Introducing:
Cisco Open Network Environment
Leading the Intelligent Network Evolution

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Headlines

"Google revamps networks with OpenFlow"
—ZDnet

"Prediction: OpenFlow Is Dead by 2014; SDN Reborn in Network Management"
—Mike Fratto, Network Computing

"Will OpenFlow commoditize networks? Impact Cisco margins?"
—Several media publications, Bloggers

".We share a more pragmatic view, noting Cisco (for example) is likely to view SDN as a TAM expansion opportunity…" *—Deutsche Bank Research note, Wired, April 2012*

"Hype around SDN/OpenFlow getting way out of Control. Where have I seen this before…"
—Ethereal mind, Blogger

"SDN needs a bigger definition"
—Lippis report, 2012

Basic Definitions

What Is Software Defined Network (SDN)?

"…In the SDN architecture, the **control and data planes are decoupled,** network intelligence and state are logically centralized, and the underlying network infrastructure is abstracted from the applications…"

Source: www.opennetworking.org

What Is OpenFlow?

"…open standard that enables researchers to run **experimental protocols** in campus networks. Provides standard hook for researchers to run experiments, without exposing internal working of vendor devices…"

Source: www.opennetworking.org

What is OpenStack?

Open source software for building public and private Clouds; includes Compute (Nova), Networking (Quantum) and Storage (Swift) services.

Source: www.openstack.org

What is Overlay Network?

Overlay network is created on existing network infrastructure (physical and/or virtual) using a network protocol. Examples of overlay network protocol are: MPLS, LISP, OTV and VXLAN

Industry Standards

802.1 Overlay Networking Projects, Cisco Innovations:
FEX Architecture

Open Network Research Center at Stanford University

Technical Advisory Group Chair, Working Groups:
Config, Hybrid, Extensibility, Futures/FPMOD/OF2.0

Working Groups: Quantum
API
Donabe
Cisco Innovations:
OpenStack API for Nexus
OpenStack Extensions

Open Source Cloud Computing project

Overlay Working Groups:
NVO3, L2VPN, TRILL, L3VPN, LISP, PWE3
API Working Groups:
NETCONF, ALTO, CDNI, XMPP, SDNP, I2AEX
Controller Working Groups:
PCE, FORCES

Customer Insights: Network Programmability

Research/ Academia

- Experimental OpenFlow/SDN components for production networks

Network "Slicing"

