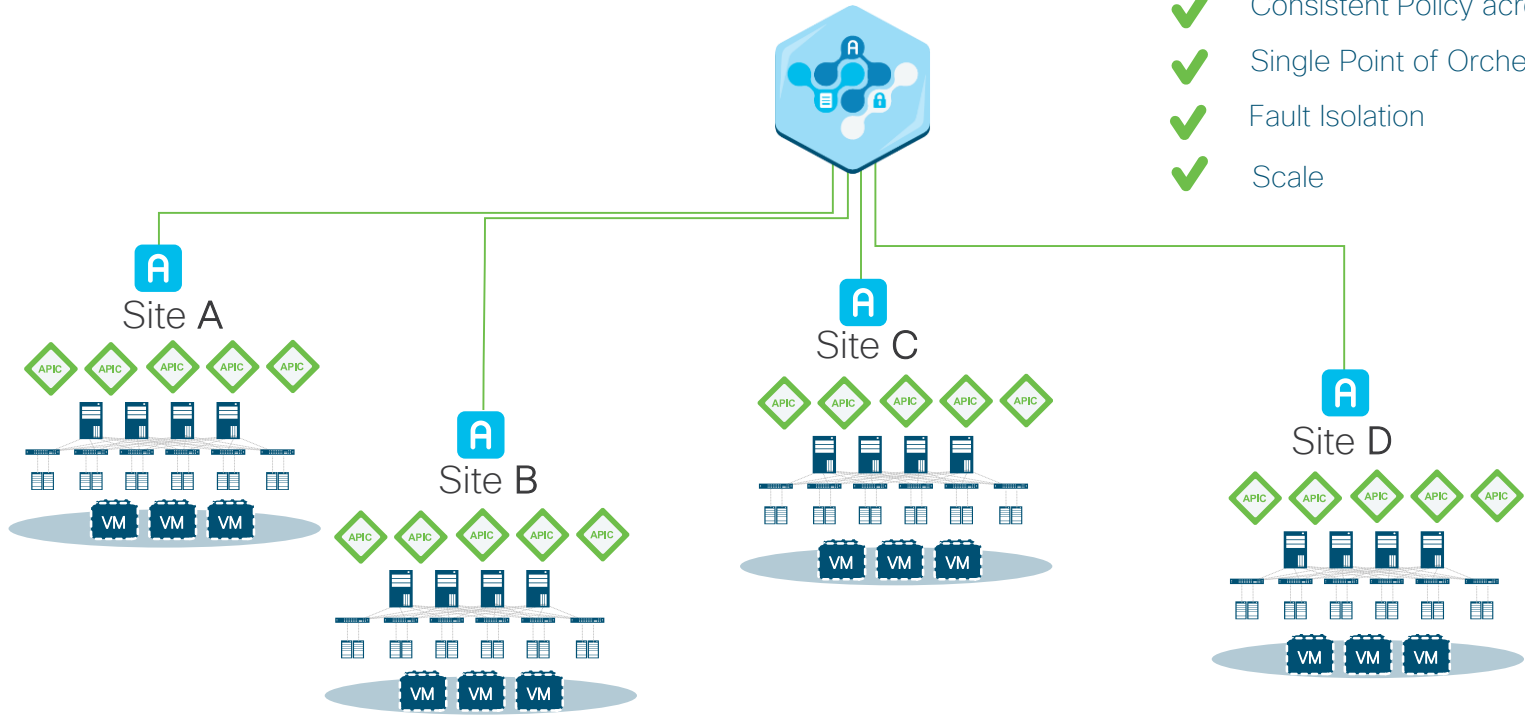
Stretch VRF, EPG, BD  
Across Sites with VXLAN

Up to 500ms to  
1 sec Latency

# ACI Multi-Site

## Multi-Site Orchestrator

- ✓ Consistent Policy across sites
- ✓ Single Point of Orchestration
- ✓ Fault Isolation
- ✓ Scale



