THUNDER ADC

APPLICATION DELIVERY CONTROLLER & LOAD BALANCER

Offering a complete application optimization solution, A10 Thunder® ADC (Application Delivery Controller) processes a complex set of functions simultaneously via the industry's highest-performing appliances. It integrates advanced L4-7 techniques to ensure server availability, protect vulnerable applications and accelerate content delivery.

PLATFORMS

THUNDER ADC
Physical & SPE Appliances

vTHUNDER ADC
Virtual Appliance

THUNDER ADC
Bare Metal

FLEXPOOL
Capacity Pooling License

MANAGEMENT

HARMONY CONTROLLER
Centralized Analytics and Management

AGILE APPLICATION DELIVERY & SECURITY

From SMBs and large enterprises to service providers and cloud operators, organizations are hosting a large and rapidly growing set of mission-critical applications.

A purpose-built solution, A10 Thunder ADC ensures these applications are highly available, accelerated and secure. It helps reduce downtime, ensure business continuity and builds highly available applications and environments.

Thunder ADC delivers the capacity, scalability, multi-tenancy and programmability to adjust to an ever-changing environment. Consolidate point products, reduce network complexity and achieve a substantial reduction in TCO.

Thunder ADC delivers L4-7 load balancing and multiple layers of security via web and DNS app firewalls, single sign-on (SSO) authentication and in-depth support for advanced encryption, including high-performance PFS/ECC. Built upon A10's Advanced Core Operating System (ACOS®) platform, Thunder ADC delivers application performance and security for any environment.

TALK
WITH A10

WEB
a10networks.com/adc

BENEFITS

ENHANCE
APPLICATION AVAILABILITY

Organizations must guarantee their applications are constantly accessible. Thunder ADC utilizes multiple load-balancing techniques to efficiently distribute workloads across all servers while constantly evaluating application health. Client requests are forwarded to servers that host the proper content and can best respond to ensure application and content delivery.

SECURE
COMMUNICATIONS

Internet sessions are rapidly adopting encryption to secure online data transport. Clients and servers, meanwhile, negotiate the most secure and complex methods mutually supported. Thunder ADC front-ends servers and offloads cumbersome, processing-intensive tasks associated with the latest cryptographic standards. This maximizes content protection, speeds delivery and lowers infrastructure expenses.

ENSURE
BUSINESS CONTINUITY

With data centers proliferating worldwide, administrators must maintain around-the-clock global operational integrity. To guarantee cohesion and optimize app delivery among diverse sites, Thunder ADC provides advanced global server load balancing (GSLB) between locations. GSLB provides optimal site selection and status to ensure disaster recovery.

PROTECT
VULNERABLE APPLICATIONS

Software development and testing can catch most, but typically not all, coding flaws. The resulting applications are susceptible to attacks that cannot be blocked by intrusion prevention systems (IPS), next-generation firewalls or sandboxing. Businesses lose revenue, suffer damaged brand reputation and confidential information is stolen. Thunder ADC provides protection against 'zero day' and other emerging application layer threats with DNS and web application firewalls.

ACCELERATE
CONTENT DELIVERY

Applications must be responsive — no matter the location — to ensure a superior end-user experience, enhanced remote employee productivity and SLA mandates are exceeded. Thunder ADC overcomes the inherent WAN latencies, inefficient software programs and chatty protocols to provide fast and responsive service. Clients obtain a fast experience while organizations gain a competitive advantage.
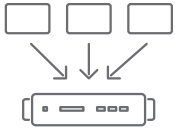
OPTIMIZE
APPLICATIONS VIA MULTI-TENANCY

To optimize the delivery and security for potentially hundreds of apps in a given data center, IT administrators need a multi-tenant methodology.

Thunder ADC provides the ability to granularly program more than 1,000 individual partitions on a single appliance for tailor-made policies by application, service or user, as well as achieve appliance consolidation.

PROACTIVE
INFRASTRUCTURE MODIFICATIONS

Dynamic traffic profiles and throughput levels require detailed visualization into application usage to implement network changes in real-time.

When combined with A10 Harmony™ Controller, Thunder ADC provides ultra granular visibility and L4-7 analytics to accelerate troubleshooting and head off potentially reduced user experiences.

CONSOLIDATE
ACCESS CONTROL

Organizations must allow external clients access to web portals, internal resources and mobile/BYOD apps. At the same time, security must be maintained with authentication and be transparent to the user.

Thunder ADC centrally manages multiple facets of authentication, authorization and accounting (AAA) with a system-wide perspective, while eliminating separate authentication points, for a single sign-on (SSO) experience.

THUNDER
7440-11 ADC
BY THE NUMBERS

220/200 *Gbps* L4/L7 Application Throughput	**100** GbE Ports	**44M** L4 HTTP RPS	**10.5M** L4 Connections Per Second

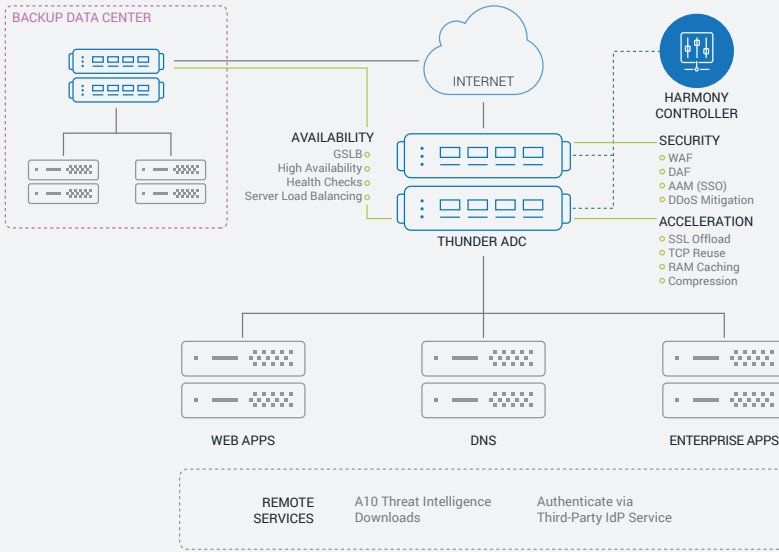|	
1,023 Application Delivery Partitions (L3V)	**75** *Gbps* SSL Bulk Throughput*

* With Maximum SSL


INDUSTRY-LEADING PERFORMANCE
Thunder ADC delivers up to an industry-leading 220 Gbps of throughput in a single one-rack unit appliance — or 1.7 Tbps of throughput in a cluster — and features the broadest range of form factors, including physical, virtual, bare metal multi-tenant and cloud.