Massively Scalable Data Center

- Customize with Programmatic APIs to provide deep insight into network traffic

Network Flow Management

Cloud

- Automated provisioning and programmable overlay, OpenStack

Scalable Multi-Tenancy

Service Providers

- Policy-based control and analytics to optimize and monetize service delivery

Agile Service Delivery

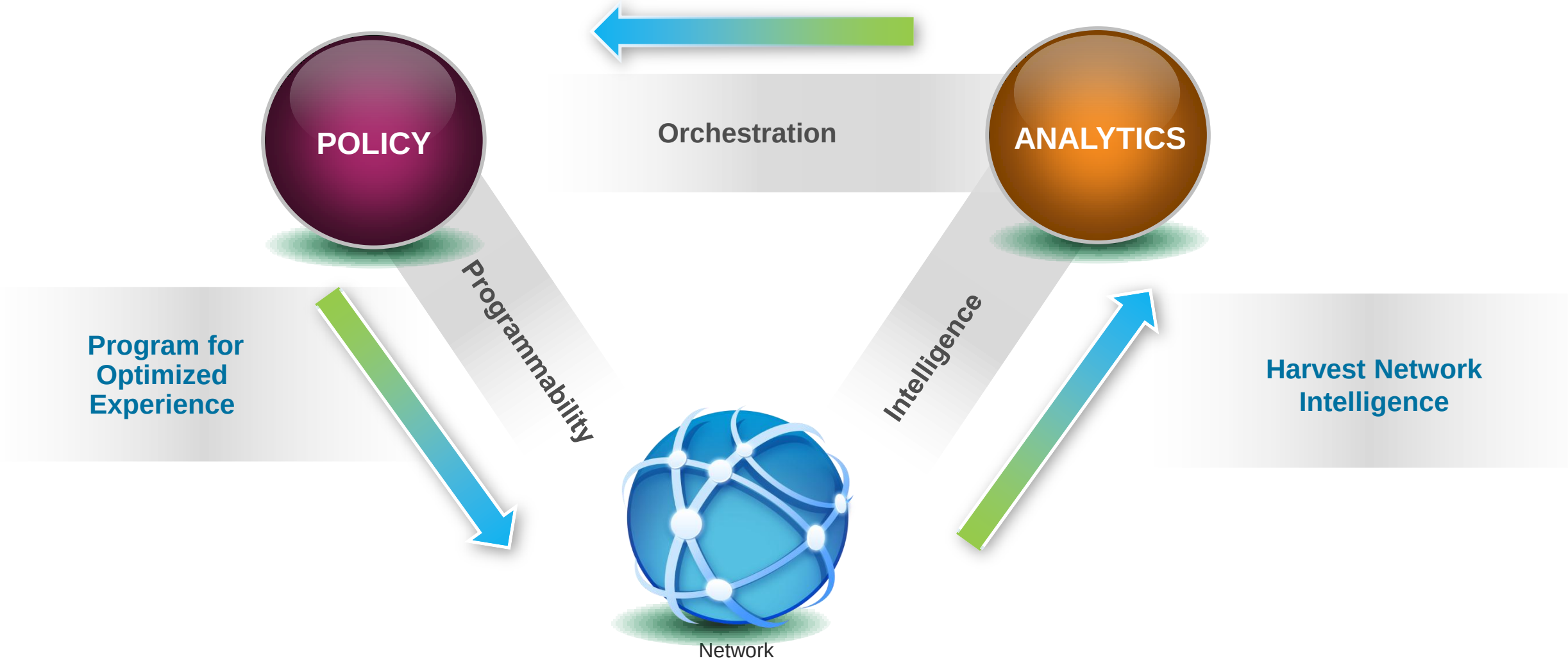
Enterprise

- Virtual workloads, VDI, Orchestration of security profiles

Private Cloud Automation

Diverse Programmability Requirements Across Segments

Expose Network Value



Industry Deployments: A Simple Analogy

iOS

Better Integrated Experience

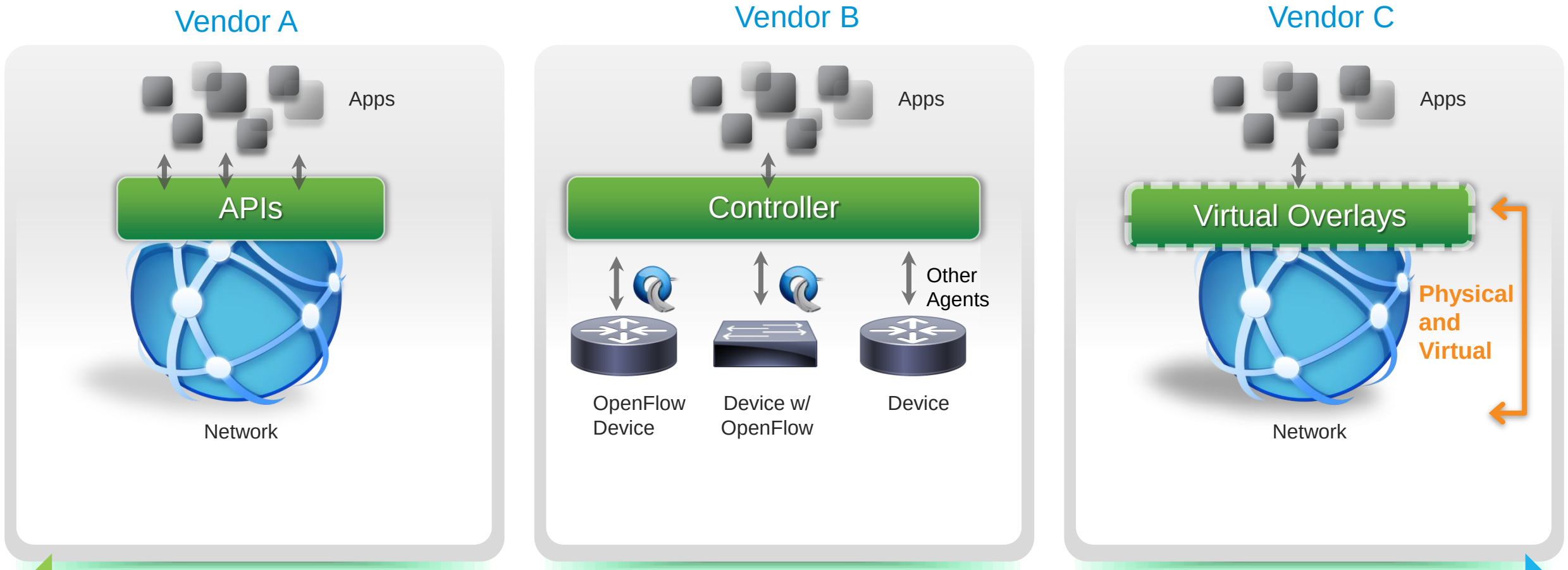
Android

Multiple options to choose from

Skype

Best effort, but ease of use

Sample Vendor Deployments in the Industry



Cisco Approach: Flexibility to Choose—The Power of "AND"