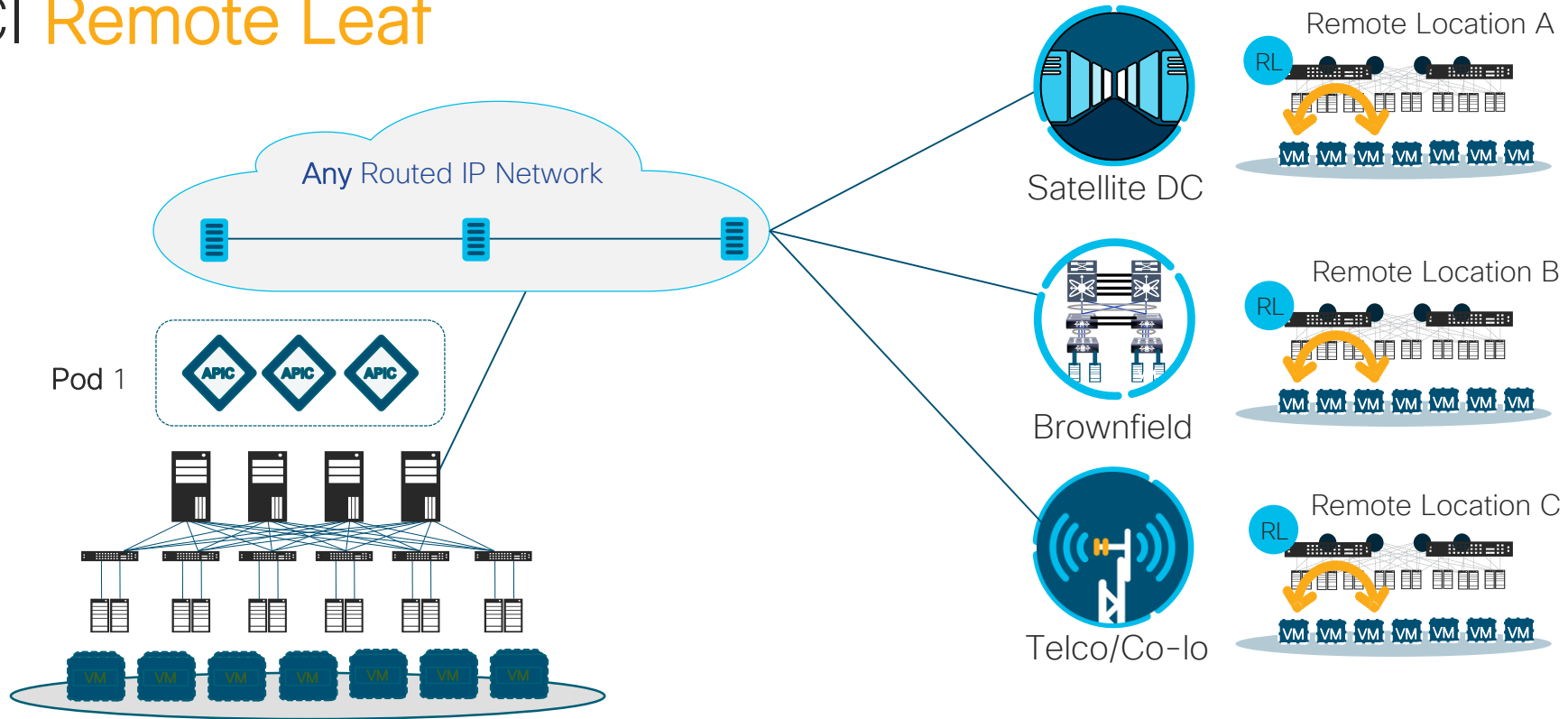
Policy  
Consistency

Single Point Of  
Orchestration

Availability  
Fault Isolation

Scale

# ACI Remote Leaf

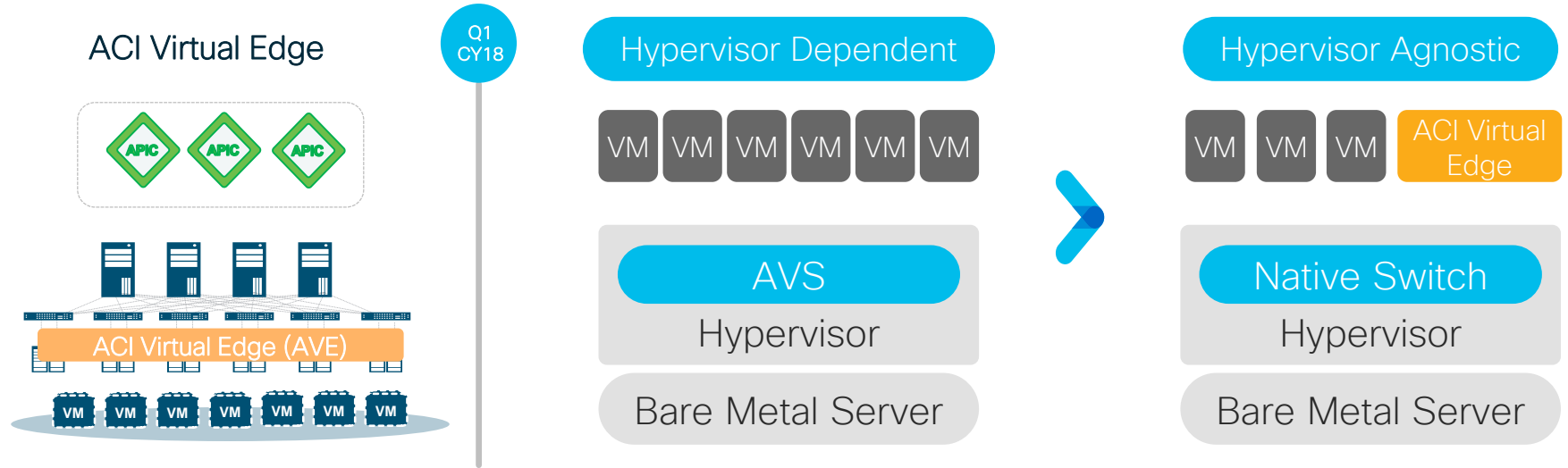


Zero Touch Auto  
Discovery of Remote Leaf

$\leq 300$  ms RTT, 100M+ BW  
Up to 20 Remote Locations

Single central management  
Automated L2 VXLAN extension

# ACI Virtual Edge



Maintain Existing Operational Models

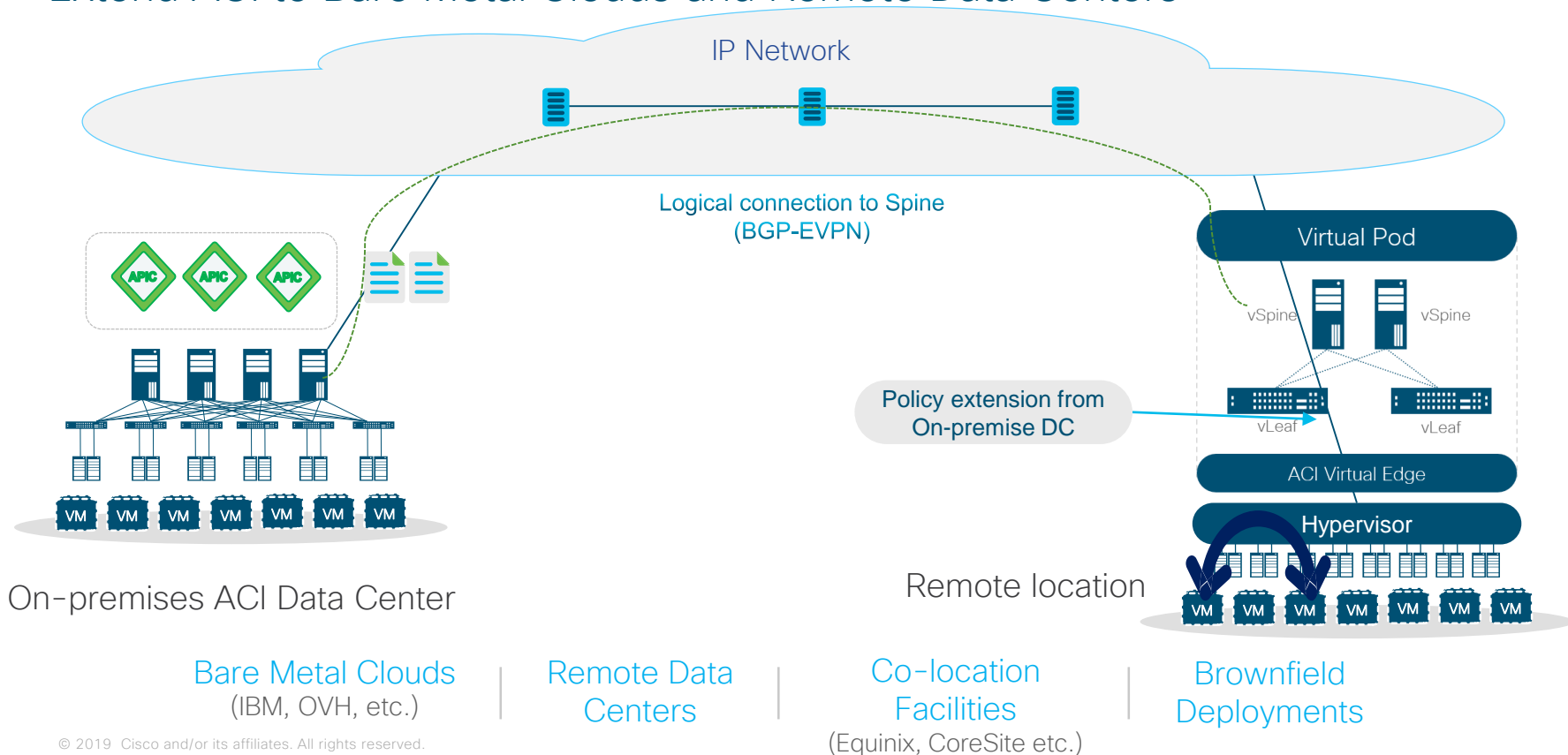
Simple Transition/Migration  
AVS => AVE

