

Cisco ACE Application Control Engine Application Switches

Q. What is the Cisco® ACE Application Control Engine family of products?

A. The Cisco ACE family, a comprehensive application delivery solution, is a part of the Cisco portfolio of Data Center 3.0 solutions.

The Cisco ACE family includes highly scalable application switching modules for Cisco Catalyst® 6500 Series Switches and Cisco 7600 Series Routers. The Cisco ACE modules consolidate a broad range of services in one device.

Cisco ACE application switch technology is now also available in a convenient appliance form factor for those deployments requiring a standalone platform from a Cisco Catalyst 6500 Series switch. The Cisco ACE 4710 Appliance uses the full range of Cisco application delivery technology, including Layer 4 and 7 content switching, extensive application security, and server offload for Secure Sockets Layer (SSL) and TCP processing, as well as an expanded set of application acceleration capabilities. Used to increase the performance of data center-based web applications, the Cisco ACE 4710 uses asymmetric compression, FlashForward, and other patented techniques to reduce the volume of transferred data and improve response times to end users, thus providing a better overall end-user experience.

The Cisco ACE family also includes the Cisco ACE XML Gateway. This appliance extends the core Cisco ACE function set to the Extensible Markup Language (XML) and web services, including security, scalability, and acceleration.

To help ensure data center availability, the Cisco ACE application delivery solution is integrated with the Cisco market-leading data center availability system, Cisco ACE Global Site Selector (GSS), which provides intelligent failover between data centers to help ensure business continuity and provide full Domain Name System (DNS) and Dynamic Host Configuration Protocol (DHCP) support, as well as protection from DNS-based distributed-denial-of-service (DDoS) attacks.

Q. What is the Cisco ACE 4710 Appliance?

A. The Cisco ACE 4710, a part of the Cisco portfolio of Data Center 3.0 solutions and a crucial component of the Cisco ACE product family, is a powerful new application delivery and optimization solution for today's data centers. The Cisco ACE 4710 helps ensure business continuity by enhancing application availability, improves business productivity by accelerating applications, and lowers operating costs by minimizing data center power and cooling needs.

Q. What customer challenges do Cisco ACE application switches solve?

A. The Cisco ACE application switches—the Cisco ACE Module and Cisco ACE 4710 Appliance—address the broad set of challenges involved in managing the deployment and delivery of applications from the data center to local and remote users:

- Support for data center consolidation by reducing the required number of servers and load balancers and the power and cooling requirements

- Capability to speed up application deployment cycles and reduce interdependencies between IT organizations and capability to reduce ongoing time required to manage application infrastructure
- Ongoing need to increase application availability and uptime, while being able to dynamically scale application resources as business requirements grow
- Capability to optimize performance of data center applications delivered to remote users
- Capability to improve application and overall data center security
- Capability to support more challenging customer service-level agreements (SLAs)

Q. What customer benefits do the Cisco ACE application switches offer?

A. The Cisco ACE application switches allows enterprises to accomplish four primary IT objectives:

- Increase application availability and scalability
- Accelerate performance of web-based applications
- Enable data center consolidation through fewer servers, load balancers, and firewalls
- Improve application and data center security

As a result, the Cisco ACE application switches provides specific benefits to network, IT, and applications organizations:

- Reduced ongoing cost of application infrastructure and increased server efficiency
- Better end-user productivity through improved application availability and up to 500 percent faster response times
- Up to 400 percent lower power and cooling expenses
- Up to 75 percent faster application deployment and build-out

Q. What service provider benefits do the Cisco ACE application switches offer?

A. The Cisco ACE product family delivers the following benefits to service providers:

- Operational efficiencies and savings
- Scalability and integration with Cisco Catalyst 6500 Series Switches and Cisco 7600 Series Routers
- Incremental revenue streams through the capability to transparently offer more advanced application hosting services and network security services, with the Cisco Catalyst 6500 Series Firewall Services Module (FWSM)
- Capability to offer more competitive SLAs, with higher application and data center availability objectives
- Competitive differentiation from other hosting service providers through leading-edge application acceleration capabilities, best-in-class security features, and integration with the Cisco Catalyst 6500 Series FWSM and the Cisco Catalyst 6500 Series SSL Services Module
- Better SLA support

Q. What are the core features of the Cisco ACE application switches?**A.** The Cisco ACE family of products supports the following features:

- Broad set of proven load-balancing and content-switching technologies, coupled with high availability
- Leading-edge application acceleration
- Best-in-class security capabilities

A crucial design element of the Cisco ACE family of products, and a differentiator between Cisco and other solutions in the marketplace, is the capability to use a virtualized architecture and role-based system administration to streamline and reduce the cost of operations involved in rolling out, scaling, accelerating, and protecting application deployments, providing support for more end users with fewer dedicated devices than competing solutions.