REFERENCE ARCHITECTURES

ENTERPRISE DEPLOYMENT

Offering up to an industry-leading 220 Gbps of throughput in a single one-rack unit appliance, Thunder ADC may be deployed at the core of an environment to deliver high-performance application delivery, load balancing and security.
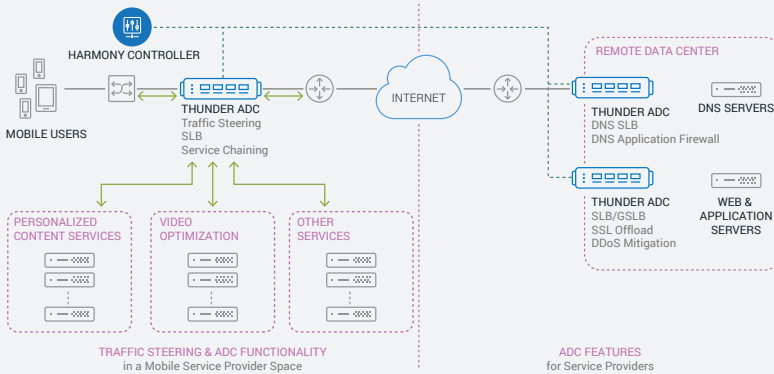
SERVICE PROVIDER DEPLOYMENT

Proven in large-scale service provider environments, Thunder ADC may be deployed to optimize network efficiency and services via traffic-steering and service-chaining to multiple value-added services, such as video optimization. The solution includes carrier-grade networking (CGN) support for IPv4 address expansion and IPv6 migration.
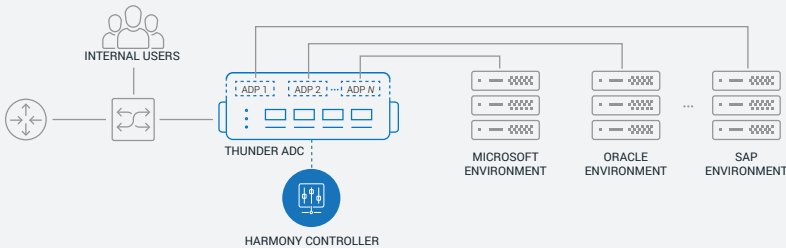

APPLICATION DELIVERY PARTITIONS

A10 Thunder ADC supports multi-tenant environments with application delivery partitions (ADP). Configure more than 1,000 virtual ADCs on a single appliance that also enables Layer 3 virtualization. Each partition may be configured for a unique set of policies and offers sufficient resource isolation for most application-oriented use cases.

FEATURES

APPLICATION DELIVERY & PERFORMANCE
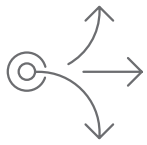
ADVANCED
SERVER LOAD BALANCING

Thunder ADC is a full-proxy, load-balancing and content-switching solution. With aFleX® scripting, deep packet inspection, comprehensive load-balancing algorithms and persistence support, Thunder ADC enables application layer visibility to optimally route inbound requests.

Customizable server health checks ensure only fully functional servers are used to service client needs. The server best able to respond is selected and total servers required can be substantially reduced for lower TCO.

GLOBAL
SERVER LOAD BALANCING (GSLB)

Extend load balancing on a global basis. Thunder ADCs, distributed worldwide, continuously update each other on their respective individual nodes for optimal site selection and status to ensure disaster recovery.

Geographic and network proximity policy metrics optimize multi-site deployments. DNS Proxy or DNS Server methods further improve implementation flexibility and deployment simplicity.

BROAD
ACCELERATION METHODOLOGIES

Leverage numerous techniques to overcome inherent distance-related latency, inefficient internet protocols and application design limitations. Acceleration methods, including TCP connection multiplexing, RAM caching, GZIP compression and SSL-offload, expedite content transfer. The solution supports TCP optimization standards, such as selective acknowledgment, client keep-alive and window scaling, to further speed delivery.

HIGH-DENSITY
APPLICATION DELIVERY PARTITIONS

Provide support for multi-tenant environments with application delivery partitions (ADP). They allow the configuration of more than 1,000 partitions on a single Thunder ADC appliance, which enables Layer 3 virtualization. Each partition may be configured for a unique set of policies and offers resource isolation for most application-oriented use cases.

ULTRA LOW LATENCY
FOR FINANCIAL APPLICATIONS

The Thunder ADC family also offers solutions for Low Latency applications, featuring specialized Thunder appliances, with custom software to meet the low latency and jitter requirements of financial applications. Featuring ultra-low latency hardware, these appliances offer near instantaneous execution times and provide granular program policies for efficient packet forwarding, while also consolidating multiple network functions and thus reducing hops.
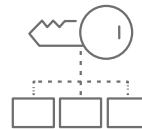
APPLICATION SECURITY

EXTENSIVE
CIPHER SUITE SUPPORT

Hardware-based SSL offload engines support advanced cryptographic methods at ultra-high capacity. Thunder ADC can manage session security, such as Perfect Forward Secrecy (PFS), with an advanced cipher suite, including elliptic curve cryptography (ECC).

Appliances can process SSL encryption and decryption at rates over 50 Gbps — and up to 90,000 connections per second — when using ECC with 256-bit keys.

APPLICATION
AUTHENTICATION & SSO

The integrated application access management (AAM) module optimizes and enforces authentication and authorization to applications.

The module integrates with authentication servers, identity data stores, identity providers (IdPs) and applications to authenticate users and enforce access privileges. Common AAA and single sign-on (SSO) methods include LDAP, RADIUS, RSA SecurID, TDS SQL, SAML and Kerberos.

AAM interfaces to OCSP responders to validate client certificate status, as well as to Microsoft Active Directory for SharePoint and Outlook Web Access users.

ZERO-DAY
APPLICATION PROTECTION

An ICSA-certified web application firewall (WAF) guards vulnerable software from dozens of application layer attacks, including the Open Web Application Security Project (OWASP) top-10 threats. These attacks include cross-site request forgery, SQL injection and buffer overflows that target coding flaws. Integrated into Thunder ADC, the WAF blocks these and other application behavior anomaly attacks, as well as prevents unauthorized data leakage.
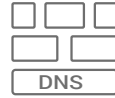
POWERFUL
DNS FIREWALL

Thunder ADC incorporates a sophisticated DNS application firewall (DAF) to stop buffer overflows, malformed requests and head off DNS amplification-based DDoS attacks. It delivers validated DNSSEC pass-through support to prevent threats such as DNS cache-poisoning and spoofing. In addition, the ADC can load-balance multiple DNS servers and cache DNS responses to provide scalability to DNS servers.

SERVER
DDOS PROTECTION

DDoS protection is standard in all appliances. With FTA-based hardware models, using field-programmable gate arrays (FPGA), protection may be enabled for high-volume attacks against application servers. FPGAs mitigate common volumetric attacks, while general-purpose CPUs mitigate more sophisticated low-and-slow and application attacks, such as Slowloris and HTTP floods. Additional methods to limit unwarranted data floods include connection rate limiting and bandwidth rate limiting per source IP.

THREAT INTELLIGENCE
SERVICE

An optional subscription, the A10 Threat Intelligence Service provides data from more than three dozen security sources, including DShield and Shadowserver. The service enables Thunder ADC to instantly recognize and block traffic to and from known malicious IP address sources. The service protects networks from future threats, blocks threats such as spam and phishing, and greatly increases Thunder ADC efficiency.

CERTIFIED BY ICSA LABS

The integrated Thunder ADC web application firewall has achieved WAF certification from ICSA Labs. ICSA Labs testing and certification ensures that Thunder ADC performs as intended to secure application services from exploitation and attack.

ICSAlabs
CERTIFIED WEB APPLICATION FIREWALL

SEE ALL CERTIFICATIONS

APPLICATION VISIBILITY & MANAGEMENT
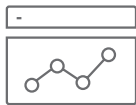
RICH
ANALYTICS AND VISIBILITY

When deployed in conjunction with the A10 Harmony Controller, Thunder ADC provides access to dozens of aggregate or per-request metrics in real-time. These include end-to-end response times, latency, popular URLs, and error and health indicators. This data is analyzed to provide per-app reporting and alerts on availability, security and performance.

