



Cisco Application Centric Infrastructure and A10 Networks Thunder Application Delivery Controllers Deliver Dynamic Layer 4 through 7 Services

What You Will Learn

Modern data centers are increasingly focused on applications as the primary unit of currency. Current business trends like big data, mobility, and cloud deployments require a dynamic data center infrastructure that is secure, shared, flexible, and capable of rapidly adapting to changing application needs. Cisco® Application Centric Infrastructure (ACI) addresses these business challenges by providing a secure, multitenant-capable, high-performance fabric and a centralized controller-based policy model to automate and accelerate the delivery of applications. A10 Networks, a leader in application delivery controllers (ADCs), is an important partner in the ACI ecosystem. The physical, virtual, and hybrid A10 Thunder ADC integrates into the Cisco ACI policy and orchestration model, providing the agility, automation, and lower total cost of ownership (TCO) needed in the modern data center.

Challenges

As businesses look to IT as a point of strategic differentiation, agility in the data center becomes more critical than ever. This focus puts the onus on IT to respond quickly to changing business requirements. However, an application's agility is directly related to the infrastructure on which it runs. Evolving applications plus the need for always-on reliability require that IT departments provide a transparent infrastructure for application deployment and on-demand consumption. Data center operators need to be able to dynamically manage policies to address business demands as new applications are introduced and existing applications change. The data center infrastructure must be built to deliver consistent application and security services in an elastic and cost-effective environment.

Existing data center infrastructure is a heterogeneous mix of physical and virtual devices with a device-centric management approach, and its operation is manual, repetitive, and time consuming. The processes for provisioning applications and addressing their changing network services needs are time consuming and require significant process overhead. Most IT departments are not set up to deploy applications quickly, scale them effectively, and maintain required service levels. For the business owner, this means that time-to-service for applications is too long, operating costs are too high, and customer satisfaction is at risk.

Solution Overview

Cisco ACI is the foundation of an application-based data center. Cisco ACI makes IT departments more agile by providing a common programmable automation and policy management framework for network, application, security, and Layer 4 through 7 service and virtualization teams. Within Cisco ACI, the Cisco Application Policy Infrastructure Controller (APIC) is the creation, repository, and enforcement point for application policies, which can be set based on application-specific network requirements. Essentially, the APIC serves as the single point of automation and fabric element management in both physical and virtual environments. The APIC communicates with other Layer 4 through 7 elements in the fabric through a plug-in, also known as a device package. Physical, virtual, and hybrid A10 Thunder appliances with the A10 aCloud Services Architecture are integrated into the open Cisco ACI solution through the A10 device package for the APIC, enabling data center operators to deliver automated advanced Layer 4 through 7 tenant services on the Thunder ADC.

The A10 device package for Cisco APIC makes it easy to combine the A10 Layer 4 through 7 ADCs with the Cisco ACI Layer 2 through 3 network fabric. Network segmentation and security policies are enforced consistently whenever a new application is deployed in the network. All A10 appliances run the innovative A10 Advanced Core Operating System (ACOS). The comprehensive ACOS features and flexibility in combination with an architecture that allows the system to increase utilization of CPU resources makes A10 products well suited to meet cloud scale and performance requirements. The robust services platform accelerates service integration and manageability through open and standards-based programmability. ACOS is completely API based and programmatically exposes comprehensive services for cloud and network functions virtualization (NFV) environments. An all-inclusive licensing model helps ensure flexibility and simplified operations. Furthermore, ACOS features and configurations are identical and transferable across all form factors. The A10 integration with Cisco ACI allows IT departments to enable automatic provisioning of dynamic Layer 4 through 7 application networking and security services by reducing application deployment time.

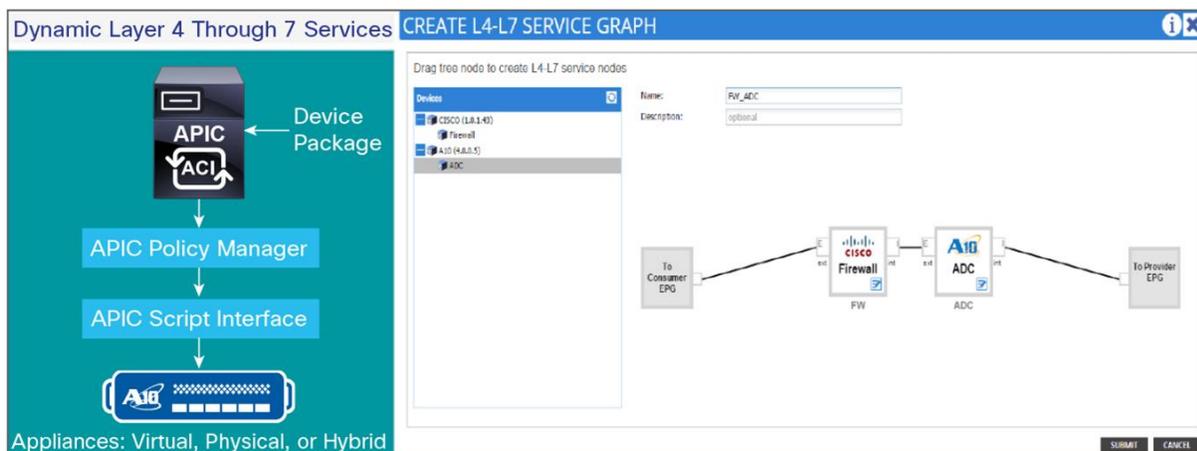
Cisco ACI architecture simplifies operations with centralized automation and policy-based application deployment. A10 shares a similar vision to deliver on-demand, policy-based mechanisms for dynamic Layer 4 through 7 services in a cloud environment. Together, Cisco ACI and the A10 Thunder ADC provide an automated approach based on application-specific policies that allow applications to dynamically scale on demand throughout data centers. Furthermore, the ACI and Thunder integration allows Cisco and A10 to independently innovate and address pervasive requirements of network programmability. As Cisco and A10 continue to innovate, more advanced ADC and security functions such as service chaining, web application firewall (WAF), SSL intercept (SSLi), and global server load balancing (GSLB) will be integrated with Cisco ACI.