The News: Cisco Open Network Environment

Phased availability and customer trials from Q4 CY 2012

1. Platform APIs

onePK

Comprehensive Developer Kit across IOS, IOS-XR and NX-OS

2. Controller/Agents

Proof-of-concept Controller software for SDN research

OpenFlow v1.0 Agent on Catalyst 3570-X and 3560-X

3. Overlay Virtual Networks

Nexus 1000V

OpenStack and REST API

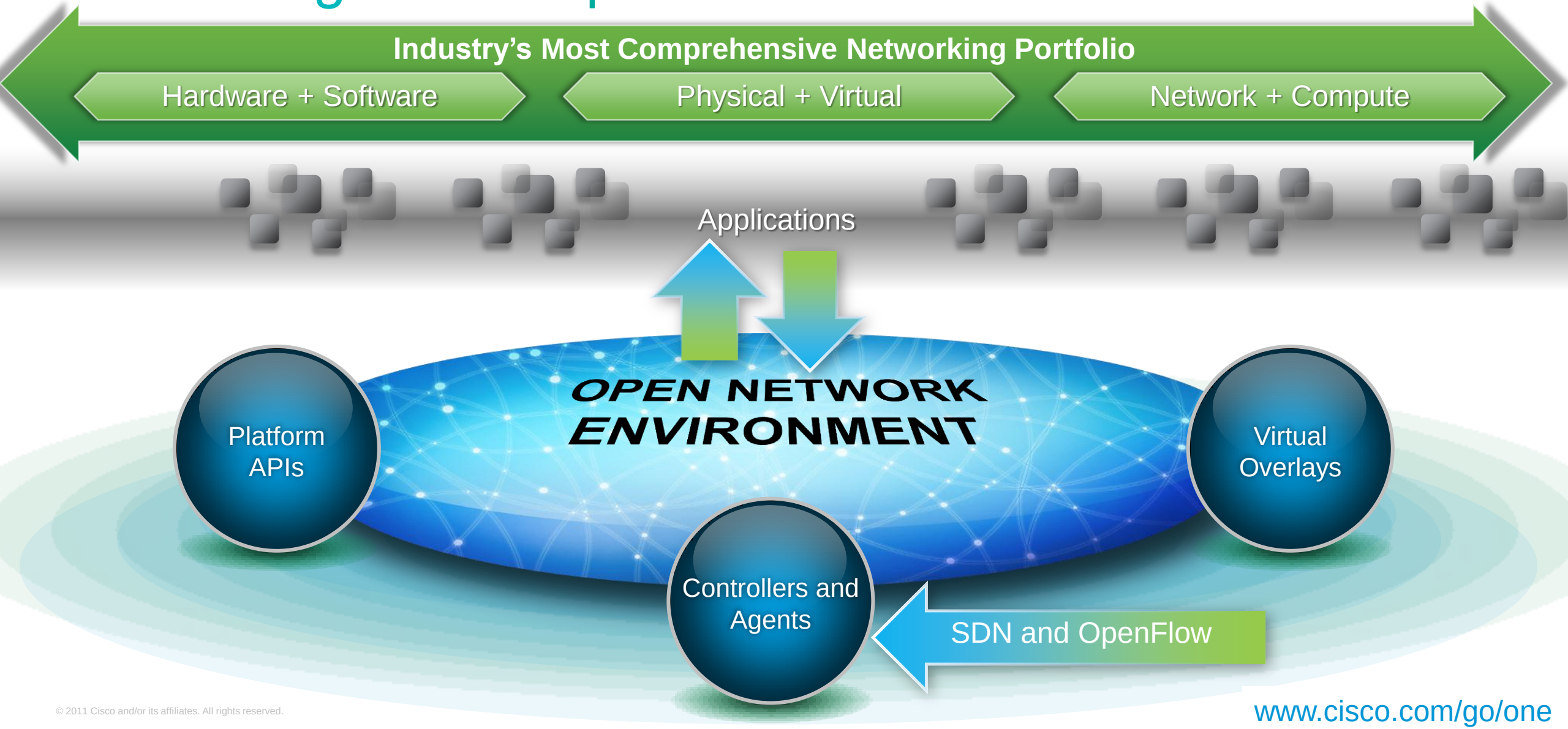
Multi-Hypervisors

VXLAN Gateway

Security, Services Chaining

Industry's broadest approach for Network Programmability

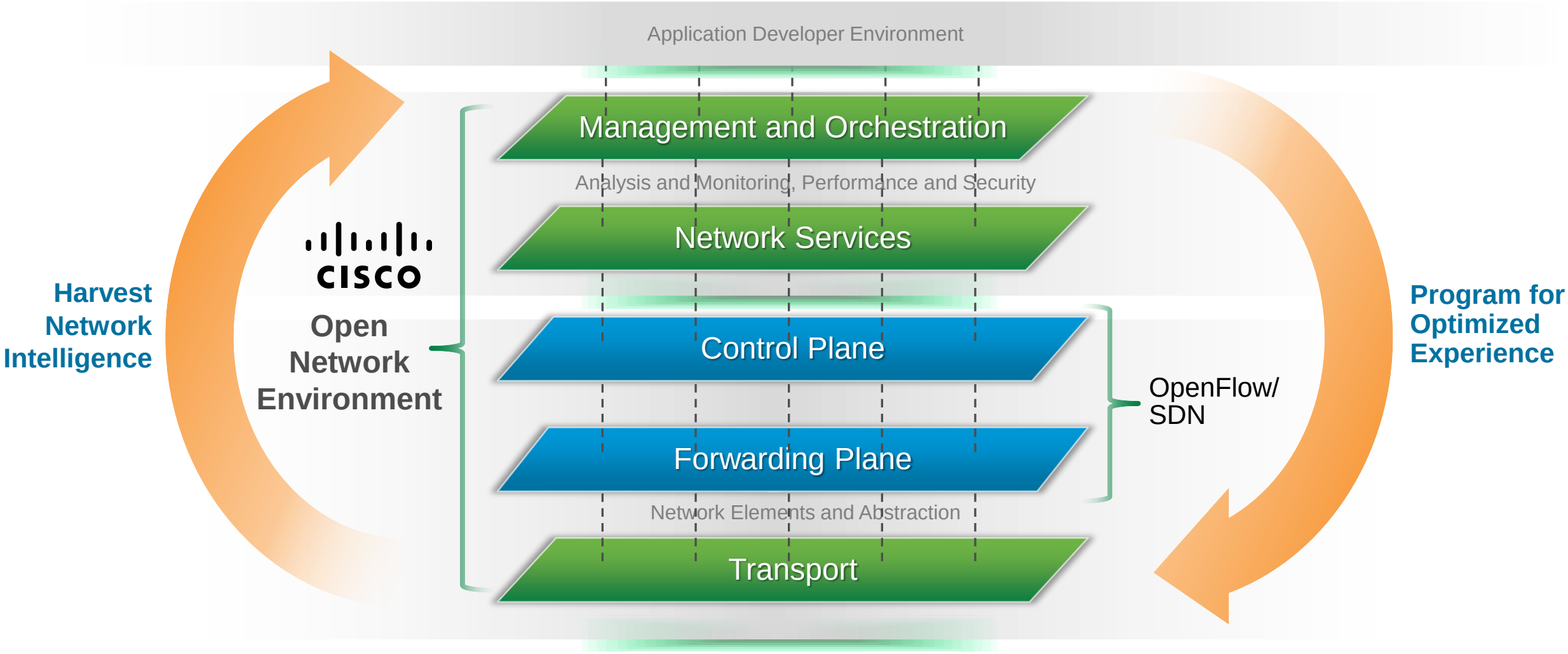
Announcing : Cisco Open Network Environment