Detailed Layer 4 based analytics information is separately provided by individual clients, ADC (single appliance or as a cluster) and per server.

FULLY
PROGRAMMABLE

The Thunder ADC platform leverages A10's REST-based aXAPIs to configure all features with 100 percent API coverage. This interface is used to integrate with third-party or custom management consoles, such as SDN platforms (e.g., Cisco ACI and VMware) and cloud orchestration systems (e.g., OpenStack and Microsoft SCVMM). A software plug-in is available for private clouds leveraging vRealize Orchestrator from VMware.

SMART
TEMPLATES

To optimally deliver server content, the ADC front-ending the application should be 'tuned' with configurations that best fit the needs of that application; that takes time and iterative efforts to get the ideal settings.

Thunder ADCs equipped with AppCentric Templates (ACT) bypass this step by providing select business-critical applications — from Microsoft (e.g., Exchange, Skype for Business and SharePoint), Oracle and many more — with predefined templates that include the key policy settings on a per-application basis for rapid deployment.

COMPREHENSIVE
MANAGEMENT TOOLS

Thunder ADC is supported by the A10 Harmony Controller; this controller is a centralized management platform that coordinates and distributes application centric service policies and configuration files to hundreds of Thunder appliances and device cluster infrastructures across multi-cloud environments. Administrators can automatically discover, track and monitor each appliance including key operational metrics such as CPU and disk usage as well as device partitions and users. The controller performs configuration backup and restore operations and schedules software upgrades.
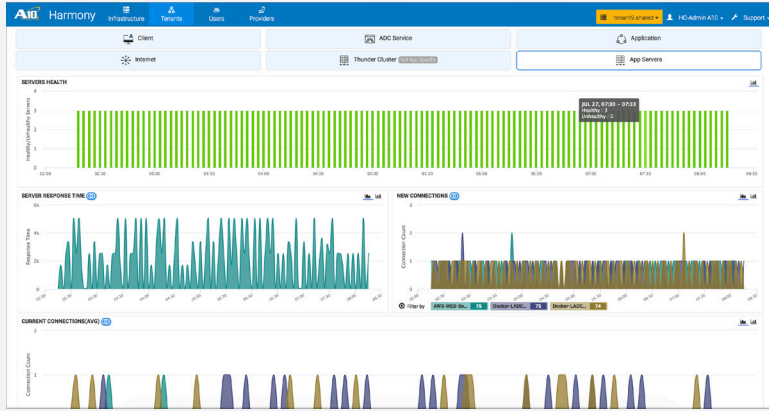
APPLICATION SERVER VIEW

Thunder ADC with Harmony Controller provides detailed analytics from the server perspective. Including server health, response times, number of new and existing connections. Multiple filtering options customize the reports.
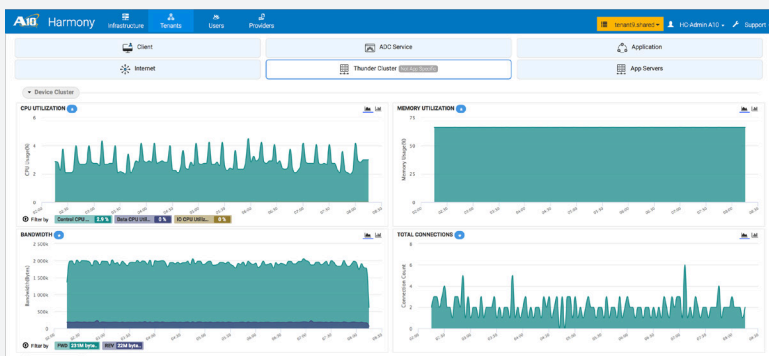
THUNDER ADC CLUSTER VIEW

Granular real-time reports on the health of the Thunder ADC may be generated. Information available includes CPU and memory utilization rates, bandwidth utilized and total cluster connections.
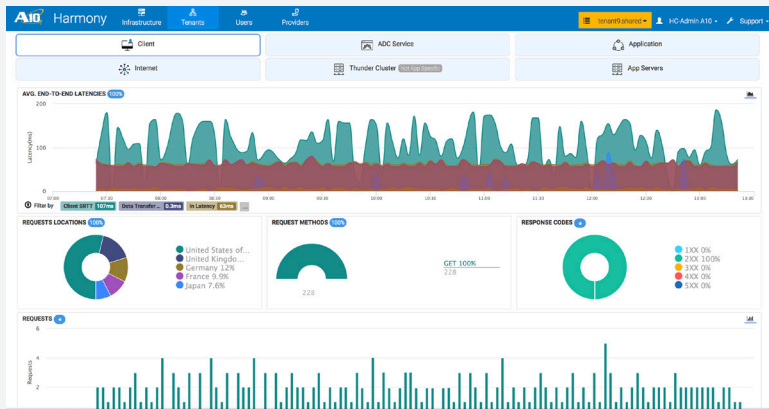
CLIENT VIEW

The experience from the end-user perspective may be measured and reported. Includes end-to-end latency, app server latency and client performance.
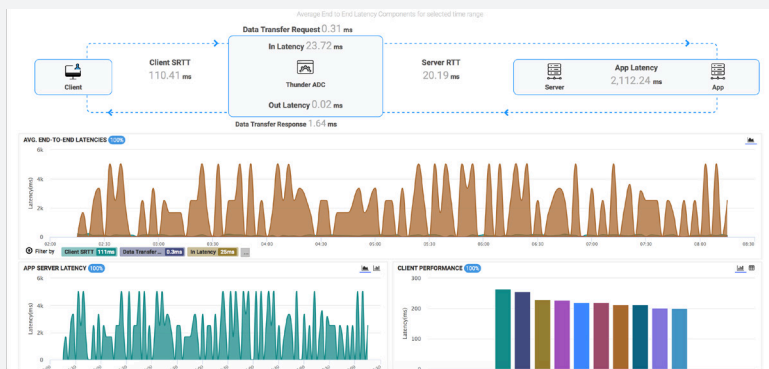
RESPONSE TIME DETAILS

This information is useful for troubleshooting delayed application response times. The screen details the time taken in various portions of a HTTP transaction. These graphs also help distinguish application vs. Infrastructure related issues.

