

## Simplify Your Network: Easy as 1+1=2



Imagine you manage a warehouse for a small shipping firm. You have a simple job: route packages. But your employer expands to 25 western cities and 50 locations. After further expansion you now need to track packages coming by truck, rail, and plane and route them based on contents and weight to 10,000 different locations worldwide. While keeping traffic in and out tightly secured, making sure each package reaches its destination on time, and without going over budget.

You might be wondering how things could get so complicated so quickly. But as an IT professional, you are nodding your head, because it all sounds very familiar.

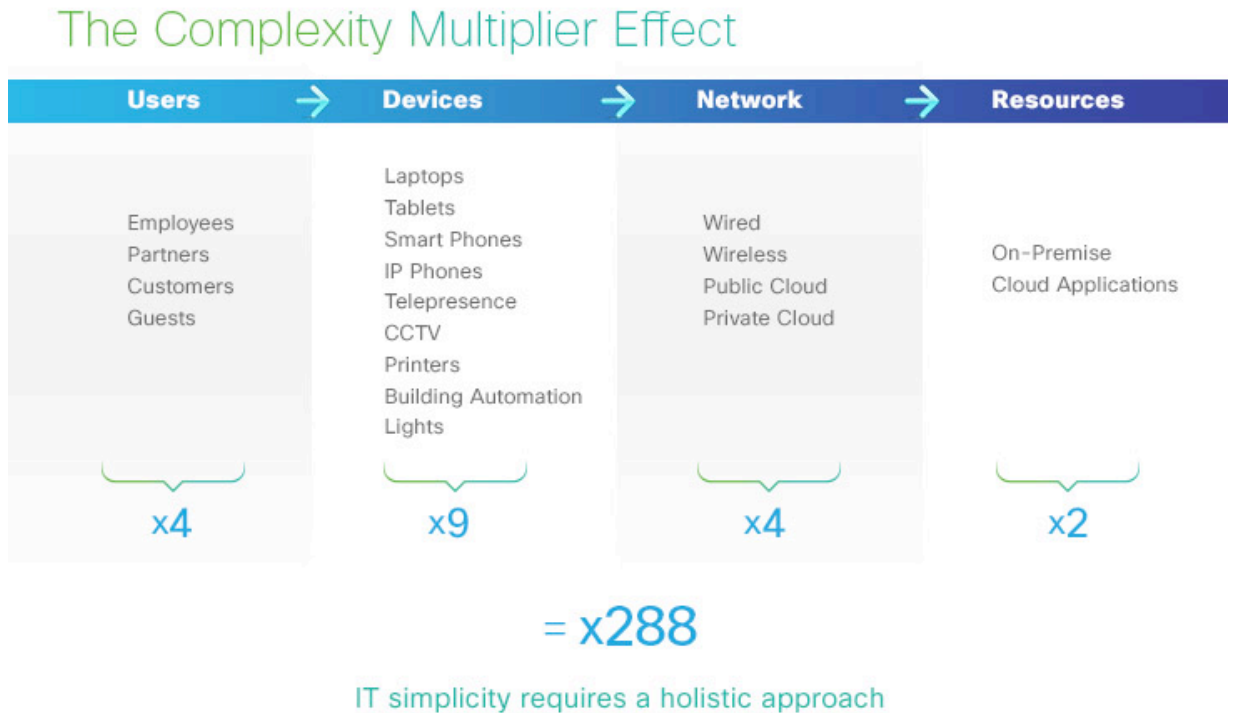
### More Users + More Devices = More Complexity

Networks are getting more complex and harder to manage. A decade ago, you simply had an employee connecting over the corporate LAN with a corporate-controlled PC. One type of user connecting to one network using one type of device. And users would typically access corporate-owned applications and resources.

Today employees, partners, customers, and guests all have different levels of access. Many of them use their own laptops, tablets, and smartphones and, increasingly, their own applications on the enterprise network. On top of that, a growing number of network users are connected devices such as cameras, printers, phones, energy meters, medical devices, industrial machine sensors, and vehicles. Ten billion devices already connect to the world's networks, and the Cisco® Visual Networking Index projects that number will double by 2018.