Policy Consistency Across Multiple Hypervisors

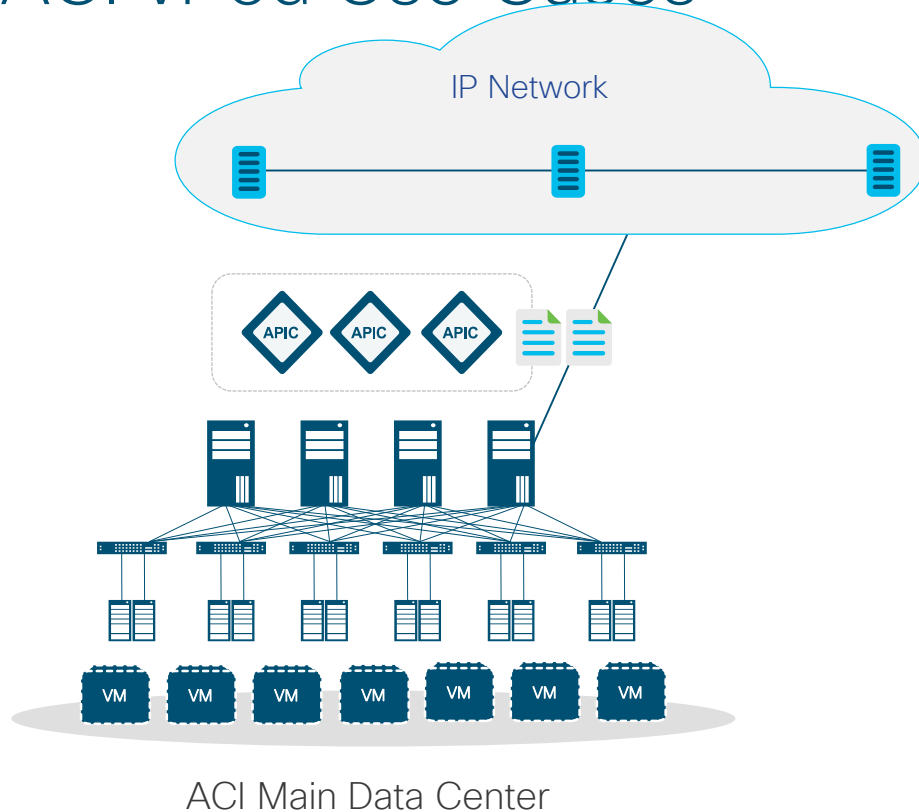
AVS/AVE Feature Parity

# Cisco ACI Virtual Pod

Extend ACI to Bare Metal Clouds and Remote Data Centers



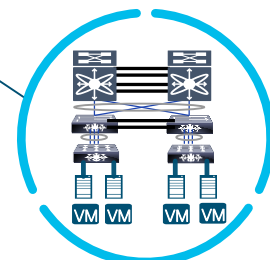
# ACI vPod Use Cases



ACI Main Data Center



Bare Metal Cloud

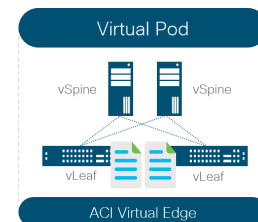


Brownfield

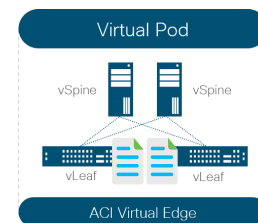


Co-location/Remote DC

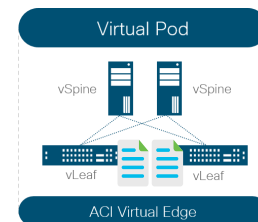
Data Center A



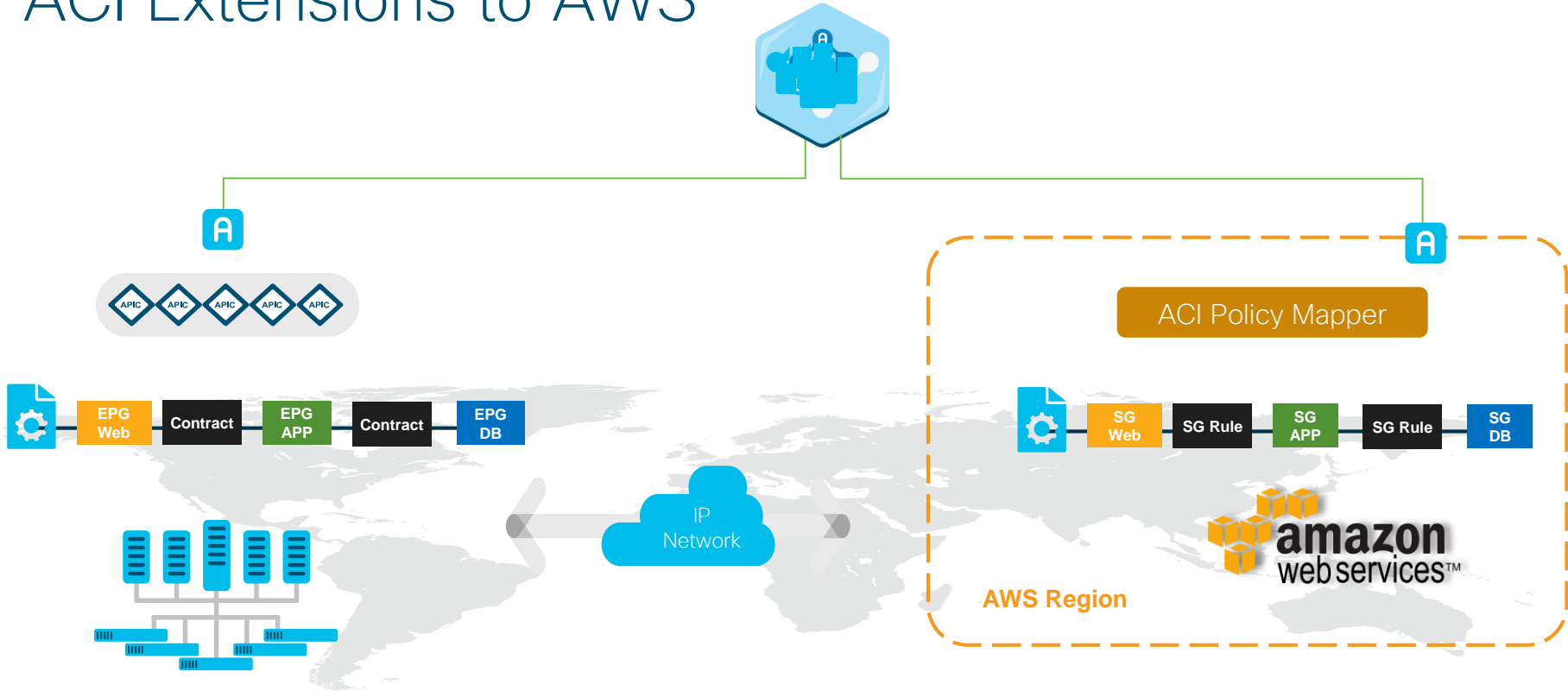
Data Center B



Data Center C







# ACI Extensions to AWS



## ACI Policy Mapped To AWS Cloud Native Constructs

# ACI Security Certifications

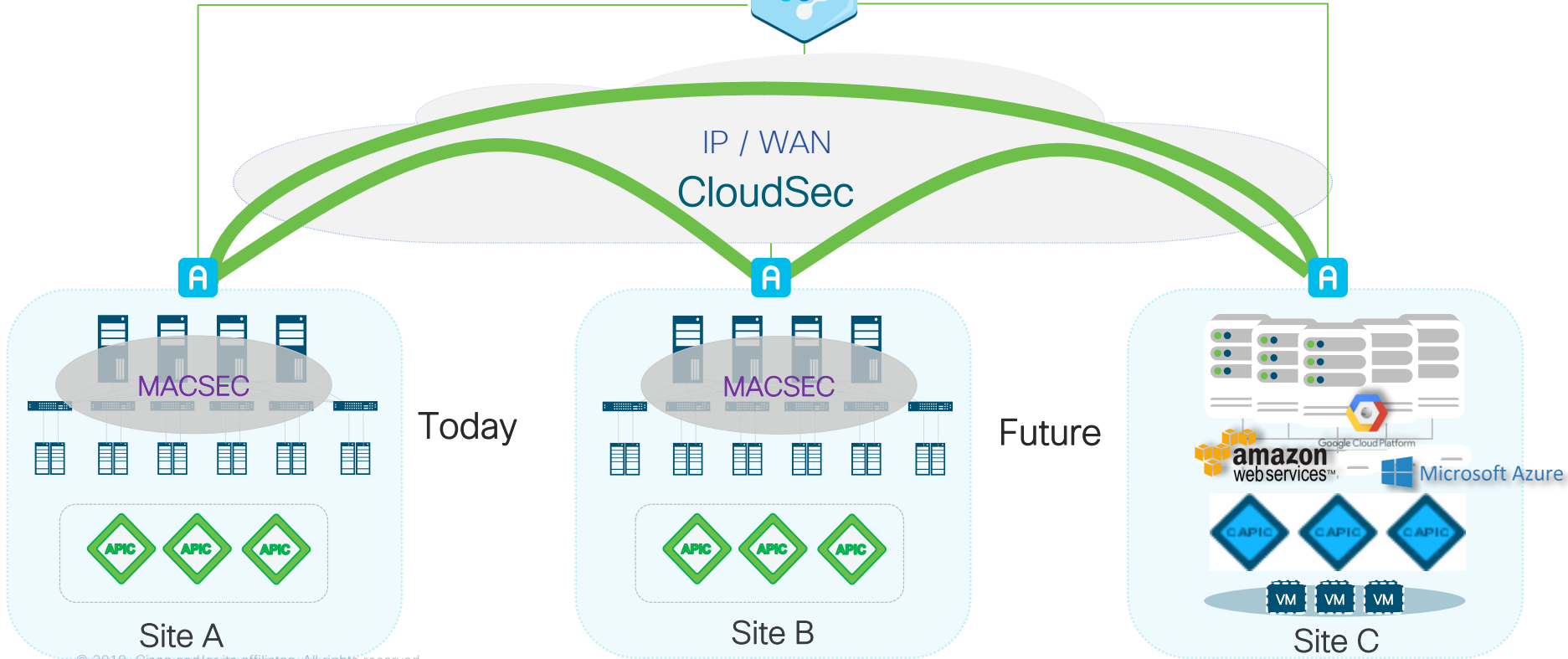
Certification	ACI
	Certified
	Certified
	Certified
	Certified
Vulnerability Scanners <ul style="list-style-type: none"><li>• Nessus, Fuzzing, etc ...</li><li>• Port Scan, AppScan</li></ul>	Certified (Ran every release)

