



Cisco ACI and Nexus 9000 Executive Briefing and Technical Concept

Presented by:
Shangxin Du (@shdu)-Solution Support Engineer, Cisco TAC
Aug 26th, 2015

Applications Are Changing

Type ➤ Big data, distributed, mobile

Consumption ➤ Cloud – public, private, hybrid

Delivery ➤ Any where, any time, any device

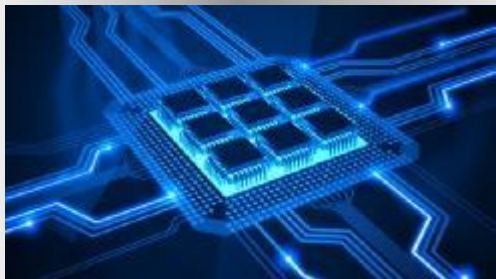
78% Network is even more critical to delivering applications than a year ago*

* Cisco Global IT Impact Survey



Data Market Trends

New Server Platforms Enabling Higher I/O Throughput



10G LOM/FlexLoM Shipping^{*4}

Intel Haswell (2 Sockets x 12 Cores)^{*2}

Virtual Machine Density Driving I/O Performance



24 VMs/ Server^{*1}

Big Data Increasing East-West Traffic



DATA CENTER IP TRAFFIC GROWTH

25% CAGR (2012-2017)^{*3}

Faster SERVER Refresh Cycle 2-3 YRS



NETWORK refresh cycle of 5 yrs. should cover two server refresh cycles

^{*2}[Intel Xeon E5 Spec](http://www.intel.com/processors/xeon/e5-spec)

^{*4}<http://h30507.www3.hp.com/t5/Coffee-Coaching-HP-and-Microsoft/HP-FlexibleLOM-for-Gen8/ba-p/108515>

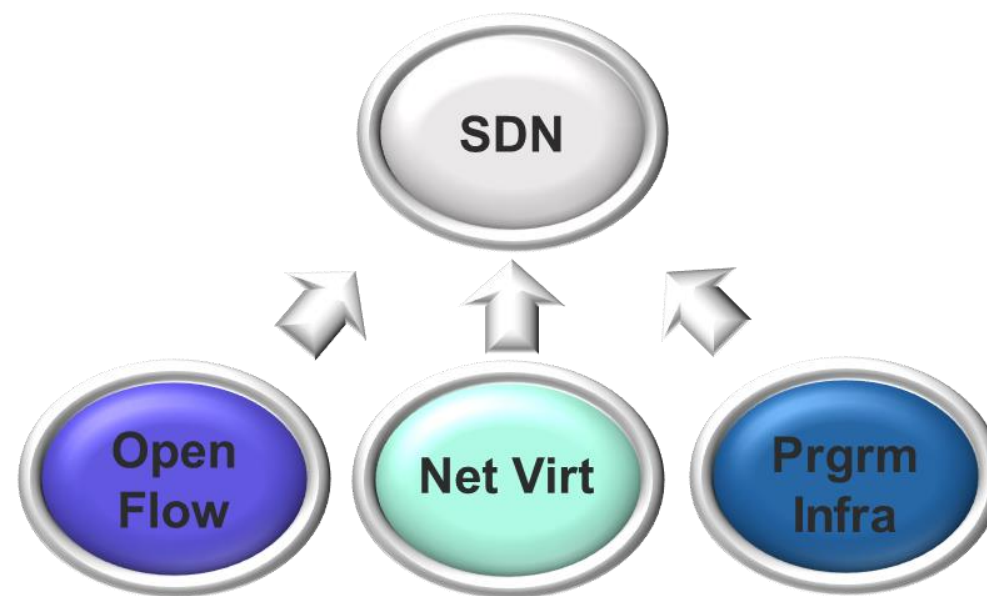
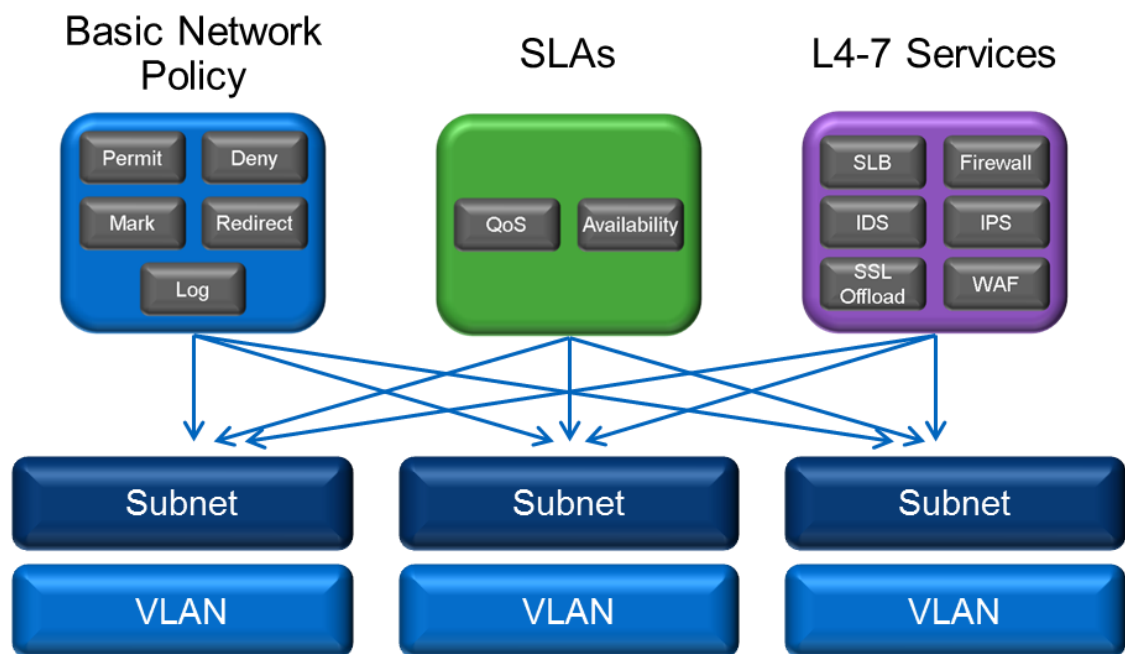
^{*1} IDC Worldwide Virtual Machine 2013-2017 Forecast

^{*3} Cisco Global Cloud Index: Forecast (2012-2017)