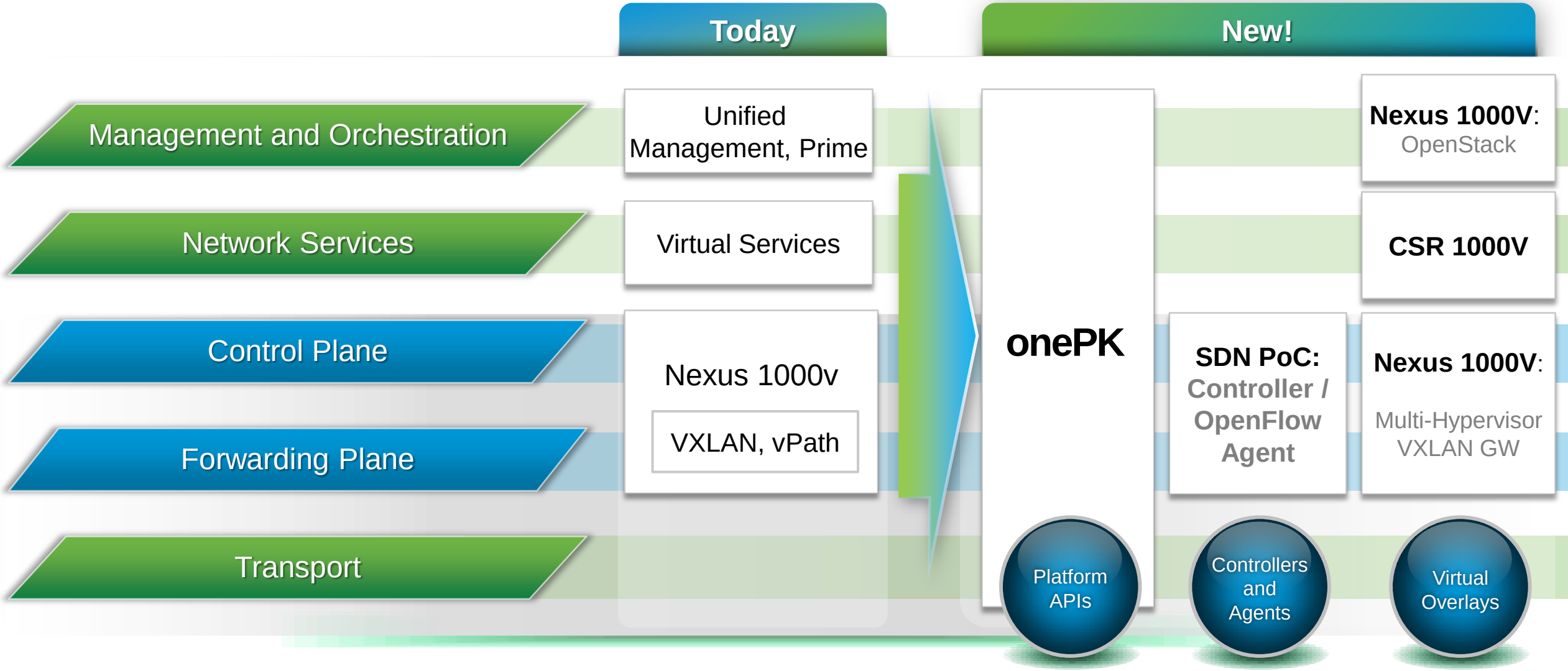
www.cisco.com/go/one

Cisco's Differentiation: Multi-layered Programmability

Flexibility in Deriving Abstractions

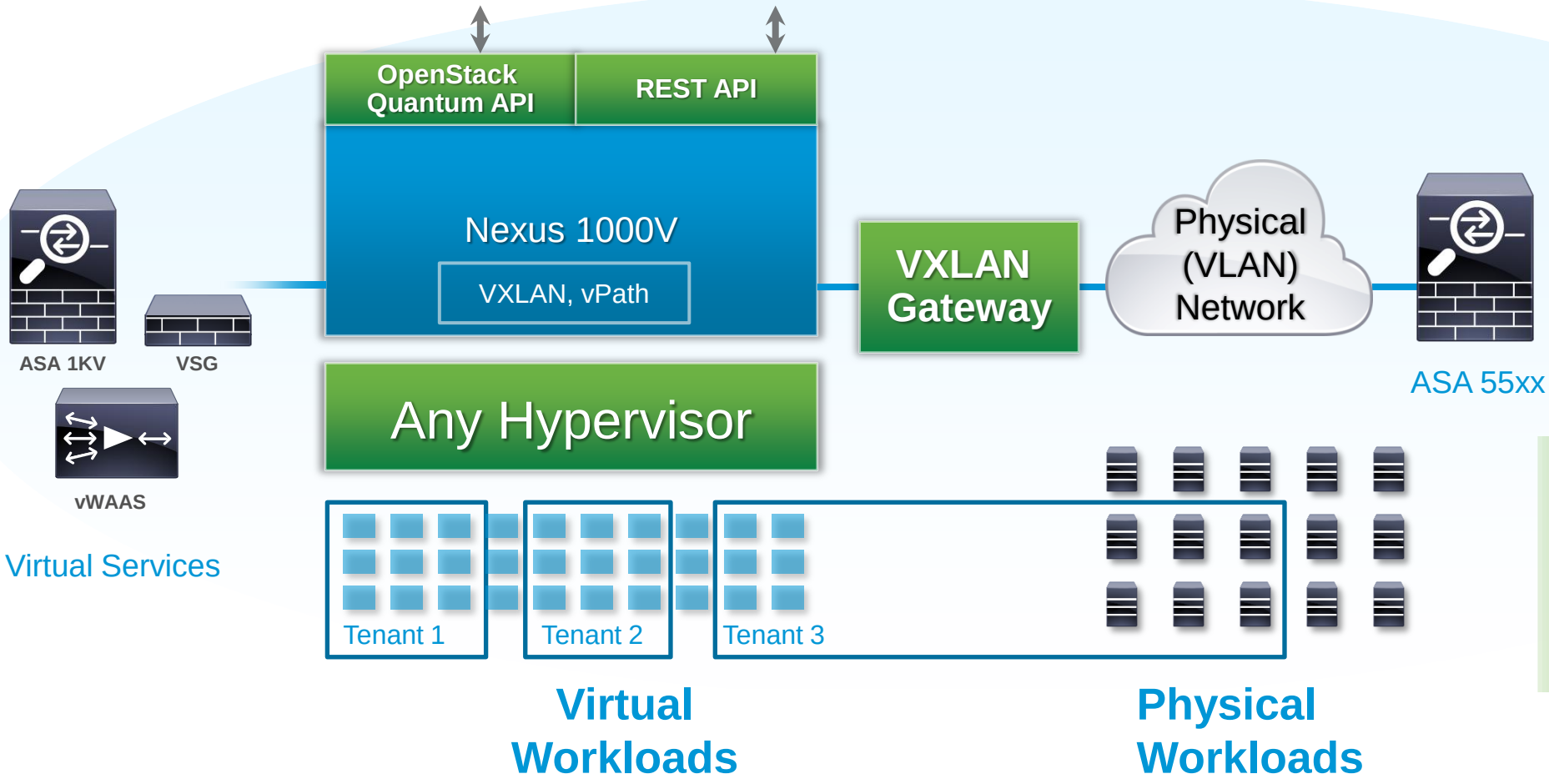


Cisco's Investments: Emerging Technologies



Virtual Overlay Networks – Extending the lead

Scalable Multi-tenant Cloud Infrastructures – foundation for Secure Hybrid cloud



Nexus 1000V enhancements

- **Multi-hypervisor:** VMware, Microsoft, Citrix, RedHat
- **OpenStack/REST API**
- **VXLAN Gateway**