# ACI Anywhere

## Encrypted DCI Connectivity



Multi-Site



# MultiCloud Needs ACI More Than Ever



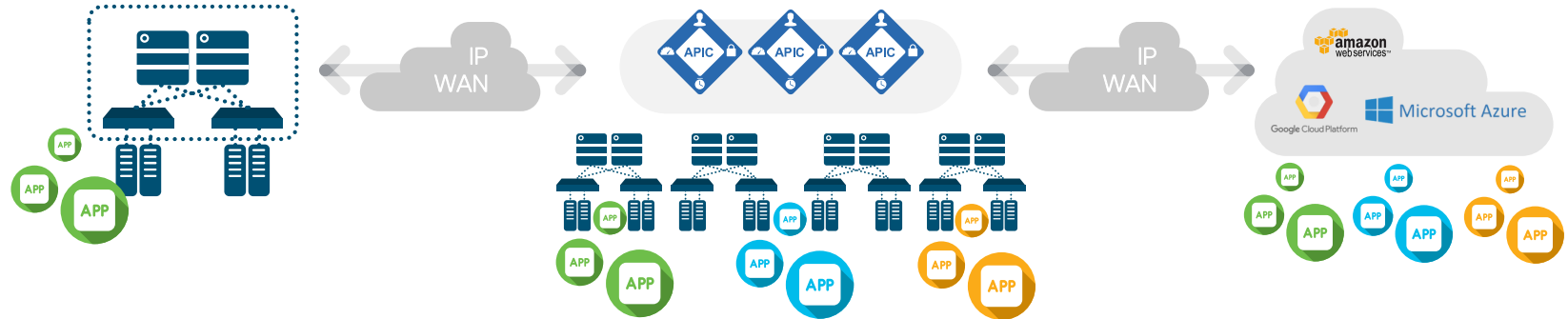
ACI policies that follow the workloads anywhere