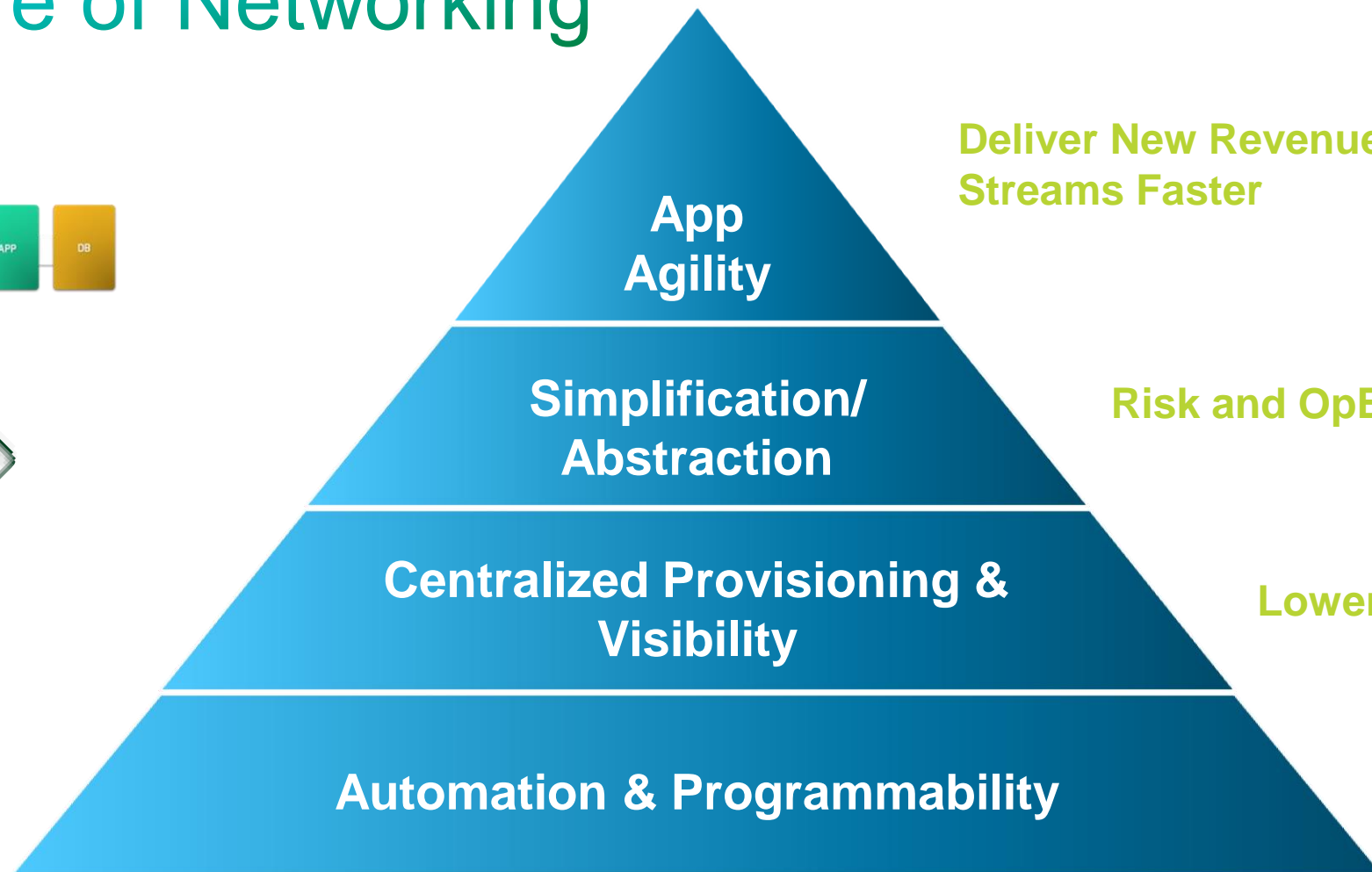
Why SDN, Why Now?

Networks are complex!
They are the next silo to experience major shift

1st Gen SDN solutions look to meet the new technical challenges.



The Future of Networking



Deliver New Revenue Streams Faster

Risk and OpEx Reduction

Lowered OpEx

Reduced Risk

Reduced CapEx

Application vs. Network: Two languages

APPLICATION LANGUAGE

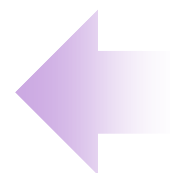
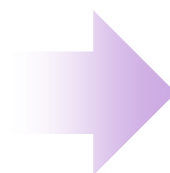
Exchange Hadoop SAP SharePoint

- Application Tier Policy and Dependencies
- Security Requirements
- Service Level Agreement
- Application Performance
- Compliance
- Geo Dependencies
- Tenants

NETWORK LANGUAGE



- VLAN
- IP Address
- Subnets
- Firewalls
- Quality of Service
- Load Balancer
- Access Lists