Secure Consistent Experience Across Physical and Virtual Environments

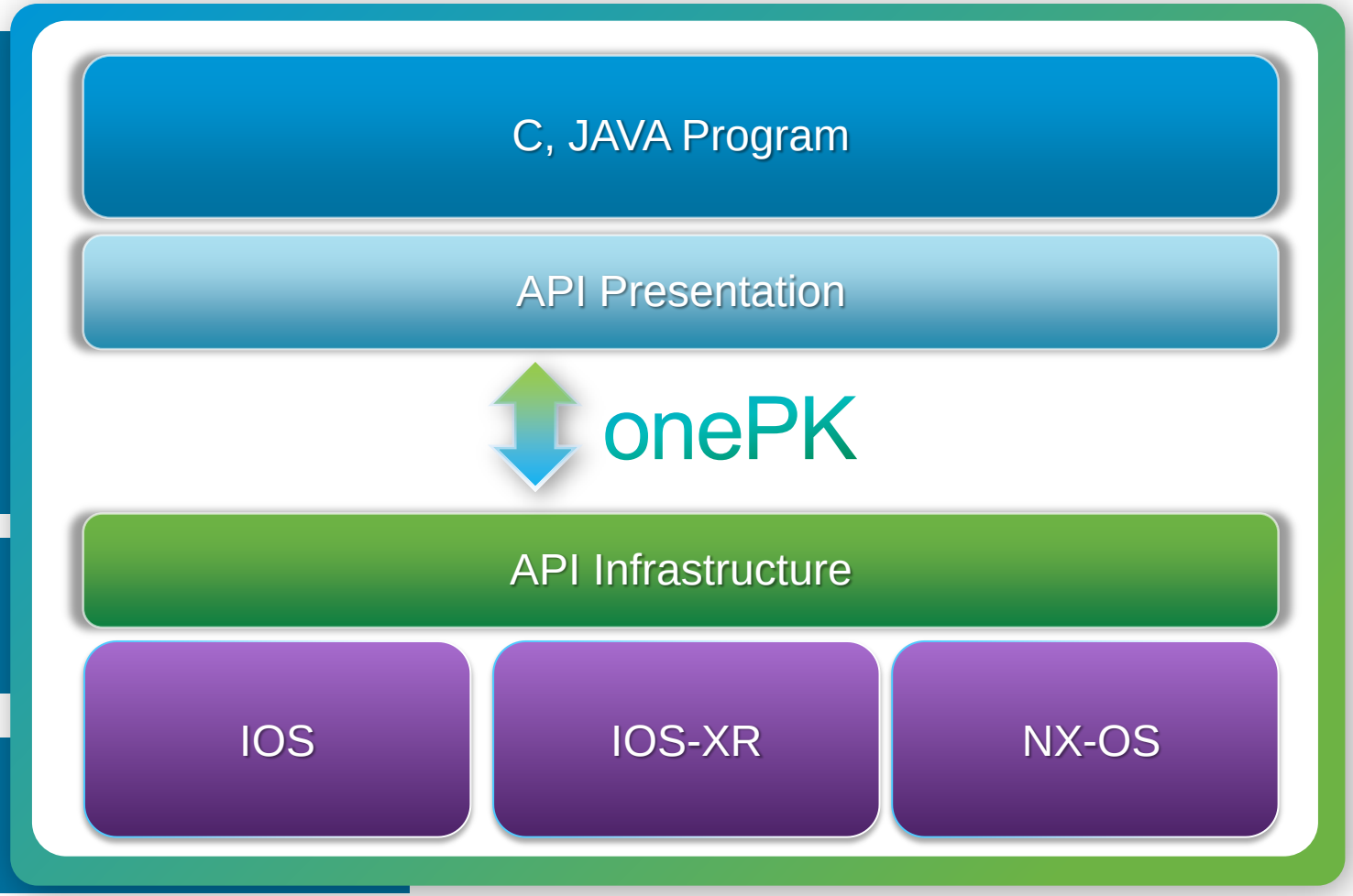
Introducing One Platform Kit (onePK)

Industry's most Comprehensive Kit For Network Infrastructure across:

- **Branch**
- **Campus**
- **Data Center**
- **Service Provider**
- **Cloud**

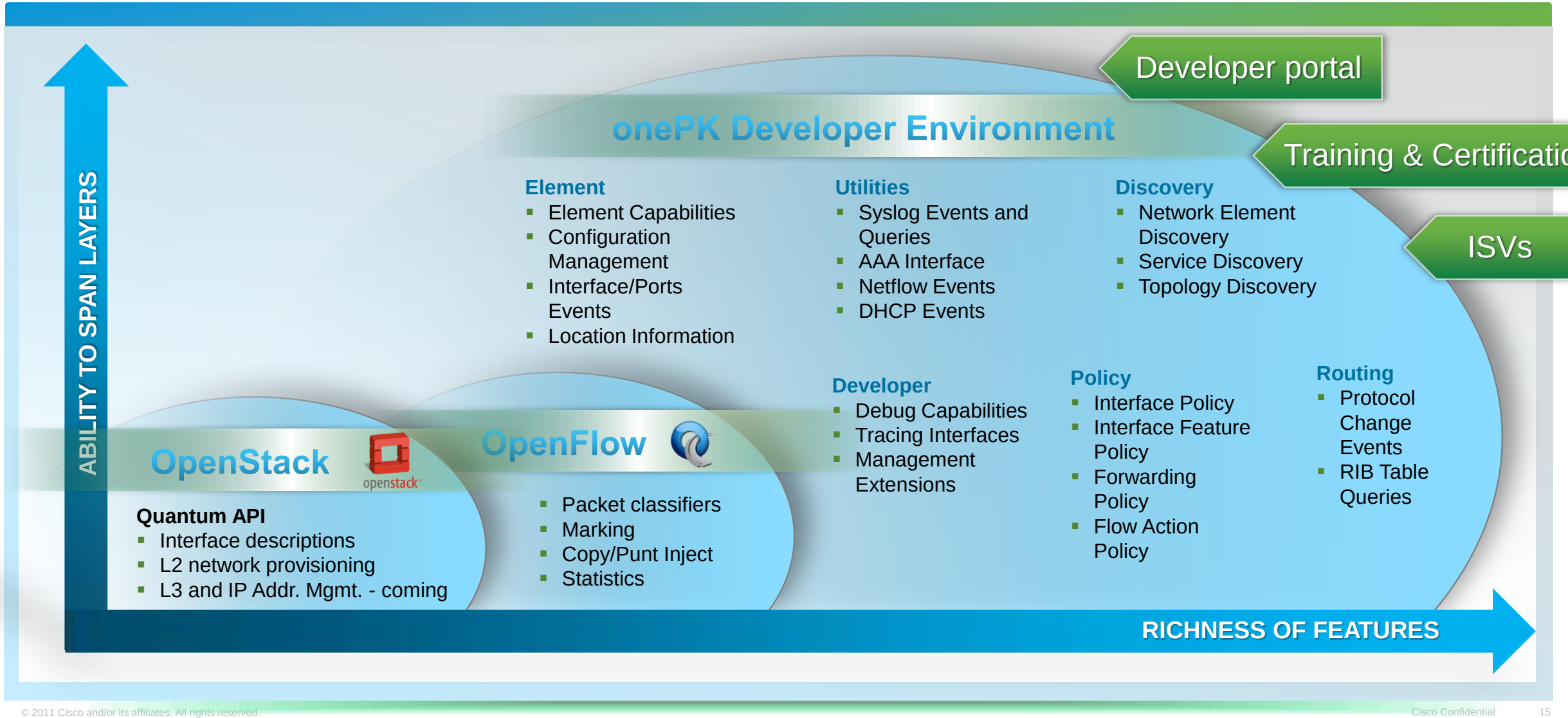
Simplicity, Integration and choice of protocols and programming languages

Phased availability across multiple Platforms: ISR G2, ASR, CRS, Catalyst, Nexus



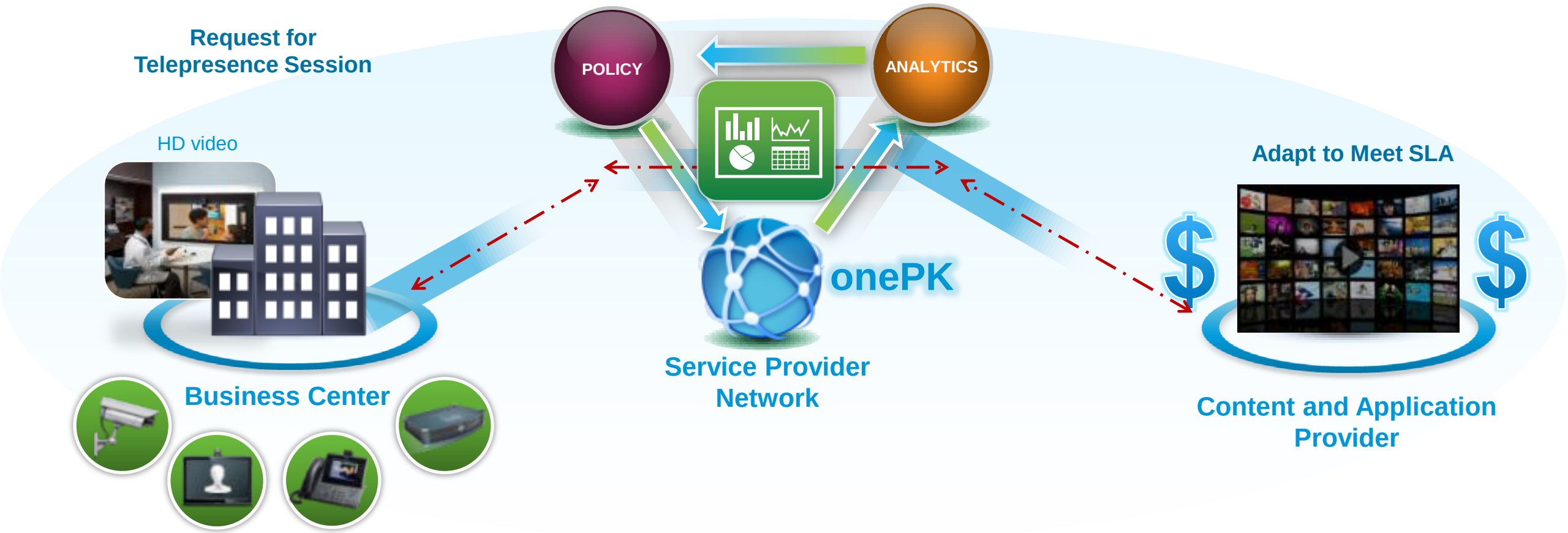
Open Network Environment – Flexibility to Choose

