



# THUNDER CGN

## High-Performance IPv4 Scaling and IPv6 Transition Technologies

### Supported Platforms



**Thunder CGN**  
physical appliance



**Thunder HVA**  
hybrid virtual appliance



**vThunder**  
virtual appliance



**aGalaxy**  
centralized management

A10 Thunder™ CGN product line of Carrier Grade Networking gateways provide high-performance, highly transparent address and protocol translation enterprises and services for service providers to extend their IPv4 network connectivity, while simultaneously making the transition to IPv6. Thunder CGN is our premium CGN product line, delivering performance scalability up to 150 Gbps and with expanded system resources designed to support future feature needs.

The Thunder CGN product line is built upon our Advanced Core Operating System (ACOS®) platform—a Symmetric Scalable Multi-Core Processing (SSMP) software architecture that delivers high performance and a wide range of deployment options for enterprise and carrier networks.

- **Extend IPv4 connectivity:** Today's networks may be prepared to scale bandwidth capacity, but the rapid proliferation of Internet-connected devices has depleted the available IPv4 address space. Service providers, as well as enterprises, have to meet the demand for connectivity expansion, but an immediate transition to IPv6 is not a realistic option. Carrier Grade NAT (CGN/CGNAT) enables customers to extend connectivity with standards-based IPv4 translation, preserving their existing IPv4 address allocation and their investment in IPv4-based infrastructure. CGNAT allows organizations to extend the lifetime of their current IPv4-based infrastructure, save cost and gain time to plan their IPv6 transition strategy.
- **Broad transition options:** The Thunder CGN product line provides a wide choice of technologies that enable a smooth transition to IPv6 networks and devices as they are deployed. The IPv6 transition technologies ensure that an organization's applications and users can connect to the entire Internet, regardless of what IP version is used. There are many IPv6 transition technologies, which allow customers to serve different IPv6 network transition needs simultaneously. Interplay between the transition technologies on a single high-performance platform allows for cost-effective transition.
- **Application reliability:** The Thunder CGN product line provides the highest connection reliability by using application layer gateways (ALGs) and other important features to ensure that applications can remain addressable and operate transparently through address translation. High availability (HA) ensures that established sessions are maintained during failover and the end user is unaware that anything has happened. The high reliability of Thunder CGN provides organizations a cost-effective solution to meet service-level agreements (SLAs) and user satisfaction goals.

### Overview

A10 Thunder Series is a family of both hardware and software appliances ready to match any deployment need. Each Thunder Series form factor is powered by ACOS software, which brings efficiency with a unique combination of shared memory accuracy and efficiency, 64-bit scalability and advanced flow processing.

A10 Thunder CGN devices enable critical services in the most efficient hardware and software-based form factors. The Thunder CGN product line also ensures that your rack space is used efficiently. The combination of high performance in a small form factor results in lower OPEX through significant lower power usage and cooling requirements.

## Features and Benefits

A10 Thunder CGN provides many advanced features for enterprises and carriers to extend IPv4 connectivity and to transition to IPv6 Internet connectivity. As network addressing and IPv6 transition architectures can vary greatly across and within an organization, customers need a solution that provides the broadest support for industry standards and addresses different address and protocol translation requirements simultaneously. The Thunder CGN product line provides a broad array of standards-compliant IPv4 extension and IPv6 transition technologies integrated within our high-performance, ACOS-based physical, virtual and hybrid appliances.

### Extend IPv4 Connectivity

The Thunder CGN product line provides advanced CGNAT functions to easily mitigate IPv4 address exhaustion and extend the life of an IPv4 network infrastructure. There are many features available within our CGNAT solution to meet the needs for organizations that are looking into CGNAT.

- Advanced CGNAT functions:** CGNAT provides a standards-based mechanism to reclaim existing public IPv4 address space, using address and port translation. This allows for a network where private addresses inside the network are translated using a pool of public, routable IP addresses on the outside network. The ratio of private to public IP addresses can be high, resulting in a significant amount of reclaimed public IPv4 address space. Performing CGNAT for many simultaneous users requires large amounts of computing and memory resources to maintain user state information. The A10 Thunder CGN product line leverages the highly efficient ACOS platform architecture, which provides

high-performance CGNAT scaling in very efficient form factors. The Thunder CGN product line provides support for up to 256 million concurrent sessions in a single RU form factor, as well as unprecedented session setup and teardown rates. Competing solutions require a large chassis product with multiple application blades to achieve similar performance.