Remote Leaf, or Virtual PoD

ACI / Multi-Site  
ACI Mini Fabric

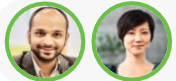
Multi-cloud Extensions



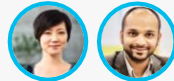
Remote Location

On Premise

Public Cloud



Security Everywhere



Analytics Everywhere



App Deployment Anywhere

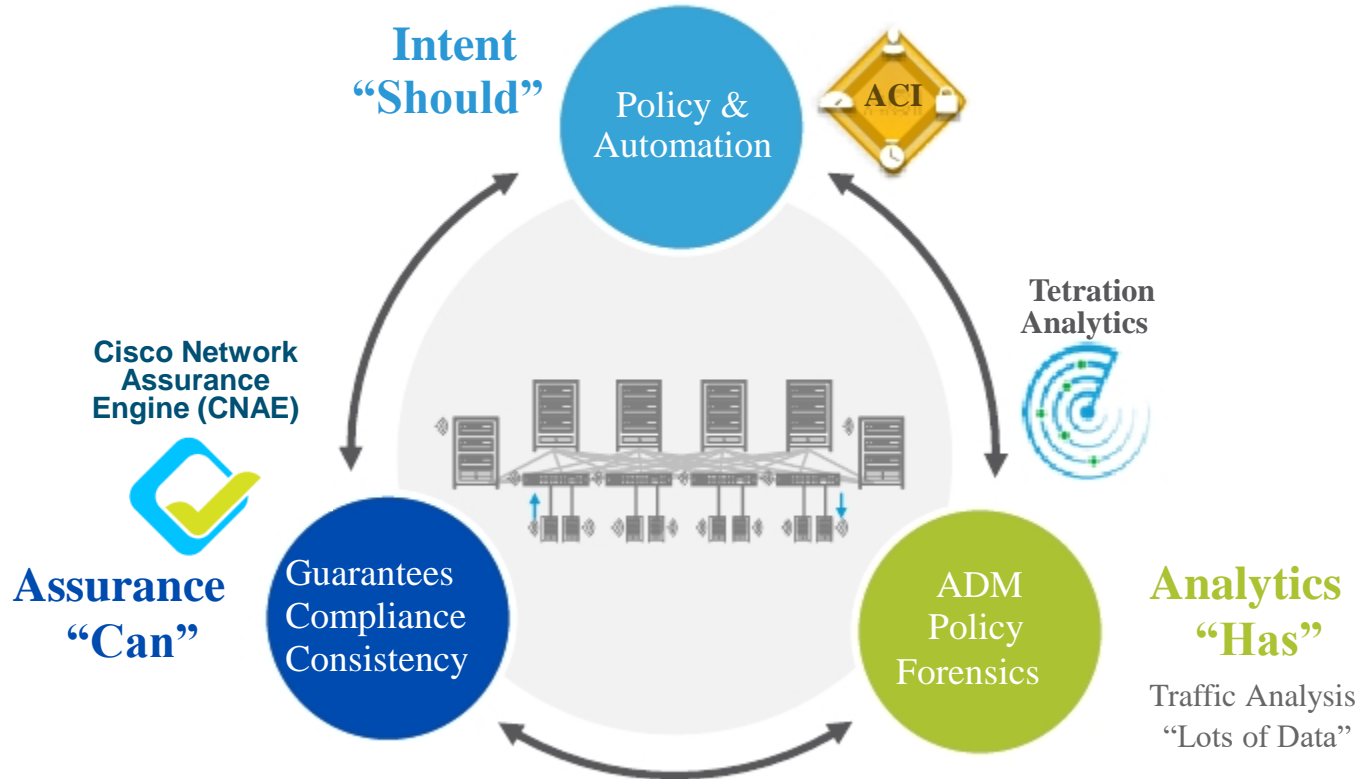


# Tetration Analytics Platform



Cisco Tetration™  
with Intel® Xeon®  
Platinum  
processor

# Intent-Based Network for Data Center



# Cisco Tetration

Understand what's running in your datacenter



Cisco Tetration™  
with Intel® Xeon®  
Platinum  
processor



Cisco Tetration



Visibility and forensics



Process inventory



Application insight



Network performance insights



## Main features

- Software sensors that support bare-metal, virtual machines and containers
- Other telemetry collection option includes Nexus 9000 series hardware, ERSPAN and Netflow sensors
- Visibility into every packet, every flow within the datacenter
- Information about users accessing application, user groups and location
- Long term retention for telemetry and forensics

