



## IDC BUSINESS VALUE BRIEF: CISCO ACI

# Cisco Preparing Its Datacenters for the Next Generation of Virtualization and Hybrid Cloud with Its Application Centric Infrastructure

Sponsored by: Cisco

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## Overview

Cisco Systems, with 75,000 employees and annual revenue of close to \$50 billion, is a major multinational supplier of networking solutions. In addition to supplying networking solutions that businesses use to run their own datacenters, Cisco is constantly seeking to simplify and optimize its own IT infrastructure to make it more adaptable and innovative and to better provide itself with a competitive advantage.

The pace of change facing Cisco's IT department is accelerating as new applications, particularly from cloud and mobile environments, become key business enablers. Cisco's IT department, which is responsible for 4,067 production applications and inspecting 27TB of data daily, must be able to deploy such applications quickly, securely, and cost-effectively – and then make changes to them or remove them just as quickly and efficiently.

Cisco's IT department has chosen to address these challenges by transforming its datacenters through the deployment of a new architecture from Cisco that brings greater automation, programmability, and openness to its IT infrastructure. Cisco has already completed its initial deployment of Nexus 9000 Switches in preparation for deployment of Application Centric Infrastructure (ACI) in datacenters hosting its key business applications.

IDC has quantified the network-related benefits that it projects Cisco will achieve in the first datacenter where it will deploy ACI in terms of initial capex cost savings and IT staff time savings, in addition to certain other datacenter-related opex cost reductions. These projections are based on ACI having been fully deployed at this datacenter. To quantify these benefits, IDC conducted several interviews with IT managers at Cisco and reviewed presentations and other materials created by Cisco detailing its ACI deployment plans.

### Business Value Highlights

**Organization:** Cisco

**Location:** San Jose, California

**Challenge:** Prepare Cisco's datacenters, which run over 4,000 production applications, for evolving IT and business challenges and speed up deployment of business-critical applications

**Solution:** Cisco Application Centric Infrastructure

**Expected ACI Network Benefits from Complete ACI Deployment at First Datacenter:**

- Three-year 41% combined savings in initial capex and ongoing IT staff time for provisioning and network operations
- 25% initial capex savings
- 44% average IT staff time savings in technology provisioning and network operations

**Other Projected Benefits:**

- 45% savings in power required
- 20% storage optimization, 12% compute optimization
- 20% reduction in downtime instances and duration

IDC believes that Cisco will be able to leverage ACI to make its IT operations more efficient, reduce its datacenter-related infrastructure costs, and minimize risk by lowering the incidence of revenue-impacting downtime, among other benefits. IDC also believes that Cisco will be able to use ACI to increase its non-IT staff productivity and potentially increase its revenue by speeding up application deployments and enhancing the flow of information across the organization, although IDC has not attempted to quantify these benefits because of their more speculative nature.

IDC projects that Cisco will be able to leverage its deployment of ACI in this first datacenter to realize combined initial capex savings in its deployment of ACI and ongoing IT staff time savings in technology provisioning and network operations of 41.0% over three years, in addition to other datacenter-related savings and benefits discussed in this IDC Business Value Brief.

## Overview of Cisco ACI

ACI is application aware, enables dynamic application instantiation and removal, and is capable of supporting physical, virtual, and cloud integration with full management visibility. The driver of its speed and efficiencies is the common policy-based operating model ACI employs across ACI-ready network and security elements. By leveraging a policy-based solution, ACI is able to overcome the limitations of siloed IT organizational structures and dramatically reduce datacenter costs and complexity.

ACI provides a common policy and management framework across siloed IT teams that enables automatic infrastructure provisioning based on application policy profiles. In the ACI model, networked infrastructure becomes a flexible and programmable pool of stateless resources ready to be provisioned for new applications and services. According to Rebecca Jacoby, SVP and CIO, Cisco, "ACI's policy-based architecture will bring the promise of infrastructure programmability to the masses. It makes every datacenter operator able to effectively create policies that can be used, reused, and deployed in a much simpler and more efficient manner – and use the staff that is currently spending all their time in running the network and the security protocols, to do something much more strategic."

A key architectural component of ACI is the Cisco Application Policy Infrastructure Controller (APIC), which provides a single touch point for all configuration, management, and operational tasks, including policy definition and health monitoring. By providing a common operational framework, it unifies applications, networking, cloud, and security teams in defining application requirements.