These devices and users are creating more traffic over a diverse array of networks: wireless, public Internet, and remote VPNs. And that traffic is no longer accessing only corporate resources. Many are connecting with personal and cloud applications operated by third parties. (See Figure 1.)

Figure 1. The Complexity Multiplier Effect



Compared to a decade ago, you are now looking at 4x the types of users, 9x the types of devices, 4x the networks, and twice the types of resources. Do the math, and that is 288 times the complexity of yesterday's networks.

We call this the complexity multiplier effect. It has real consequences:

- It makes IT into a bottleneck for the enterprise.
- It drains productivity, because IT spends most of its time just trying to keep things running smoothly.
- It limits your business agility, because it takes much longer to adapt to change and get new applications up and running.
- It makes it more difficult to scale IT services to keep up with the new markets, suppliers, and services your company needs to support.
- It hinders innovation, because your smartest people and the bulk of your budget are focused on maintaining complexity, instead of achieving business results.

As you know, IT budgets are not keeping pace with this growing complexity. In fact, the more IT investments businesses make these days for things such as BYOD, the cloud, and the Internet of Things, the more that complexity grows.

### Simplify the Network

IT should not impede your business growth, but rather should accelerate it. But to get to a place where IT efforts are focused on achieving results instead of managing complexity, the network needs to get much simpler. Cisco can

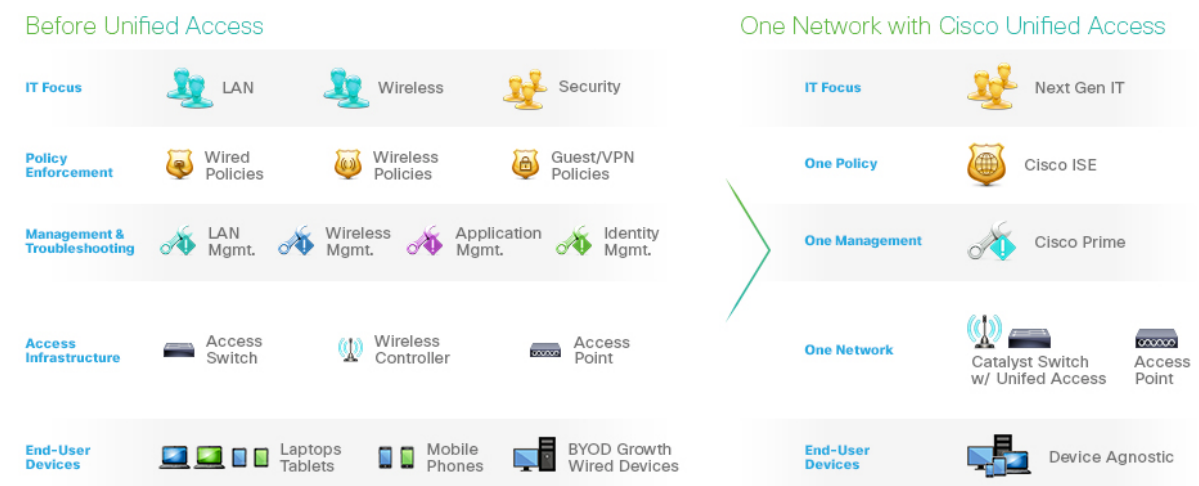
help you get there, using capabilities embedded in the network you already have in place. And it is as easy as 1+1=2:

1. **Converge** your wired, wireless, and virtual networks so that you can use one policy, one management, and one network for your entire environment.
2. **Automate** repetitive operations and **Innovate** with zero-touch deployment tools and software-defined networking (SDN) capabilities that speed up provisioning and amplify network intelligence.

## 1. Converge

A major source of complexity in your network is the sheer variety of infrastructures types and number of networks you have to manage. You may have started with a basic LAN/WAN/WLAN years ago, but the explosion of the number of branches led to the adoption of WAN architectures. Then you enabled remote worker connectivity with VPN. With BYOD, now users need to be delivered the same level of experience no matter the device and no matter the location. Too many of these services depend on their own separate infrastructures, separate policy, and separate management. (See Figure 2.)