PERFORMANCE	THUNDER 840 ADC	THUNDER 930 ADC	THUNDER 940 ADC	THUNDER 1030S ADC	THUNDER 1040 ADC
Application Throughput (L4/L7)	5 Gbps / 5 Gbps	5 Gbps / 5 Gbps	10 Gbps / 7.5 Gbps	10 Gbps / 10 Gbps	20 Gbps / 20 Gbps
Layer 4 CPS	200K	200K	240k	450K	500K
Layer 4 HTTP RPS	1 Million	1 Million	1 Million	2 Million	2 Million
Layer 4 Concurrent Sessions	16 Million	16 Million	16 Million	32 Million	32 Million
Layer 7 CPS (1:1)*1	50K	50K	75K	150K	180K
SSL Bulk Throughput*2	1 Gbps	1 Gbps	1 Gbps	7 Gbps	9 Gbps
SSL CPS*2	RSA (1K): 2K RSA (2K): 500	RSA (1K): 1.9K RSA (2K): 400	RSA (1K): 2K RSA (2K): 1k	RSA (1K): 25K RSA (2K): 7K	RSA: 15K*7 ECDSA: 15K*7
DDoS Protection (SYN Flood) SYN/sec	1.7 Million	2 Million	2 Million	4 Million	4 Million
Application Delivery Partitions (ADP)	32	32	32	32	32
NETWORK INTERFACE					
1 GE Copper	5	6	5	6	5
1 GE Fiber (SFP)	0	2	0	2	0
1/10 GE Fiber (SFP+)	2	2	4	2	4*8
Management Ports	1 x Ethernet Mgmt port, 1 x RJ-45 console port				
HARDWARE SPECIFICATIONS					
Processor	Intel Communications Processor	Intel Xeon 2-core	Intel Communications Processor	Intel Xeon 4-core	Intel Communications Processor
Memory (ECC RAM)	8 GB	8 GB	8 GB	8 GB	8 GB / 16 GB*4
Storage	SSD	SSD	SSD	SSD	SSD
Hardware Acceleration	Software	Software	Software	Software	Software
SSL Security Processor ('S' Models)	N/A	N/A	N/A	Yes	Yes
Dimensions (inches)	1.75 (H) x 17 (W) x 12 (D)	1.75 (H) x 17.5 (W) x 17.45 (D)	1.75 (H) x 17.5 (W) x 17.25 (D)	1.75 (H) x 17.5 (W) x 17.45 (D)	1.75 (H) x 17.5 (W) x 17.25 (D)
Rack Units (Mountable)	1U	1U	1U	1U	1U
Unit Weight	8.8 lbs	17.8 lbs 19.9 lbs (RPS)	14 lbs 16 lbs (RPS)	18.0 lbs 20.1 lbs (RPS)	15 lbs 17 lbs (RPS)
Power Supply (DC option available)	Single 150W (AC only)	Single 600W*6	Single 750W*6	Single 600W*6	Single 750W*6
	100 - 240 VAC 50-60Hz	80 Plus Platinum efficiency, 100 - 240 VAC, 50 – 60 Hz			
Power Consumption (Typical/Max)*3	57W / 75W	66W / 76W	60W / 80W	98W / 108W	80W / 110W
Heat in BTU/hour (Typical/Max)*3	195 / 256	225 / 259	205 / 273	334 / 369	273 / 376
Cooling Fan	Single Fixed Fan	Hot Swap Smart Fans	Removable Fans	Hot Swap Smart Fans	Removable Fans
Operating Ranges	Temperature 0° - 40° C | Humidity 5% - 95%				
Regulatory Certifications	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, BSMI, RCM | RoHS	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, MSIP, BSMI, RCM, FAC | RoHS	FCC Class A, UL, CE, GS, CB, VCCI, CCC, BSMI˅, RCM˅ | RoHS	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, KCC, BSMI, RCM, FAC | RoHS, CC EAL2+	FCC Class A, UL, CE, GS, CB, VCCI, CCC, BSMI˅, RCM˅ | RoHS
Standard Warranty	90-Day Hardware and Software				

Thunder ADC Physical Appliance Specifications (Cont.)

PERFORMANCE	THUNDER 3030S ADC	THUNDER 3040 ADC	THUNDER 3350 ADC		
Application Throughput (L4/L7)	30 Gbps / 30 Gbps	30 Gbps / 30 Gbps	40 Gbps / 40 Gbps		
Layer 4 CPS	750K	750K	1.2 Million		
Layer 4 HTTP RPS	3 Million	3 Million	5 Million		
Layer 4 Concurrent Sessions	64 Million	64 Million	64 Million		
Layer 7 CPS (1:1)*1	250K	280K	500K		
SSL Bulk Throughput*2	11 Gbps	11 Gbps	18 Gbps		
SSL CPS*2	RSA (1K): 47K RSA (2K): 14K	RSA: 30K ECDSA: 20K	RSA: 28K*7 ECDSA: 28K*7		
DDoS Protection (SYN Flood) SYN/sec	7.5 Million	8 Million	7.5 Million		
Application Delivery Partitions (ADP)	64	64	64	64	127
NETWORK INTERFACE			**Model C**	**Model E**	
1 GE Copper	6	6	6	6	6
1 GE Fiber (SFP)	2	2	18	2	2
1/10 GE Fiber (SFP+)	4	4	4*8	4*8 + 16	4*8
25 GE Fibers (SFP28)	0	0	0	0	4
40 GE Fiber (QSFP+)	0	0	0	0	0
Management Ports	1 x Ethernet Mgmt port, 1 x RJ-45 console port, 1 x Lights Out Management		1 x Ethernet Mgmt port, 1 x RJ-45 console port		
HARDWARE SPECIFICATIONS					
Processor	Intel Xeon 4-core	Intel Xeon 4-core	Intel Xeon 8-core	Intel Xeon 8-core	Intel Xeon 8-core
Memory (ECC RAM)	16 GB	16 GB	16 GB	16 GB	32 GB
Storage	SSD	SSD	SSD		
Hardware Acceleration	Software	Software	Software		
SSL Security Processor ('S' Models)	Yes	Yes	Yes		
Dimensions (inches)	1.75 (H) x 17.5 (W) x 17.45 (D)	1.75 (H) x 17.5 (W) x 17.45 (D)	1.75 (H) x 17.5 (W) x 18(D)		
Rack Units (Mountable)	1U	1U	1U		
Unit Weight	20.1 lbs	20.6 lbs	18 lbs		
Power Supply (DC option available)	Dual 600W RPS	Dual 600W RPS	Dual 750W RPS		
	80 Plus Platinum efficiency, 100 - 240 VAC, 50 − 60 Hz				
Power Consumption (Typical/Max)*3	131W / 139W	180W / 240W	153W / 220W	159W / 222W	165W / 238W
Heat in BTU/hour (Typical/Max)*3	447 / 474	615 / 819	523 / 751	543 / 758	564 / 831
Cooling Fan	Hot Swap Smart Fans				
Operating Ranges	Temperature 0° - 40° C | Humidity 5% - 95%				
Regulatory Certifications	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, KCC, BSMI, RCM, EAC, FAC | RoHS, CC EAL2+, FIPS 140-2*5	FCC Class A, UL, CE, CB, GS, VCCI, CCC, KCC, BSMI, RCM | RoHS, FIPS 140-2*|*5	FCC Class A*, UL*, CE*, GS*, CB*, VCCI*, CCC*, BSMI*, RCM* | RoHS*		
Standard Warranty	90-Day Hardware and Software				

Thunder ADC Physical Appliance Specifications (Cont.)