Logical Provisioning of Stateless Hardware

SIM Card

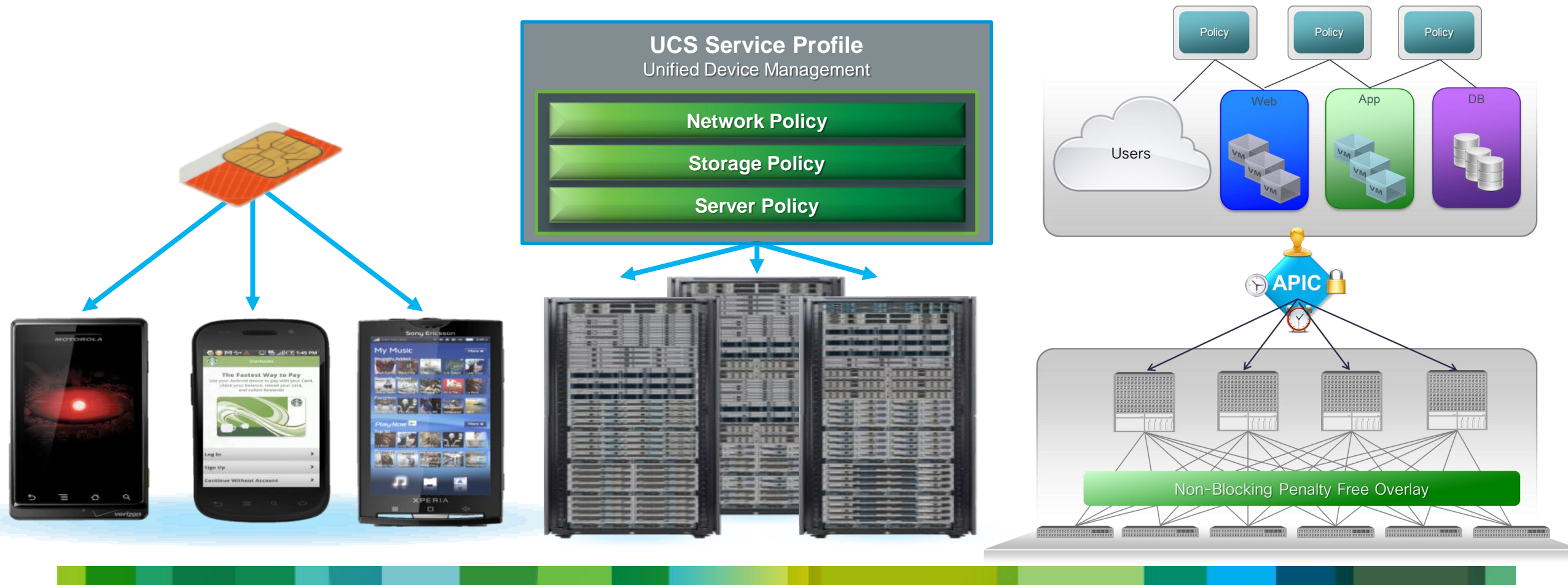
Identity for a Phone

Service Profile

Identity for a Server

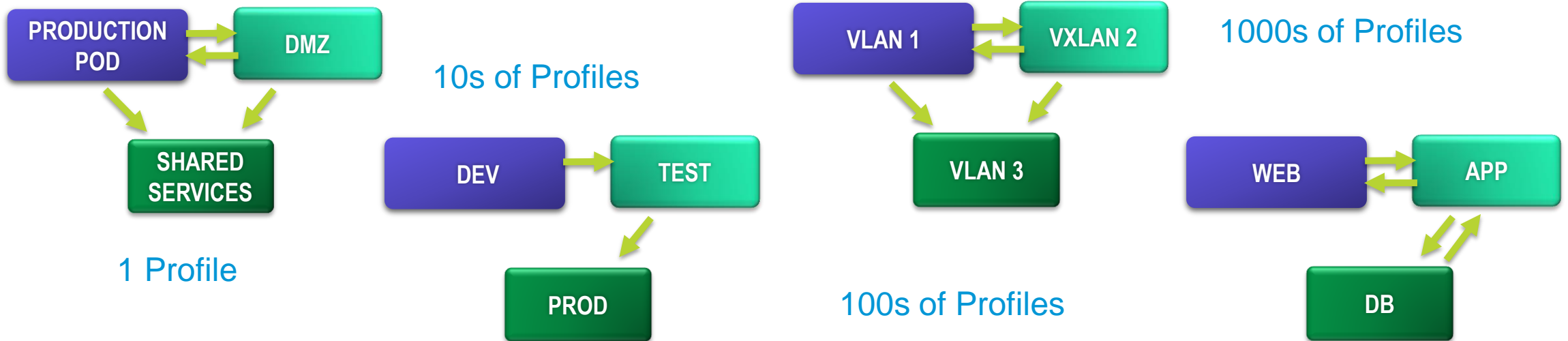
Application Profile

Identity for the Network



Flexibility of Profiles – Mapping to Business Needs

Group Policy Model
Topology/ Service Graph

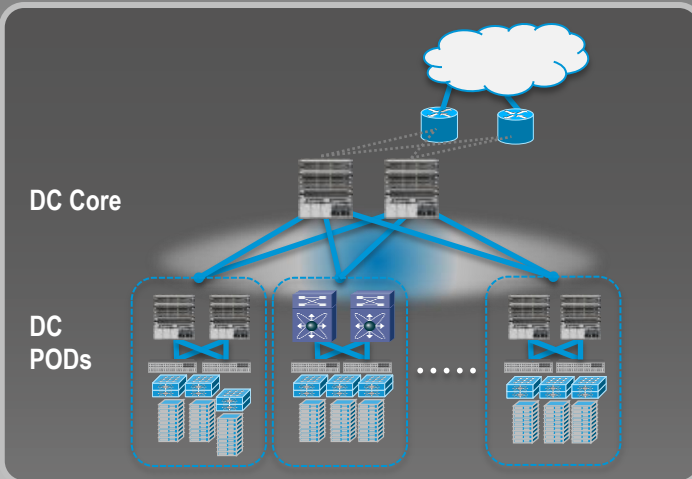


Common building blocks: Flexible Deployment options

EXISTING 3-TIER DESIGNS

PROGRAMMABLE SDN OVERLAY
MODEL

APPLICATION PROFILES & POLICIES



Existing 2-Tier & 3-Tier
Designs

Open API: Programmability

Modernized Operating System

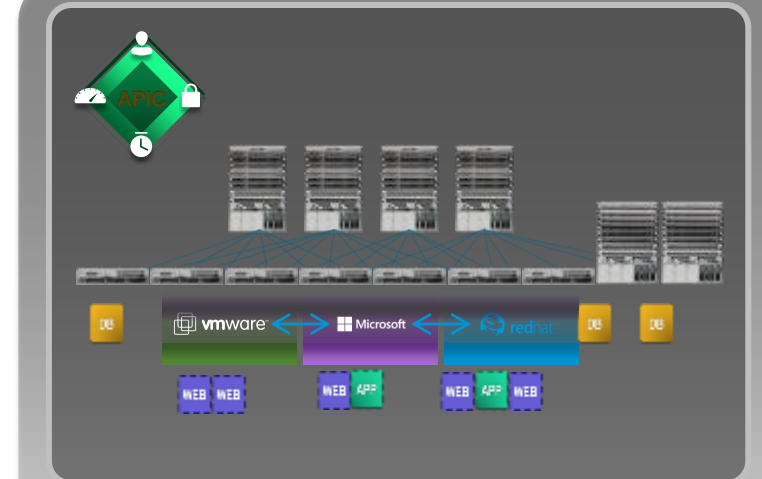
Nexus OS



VXLAN Bridging & Routing

Integrated Network
Virtualization

OpenFlow Support



Application Centric
Infrastructure

No VM Tax: Any Hypervisor

Physical & Virtual

Open API's & Controller

OPEN FROM GROUND UP

OPEN SOURCE



OPEN STANDARDS



NSH

VXLAN

OpFlex

OPEN INTERFACES



JSON



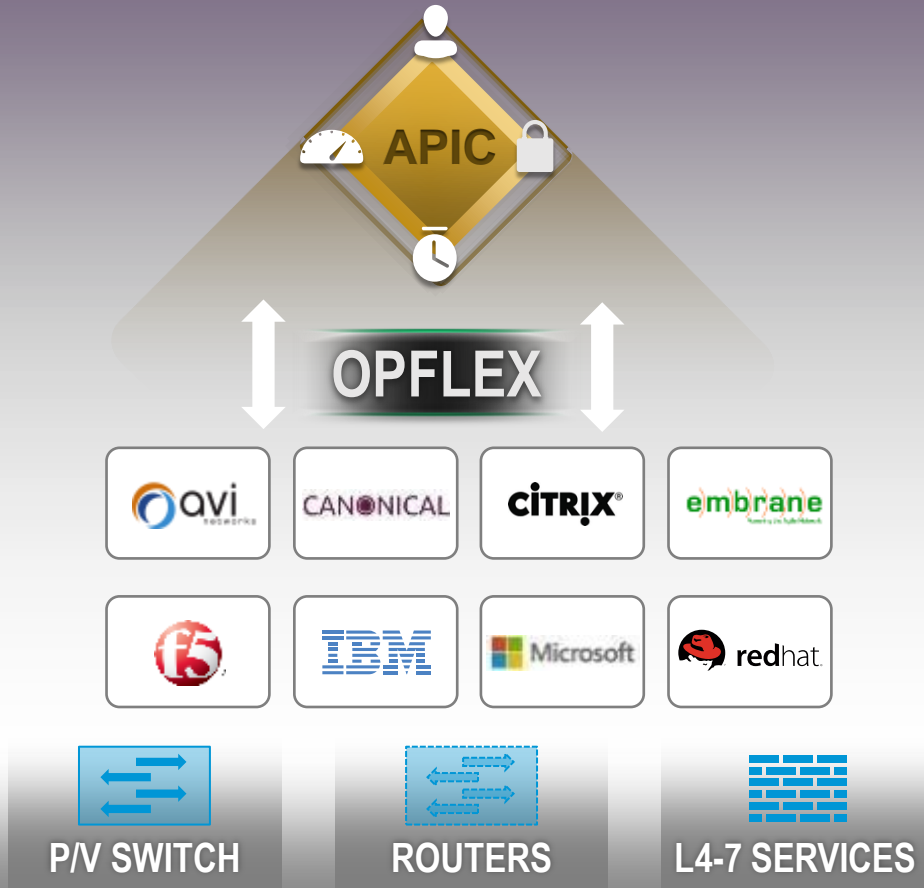
XML

REST

OpFlex

OPFLEX: Open Southbound Protocol

OPFLEX PROTOCOL + ECOSYSTEM



OPEN SOURCE

Open source OpFlex agent will be available to anyone