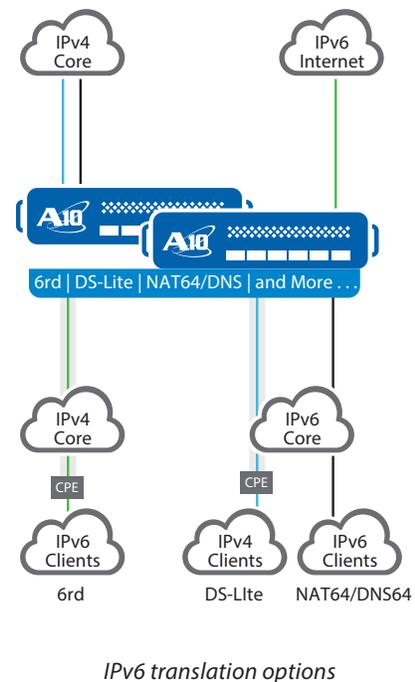
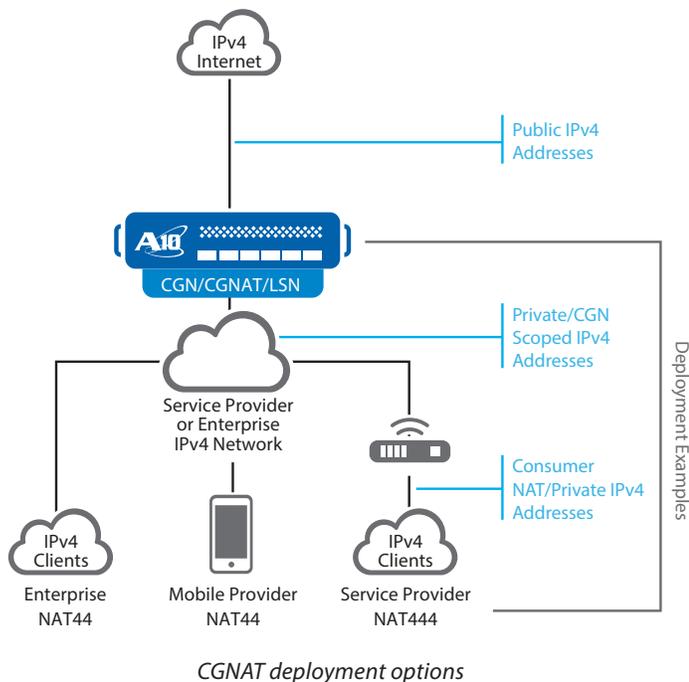
- Advanced logging features:** Local governments often mandate that network operators can trace a user's connection details at a given moment in history, which can be complicated when scaling out large IPv4 CGNAT solutions. Thunder CGN offers many techniques to enhance the logging detail or reduce the volume of logs, in order to reduce logging infrastructure requirements. For example, there are log compression features that significantly reduce the amount of data needed to describe a log event. Deterministic or fixed Network Address Translation (NAT) makes it possible to virtually eliminate translation logs; the user details of a connection can easily be derived via a simple algorithm.

### Broad Transition Options

Since IPv6 is not backwards compatible with IPv4, various solutions are available to achieve full connectivity, regardless of source or destination IP protocol.

- Prevalent protocol connectivity:** Transition technologies such as Dual-Stack Lite (DS-Lite) allow network operators to run an IPv6-only access network, while IPv4-only devices can still connect to the Internet using softwires (also referred to as tunnels) through the IPv6-only infrastructure. Light Weight 4 over 6 (LW4o6) or IPv6 Rapid Deployment (6rd) provide similar behavior, allowing alternate IP versions access through the network.

## Architecture and Key Components



- **Ensure IPv6 client access to IPv4 content:** IPv6 was not built to be backward compatible with IPv4, complicating the deployment of IPv6 clients. NAT64/DNS64 solves this problem by allowing IPv6-only devices to access IPv4-only content, thus enabling clients to access the majority of the Internet today.
- **Interplay for phased transition:** Networks often require different transition technologies to be deployed simultaneously. Thunder CGN products ensure that you can deploy each transition technology concurrently, for example starting with CGNAT to immediately mitigate IPv4 address exhaustion, and then phasing in NAT64/DNS64 to enable IPv6 clients to access the IPv4 Internet, when you are ready.

### Application Accessibility and Reliability

Even though the OSI network layer principle should ensure separation between the application and network behavior, this is not always the case. Many applications rely on network transport information to operate, which can lead to problems when just the network portion is translated. Connection reliability is also crucial for applications that need to be available at all times.

- **CGNAT transparency:** Advanced CGNAT features such as Endpoint Independent Mapping (EIM) and hairpinning ensure predictable NAT behavior, and they provide a transparent end user experience. User quotas ensure that public IP port usage is fairly distributed between end users, and that viruses and malware, for example, can't exhaust the resources for other users.
- **Application Layer Gateways (ALGs):** For network operators, it is critical to ensure connectivity for all application services and users. ALGs within CGNAT ensure that protocols such as FTP, TFTP, RTSP, PPTP, SIP, ICMP, and DNS remain functional. Many legacy NAT implementations do not provide this level of transparency.
- **Stateful session synchronization (hitless failover):** When deployed in HA mode, the A10 Thunder CGN units synchronize active sessions, so when a failover occurs, the sessions will be maintained and end users will not be aware that a failover has occurred. This prevents users from having to restart a large download, for example, and increases user satisfaction.