Protocols, APIs and Deployment Models



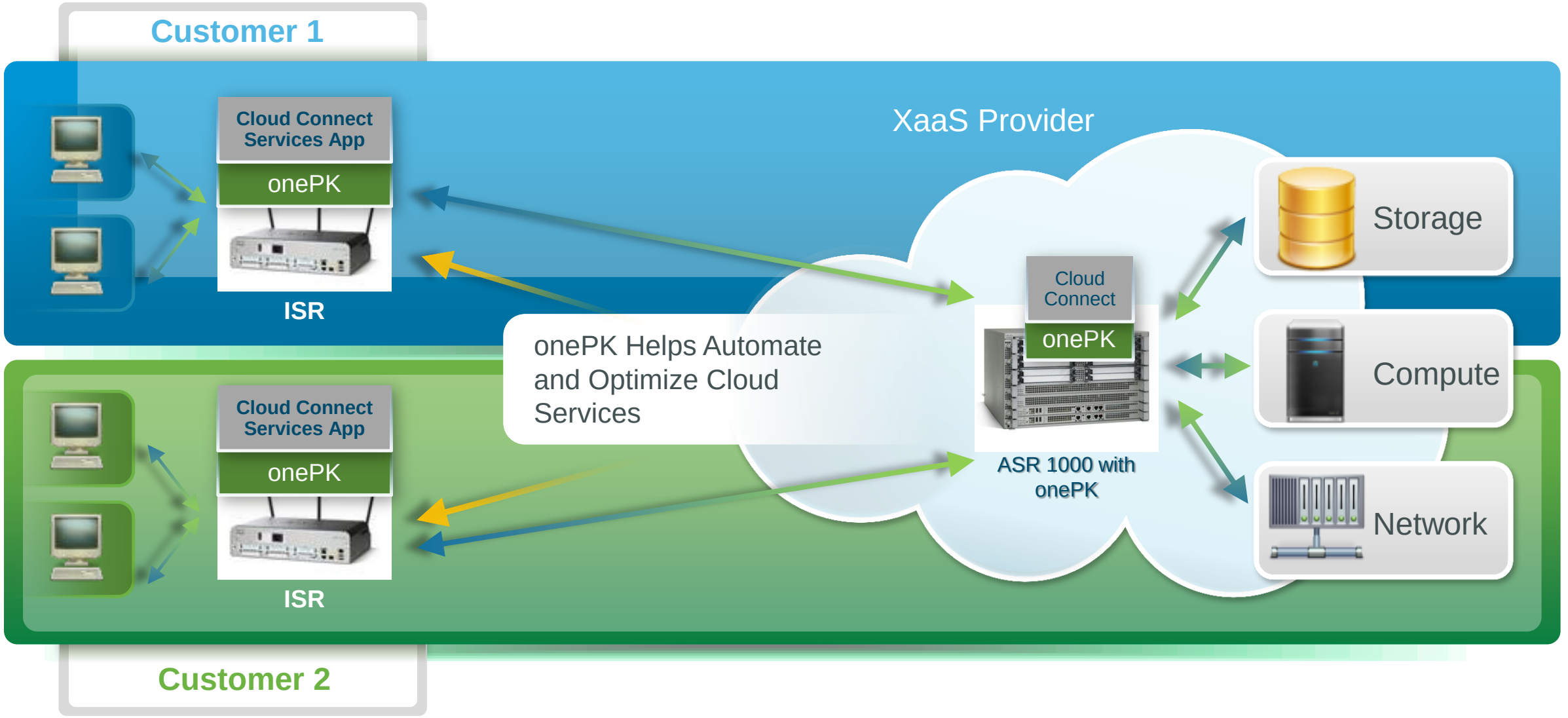
Use Case: Agile Service Delivery for Service Providers