PERFORMANCE	THUNDER 3230 ADC	THUNDER 3430 ADC	THUNDER 4430 ADC	THUNDER 4440 ADC	THUNDER 5330 ADC
Application Throughput (L4/L7)	30 Gbps / 30 Gbps	42 Gbps / 42 Gbps	38 Gbps / 38 Gbps	80 Gbps / 80 Gbps	78 Gbps / 78 Gbps
Layer 4 CPS	1.5 Million	2.5 Million	2.7 Million	2.9 Million	3.1 Million
Layer 4 HTTP RPS	7.5 Million	12 Million	12 Million	15 Million	15 Million
Layer 4 Concurrent Sessions	64 Million	128 Million	128 Million	128 Million	128 Million
Layer 7 CPS (1:1)[*1]	420K	620K	620K	750K	770K
SSL Bulk Throughput[*2]	14 Gbps	20 Gbps	20 Gbps	25 Gbps	30 Gbps
SSL CPS[*2]	RSA: 40K ECDSA: 26K	RSA: 45K ECDSA: 32K	RSA (1K): 86K RSA (2K): 84K	RSA: 70K ECDSA: 42K	RSA: 70K ECDSA: 50K
DDoS Protection (SYN Flood) SYN/sec	55 Million	55 Million	55 Million	166 Million	112 Million
Application Delivery Partitions (ADP)	64	127	127	127	127

NETWORK INTERFACE					
1 GE Fiber (SFP)	4	4	0	0	0
1/10 GE Fiber (SFP+)	4	4	16	24	8
40 GE Fiber (QSFP+)	0	0	4	4	0
Management Ports	1 x Ethernet Mgmt port, 1 x RJ-45 console port, 1 x Lights Out Management				

HARDWARE SPECIFICATIONS					
Processor	Intel Xeon 4-core	Intel Xeon 6-core	Intel Xeon 6-core	Intel Xeon 6-core	Intel Xeon 10-core
Memory (ECC RAM)	16 GB	32 GB	32 GB	32 GB	32 GB
Storage	SSD	SSD	SSD	SSD	SSD
Hardware Acceleration	FTA-4	FTA-4	FTA-3	2 x FTA-4	FTA-4
SSL Security Processor ('S' Models)	Yes	Yes	Yes	Yes	Yes
Dimensions (inches)	1.75 (H) x 17.5 (W) x 17.15 (D)	1.75 (H) x 17.5 (W) x 17.15 (D)	1.75 (H) x 17 (W) x 24.6 (D)	1.75 (H) x 17.5 (W) x 30 (D)	1.75 (H) x 17.5 (W) x 17.15 (D)
Rack Units (Mountable)	1U	1U	1U	1U	1U
Unit Weight	23 lbs	23 lbs	25.2 lbs	32.5 lbs	23 lbs
Power Supply (DC option available)	Dual 600W RPS	Dual 600W RPS	Dual 600W RPS	Dual 1100W RPS	Dual 600W RPS
	80 Plus Platinum efficiency, 100 - 240 VAC, 50 − 60 Hz				
Power Consumption (Typical/Max)[*3]	190W / 240W	210W / 260W	266W / 319W	360W / 445W	210W / 260W
Heat in BTU/hour (Typical/Max)[*3]	648 / 819	717 / 887	908 / 1,088	1,229 / 1,519	717 / 887
Cooling Fan	Hot Swap Smart Fans				
Operating Ranges	Temperature 0° - 40° C	Humidity 5% - 95%			
Regulatory Certifications	FCC Class A, UL, CE, GS, CB, VCCI, CCC, KCC, BSMI, RCM, NEBS | RoHS	FCC Class A, UL, CE, GS, CB, VCCI, CCC, KCC, BSMI, RCM, NEBS | RoHS	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, KCC, BSMI, RCM, NEBS | RoHS, CC EAL2+	FCC Class A, UL, CE, GS, CB, VCCI, CCC, KCC, BSMI, RCM | RoHS, FIPS 140-2[*][*5]	FCC Class A, UL, CE, GS, CB, VCCI, CCC, BSMI, RCM, NEBS | RoHS
Standard Warranty	90-Day Hardware and Software				

Thunder ADC Physical Appliance Specifications (Cont.)

PERFORMANCE	THUNDER 5430-11 ADC	THUNDER 5440 ADC	THUNDER 5630 ADC	THUNDER 5840 ADC	THUNDER 5840-11 ADC
Application Throughput (L4/L7)	79 Gbps / 78 Gbps	100 Gbps / 100 Gbps	79 Gbps / 78 Gbps	115 Gbps / 113 Gbps	115 Gbps / 113 Gbps
Layer 4 CPS	3.7 Million	4 Million	6 Million	6.2 Million	6.2 Million
Layer 4 HTTP RPS	20 Million	22 Million	32.5 Million	31 Million	31 Million
Layer 4 Concurrent Sessions	256 Million	256 Million	256 Million	256 Million	256 Million
Layer 7 CPS (1:1)[*1]	790K	950K	1.5 Million	1.5 Million	1.5 Million
SSL Bulk Throughput[*2]	30 Gbps	45 Gbps	45 Gbps	55 Gbps	55 Gbps
SSL CPS[*2]	RSA (1K): 111K RSA (2K): 110K	RSA: 100K ECDSA: 60K	RSA (1K): 180K RSA (2K): 174K	RSA: 150K ECDSA: 90K	RSA: 150K ECDSA: 90K
DDoS Protection (SYN Flood) SYN/sec	112 Million	166 Million	100 Million	166 Million	166 Million
Application Delivery Partitions (ADP)	1,023	1,023	1,023	1,023	1,023

NETWORK INTERFACE

	5430-11	5440	5630	5840	5840-11
1 GE Fiber (SFP)	0	0	4	0	0
1/10 GE Fiber (SFP+)	16	24	24	24	48
40 GE Fiber (QSFP+)	4	4	4	4	0
100 GE Fiber	0	0	0	0	4 (QSFP28)
Management Ports	1 x Ethernet Mgmt port, 1 x RJ-45 console port, 1 x Lights Out Management				

HARDWARE SPECIFICATIONS

	5430-11	5440	5630	5840	5840-11
Processor	Intel Xeon 10-core	Intel Xeon 12-core	2 x Intel Xeon 8-core	Intel Xeon 18-core	Intel Xeon 18-core
Memory (ECC RAM)	64 GB	64 GB	128 GB	64 GB	64 GB /128 GB[*4]
Storage	SSD	SSD	SSD	SSD	SSD
Hardware Acceleration	2 x FTA-3	2 x FTA-4	4 x FTA-2	2 x FTA-4	2 x FTA-4
SSL Security Processor ('S' Models)	Yes	Yes	Yes	Yes	Yes
Hardware Security Module (HSM)	N/A	Yes	N/A	Yes	N/A
Dimensions (inches)	1.75 (H) x 17 (W) x 24.6 (D)	1.75 (H) x 17.5 (W) x 30 (D)	5.3 (H) x 16.9 (W) x 28 (D)	1.75 (H) x 17.5 (W) x 30 (D)	1.75 (H) x 17.5 (W) x 30 (D)
Rack Units (Mountable)	1U	1U	3U	1U	1U
Unit Weight	25.6 lbs	32.5 lbs	72 lbs / 76.5 lbs[*4]	32.5 lbs	34.3 lbs
Power Supply (DC option available)	Dual 600W RPS	Dual 1100W RPS	2+2 1100W RPS	Dual 1100W RPS	Dual 1500W RPS
	80 Plus Platinum efficiency, 100 - 240 VAC, 50 − 60 Hz				
Power Consumption (Typical/Max)[*3]	288W / 345W	360W / 445W	780W / 890W	375W / 470W	550W / 760W
Heat in BTU/hour (Typical/Max)[*3]	983 / 1,178	1,229 / 1,519	2,661 / 3,037	1,280 / 1,604	1,877 /2,594
Cooling Fan	Hot Swap Smart Fans				
Operating Ranges	Temperature 0° - 40° C	Humidity 5% - 95%			
Regulatory Certifications	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, KCC, BSMI, RCM	RoHS	FCC Class A, UL, CE, GS, CB, VCCI, CCC, BSMI, RCM	RoHS, FIPS 140-2*|*5	FCC Class A, UL, CE, TUV, CB, VCCI, KCC*, EAC, FAC	RoHS, CC EAL2+	FCC Class A, UL, CE, GS, CB, VCCI, CCC, BSMI, RCM	RoHS, FIPS 140-2*|*5	FCC Class A, UL, CE, GS, CB, VCCI, CCC*, BSMI, RCM	RoHS*
Standard Warranty	90-Day Hardware and Software				

Thunder ADC Physical Appliance Specifications (Cont.)