Q. What are the advantages of these core Cisco ACE features?**A.** The core Cisco ACE features provide these advantages:

- **Server load balancing and content switching:** To increase application availability, the Cisco ACE product family uses best-in-class Layer 4 load-balancing and Layer 7 content-switching algorithms coupled with highly available system software and hardware. Specifically, Cisco ACE provides a state-of-the-art failover system with an extensive set of application health probes that guarantees that traffic is forwarded to the most available server. To help ensure data center availability, Cisco ACE is integrated with the Cisco leading data center availability system: Cisco ACE GSS.
- **Application acceleration:** The Cisco ACE 4710 appliance is designed to accelerate the application experience for all users, whether they are in the office or on the road. To enable optimal application performance for remote and traveling users, Cisco ACE 4710 uses a range of acceleration capabilities to improve application response times, reduce bandwidth, and improve protocol efficiency. These technologies, including hardware-based compression, delta encoding, and FlashForward, improve the performance and reduce response times by minimizing latency and data transfers for any HTTP-based application, and they do so for any internal employee or external end user. Cisco ACE 4710 customers have achieved up to 500 percent improvement in response times by minimizing latency and data transfers.
- **Cisco ACE products greatly improve server efficiency** through highly accurate application traffic management and the offloading of CPU-intensive tasks such as SSL encryption processing and TCP session management. Cisco ACE offloads SSL and TCP processing from servers in large volumes, allowing IT to get more application processing and use from each computing resource and thus reduce application infrastructure expense. The Cisco ACE solution integrates SSL acceleration technology, which offloads the encryption and decryption of SSL traffic from external devices (servers, appliances, etc.).
- **Application protection:** Cisco ACE is designed to serve as a last line of defense for servers and applications in data centers. The Cisco ACE family of application switches provides protection against application threats and denial-of-service (DoS) attacks with features such as deep packet inspection, network and protocol security, and highly scalable access control capabilities.

- **Virtual devices and role-based access control (RBAC):** A primary Cisco ACE differentiator, and a major benefit to IT and network staff, is the solution's capability to reduce the provisioning time required for new applications by up to 75 percent as well as to reduce ongoing management time and total cost of ownership (TCO). This time and cost reduction is made possible through such unique Cisco ACE capabilities as device virtualization, role-based administration, and software release rollback, which together enable different IT organizations to rapidly provision multiple virtual devices within a single Cisco ACE platform.
- **The Cisco ACE product family's virtualized architecture enables IT managers** to configure up to 250 virtual devices on a single Cisco ACE module and up to 20 virtual devices on the Cisco ACE 4710 appliance to enable dedicated application delivery functions for different applications and departments or to meet other requirements; for example, a service provider administrator may want to allocate a virtual device for each customer. The resulting benefit is far fewer devices and simpler configurations to manage as application deployments grow, resulting in significantly lower power and cooling expenses and faster time-to-service for new applications.

Q. What are the highlights of the Cisco ACE family of application switches?

A. The Cisco ACE products offer these main features:

- **Virtual devices:** Virtualized architecture is a primary design element of Cisco ACE and a unique advantage in comparison to other solutions in the marketplace. IT managers can configure up to 250 virtual devices on a single Cisco ACE module and up to 20 virtual devices on the Cisco ACE 4710 appliance. The resulting benefit is far fewer devices and simpler configurations to manage as application deployments grow, significantly lower power and cooling expenses, and faster time-to-service for new applications.
- **Role-based system administration:** Multiple departments or stakeholders can independently manage appropriate, role-assigned tasks using Cisco ACE, minimizing interdepartmental conflict and increasing productivity.
- **Performance and application acceleration:** Cisco ACE provides best-in-industry scalability and throughput for managing application traffic—up to 64 Gbps with four Cisco ACE modules in a single Cisco Catalyst 6500 Series switch chassis—thus providing IT with long-term investment protection and scalability. Additionally, through its unique virtualization capabilities, Cisco ACE enables IT to provision and deliver a broad range of multiple applications from a single Cisco ACE module or appliance, bringing increased scalability for application provisioning to the data center.
- **To enable optimal application performance for remote and traveling users, the Cisco ACE 4710 appliance uses** a range of acceleration capabilities, including hardware-based compression, delta encoding, and FlashForward, to improve application response times, reduce bandwidth, and improve protocol efficiency. The Cisco ACE solution also integrates SSL acceleration technology, which offloads the encryption and decryption of SSL traffic from external devices (servers, appliances, etc.).
- **Application availability:** Cisco ACE provides a state-of-the-art failover system with an extensive set of server and application health probes that helps ensure that traffic is forwarded to the most available server, helping ensure business continuity.