**Figure 2.** Simplify Your Network with Unified Access



With the Cisco ONE Enterprise Networks Architecture, your Cisco network can help you reduce the complexity and empower you to use one network, one policy, and one management for wired, wireless, and remote networks. Cisco helps you converge your network by providing:

- **One policy with Cisco Identity Services Engine (ISE):** Manually provisioning security policies for each type of user, device, location, and resource is a nightmare, especially when your policy frameworks are different across wired, wireless, and VPN domains. Cisco ISE lets you control policies from a business perspective, based on the user's identity, device, connectivity, location, and time of day. Cisco ISE communicates with Cisco Catalyst® switches to enforce these policies everywhere on the network with no need for an overlay policy framework. Just specify the business policy, and Cisco ISE translates it into network actions, without you having to touch a single device.
- **One management with Cisco Prime™:** Cisco also converges your environment from a management perspective. No longer do you need to swivel between different management platforms. No matter which device, network, application, or user, Cisco Prime provides a holistic view of your IT environment and

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complete lifecycle management capabilities. So you can identify problems much more quickly and control your entire business network with fewer resources.

- **One network with Cisco Unified Access and Unified Computing:** Unified access has two overarching deployment modes – converged access and wireless overlay. Converged access architecture extends all of the Cisco IOS Software capabilities you use in the wired network – scalability, resiliency, security, QoS, and more – to your wireless infrastructure. In smaller sites (up to 100 access points) the need for appliance controllers can be eliminated by leveraging Cisco Catalyst switches that integrate wireless controller functionality. For larger deployments – irrespective of whether it is a converged access architecture or a wireless overlay architecture – a controller appliance based deployment makes more sense since it optimizes IP addressing and roaming at scale. For these deployments Cisco Prime enables you to minimize the complexities and manage your wired and wireless network components as a single holistic network.

## 2. Automate and Innovate

Most IT departments spend almost 80 percent of their time on repetitive operations. The entire lifecycle of the network is affected, from deploying new network devices, to managing the network, to upgrading or replacing network equipment. This includes activities such as installing software on all your various networking platforms, managing VLANs, configuring QoS, and more.

### Automation

Today, each of these activities—and many others—is a manual process, requiring you to address each switch, wireless controller, and endpoint device in your network individually. With up to tens of thousands of devices in the network, it is no wonder IT spends most of its time just making everything run. You need to automate these very manual and repetitive tasks.

Cisco switches, routers, and wireless equipment can automate software installation, configuration, and image management across the lifecycle of your network. The zero-touch capabilities brought by Cisco also make your network easier to manage. You can make a configuration change once and know it is implemented consistently everywhere, without the errors that inevitably crop up when making changes manually.

Your switches automatically notify you if there is a problem and often provide specific steps needed to solve it. So troubleshooting does not stretch out over hours and days; many problems are identified and resolved before they ever affect end users:

- **Smart Install** lets you install software or make a configuration change once to automatically and rapidly propagate it across your infrastructure. **Plug-and-Play (PnP)** is the next generation of Smart Install functionality. It reduces the need for highly skilled IT engineers and accelerates switch deployments, especially with large branch and geographically disperse networks.
- **Cisco Device Sensor** works with Cisco Smart Install to automatically detect new devices.
- **Instant Access** lets you manage dozens of access switches across your campus as if they were just extended ports on a single backbone switch.
- **Auto Smart Port** identifies new devices such as PCs, IP phones, cameras, or connected TVs. It configures the port, applies the right policy, and assigns the proper VLAN.
- **Auto QoS** recognizes the applications on that device and automatically configures the right QoS.
- **Smart Call Home** is an automated support capability that monitors Cisco devices on your network. It flags issues before your business operations are affected.

- **Cisco IOS® Embedded Event Manager (EEM)** provides real-time network event detection and onboard automation. It gives you the ability to adapt the behavior of your network devices to align with your business needs.

With Cisco Intelligent WAN (IWAN), your routers also bring automated intelligence to your branches to simplify operations and lower costs:

- **Performance Routing (PfR)** offloads the Internet traffic from the expensive MPLS line to the direct Internet access (DIA) traffic line and immediately aligning the right application with the right resource.
- **Application Visibility and Control (AVC)** gives PfR the ability to recognize the applications and automatically match it to the right WAN connection to increase performance and decrease resource cost.
- **Cisco Prime Plug-and-Play Application** enables you to automatically deploy a new router on the network with low-touch interaction simply leveraging the Cisco Prime infrastructure.