These requirements are defined via an application network profile (ANP), which consists of the logical representation of all the application infrastructure requirements, connectivity, and network services that define their interdependencies. When an application is ready to be deployed, the APIC uses the profile to automatically provision the required infrastructure resources and services. This simplifies the operation and reduces infrastructure configuration and application deployment times. Another key ACI component is the Cisco Nexus 9000 Switching portfolio, which uses APIC policies to increase the resiliency, speed, and flexibility for making adds, moves, and changes in a predictable manner.

ACI draws on predefined application requirements and policy profiles to automate the provisioning of the network, application services, security policies, and workload placement. This should help Cisco further lower IT costs and reduce errors while speeding deployment to increase business agility, in addition to providing it with the agility needed to deliver applications rapidly and securely to users when and where they want.

Cisco's ACI-powered datacenters should also better enable Cisco to better architect its networks, security, and infrastructure in alignment with its business strategy, which is increasingly dependent on applications. Further, it can potentially leverage ACI to become more strategic in making choices about streamlining its IT resources and to essentially run IT as a business.

## Implementation

Cisco's IT team is deploying ACI in the context of its need to ensure that it has the right infrastructure in place to support virtualization and its anticipated move to a hybrid cloud model, and to ensure that it has the flexibility and scalability to meet evolving IT and business challenges. Jacoby explained, "ACI's policy-based architecture brings us the productivity we need today, but over time, it brings us the speed, agility, and adaptability, which lowers risk for our business. A policy-based architecture will let us redeploy resources in response to fundamental shifts in the business and get much higher asset utilization while doing so."

Cisco envisions that over the next five years, its datacenters will become core strategic assets and facilitators of business enablement rather than cost centers. In line with this, Cisco realized that its legacy datacenter infrastructure for applications could not provide either the agility or the robust platform needed to accomplish this.

Cisco's IT team decided that it would use its own ACI technology to support this vision for its datacenters. This was not a foregone conclusion – Cisco's IT team uses many technologies and solutions from other vendors. However, Cisco's IT team concluded that ACI was the right solution to become what John Manville, Cisco's SVP of IT Infrastructure, called "a fundamental cornerstone and a foundation" for its effort to turn its datacenter operations into a true business enabler.

ACI testing and trial runs have been completed, and the results yield detailed calculations of ACI's impact on IT operations, including IT infrastructure spending, the efficiency of IT operations including application deployments, and the incidence of downtime.

ACI deployment is slated for Cisco's datacenters in Research Triangle Park, North Carolina, and in Richardson and Allen, Texas, in summer 2014. Cisco expects to see the benefits from the initial deployment through the migration of the thousands of applications in these production datacenters. Cisco is aiming to complete the build in these datacenters in 2015 and estimates that it will take two to three years to migrate its application portfolio onto ACI.

Cisco's objective is to use the ACI fabric to connect these datacenters and draw datacenter operations closer together. This unity of datacenter operations is the heart of the value Cisco expects to derive from ACI. Once this ACI fabric is in place for these datacenters, Cisco plans to extend ACI to other datacenters in the United States and worldwide. Cisco expects that these further deployments will be seamless and efficient to complete because ACI will employ a common policy model in each datacenter.

## Benefits

IDC reviewed detailed analyses of the expected benefits once ACI is fully deployed at the first datacenter. IDC believes that the projections are well founded and that these benefits are of the type and scope that organizations can reasonably expect to attain by deploying a policy-based infrastructure solution.

ACI will create value for Cisco by speeding up its application deployment efforts and reducing operating and capital expenses by enabling application development, security, network services, and network configuration personnel to collaborate through a common platform. ACI should also make managing application security simpler and less expensive. Further, the more robust and virtualized environment of ACI should lead to a reduction in the number and duration of downtime instances.

Manville explained: "Through our ACI vision, we will help IT departments – including Cisco's – dramatically simplify how they provision their datacenter resources that are critical to the performance of their applications." Automation will allow Cisco's IT team to save significant time now spent on manual processes and to reduce its SLA times. Automated provisioning in areas such as datacenter access (62.1% projected time savings), access control lists (53.0%), local server load balancing (55.5%), global server load balancing (72.4%), and fleet provisioning (58.0%) will be achieved through the creation and maintenance of provisioning templates. ACI will also create and manage applications in datacenters that will support this automated provisioning.

Cisco's Network Operations team should also realize significant efficiencies with ACI in areas such as incident management (44.5% projected time savings), problem management (17.1%), event management (18.7%), request fulfillment (24.9%), services delivery (25.4%), and project resourcing (10.2%). In each of these areas, ACI will add specific capabilities such as automation enabled by the policy model and greater workload mobility that will allow Cisco's IT team to complete tasks in less time, thereby making it more productive.