# Cisco Tetration Platform

## Security use cases



Cisco Tetration™  
with Intel® Xeon®  
Platinum  
processor



Cisco Tetration



### Advanced security



Process security



Software  
inventory baseline

### Segmentation



Whitelist policy



Application  
segmentation



Policy  
compliance

### Insights



Visibility and  
forensics



Process inventory

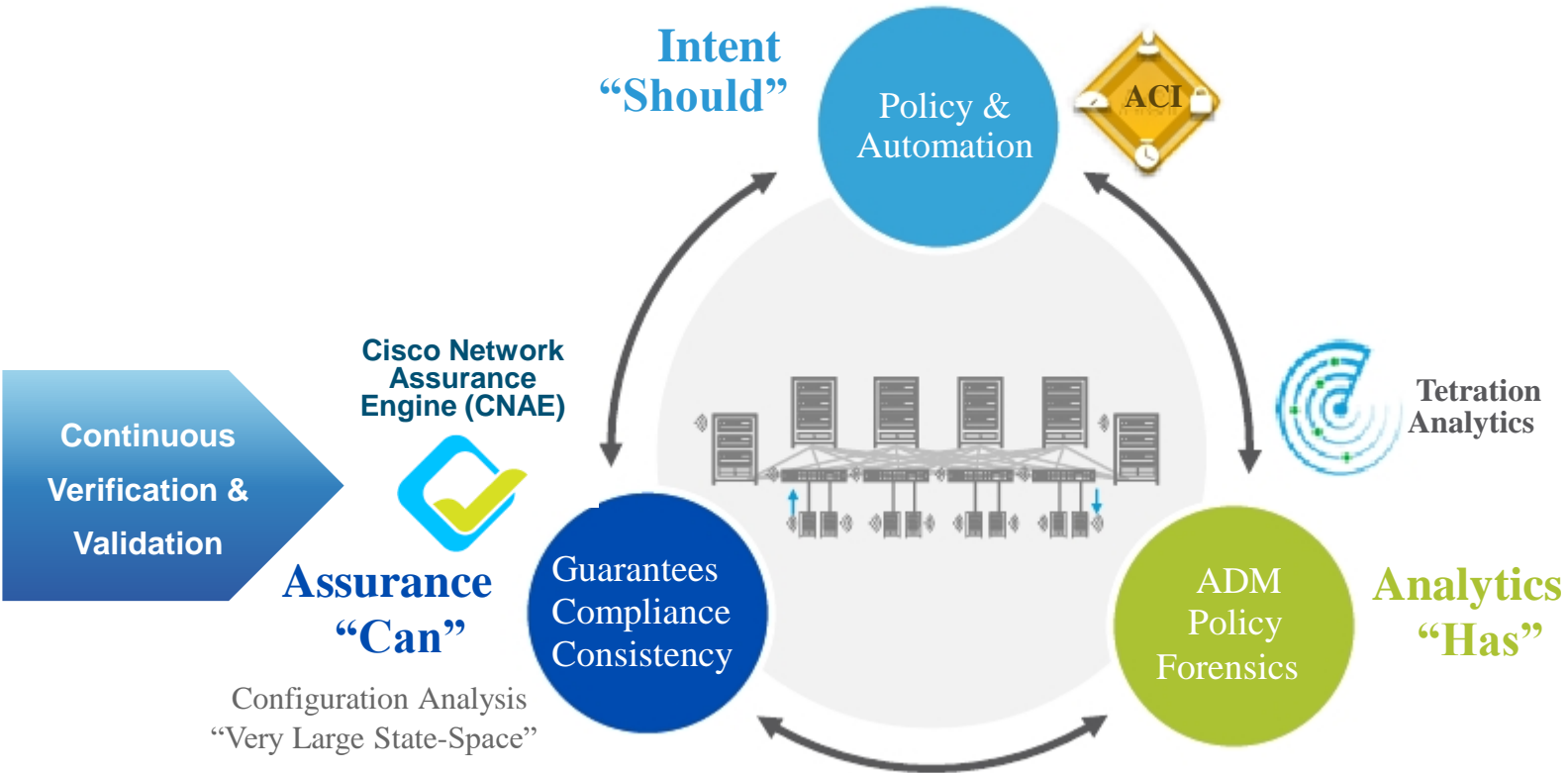


Application insight

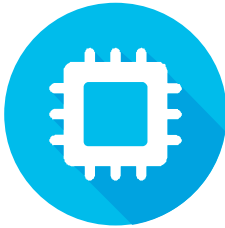


# Cisco Network Assurance Engine

# Intent-Based Network for Data Center



# Assurance in Other Industries



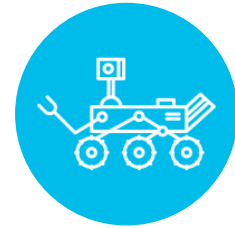
## Chip Design

Functional and Physical  
Design Verification, Lint,  
Timing Analysis



## Software Verification

Semantic Checks, Dynamic  
Testing, Memory Profiling

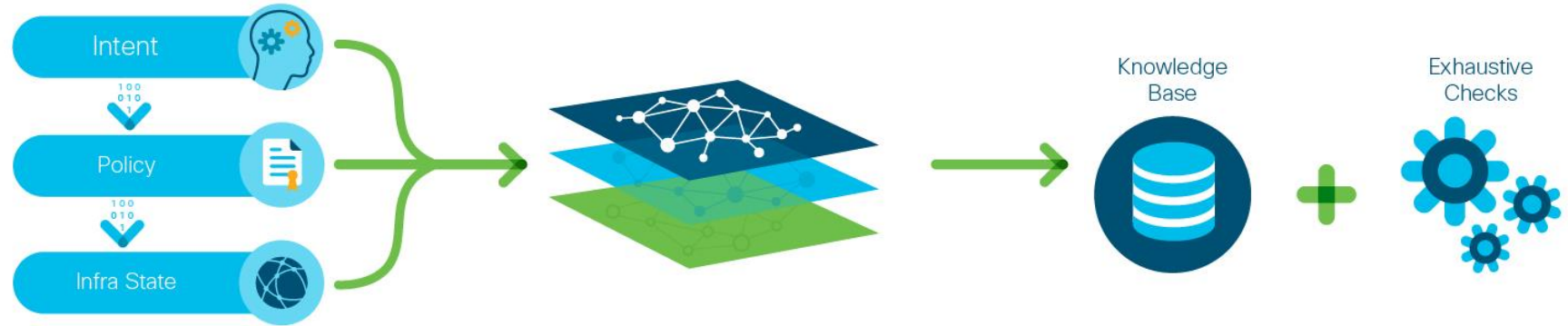


## Mars Rover

Mars Rover (B) Still  
Operational After 14 yrs  