OPEN STANDARD

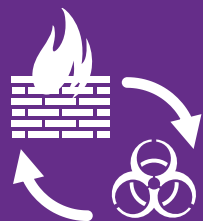
Co-authors for IETF submission



OPEN ECOSYSTEM

Broad, growing support including from hypervisor, network, and L4-7 vendors

Advanced Security At Scale



Security
Expressed in
Application
Language

Lifecycle
Management

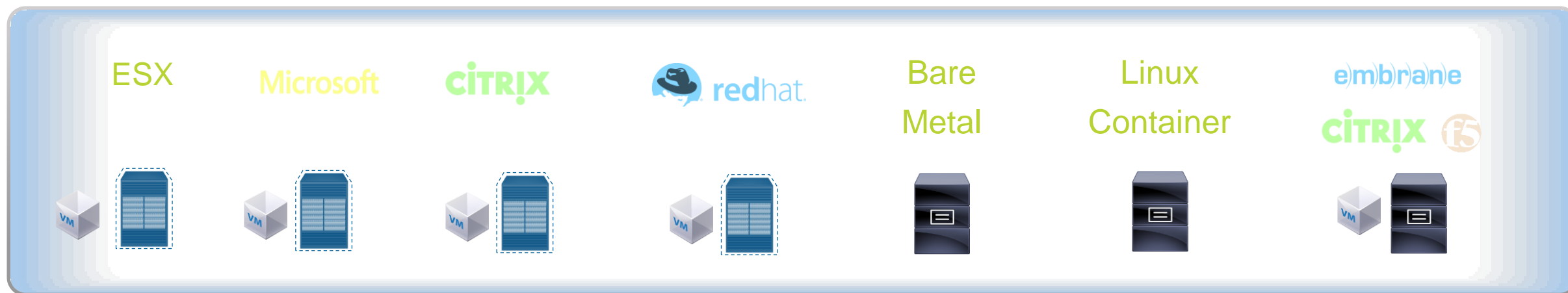
Policies Track
Workloads

Visibility,
Analytics,
Forensics

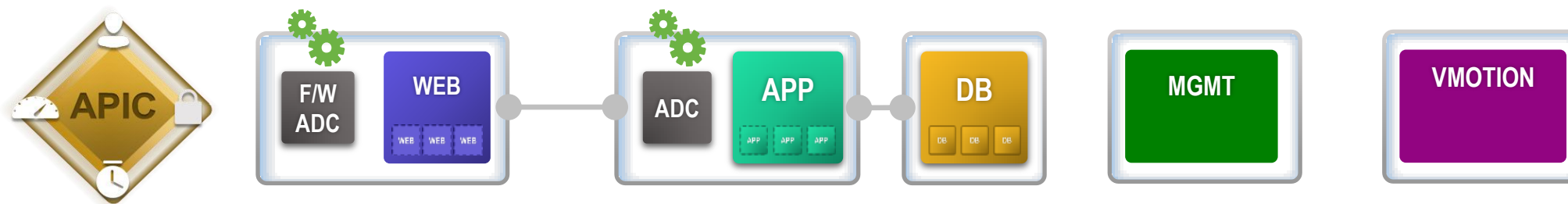
Automate
Compliance,
Centralized Audit

Distributed Security Across Physical and Virtual
Centrally Managed & Fully Automated

ACI Policy Model – Security & Micro-Segmentation

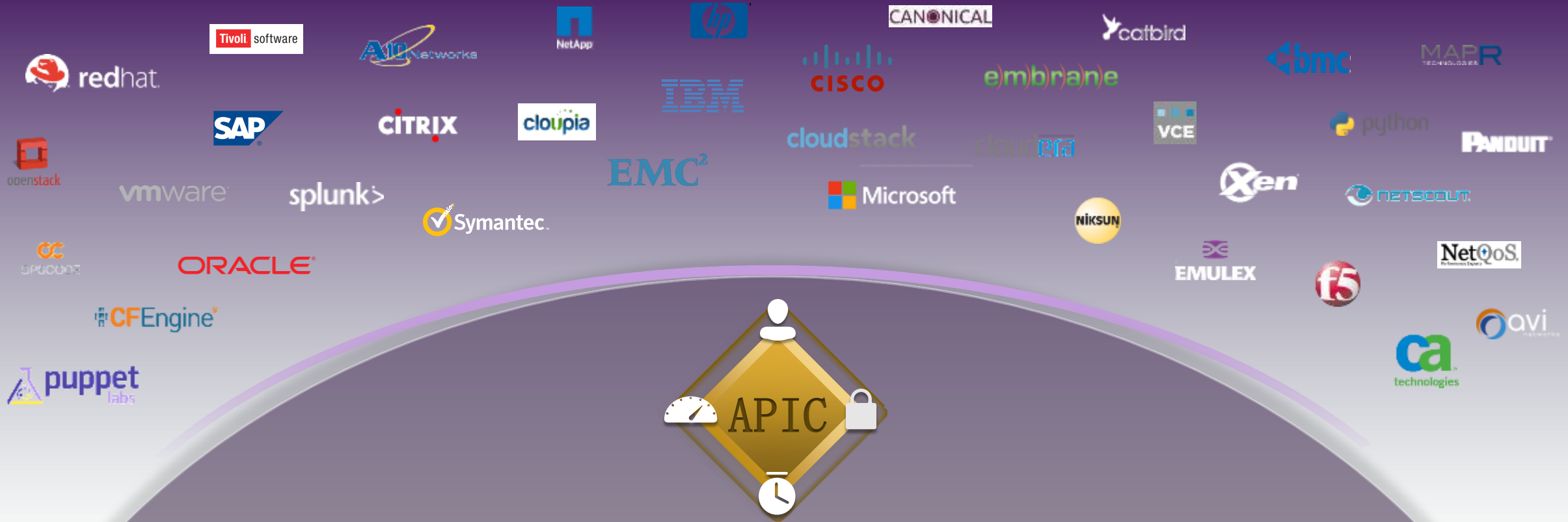


ACI Integrated Security - Open, Flexible, Policy Driven



Consistent Audit, Logging, & Visibility – FIPS / CC / PCI / RBAC

RESULT: Broad Ecosystem of partners

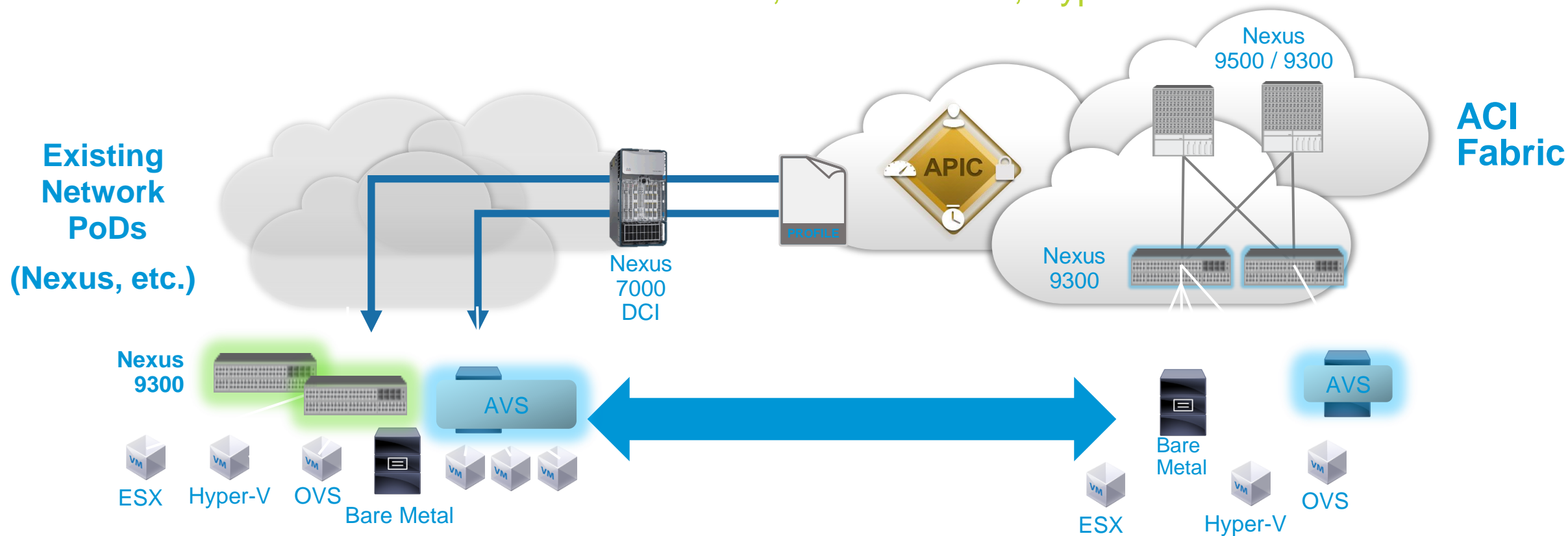


NOV 6th 2013

THE JOURNEY BEGAN ON THE NORTHBOUND

Investment Protection: Extend ACI to Installed Base

1. Leverage Existing Nexus/ IP Network
2. Deploy ACI: New Pods For Cloud Build Outs
3. Extend ACI Model. Preserve - IP networks, L4-7 Services, Hypervisors