Cisco anticipates that ACI will further improve its IT staff's productivity by enabling previously siloed teams to collaborate through a common platform with centralized visibility into the IT infrastructure and real-time health monitoring. Planned and unplanned outages will occur less often as issues are pinpointed and resolved more quickly. As the amount of downtime declines, users and IT staff will become more productive, and Cisco's business units should be able to more squarely focus on driving their business and generating more revenue.

Further, Cisco will realize datacenter operational and capital cost savings with ACI. On the operations side, Cisco projects that ACI will have a lighter power imprint (45.2% projected reduction) and require less floor space (19.0%) than its existing infrastructure. In addition, Cisco should be able to provision and use storage more efficiently (20.0%) and optimize its compute capabilities by returning many virtual machines to the common pool (12.0%).

In terms of capital expenditures, Cisco will be able to retire some hardware at each of its datacenters where it will deploy ACI, thereby saving money on infrastructure refreshes that it otherwise would have had to undertake (24.7% projected one-time capex savings). In addition, Cisco will benefit from being able to deploy ACI without disrupting its datacenter operations because ACI can replace PoDs and subnets selectively without needing to retrofit the entire fabric.

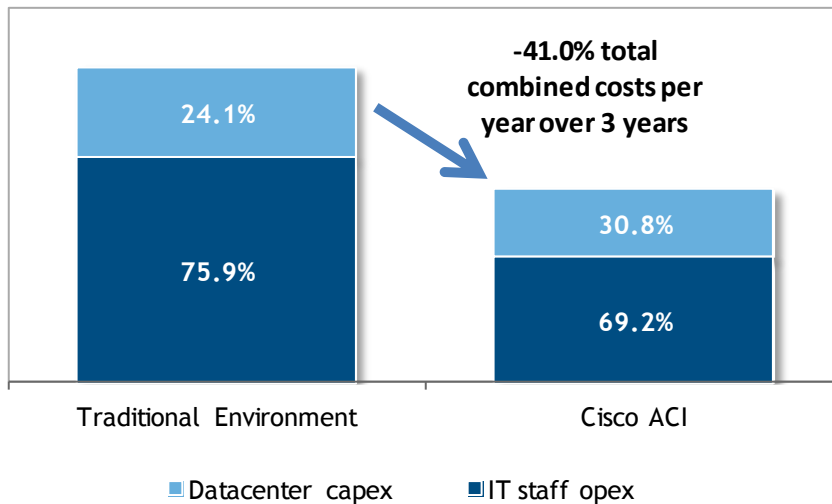
Finally, Cisco expects that the productivity of its business teams will increase as less calendar time is needed for application deployments with ACI. As applications become more central to Cisco's business as a whole, the speed and accuracy with which applications are deployed will become even more important to non-IT staff productivity and the success of projects and business plans. IDC has not attempted to quantify these benefits as they are still hypothetical in nature but expects that this will become a key benefit to Cisco in the next few years.

## Identifying the Business Value of Cisco ACI

By interviewing Cisco IT managers and asking questions about the operations and performance metrics behind the projected savings from the new architecture, IDC was able to quantify certain benefits Cisco expects to obtain from ACI *at the first datacenter where it will deploy ACI, once ACI has been fully deployed at that datacenter*, and to understand how it expects ACI to boost its business productivity and revenue over time. Based on this analysis, IDC calculates that Cisco will be able to leverage ACI to achieve combined 41.0% savings on initial capex costs and IT staff costs related to technology provisioning and network operations over three years, compared with the environment that Cisco will replace with ACI ("traditional environment"), which does not employ application-aware hardware such as switches and gateways (see Figure 1).