These capabilities save time: a huge amount of time, potentially quadrupling the productivity of your staff compared to the time it takes to do these things manually. They also make your network much more scalable and your business more agile. Because adding a new device anywhere in your environment now requires one step: plug it in. The network handles the rest.

## Programmability

The next step in simplifying networking is SDN, the ability to implement network capabilities in software, where they can be programmed and reprogrammed at will. Cisco can unlock the business benefits of SDN today, in the network you already have deployed, with the Cisco Application Policy Infrastructure Controller Enterprise Module (APIC EM). The solution provides an intelligent, two-way control layer that lets you use SDN capabilities to make your network:

- **Simpler**, by letting you make network policy changes and configurations once and automatically programming them everywhere
- **More open**, with an architecture that uses open APIs and open standards to integrate Layer 4 through 7 services, virtualization, and management vendors
- **More innovative**, by allowing you to bring in state-of-the-art third-party applications that use your network's programmability to deliver new business capabilities

## Simplifying with SDN

Cisco APIC EM lets you make network changes and configurations everywhere, dynamically throughout the network, independently of device-specific limitations. SDN enables you to shift away from appliance-based networking to intent-based networking: your network is managed and optimized for the business results that you want to achieve. You can now shift the time that your IT team spends on configuring network components to delivering services towards business goals. For example, you can:

- **Simplify access control list (ACL) management:** Managing ACLs is complex and time consuming because you have to do it manually for each of the hundreds of devices on your network. It is also prone to errors, so IT managers are often afraid to make a change. APIC EM monitors your entire environment and automatically identifies ACL duplicates, inconsistencies, and misconfigurations. So security and regulatory policy compliance become much easier.

- **Provision QoS end to end:** The same capabilities apply to QoS. Configure QoS for your devices and applications once, centrally. APIC EM can apply enterprise best practices for QoS based on Cisco Validated Design templates and automatically provision them everywhere, no matter where users move on the network. So you do not have to worry about one device or application somewhere in your environment being non-compliant with your QoS.

### Third-Party Innovation

As an open platform, Cisco APIC EM makes it much easier to bring innovative new services to your business. It uses open standards such as OpenFlow and open southbound APIs to control and manage your entire network. Support for CLI API on APIC-EM enables SDN capabilities on brownfield deployments, rather than requiring a forklift upgrade to go through phased upgrade/migration of campus. And the Cisco APIC-EM uses open northbound RESTful APIs to expose deep network intelligence and programmability to third-party applications. So you can bring in best-in-class applications (or develop your own) to exploit APIC EM programmability. You can deploy and operate innovative new services everywhere in your network the same way you provision ACLs and QoS. You are not tied to one vendor's product roadmap. And you can introduce new capabilities much more quickly and at a much lower cost.

Cisco is already developing an ecosystem of industry-leading partners that offer preintegrated, pretested solutions for APIC EM programmable networks, including:

- Threat detection and mitigation
- Cloud-hosted WAN management
- Virtual desktop infrastructure and load balancing
- Network performance management

All of these applications let you program new network policy and capabilities quickly, control them centrally, and use them anywhere and everywhere in your business environment.

### Start Simplifying Today

As your business adopts more services, devices, and clouds, your network is going to get even more complicated. This problem will not be solved by a new network product or management tool. It requires an end-to-end approach to business networking.

With Cisco networking capabilities for automation, convergence, and programmability, you can operate far more efficiently and at a much lower cost. Even more important, IT simplicity frees up your IT resources so you can operate more strategically. With a network that is simpler, more efficient, and easier to scale, you can focus your efforts on:

- Designing and optimizing your networks and architecture
- Evaluating new technologies and solutions
- Advising lines of business on how they can make the most of new technologies
- Innovating to improve business agility

Cisco offers a much more compelling way to use IT by making the network simpler and faster. And getting there is as easy as 1+1=2.