with Formal Verification

# Formal Methods Assure Intent

# Cisco Network Assurance Engine



## Data Collection

Captures all non-packet data:  
intent, policy, state across  
data center network

## Comprehensive Network Modeling

Mathematically accurate models  
spanning underlay, overlay and  
virtualization layers

## Intelligent Analysis

5000+ domain knowledge-based  
error scenarios built-in, codified  
remediation steps

# What Makes Cisco Network Assurance Engine Unique



Codified Cisco  
Domain Knowledge

**5000+** built-in  
failure scenarios



Deep Policy  
Controller Integration

Assures **controller**  
policy and configurations



Most Comprehensive  
Analysis

Capture and analyze  
switch configs + **hardware**



Cisco Network  
Assurance Engine

## What are the Benefits?



Predict the impact of  
changes



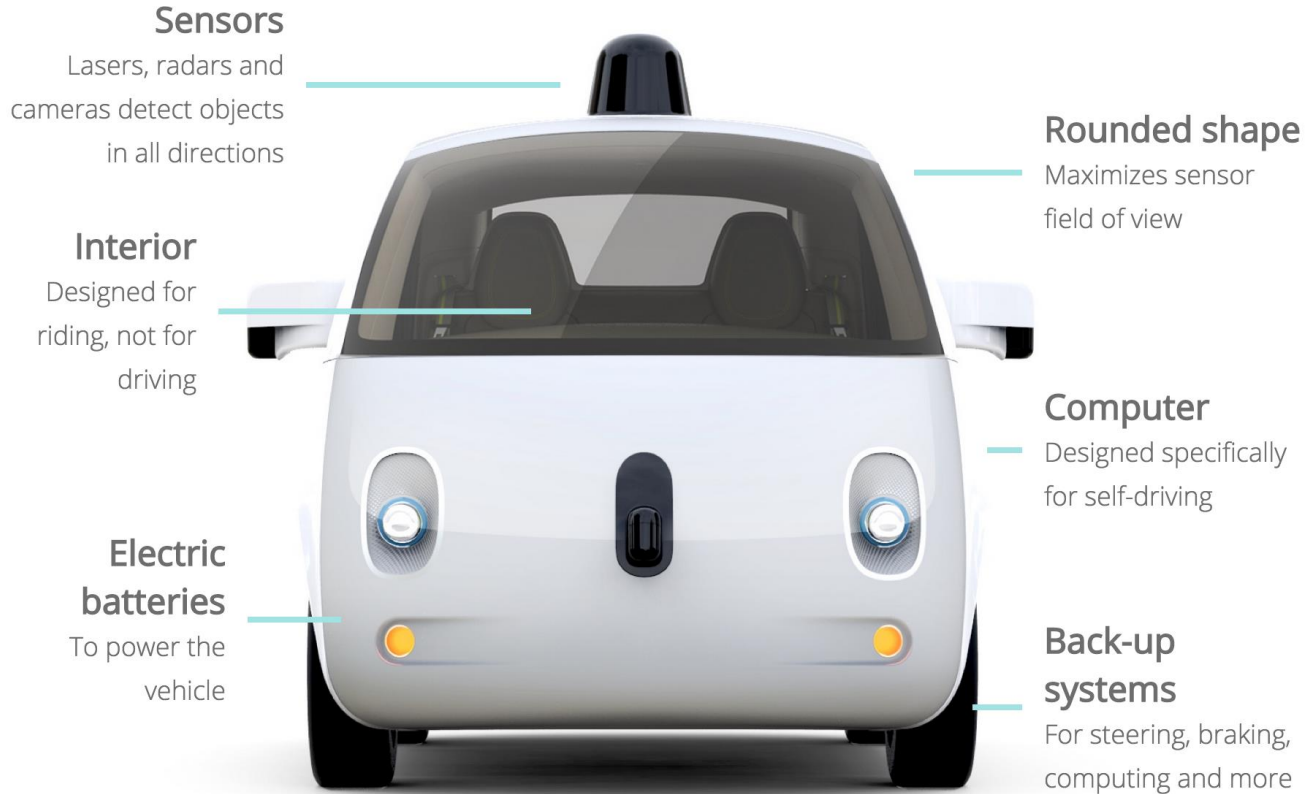
Proactively verify network-  
wide behavior