SAP Business Warehouse: Automate Deployment with ACI

SOLUTION

ACI + VNOMICS + SAP BW ON SAP HANA

SAP STACKS FOR
VBLOCK, FLEXPOD, VSPEX

EXTEND ACI TO 20 DIFFERENT SAP
APPLICATIONS

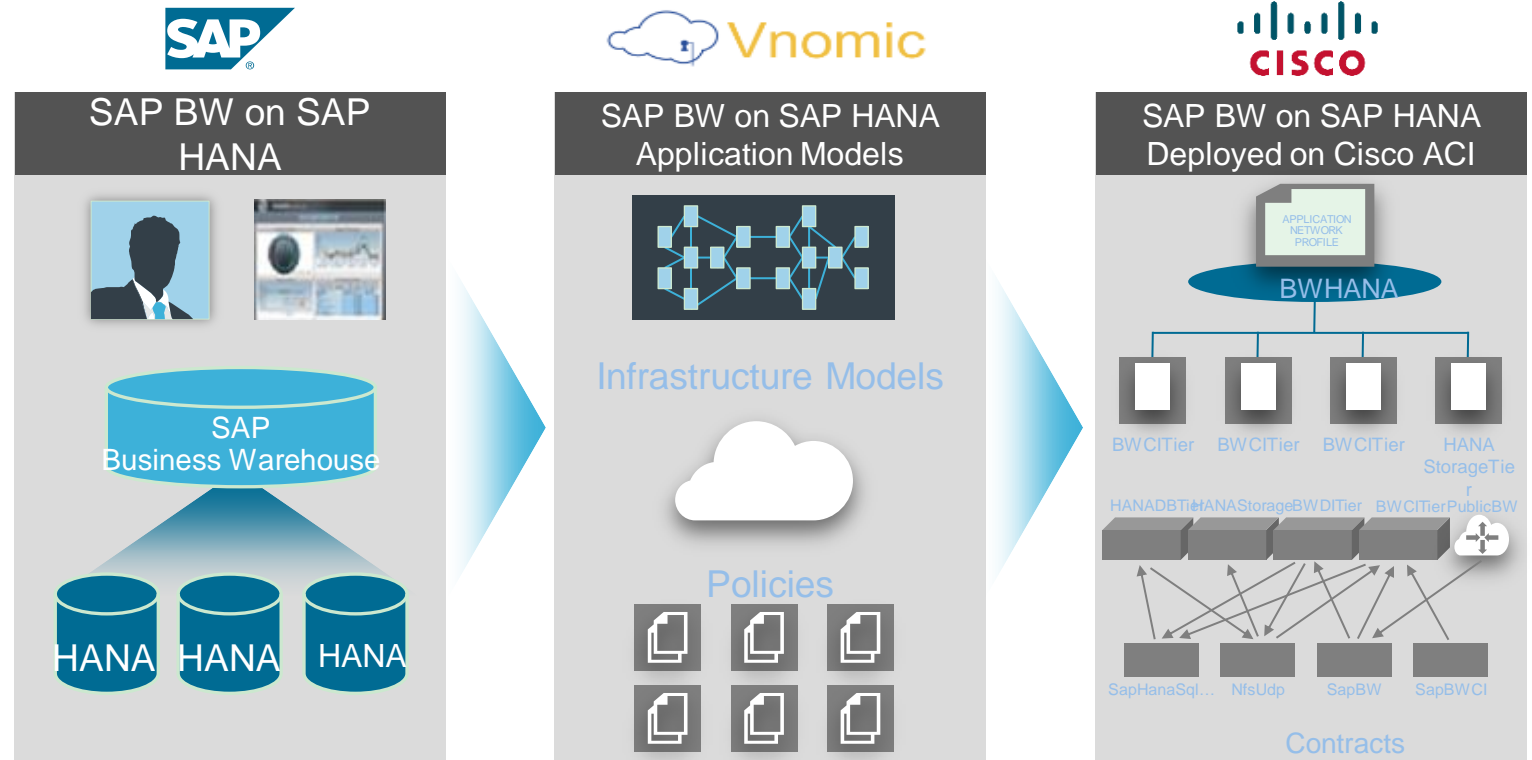
BENEFITS

ACCELERATE DEPLOYMENT OF SAP BW
ON SAP HANA + CISCO ACI

RAPID ANALYSIS, TROUBLESHOOTING OF
SAP LANDSCAPE

SCALE SAP APPLICATION CAPACITY
WITHOUT COMPLEXITY

MONITORING AND AUTOMATIC
REMIEDIATION



Elasticity at scale / pay as you grow

\$100K
STARTING

STARTING
AT
200 PORTS
SCALING
TO
100K+
PORTS

8K
MULTICAST
GROUPS
(PER LEAF)

1M
IPV4 / IPV6
END
POINTS

64K
TENANTS

576
40G PORTS
WIRE-RATE
(PER SPINE)

60 TBPS
CAPACITY
(PER SPINE)

**BUILT FOR THE GROWING COMMERCIAL ENTERPRISE
TO THE LARGEST SERVICE PROVIDERS**

ACI & 9K Momentum is Growing: Public References

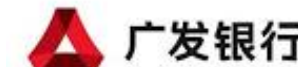
“It’s critical that we are able to deliver hundreds of thousands of transactions per second, so latency and 40G throughput is a number one concern. After evaluating numerous vendor solutions, Cisco's Nexus 9000 switching platform provided us with the best performance to support our evolving data centers, while protecting existing IT investments.”

Bob Hammond, CTO, Millennial Media



“Symantec is an early adopter of Cisco's ACI, leveraging the technology within our own Agile Data Center. Cisco ACI brings the scalability and efficiency we need while enabling us to truly bring next generation networking capabilities to our customers.”