**FIGURE 1**

### ACI Networking Costs: ACI Versus Traditional Environment



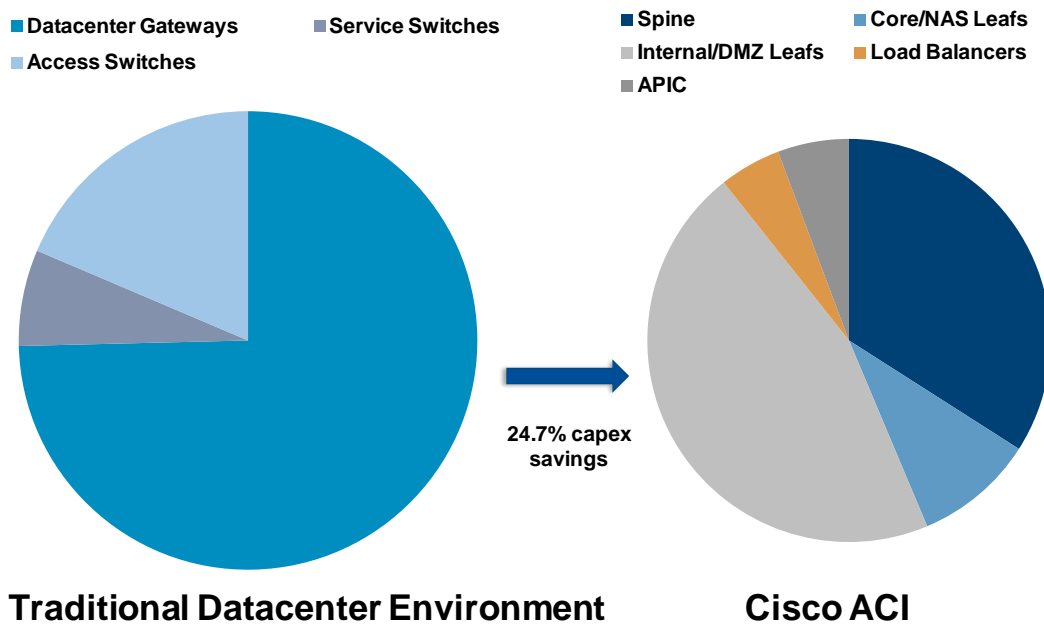
Source: IDC and Cisco, 2014

## Datacenter Capex Savings

Cisco intends to retire certain hardware as it transitions to ACI in its first datacenter. The savings from the retirement of this hardware will be greater than the additional hardware-related costs it will incur to deploy ACI in this datacenter. In total, it expects to realize one-time capex savings of about 24.7% in this datacenter as it moves to ACI instead of refreshing its current datacenter environment (see Figure 2).

FIGURE 2

### Datacenter Infrastructure Costs: ACI Additional Costs Versus Traditional Environment Refresh Costs Avoided



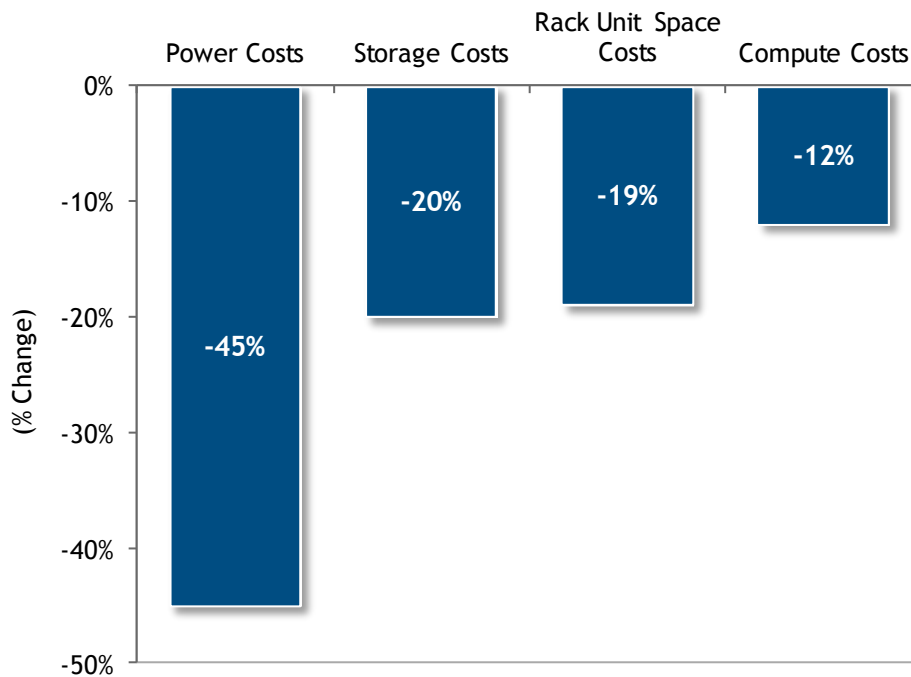
Source: IDC and Cisco, 2014

## Datacenter Opex Savings

By creating a more virtualized, streamlined datacenter environment with ACI, Cisco should realize significant cost savings in areas such as power, storage, floor space, and compute. For example, by being able to return hundreds of virtual machines to the general capacity pool with ACI in place in the first datacenter, Cisco would save about 12% on compute costs. ACI's impact on power costs at the first datacenter is expected to be particularly noticeable; ACI is expected to reduce the number of kilowatts required by 45% (see Figure 3).