PERFORMANCE	THUNDER 6430 ADC	THUNDER 6440 ADC	THUNDER 6630 ADC	THUNDER 7440 ADC	THUNDER 7440-11 ADC
Application Throughput (L4/L7)	150 Gbps / 145 Gbps	160 Gbps / 150 Gbps	150 Gbps / 145 Gbps	220 Gbps / 200 Gbps	220 Gbps / 200 Gbps
Layer 4 CPS	5.3 Million	5.5 Million	7.1 Million	10.5 Million	10.5 Million
Layer 4 HTTP RPS	31 Million	31 Million	38 Million	44 Million	44 Million
Layer 4 Concurrent Sessions	256 Million	256 Million	256 Million	256 Million	256 Million
Layer 7 CPS (1:1)[*1]	1.35 Million	1.4 Million	1.6 Million	2.8 Million	2.8 Million
SSL Bulk Throughput[*2]	46 Gbps	60 Gbps	64 Gbps	75 Gbps	75 Gbps
SSL CPS[*2]	RSA (1K): 134K RSA (2K): 130K	RSA (1K): 180K RSA (2K): 180K	RSA (1K): 190K RSA (2K): 174K	RSA (1K): 200K RSA (2K): 200K	RSA (1K): 200K RSA (2K): 200K
DDoS Protection (SYN Flood) SYN/sec	223 Million	332 Million	223 Million	332 Million	332 Million
Application Delivery Partitions (ADP)	1,023	1,023	1,023	1,023	1,023

NETWORK INTERFACE

	6430	6440	6630	7440	7440-11
1/10 GE Fiber (SFP+)	16	48	12	48	48
40 GE Fiber (QSFP+)	4	4	0	4	0
100 GE Fiber	0	0	4 (CXP)	0	4 (QSFP28)
Management Ports	1 x Ethernet Mgmt port, 1 x RJ-45 console port, 1 x Lights Out Management				

HARDWARE SPECIFICATIONS

	6430	6440	6630	7440	7440-11
Processor	2 x Intel Xeon 8-core	2 x Intel Xeon 10-core	2 x Intel Xeon 12-core	2 x Intel Xeon 18-core	2 x Intel Xeon 18-core
Memory (ECC RAM)	128 GB	128 GB	128 GB	128 GB	128 GB
Storage	SSD	SSD	SSD	SSD	SSD
Hardware Acceleration	4 x FTA-3	3 x FTA-4	4 x FTA-3	3 x FTA-4	3 x FTA-4
SSL Security Processor ('S' Models)	N/A	Yes	Yes	Yes	Yes
Hardware Security Module (HSM)	N/A	N/A	Yes	N/A	N/A
Dimensions (inches)	1.75 (H) x 17.5 (W) x 30 (D)	1.75 (H) x 17.5 (W) x 30 (D)	5.3 (H) x 16.9 (W) x 28 (D)	1.75 (H) x 17.5 (W) x 30 (D)	1.75 (H) x 17.5 (W) x 30 (D)
Rack Units (Mountable)	1U	1U	3U	1U	1U
Unit Weight	39 lbs	36 lbs	74.5 lbs / 78 lbs[*4]	36 lbs	37 lbs
Power Supply (DC option available)	Dual 1100W RPS	Dual 1100W RPS	2+2 1100W RPS	Dual 1100W RPS	Dual 1500W RPS
	80 Plus Platinum efficiency, 100 - 240 VAC, 50 − 60 Hz				
Power Consumption (Typical/Max)[*3]	590W / 680W	480W / 550W	995W / 1,150W	690W / 820W	820W / 950W
Heat in BTU/hour (Typical/Max)[*3]	2,013 / 2,320	1,638 / 1,877	3,395 / 3,924	2,355 / 2,798	2,798 / 3,242
Cooling Fan	Hot Swap Smart Fans				
Operating Ranges	Temperature 0° - 40° C	Humidity 5% - 95%			
Regulatory Certifications	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, KCC, BSMI, RCM, EAC, FAC, NEBS | RoHS, CC EAL2+	FCC Class A, UL, CE, GS, CB, VCCI, CCC, BSMI, RCM | RoHS	FCC Class A, UL, CE, TUV, CB, VCCI, KCC^, EAC, FAC | RoHS, CC EAL2+, FIPS 140-2[*5]	FCC Class A, UL, CE, GS, CB, VCCI, CCC, KCC, BSMI, RCM | RoHS, FIPS 140-2[*5]	FCC Class A, UL, CE, GS, CB, VCCI, CCC^, KCC^, BSMI, RCM | RoHS^, FIPS 140-2^[*5]
Standard Warranty	90-Day Hardware and Software				

The specifications, performance numbers are subject to change without notice, and may vary depending on configuration and environmental conditions.
As for network interface, it's highly recommended to use A10 Networks qualified optics/transceivers to ensure network reliability and stability.

*1 Layer 7 connections per second - measures number of new HTTP connections (1 HTTP request per TCP connection, without TCP connection reuse) within 1 second | *2 Tested with maximum SSL option. Products showing both RSA and ECDSA are tested using 3rd generation SSL card(s). Cipher "TLS_RSA_WITH_AES_128_CBC_SHA256" with RSA 2K keys, unless noted, are used for RSA cases, "TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256" with EC P-256 are used for PFS cases. | *3 With base model. Number varies by SSL model | *4 With maximum SSL option | *5 For FIPS 140-2 Level 2 validated, FIPS models must be purchased | *6 Optional RPS available | *7 Tested with session ticket TLS extension enabled on the 4th gen SSL model (QSSL) | *8 10Gbps speed only | ^ Certification in process

THUNDER ADC SPE PHYSICAL APPLIANCE

PERFORMANCE	THUNDER 4435 SPE	THUNDER 5435 SPE	THUNDER 6435 SPE	THUNDER 6635 SPE
Application Throughput (L4/L7)	38 Gbps / 38 Gbps	78 Gbps / 77 Gbps	153 Gbps / 150 Gbps	150 Gbps / 145 Gbps
Layer 4 CPS	3.1 Million	3.7 Million	7.1 Million	7.1 Million
Layer 4 HTTP RPS	12 Million	20 Million	38 Million	38 Million
Layer 4 Concurrent Sessions	128 Million	256 Million	256 Million	256 Million
Layer 7 CPS (1:1)*1	660K	790K	1.6 Million	1.6 Million
SSL Bulk Throughput (RSA 2K keys)*2	26 Gbps	37 Gbps	60 Gbps	64 Gbps
SSL CPS (RSA 2K keys)*2	65K	65K	135K	174K
DDoS Protection (SYN Flood) SYN/sec	55 Million	112 Million	223 Million	223 Million
Application Delivery Partitions (ADP)	1,023	1,023	1,023	1,023

NETWORK INTERFACE

1/10 GE Fiber (SFP+)	16	16	16	12
40 GE Fiber (QSFP+)	0	4	4	0
100 GE Fiber (CXP)	0	0	0	4
Management Ports	1 x Ethernet Mgmt port, 1 x RJ-45 console port, 1 x Lights Out Management			