Jon Sanchez, Director of Data Center Services, Symantec



ACI: Business Outcome and Benefits for Cisco IT

**Greater
Business
Agility**



58%

Reduce Network
Provisioning



**Lower Capital
Expenses**



25%

CAPEX
Reduction



**Reduced
Costs/
Complexity**



21%

Reduce
Management
Costs



**Lower
Operating
Cost**



45%

Reduce Power
and Cooling
Costs



**Resource
Optimization**

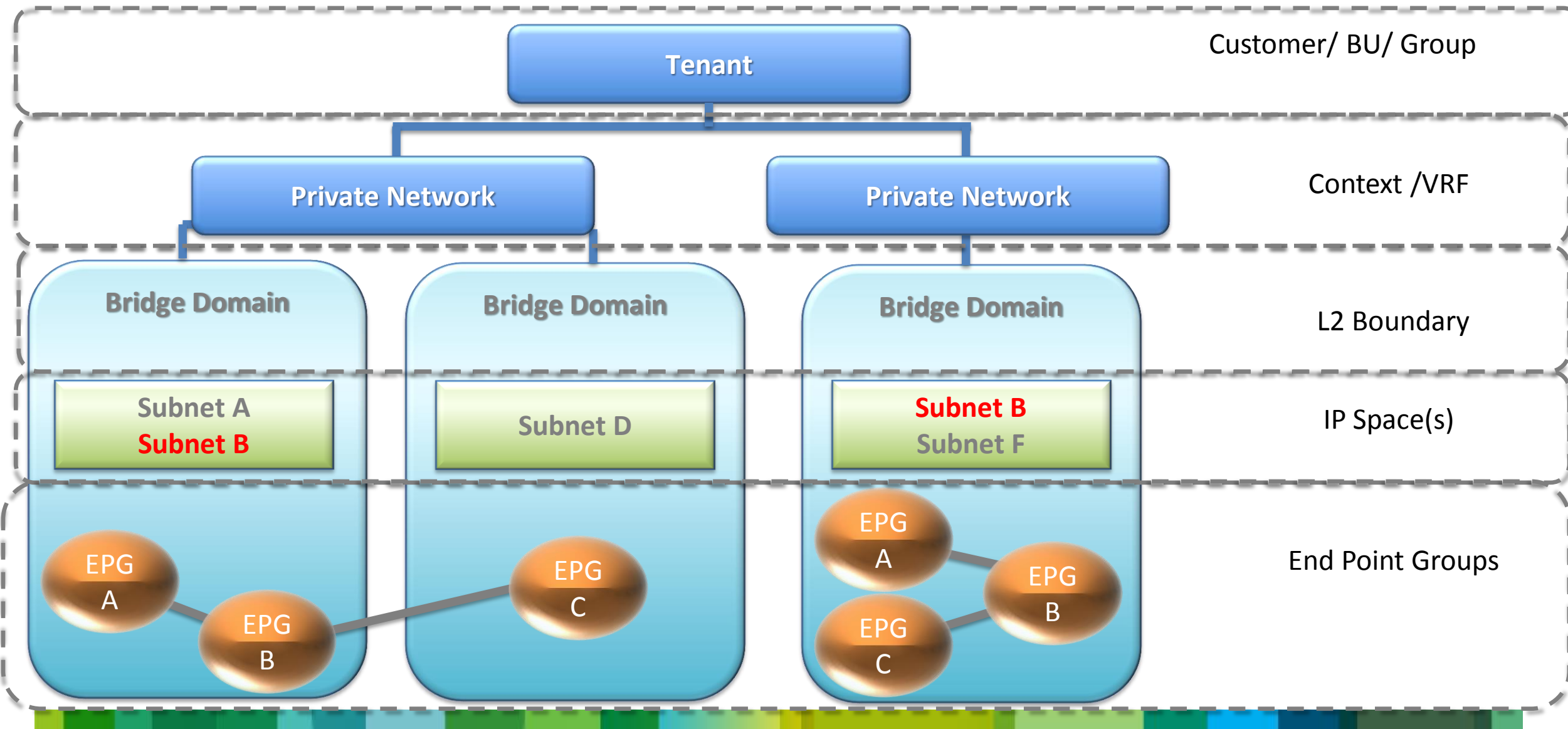


10-20%

Compute and
Storage
Optimization

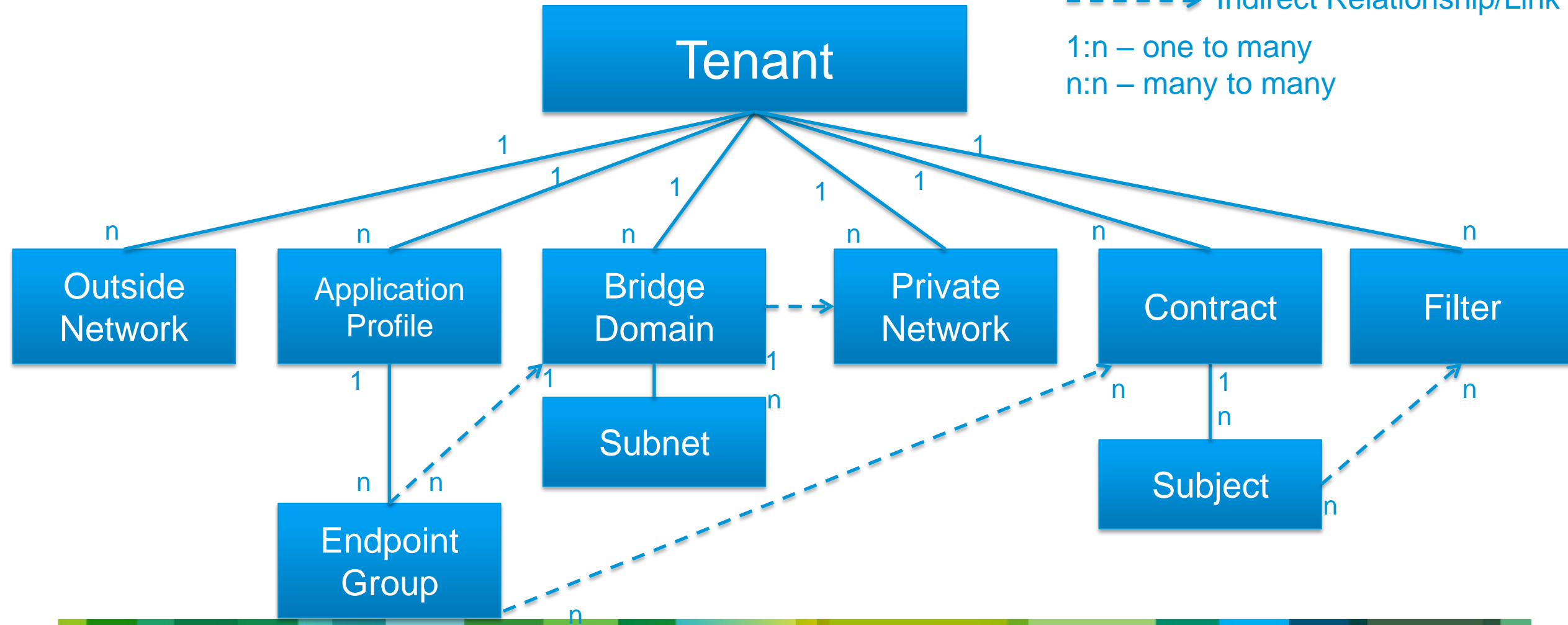


ACI Constructs



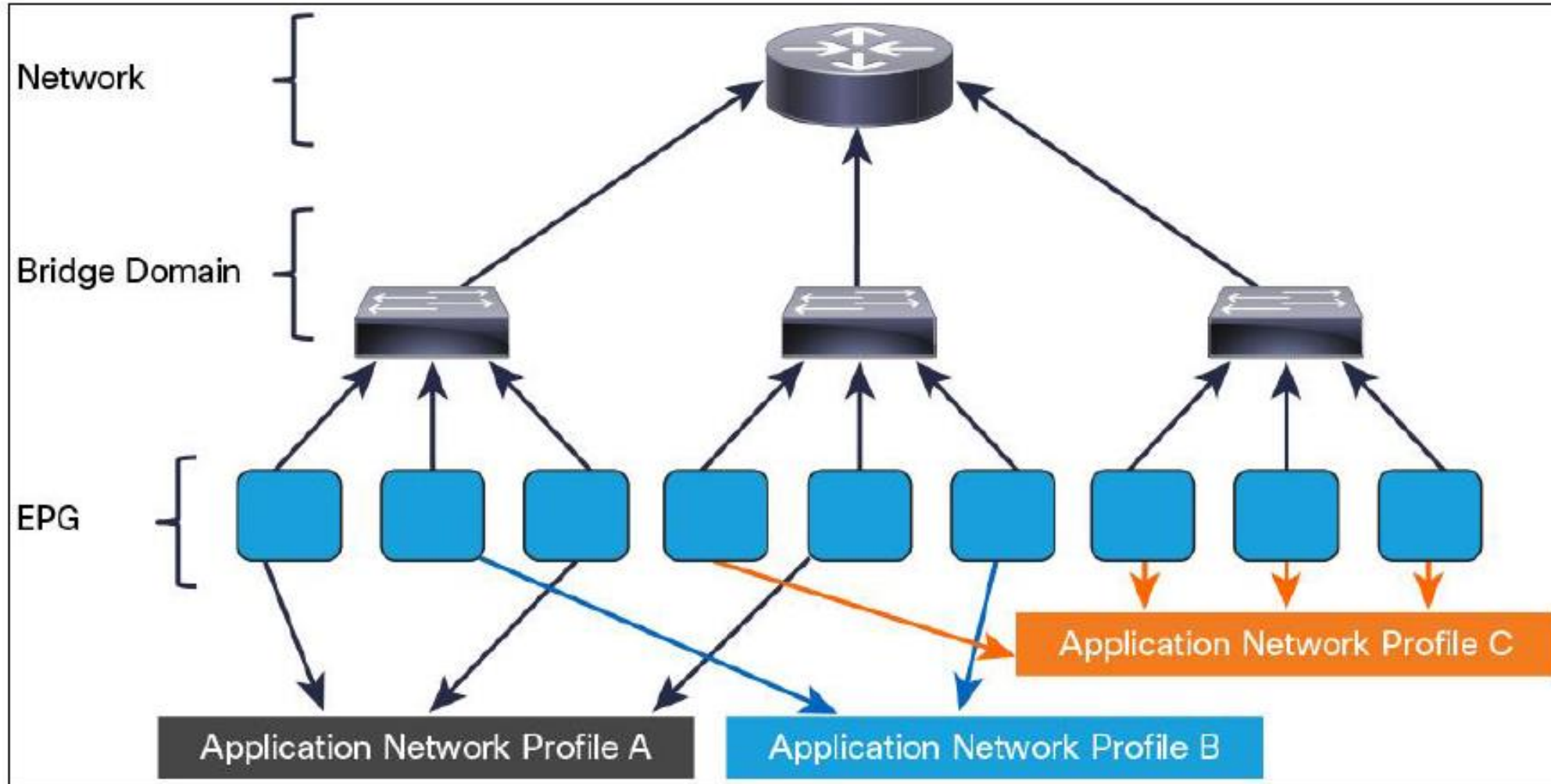