**FIGURE 3**

### Datacenter Operating Costs: Expected ACI Versus Traditional Environment



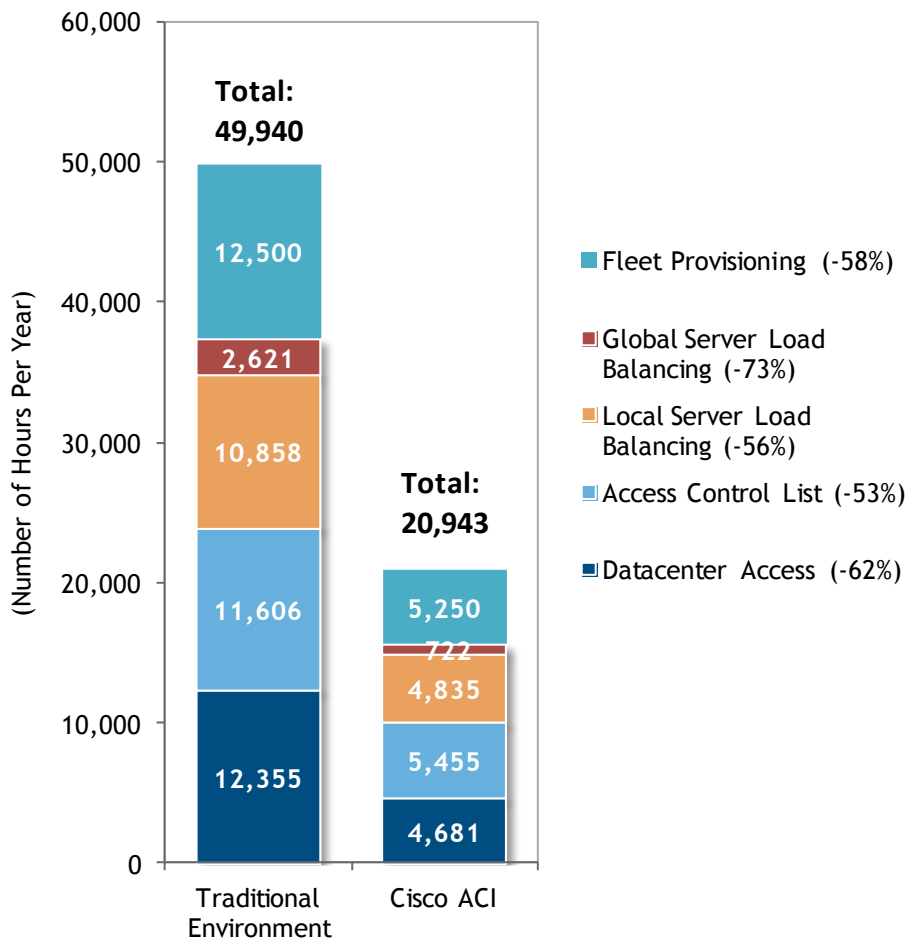
Source: IDC and Cisco, 2014

## IT Staff Productivity – Technology Provisioning

Cisco's IT staff should save significant amounts of time under the ACI fabric as minor provisioning requests are automated and supporting systems are integrated into automated network provisioning. On average, Cisco expects that its IT staff will reduce the time it spends on areas such as datacenter access, access control, and load balancing requests by an average of 58.1% (see Figure 4).