HARDWARE SPECIFICATIONS

Processor (Intel Xeon)	10-core	10-core	2 x 12-core	2 x 12-core
Memory (ECC RAM)	64 GB	64 GB	128 GB	128 GB
Storage	SSD	SSD	SSD	SSD
Hardware Acceleration	FTA-3, SPE	2 x FTA-3, SPE	4 x FTA-3, SPE	4 x FTA-3, SPE
SSL Security Processor ('S' Models)	N/A	N/A	Yes	Yes
Dimensions (inches)	1.75 (H) x 17.5 (W) x 30 (D)	1.75 (H) x 17.5 (W) x 30 (D)	1.75 (H) x 17.5 (W) x 30 (D)	5.3 (H) x 16.9 (W) x 28 (D)
Rack Units (Mountable)	1U	1U	1U	3U
Unit Weight	34.5 lbs	35.5 lbs	39 lbs	74.5 lbs / 78 lbs*4
Power Supply (DC option available)	Dual 1100W RPS	Dual 1100W RPS	Dual 1100W RPS	2+2 1100W RPS
	80 Plus Platinum efficiency, 100 - 240 VAC, 50 – 60 Hz			
Power Consumption (Typical/Max)*3	350W / 420W	400W / 480W	620W / 710W	995W / 1,150W
Heat in BTU/hour (Typical/Max)*3	1,195 / 1,433	1,365 / 1,638	2,116 / 2,423	3,395 / 3,924
Cooling Fan	Hot Swap Smart Fans			
Operating Ranges	Temperature 0° - 40° C	Humidity 5% - 95%			
Regulatory Certifications	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, MSIP, BSMI, RCM, EAC, NEBS	RoHS	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, BSMI, RCM, EAC, NEBS	RoHS	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, BSMI, RCM, EAC, NEBS	RoHS	FCC Class A, UL, CE, TUV, CB, VCCI, EAC, FAC	RoHS
Standard Warranty	90-Day Hardware and Software			

The specifications, performance numbers are subject to change without notice, and may vary depending on configuration and environmental conditions.
As for network interface, it's highly recommended to use A10 Networks qualified optics/transceivers to ensure network reliability and stability.

*1 Layer 7 connections per second - measures number of new HTTP connections (1 HTTP request per TCP connection, without TCP connection reuse) within 1 second
*2 Tested with maximum SSL option, using cipher "TLS_RSA_WITH_AES_128_CBC_SHA" with RSA 2K keys | *3 With base model. Number varies by SSL model
*4 With maximum SSL option

THUNDER ADC FOR LOW LATENCY PHYSICAL APPLIANCE

PERFORMANCE	THUNDER 4435
Mean Latency L7	3.9 μs
Max Latency L7	4.2 μs
Jitter L7	0.4 μs
Concurrent NAT Sessions	32,000
NETWORK INTERFACE	
1/10 GE Fiber (SFP+)	16
Management Ports	1 x Ethernet Mgmt port, 1 x RJ-45 console port, 1 x Lights Out Management
HARDWARE SPECIFICATIONS	
Processor (Intel Xeon)	10-core
Memory (ECC RAM)	64 GB
Storage	SSD
Hardware Acceleration	FTA-3, SPE
Dimensions (inches)	1.75 (H) x 17.5 (W) x 30 (D)
Rack Units (Mountable)	1U
Unit Weight	34.5 lbs
Power Supply (DC option available)	Dual 1100W RPS 80 Plus Platinum efficiency, 100 - 240 VAC, 50 – 60 Hz
Power Consumption (Typical/Max)	350W / 420W
Heat in BTU/hour (Typical/Max)	1,195 / 1,433
Cooling Fan	Hot Swap Smart Fans
Operating Ranges	Temperature 0° - 40° C	Humidity 5% - 95%
Regulatory Certifications	FCC Class A, UL, CE, TUV, CB, VCCI, CCC, MSIP, BSMI, RCM, EAC, NEBS	RoHS
Standard Warranty	90-Day Hardware and Software

The specifications, performance numbers are subject to change without notice, and may vary depending on configuration and environmental conditions.
As for network interface, it's highly recommended to use A10 Networks qualified optics/transceivers to ensure network reliability and stability.

vTHUNDER ADC

Supported Hypervisors	VMware ESXi 5.0 or higher (VMXNET3, SR-IOV, PCI Passthrough) KVM QEMU 1.0 or higher (VirtIO, OvS with DPDK, SR-IOV, PCI Passthrough) Microsoft Hyper-V on Windows Server 2008 R2 or higher
Hardware Requirements	See installation guide
Standard Warranty	90-Day Software

Bandwidth Licenses	Lab	200 Mbps	1 Gbps	4 Gbps	8 Gbps	10 Gbps	20 Gbps	40 Gbps	100 Gbps	FlexPool
VMware ESXi	●	●	●	●	●	●	●[*1]	●[*1][*2]	●[*2]	Yes
KVM	●	●	●	●	●	●	●[*1]	●[*1][*2]	●[*2]	Yes
Microsoft Hyper-V	●	●	●	●	●[+]					Yes

[*1] SR-IOV
[*2] PCI Passthrough
[+] 8 Gbps license not recommended for Microsoft Hyper-V

vTHUNDER ADC FOR CLOUD

	AWS	MICROSOFT AZURE	ORACLE
Throughput	Up to 10 Gbps	Up to 10 Gbps	Up to 10 Gbps
Image Format	Amazon AMI	Microsoft VHD	QCOW2

Licenses	30-days Trial License
	Pre-installed Bnadwidth License:
	  - 200 Mbps, 500 Mbps, 1 Gbps
	BYOL Bandwidth License:
	  - Lab/Developer, 200 Mbps, 1 Gbps,
	    4 Gbps, 10 Gbps
	FlexPool License:
	  - Up to 10 Gbps
		30-days Trial License
		Pre-installed Bandwidth License:
		  - 10 Mbps, 50 Mbps, 100 Mbps, 200
		Mbps, 500 Mbps
		BYOL Bandwidth License:
		  - Lab/Developer, 200 Mbps, 500 Mbps,
		    1 Gbps, 4 Gbps, 10 Gbps
		FlexPool License
		  - Up to 10 Gbps
			30-days Trial License
			Pre-installed OCPU based License:
			  - 1 OCPU to 24 OCPU
			BYOL Bandwidth License:
			  - Lab/Developer, 200 Mbps, 1 Gbps,
			    4 Gbps, 10 Gbps
			FlexPool License
			  - Up to 10 Gbps

THUNDER ADC FOR BARE METAL

System Requirements	Minimum Hardware Requirement • Intel x86-based CPUs with minimum of 4 cores • 16 GB RAM • 80 GB of free disk space • 2 Ethernet interfaces (3 or more are recommended) • Intel Network Adapters and drivers including igb, ixgbe, and i40e.
Reference Platforms	Cisco UCS, Dell PowerEdge, Ericsson Hyperscale Datacenter System (HDS), HP ProLiant and more.
Bandwidth Licenses*	10 Gbps (4 cores), 20 Gbps (8 cores), 40 Gbps (14 cores) and 60 Gbps (24 cores) FlexPool
Standard Warranty	90-Day Software

* Licenses are tied with maximum number of cores which can be allocated to ACOS

DETAILED FEATURE LIST

Features may vary by appliance.