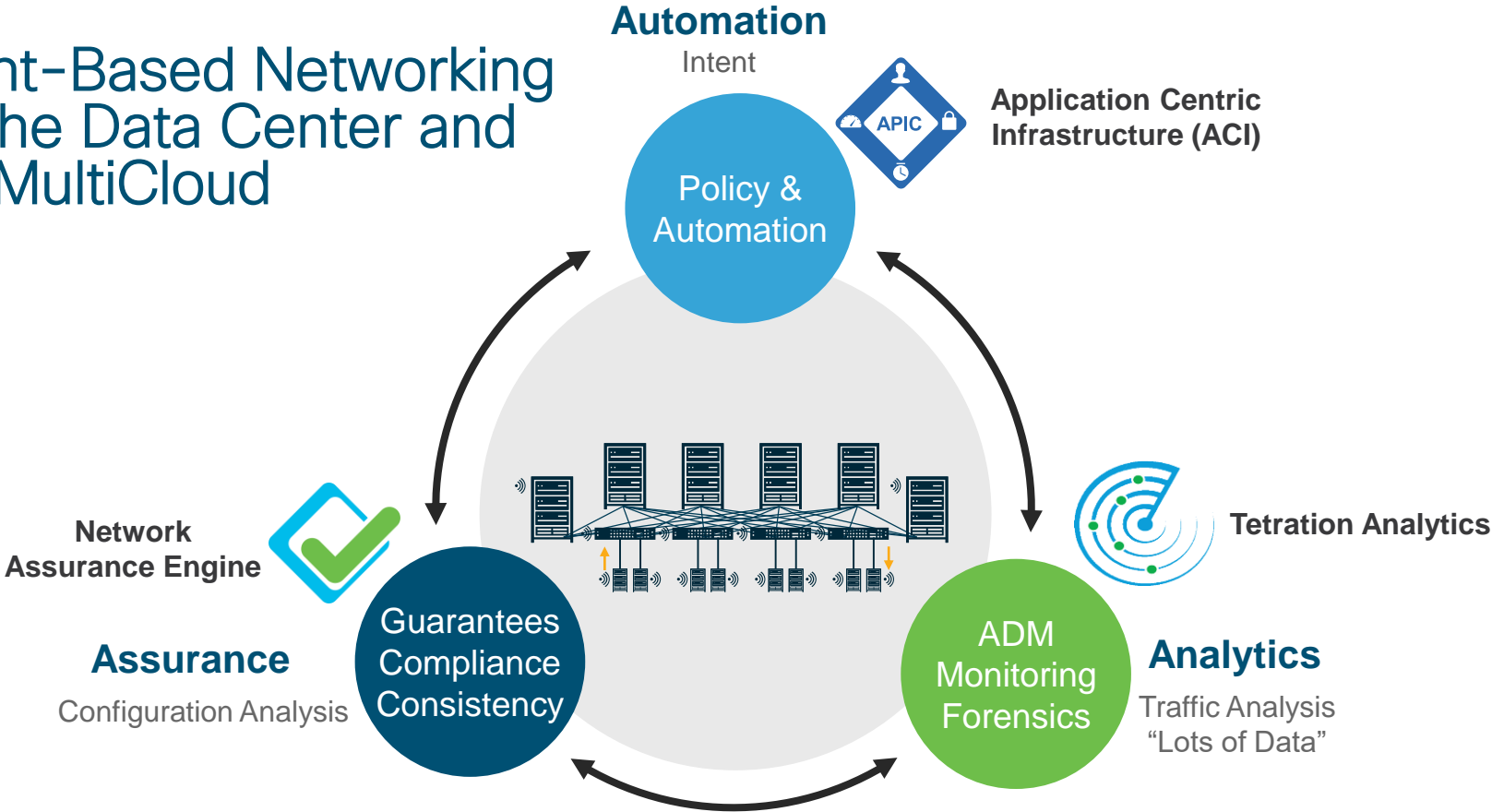
Assure network security  
policy and compliance

What are we  
Delivering?

# The Autonomous Vehicle



# Intent-Based Networking for the Data Center and the MultiCloud



Constantly  
Learning



INTENT  
Based  
Data Center

Constantly  
Adapting

Constantly  
Protecting