Solution Detail

The Cisco ACI fabric is designed with application connectivity and policy at the core. This focus allows both traditional enterprise applications and internally developed applications to run side by side on a network infrastructure designed to support them in a dynamic and scalable way. Cisco ACI technology provides the capability to insert Layer 4 through 7 services through simplified definitions on the APIC. The APIC serves as the central point of control for application policy management and redirects traffic to Layer 4 through 7 devices.

Through the concept of A10 device package, Cisco ACI automates the service chaining and service insertion of physical, hybrid, and virtual A10 Thunder appliances (Figure 1). The device package has been rigorously tested by A10 in a Cisco ACI environment and offers robust Layer 4 through 7 network application services, application templates, and HTTP optimization services for the ACI fabric. The A10 device package uses open APIs and scripts that allow Cisco APIC to configure consistent automation and orchestration of A10 ADC services within the fabric to allow organizations to deploy applications in a fast, highly secure, and reliable manner.

Figure 1: A10 Device Package Integration

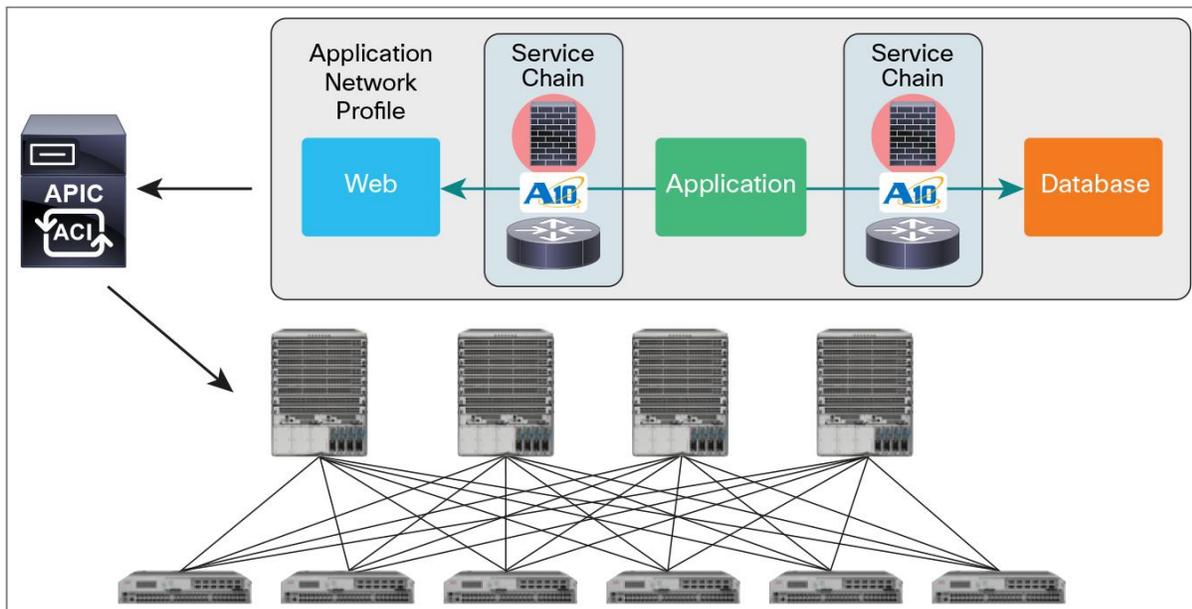


The integration with A10 Thunder ADC appliances allows the Cisco APIC controller to communicate with the A10 ADC through Representational State Transfer (REST) APIs to push the necessary Layer 4 through 7 ADC service policies and allocate network path to A10 Thunder devices. The policies can be applied on a choice of high-performance physical appliances and flexible virtualized appliances. Appliances can use multitenancy capabilities for increased resource utilization. The Cisco ACI integration allows definition of Layer 4 through 7 services based on operational needs and essentially enables resource pooling of Layer 4 through 7 services on A10 appliances. Enterprises, service providers, and cloud providers can use the solution to rapidly deploy services to address changing demands