Application Delivery

- Comprehensive IPv4/IPv6 Support
- Advanced Layer 4/Layer 7 Server Load Balancing
  - Fast HTTP, Full HTTP Proxy
  - High-performance, template-based Layer 7 switching with header/URL/domain manipulation
  - Comprehensive Layer 7 application persistence support
  - HTTP/2, FTP, DNS, FIX and more
- Comprehensive load balancing methods
  - Round Robin, Least Connections, Weighted RR, Weighted LC, Fastest Response, & more
- aFleX – deep packet inspection and transformation for customizable, application-aware switching
- Advanced Health Monitoring
  - Comprehensive Protocol Support – ICMP, TCP, UDP, HTTP, HTTPS, FTP, RTSP, SMTP, POP3, SNMP, DNS, RADIUS, LDAP and more
  - Scriptable health check support using TCL, Python, Perl, Bash
- High Availability – Active-Active, Active-Standby configurations
- SIP Load Balancing for VoIP
- STARTTLS support for Secure Email & LDAP
- Network Traffic Filtering – high-speed processing of large black/white lists
- Firewall Load Balancing (FWLB)
- Global Server Load Balancing (GSLB)
- Traffic steering/Service chaining

- Transparent Cache Switching (TCS)
- Next Hop Load Distribution (NHLD) for load balancing multiple links
- Diameter AAA Load Balancing
- Database Load Balancing
- Internet Content Adaptation Protocol (ICAP) Support

Application Acceleration

- HTTP Acceleration and Optimization
  - HTTP Connection Multiplexing (also called TCP connection reuse)
  - RAM Caching
  - HTTP Compression
- SSL Offload
  - SSL Termination, SSL Bridging
  - SSL Proxy
  - SSL session ID reuse
- TCP optimization support including Selective Acknowledgment, Client Keep-Alive and Window Scaling
- HTTP Pipelining support
- HTTP/2, SPDY protocol support

Application Security

- Web Application Firewall (WAF)
- DNS Application Firewall (DAF)
- Integrated DDoS protection for application services
- Hardware-based DDoS protection*

- Application Access Management (AAM) — SAML, WIA, Kerberos, NTLM, TDS SQL Logon, LDAP, RADIUS, Basic, OCSP stapling, HTML Form-based
- AAM RADIUS-based audit support
- Single sign-on (SSO) authentication relay
- Authentication for Microsoft SharePoint, Outlook Web Access, and other packaged and custom applications
- Comprehensive SSL/TLS support
  - TLS 1.2 and TLS 1.3 support
  - Perfect Forward Secrecy (PFS) with Elliptic Curve Diffie-Hellman Exchange (ECDHE) and other Elliptic Curve Cryptography (ECC) ciphers
  - AES-NI and GCM ciphers
- IP Anomaly Detection
- Connection Rate Limiting/Connection Limiting
- Bandwidth Rate Limiting per Source IP
- Dynamically add IPs to Black-White Lists
- Support for Simple Certificate Enrollment Protocol (SCEP)
- Hardware Security Module (HSM) support
  - Internal HSM card*
  - External network HSM (Thales nShield HSM)

Detailed Feature List (Cont.)

A10 Threat Intelligence Service**

- Dynamically updated threat intelligence feed

Scalable, High-Performance Platform

- Advanced Core Operating System (ACOS)
  - Multi-core, Multi-CPU support
  - Linear application scaling
  - ACOS on data plane
- Linux on control plane
- IPv6 feature parity

Networking

- Integrated Layer 2/Layer 3
- Transparent Mode/Gateway Mode
- Routing – Static Routes, IS-IS (v4/v6), RIPv2/ng, OSPF v2/v3, BGP4+
- VLAN (802.1Q)
- Link Aggregation (802.1AX), LACP
- Access Control Lists (ACLs)
- Traditional IPv4 NAT/NAPT
- IPv6 NAPT
- Jumbo Frame support*
- Hardware-accelerated VXLAN*
- NVGRE

IPv6 Migration/IPv4 Preservation

- Full native IPv6 management and feature support
- SLB-PT (Protocol Translation), SLB-64 (IPv4<–>IPv6, IPv6<–>IPv4)
- Carrier Grade NAT (CGN/CGNAT), Large Scale NAT (LSN), NAT444, NAT44, NAT46
  - Integrated DDoS protection for NAT pools
- NAT64/DNS64, DS-Lite, 6rd, LW4o6
- ALG protocol support for protocols with dynamic ports like SIP and FTP

Management

- Dedicated on-box management interface (GUI, CLI, SSH, Telnet)
- Web-based AppCentric Templates (ACT) support
- SNMP, syslog, email alerts, NetFlow v9 and v10 (IPFIX), sFlow
- RESTful API (aXAPI)
- LDAP, TACACS+, RADIUS support
- Configurable control CPUs
- Interoperable with A10 Harmony Controller for centralized management, configuration and analytics
- Plug-in available for VMware vRealize Orchestrator deployments

Virtualization

- aVCS (Virtual Chassis System)
- vThunder Virtual Appliance for VMware vSphere ESXi, Microsoft Hyper-V, KVM (VirtIO, Open vSwitch with DPDK and SR-IOV), Amazon Web Services (AWS) AMI, Microsoft Azure VHD and QCOW2 for Oracle Cloud and other
- Thunder ADC for Bare Metal
- Multi-tenancy with Application Delivery Partitions (ADP)
  - Partition-based management
  - L3 virtualization
- Hypervisor acceleration and management integration

Detailed Feature List (Cont.)

Visibility and Analytics with Harmony Controller

Performance / Acceleration

- End-to-end response times
- Total bytes exchanged (BW)
- Average request-rate-per-second
- Worst-behaving URLs, services and domains
- Cache hits and misses as time series
- Compressed and uncompressed bytes sent as a time series
- Latency
  - Average end-to-end latency
  - App server latency
  - Client performance
  - Partition service latency

Traffic

- Popular URLs, services and domains
- Requests by response codes
- Geographical request distribution
- Secure versus open requests
- Most active clients
- Number of connections to application server
- Number of connections from clients

Errors and Health Indicators

- Time series of total bytes in and out from each server
- Time series of traffic rates (in Mbps) in and out from each server

- Percent of error traffic over range
- Number of good SSL connections
- Average application server latency by service
- Client-side latency SRTT, max, min and average as a time series

TCP-Based Analytics

- Client
  - Bytes and packets sent/received; Connections
  - Errors and failures
  - Top clients by: Bandwidth, Connections, Throughput
- Thunder ADC
  - Dropped traffic, errors/failures, anomalies
  - Load distribution by server
  - TCP SYN: received, rates
  - DSR received
- Thunder Cluster
  - Average cluster CPU by device and partition
  - Average cluster memory
  - Average and peak throughput
  - Connections
- Application Servers
  - Server health over time
  - Traffic by server: Connections/rates, throughput, bytes and packets received/sent
  - Logs: Normal, errors, anomalies with filters by protocol, client, VIP
  - Server response times

Carrier-Grade Hardware*

- Advanced hardware architecture
- Hardware-based SYN Cookies
- Hot swap Redundant Power Supplies (AC or DC)
- Smart Fans (hot swap)
- Solid-state drive (SSD)
- Tamper detection
- Lights Out Management (LOM/IPMI)
- 25 GbE ports, 40 GbE ports, 100 GbE ports
- High-performance security processor option

Security and Capability Assurance Certifications*

- ICSA Labs WAF Certification
- Common Criteria EAL 2+
- FIPS 140-2 Level 2
- Joint Interoperability Test Command (JITC)
- Network Equipment Building System (NEBS) compliance

* Features and certifications may vary by appliance.
** Additional paid service.