Monetize Via Real-time Network Adaptation and Maintain SLA

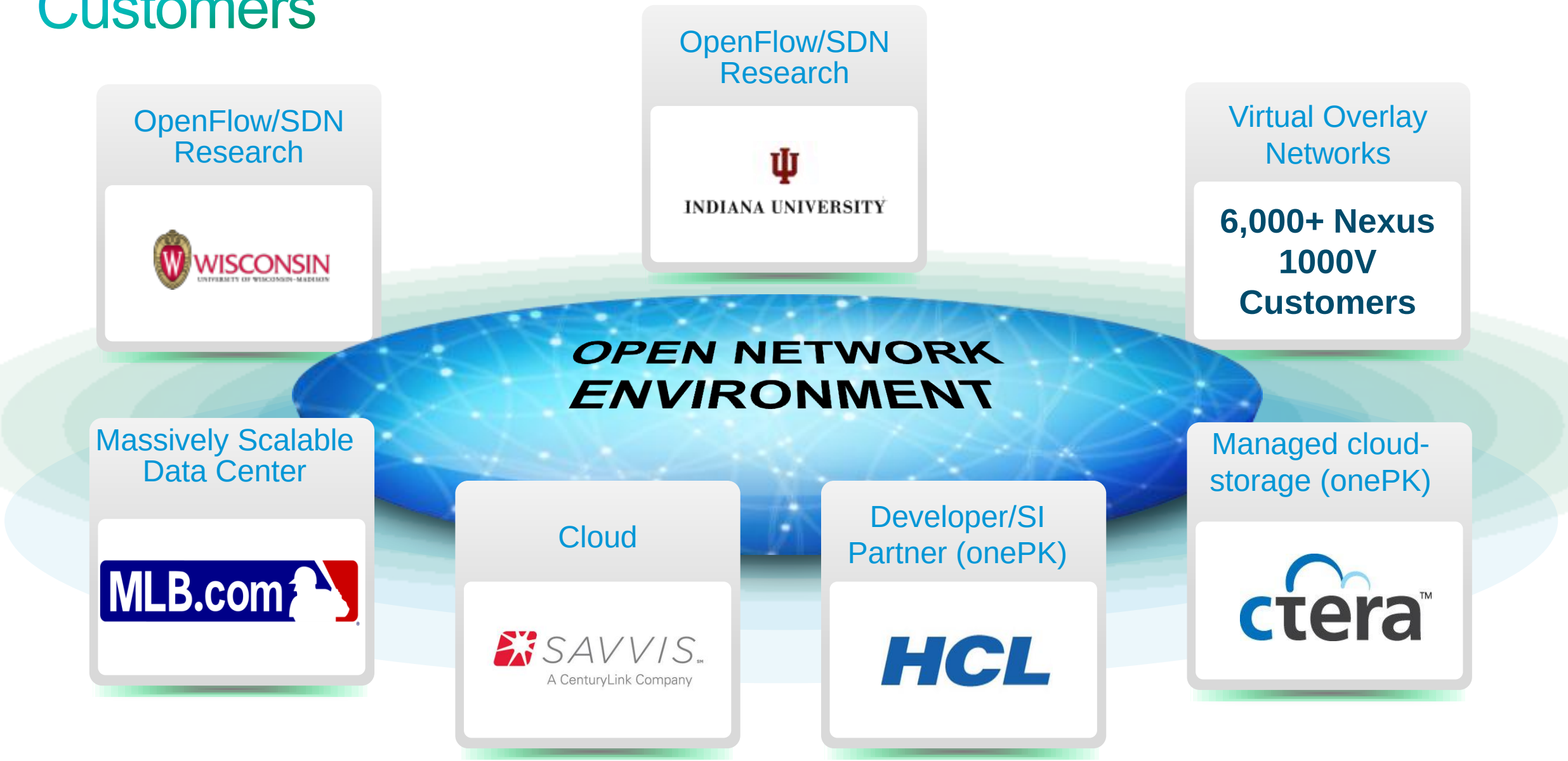


Adaptive Architecture Optimizes Resource Utilization

Use-case: Cloud Services Automation



Customers


OpenFlow/SDN Research
WISCONSIN
OpenFlow/SDN Research
INDIANA UNIVERSITY
Virtual Overlay Networks
6,000+ Nexus 1000V Customers
OPEN NETWORK ENVIRONMENT
Massively Scalable Data Center
MLB.com
Cloud
SAVVIS
A CenturyLink Company
Developer/SI Partner (onePK)
HCL
Managed cloud-storage (onePK)
ctera

Q&A

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Prashant Gandhi
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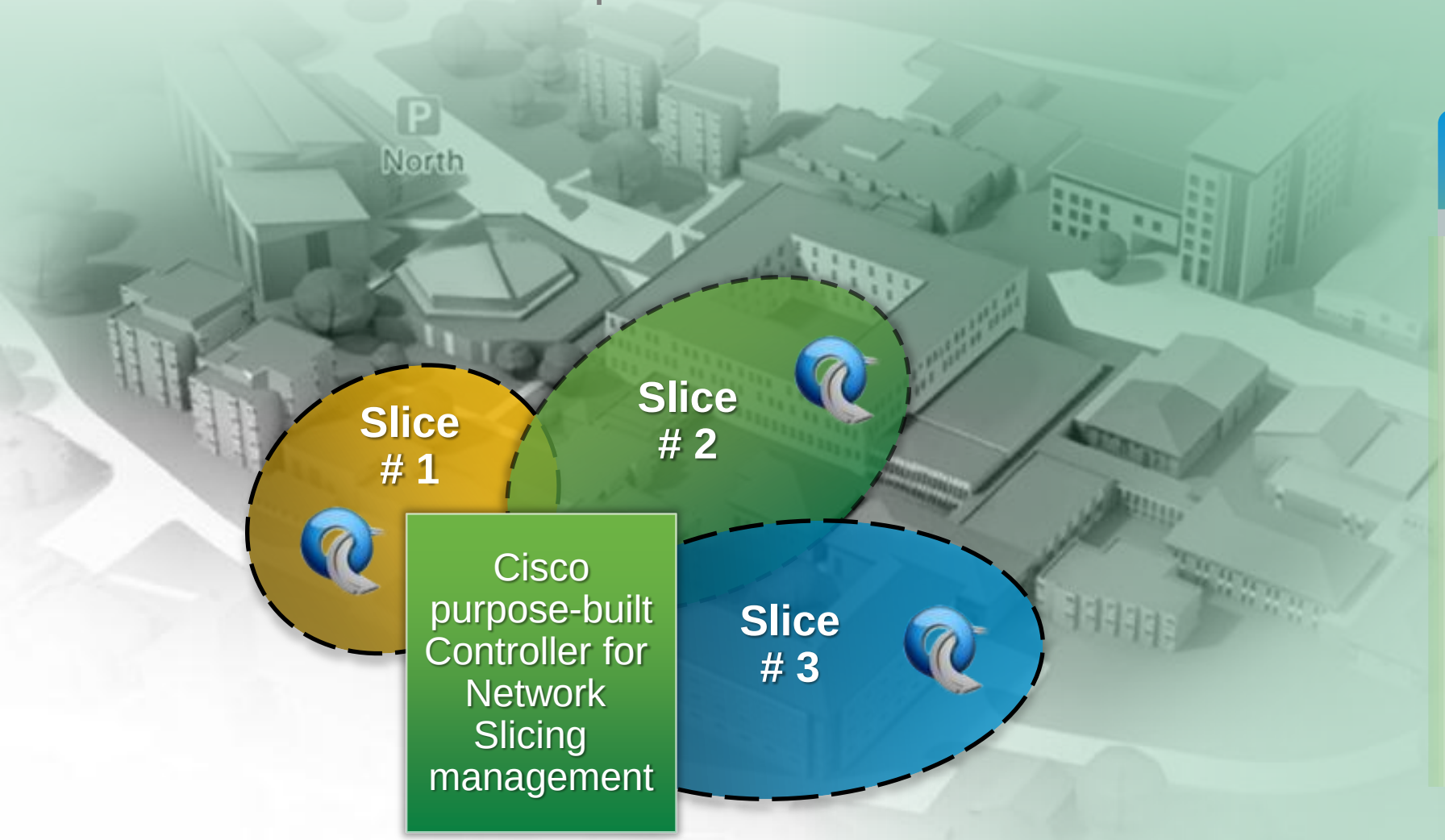
Thank you.

Use Case: Campus Network "Slicing"

Partition network for multiple user-communities—"Sandbox" R&D dept.



Solution

- OpenFlow experimental support (v1.0)
- Experimental controller software
- Integrated slicing management
- Programmatic Interfaces (Eg. REST)

Consistent Policy Management for Maximum Flexibility and Innovation