**FIGURE 4**

### IT Staff Time Savings in Technology Provisioning: Expected ACI Versus Traditional Environment



Source: IDC and Cisco, 2014

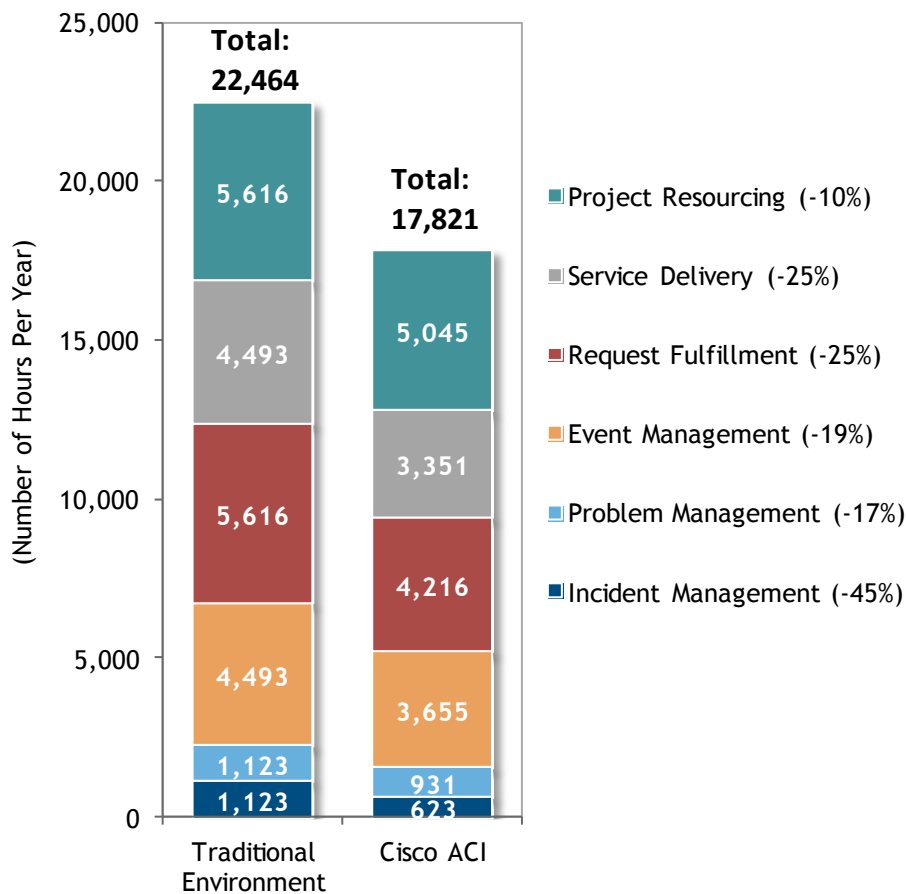


## IT Staff Productivity – Network Operations

The improved hardware behind ACI and enhanced ability to monitor applications and locate potential problems should also make Cisco's IT staff more efficient and productive on the network operations side. On average, Cisco forecasts that its IT staff will become 20.7% more efficient in areas such as incident and problem management, among others (see Figure 5).

**FIGURE 5**

### IT Staff Time Savings in Network Operations: Expected ACI Versus Traditional Environment



Source: IDC and Cisco, 2014

## SLA Enhancements

Through increased automation made possible by ACI and improved processes, Cisco's IT team should be able to better meet its SLAs to deliver services and significantly reduce the time of key SLAs. IDC has not attempted to quantify the benefit of reduced SLA times, but Cisco's business units would benefit from having applications, technologies, and platforms deployed faster for their use, as well as having greater confidence in Cisco IT's ability to deliver these to them in a timely manner (see Table 1).

**TABLE 1**

**SLAs for Service Delivery: Expected ACI Versus Traditional Environment**

	Type	Days — Expected ACI	Days — Traditional Environment	Improvement (%)
DC Network Access	Minor	<1	5	80.0
DC Network Access	Medium	12	14	14.3
DC Network Access	Complex	13	16	18.8
Access List Control	Minor	<1	5	80.0
Access List Control	Medium	11	14	21.4
Access List Control	Complex	15	21	28.6
Local Server Load Balancing	Minor	<1	5	80.0
Local Server Load Balancing	Medium	12	14	14.3
Local Server Load Balancing	Complex	13	17	23.5
Global Server Load Balancing	Minor	<1	5	80.0
Global Server Load Balancing	Complex	13	14	7.1

Source: IDC and Cisco, 2014

## Reduced Revenue-Impacting Downtime

The number of revenue-impacting downtime instances and the duration of these downtime instances should both be reduced with ACI in place by an estimated 20%. Downtime benefits should accrue as ACI helps Cisco's IT team be more proactive in terms of identifying, remedying, and repairing problems and being better able to implement long-term fixes that create greater robustness and stability. IDC has not attempted to quantify the benefits of these expected improvements in downtime metrics, although any reduction in revenue-impacting downtime is a significant benefit.

## Improved End-User Productivity and Revenue

Cisco will benefit more broadly from ACI as the amount of time it takes to deploy applications and technologies decreases. As non-IT professionals get more robust applications at an earlier time, they can use these applications to work more efficiently and productively and ultimately to drive Cisco's business. These benefits should increase as Cisco brings more of its datacenters into the ACI fabric.

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