The A10 integration with Cisco APIC enables an important innovation in the area of service insertion. The APIC can create a chain of services offered by individual Layer 4 through 7 instances on A10 Thunder appliances without having to connect discrete appliances in sequence. Cisco ACI locates the A10 appliances that provide Layer 4 through 7 functions and inserts them into the path as defined by the policy (Figure 2). Appliances don't need to be placed in any particular place in the fabric. With dynamic Layer 4 through 7 services, customers can create a logical flow of service functions, allowing them to provision complex topologies instantaneously.

The foundational focus on open, standards-based programmatic interfaces on Cisco ACI and A10 ACOS delivers the programmatic and scalable infrastructure needed to build a secure on-demand delivery model for dynamic and consistent services. ACOS' comprehensive REST APIs help ensure fast and accurate integration with the Cisco ACI fabric to provide a single point of provisioning through the command-line interface (CLI), GUI, APIs, and scripts. Data center operators can use portable configuration templates to simplify consumption of Layer 4 through 7 services. Additionally, organizations can use REST APIs to monitor and analyze application traffic to develop powerful insights into infrastructure for capacity planning, performance analysis, and regulatory compliance.

Figure 2: Cisco ACI and A10 Thunder Appliances Integration Architecture



Solution Components

Table 1 lists the components of the Cisco and A10 solution

Table 1: Solution Components

Bill of Materials	Device	Software
A10	A10 Thunder hardware appliance A10 Thunder hybrid virtual appliance A10 vThunder virtual appliances	A10 ACOS 4.0 or later
Cisco	Cisco Nexus® 9000 Series Switches fabric, Cisco ACI software, and Cisco APIC	Release 1.0(2x)

Benefits

Cisco ACI provides an advanced data center networking methodology that abstracts networking constructs from application deployments. In combination with the A10 Thunder appliances, Cisco ACI provides a robust set of network application, security, and other Layer 4 through 7 automation functions. Customers can now achieve the value of fully orchestrated and programmatically controlled Layer 4 through 7 services, service chaining, and centralized management. By using the Cisco APIC integration with Thunder ADCs, data center operators can define a dynamic sequence of service functions such as advanced distributed denial-of-service (DDoS) mitigation, SSL offloading, WAF, load balancing, and traffic filtering on the Thunder platform in a way that can be abstracted from the concrete implementation. The integration allows operators to address needs for agility and on-demand consumption while helping ensure security and compliance in an increasingly shared infrastructure.

The joint Cisco ACI and A10 Thunder ADC solution provides these benefits:

- Agility:** Data center operators can choose from a selection of A10 appliances to create new instances on demand and support dynamic Layer 4 through 7 service insertion according to tenant- or provider-defined policies. With the joint Cisco ACI and A10 Thunder solution, operators can dynamically respond to business needs by providing consistent services in a shared, multitenant environment using policy-based automated provisioning.
- Automation:** The Cisco ACI and A10 Thunder integration enables data center operators to build an automatically provisioned application-networking infrastructure. Customers can benefit from programmability and open, standards-based REST APIs to rapidly instantiate consistent application networking services for enforcing service-level agreements (SLAs), compliance, and security.
- Flexibility:** The Cisco ACI and A10 Thunder integration allows data center operators to automate data center operations with Layer 4 through 7 services independent of the location at which the services reside. The ACI policy framework provides a common policy abstraction regardless of whether services are physical and virtual, thus enabling service deployment choice and flexibility.
- Lower TCO:** A10 ACOS features and configurations are identical and transferable across all appliance form factors. The integration provides all-inclusive licensing and comprehensive programmatic interfaces, resulting in quicker integration, and facilitates dynamic provisioning of services and efficient resource utilization in a shared multitenant environment.



Conclusion

As businesses seek to make the data center more agile, application-centric automation and virtualization of both hardware and software infrastructure become increasingly important. Cisco ACI builds the critical link between business-based requirements for applications and the infrastructure that supports them. The integration of A10 Thunder ADCs with the Cisco ACI solution provides enterprises with comprehensive application delivery and security capabilities in a shared infrastructure. The integration can be used to dynamically provision Layer 4 through 7 application services and help ensure that SLAs and security requirements are met consistently. The Thunder platform can help customers accelerate, secure, and optimize the performance of their data center applications and networks. The joint solution can effectively transform the data center as applications and services are created with significantly faster provisioning speed, increased business agility, and reduced costs

For More Information

<http://www.cisco.com/go/aci>

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A10 Networks is a leader in application networking, providing a range of high-performance application networking solutions that help organizations ensure that their data center applications and networks remain highly available, accelerated and secure. Founded in 2004, A10 Networks is based in San Jose, California, and serves customers globally with offices worldwide. For more information, visit: www.a10networks.com.

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