The ACI Management Information Tree

———— Direct Relationship
-----> Indirect Relationship/Link
1:n – one to many
n:n – many to many



Private Network (aka Context)

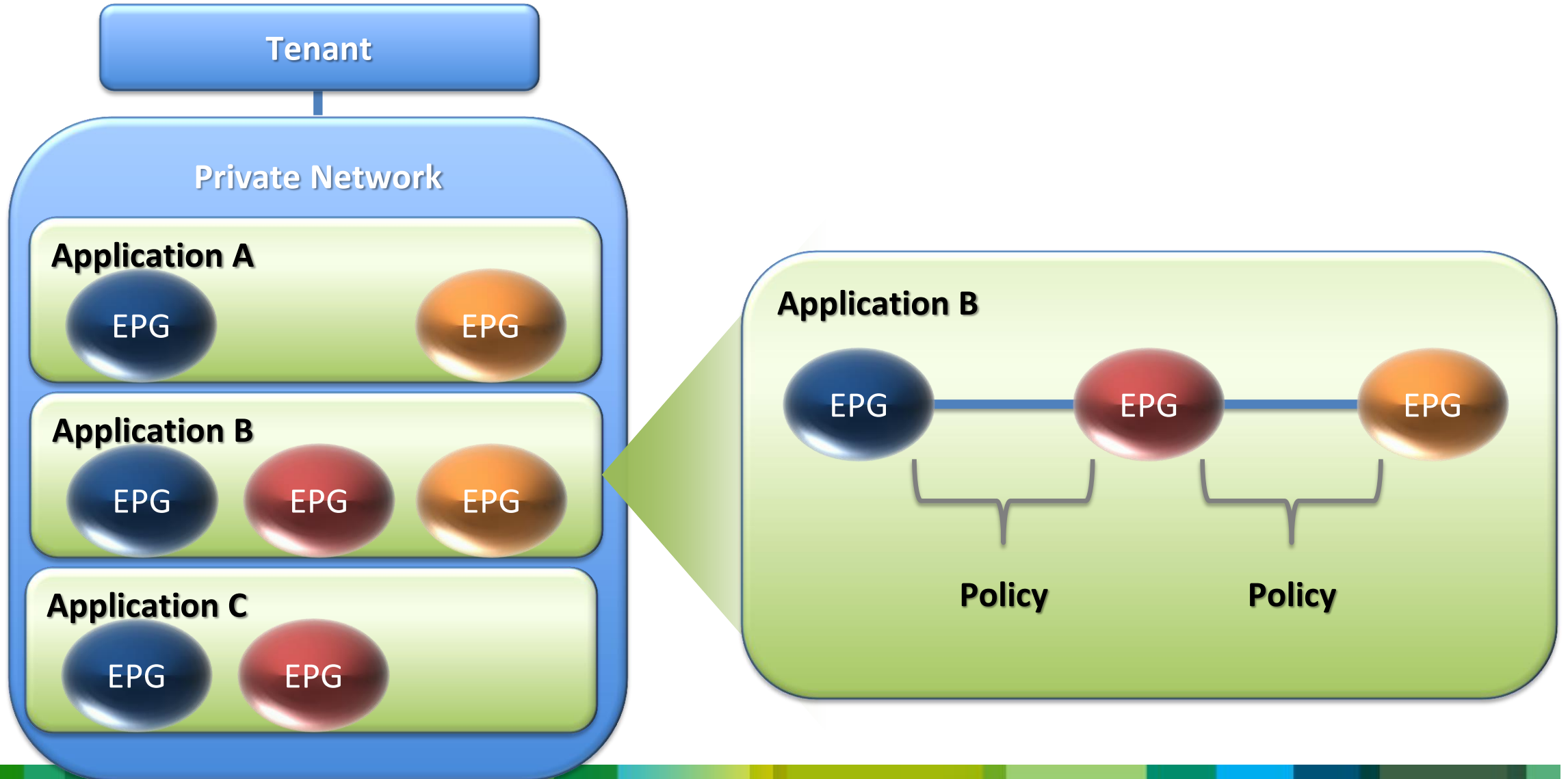
Logical Representation



Bridge Domain

- The bridge domain is not a VLAN, although it can act similar to a VLAN; you instead should think of it as a distributed switch. On each leaf VLANs will be translated with local significance.
- The bridge domain references a VRF instance called a *Private Network*. The subnets and gateways for the workloads are defined as part of the bridge domain.