Q. What is the return on investment (ROI) with Cisco ACE?

A. Consolidating data center infrastructure by reducing the number of servers and load balancers required enables companies to save on capital expenditures (CapEx; hardware, software, and IT) and operating expenses (OpEx; rack space, power, and cooling expenses and ongoing management cost of the applications). Improved application delivery and performance also increases end-user productivity and employee satisfaction. Hence, the Cisco ACE solution helps ensure that customers get excellent returns on their investments and optimal TCO.

Q. What types of customers can benefit from Cisco ACE application switches?

A. The Cisco ACE family of products is designed for enterprise, service provider, and midmarket customers. Although customers with two or more servers are considered opportunities for a Cisco ACE sale, the following offers more granular details regarding customers who should be considered as sales candidates:

- Enterprise customers with:
 - Server farms
 - Third-party or in-house business applications
 - Existing Cisco Catalyst 6500 Series infrastructure
 - Existing deployments of Cisco application delivery solutions (such as Cisco CSS 11500 Series Content Services Switches and the Cisco Content Switching Module [CSM])
- Service provider customers that:
 - Support high-traffic web portals
 - Offer hosted services
 - Want to differentiate hosted service offerings with leading-edge application acceleration capabilities, best-in-class security features, and integration with Cisco Catalyst 6500 Series FWSM and SSL Services Module services
- Midmarket customers:
 - Customers with multiple servers supporting third-party or in-house business applications

Q. How is the Cisco ACE application switching solution deployed?

A. Typically, customers deploy Cisco ACE application switches in a data center in front of multiple server farms (application, storage, or web servers) supporting many application types. As traffic is sent from clients to the data center servers, it passes through the Cisco ACE for processing.

Q. What are the performance characteristics of the Cisco ACE Module?

A. The Cisco ACE Module can process application traffic at 4 Gbps up to 16 Gbps in a single module, and 64 Gbps in a single Cisco Catalyst 6500 Series switch chassis with Cisco 7600 Series Routers, upgradeable through software licenses or new module additions. This capability is the highest in the market today, easily handling large data files and rich media. The Cisco ACE Module also supports a sustained rate of up to 345,000 Layer 4 connection setups and teardowns per second, supporting a large, dynamic user base. Detailed performance metrics are available on the Cisco ACE data sheet and can be found online at: <http://www.cisco.com/go/ace>.

Q. What are the performance characteristics of the Cisco ACE 4710 appliance?

A. The Cisco ACE 4710 appliance can process application traffic at 1 Gbps up to 4 Gbps, and up to 2 Gbps of compression, in a single appliance, upgradeable through software licenses. The Cisco ACE appliance also supports a sustained rate of up to 120,000 Layer 4 connection setups and teardowns per second, more than double the capability of any other product in this space, supporting a large, dynamic user base. Detailed performance metrics are available on the Cisco ACE data sheet and can be found online at: <http://www.cisco.com/go/ace>.

Q. What are the main new application acceleration features available on the Cisco ACE 4710 appliance?

A. The Cisco ACE 4710 appliance introduces two important acceleration technologies for remote users:

- **Latency optimization, also known as FlashForward:** FlashForward is a patented technology that enables the Cisco ACE 4710 appliance to eliminate unnecessary browser cache validation requests. This technology eliminates the network delays associated with embedded cacheable web objects such as images, style sheets, and JavaScript files.
- **Bandwidth optimization:** Optimization includes hardware-accelerated GZIP and deflate compression and patented delta encoding. GZIP and deflate compression provide significant byte savings on transmitted files. For example, text-based file sizes can be reduced up to 80 percent. The Cisco ACE 4710 appliance achieves speeds up to 1 Gbps for compression. The Cisco delta encoding technology enables the Cisco ACE 4710 appliance to send only the difference (or deltas) between a previous and new instance of a webpage. Without this technology, subsequent visits to a webpage require the client to download the entire HTML page, even though typically only a small percentage of the content has changed.

Q. Which software release is supported with the introduction of Cisco ACE 4710?

A. The Cisco ACE 4710 requires a minimum software version of A1(8.0a).

Q. Which supervisor engines are compatible with the Cisco ACE Module?

A. The Cisco ACE Module supports the Cisco Catalyst 6500 Series Supervisor Engine 720 (with policy feature card 3A [PFC3A], PFC3B, or PFC3BXL).

Q. Does the Cisco ACE Module run Cisco IOS Software?

A. No. The Cisco ACE Module runs its own software. Users familiar with the Cisco IOS Software command line interface can use that knowledge to easily identify, classify, and assign policies to their application traffic.