End Point Group (EPG) Logical Model

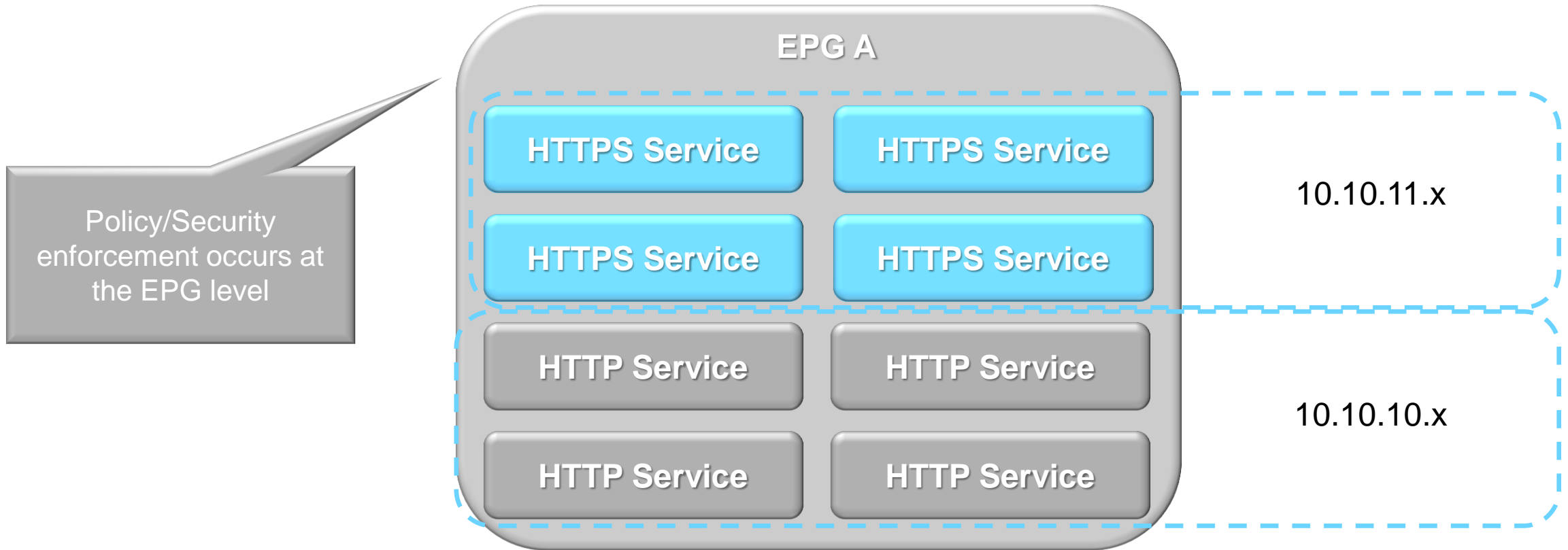


Example EPG



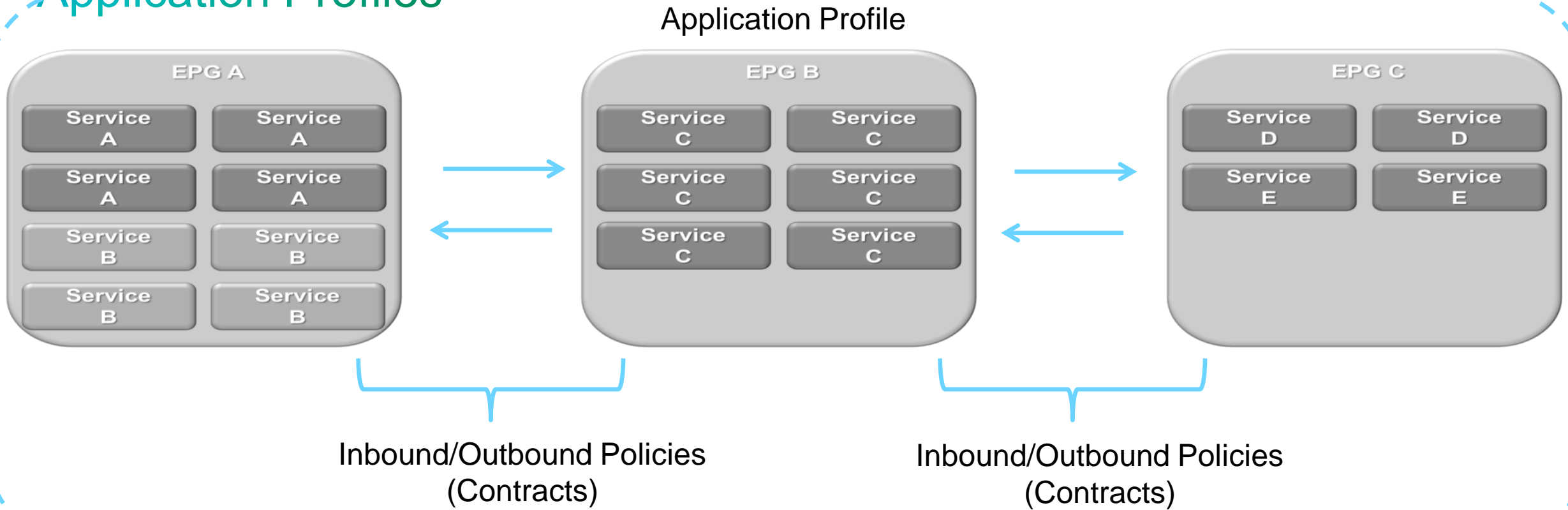
EPGs are a grouping of application or application components independent of other network constructs.

EPGs, Subnets and Policy



EPGs separate the addressing of an application from its mapping and policy enforcement on the network.

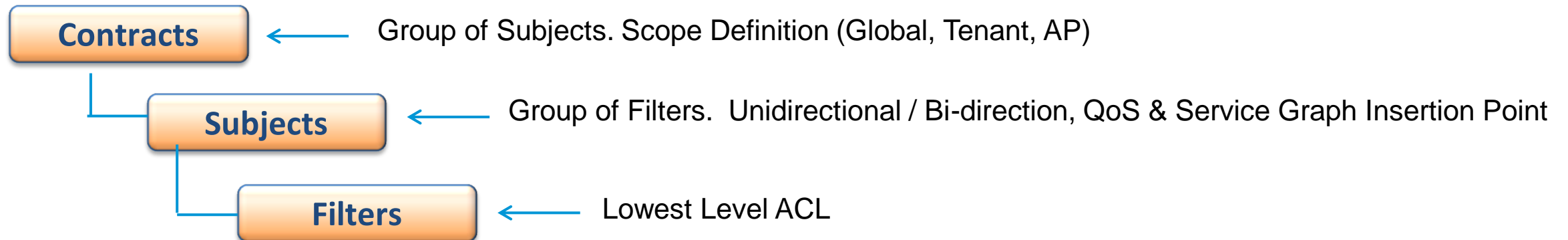
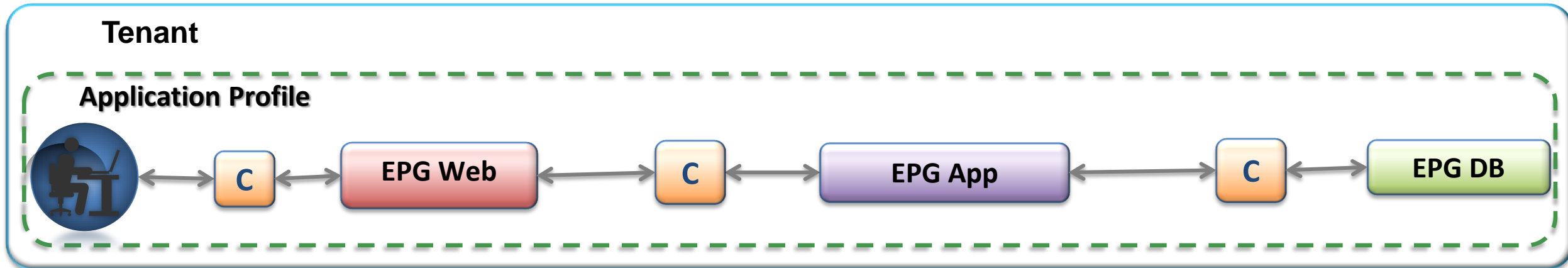
Application Profiles



Application Network profiles are a group of EPGs and the policies that define the communication between them.

Contracts – Communication Policies

- Contracts define what an EPG exposes to other EPGs and how
- Contracts are reusable for multiple EPGs and EPGs can inherit multiple contracts



Thank you.