Q. Does the Cisco ACE appliance 4710 run Cisco IOS Software?

A. No. The Cisco ACE 4710 Appliance runs its own dedicated software.

Q. Can I deploy the Cisco Catalyst 6500 Series FWSM, Cisco CSM, Cisco Catalyst 6500 Series SSL Services Module, and Cisco ACE services modules together in a Cisco Catalyst 6500 Series or Cisco 7600 Series chassis?

A. Yes.

Q. Do the Cisco ACE Module and Cisco ACE 4710 appliance have any external interfaces?

- A.** The Cisco ACE Module has an external console port for administrative access. While operational, the sessions with the Cisco ACE Module can be started from the supervisor.

The Cisco ACE 4710 has 4 10/100/1000 copper nonblocking ports and a 10/100 serial console port.

Q. How many Cisco ACE services modules can I deploy in one Cisco Catalyst 6500 Series and carrier Ethernet Cisco 7600 Series chassis?

- A.** Up to four Cisco ACE modules are supported per chassis.

Q. Does the Cisco ACE Module support failover?

- A.** Yes. Failover is supported per virtual device and per physical device using a redundant Cisco ACE Module. Stateful redundancy is available for traditional active-standby and active-active configurations. Stateful failover is supported both within a Cisco Catalyst 6500 Series chassis and across two Cisco Catalyst 6500 Series chassis.

Q. How many virtual devices does the Cisco ACE Module support?

- A.** The Cisco ACE Module supports up to 250 virtual devices.

Q. How many virtual devices does the Cisco ACE 4710 appliance support?

- A.** The Cisco ACE 4710 appliance supports up to 20 virtual devices.

Q. How much flash and DRAM memory is available on the Cisco ACE Module? Can the DRAM be upgraded?

- A.** The Cisco ACE Module comes with 1 GB of flash memory and 3 GB of data plane DRAM plus 1 GB of control plane DRAM. The DRAM is not upgradeable.

Q. How much flash and DRAM memory is available on the Cisco ACE 4710 appliance? Can the DRAM be upgraded?

- A.** The Cisco ACE 4710 appliance comes with 8 GB DRAM and 1 GB of flash memory. The DRAM is not upgradeable.

Q. How are geographically distributed data centers supported with a Cisco ACE product line for high-availability?

- A.** Global server load balancing (GSLB) is offered by the Cisco ACE GSS 4400 Series Global Site Selector Appliances. These switches can support high availability for Cisco ACE family of products that are deployed in separate geographic areas.

Q. Can I upgrade my existing service module to a Cisco ACE Module?

- A.** No. The Cisco ACE service module is a new hardware and software architecture. Other service modules can coexist with the Cisco ACE Module in a Cisco Catalyst 6500 Series chassis.

Q. Can I software upgrade my existing Cisco CSS to a Cisco ACE 4710 appliance?

- A.** No. The Cisco ACE 4710 appliance is a new hardware and software product.

Q. Do I have to upgrade the Cisco IOS Software every time I want to upgrade to a new Cisco ACE Module feature release?

- A.** No. Unlike the Cisco CSM, the Cisco ACE Module is not dependent on the Cisco IOS Software for the command-line interface (CLI) or new features, so a customer can upgrade to a new Cisco ACE feature release without upgrading the Cisco IOS Software. The Cisco ACE Module requires only the minimum Cisco IOS Software version of Release 12.2(18) SXF4.

Q. Which supervisors are required to install the Cisco ACE Module?

- A.** The Cisco ACE Module is supported by Cisco Catalyst 6500 Series Supervisor Engine 720 with PFC3A, PFC3B, or PFC3BXL. Other supervisors are not supported.

Support and Services Questions**Q. What postsales support is provided with Cisco ACE?**

- A.** With every Cisco ACE deployment, it is strongly recommended that Cisco SMARTnet[®] hardware maintenance support and Cisco Software Application Support plus Upgrades (SASU) software support be ordered.

Q. Are professional services generally required with Cisco ACE?

- A.** Customers may choose not to use professional services if they possess the skills to deploy and integrate the Cisco ACE solution. However, because the technology is new, many customers prefer to use the knowledgebase and expertise of Cisco Advanced Services engineers or partners to deploy best-practices architectures. Large deployments can often require integration activity where a network consulting engineer from Cisco Advanced Services or a partner can bring value.

Q. Who can provide services for Cisco ACE?

- A.** Professional and implementation services (PDIO) can be provided by Cisco Advanced Services or through a partner. Cisco Advanced Services for Cisco ACE are delivered through Cisco Data Center Networking (DCN).

For More Information**Q. How do I get more information?**

- A.** For more information about Cisco ACE, visit: <http://www.cisco.com/go/ace> or contact your local account representative.



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