## Product Description

A10 Thunder Series is a family of both hardware and software appliances ready to match any deployment need. Each Thunder Series form factor is powered by ACOS software, which brings efficiency with a unique combination of shared memory accuracy and efficiency, 64-bit scalability and advanced flow processing.

- **Thunder Hardware Appliances:** Our Thunder Series line of hardware CGN appliances fits all size networks, with entry-level models starting at 30 Gbps and moving up to a 150 Gbps high-performance appliance for your most demanding requirements. All models are dual power supply-capable, feature solid-state drives (SSDs) and utilize no inaccessible moving parts for high availability. All models benefit from our Flexible Traffic Acceleration (FTA) technology, with select models featuring Field Programmable Gate Arrays (FPGA) for hardware optimized flow distribution, as well as switching and routing processors for high-performance network processing. Each appliance offers the best performance per rack unit and the highest level "80 PLUS" Platinum" certification for power supplies to ensure a green solution and reduce power consumption costs. Coupled with high density 1 Gbps, 10 Gbps and 40 Gbps port options, the Thunder CGN appliances meet the highest networking bandwidth demands.
- **vThunder Virtual Appliances:** The vThunder line of virtual appliances is designed to meet the growing needs of organizations that require a flexible and easy-to-deploy IPv4 scaling and IPv6 transition solution running within a virtualized infrastructure. Each vThunder instance has the full set of CGNAT features that can run atop your choice of commodity hardware and also your choice of leading hypervisor, for example, VMware ESXi and KVM.
- **Thunder Hybrid Virtual Appliances (HVA):** Offering you the combined flexibility of a virtual appliance and the power of the performance optimized hardware appliances, A10 Thunder HVA appliances enable multi-tenancy with multiple vThunder virtual appliances running on dedicated, turnkey hardware appliances with a high density of instances that are strongly isolated from each other, each with its own dedicated ACOS instance and dedicated compute resources. All vThunder CGN instances are included within the HVA appliance.

Additional management options are also available to enhance your Thunder Series infrastructure, and the A10 aGalaxy® line of hardware or software appliances centrally manage all Thunder hardware and software appliances for streamlined operations, resulting in reduced OPEX.

## Appliance Summary/Specifications Table

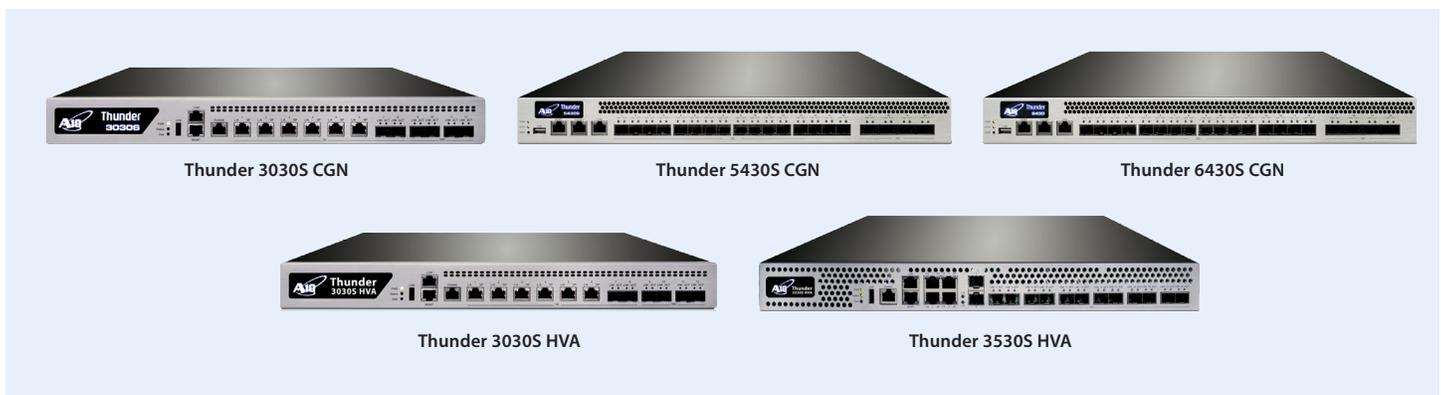
	Thunder 3030S CGN	Thunder 5430S CGN	Thunder 6430 CGN
Throughput	30 Gbps	73 Gbps	150 Gbps
Packets Per Second	6 million	46 million	78 million
Setups Per Second	1.1 million	2.5 million	5.2 million
Full TCP Connections Per Second	437k	1.4 million	2.6 million
Concurrent Sessions	64 million	256 million	256 million
Application Delivery Partitions (ADP) L3V	127	127	127
<b>Network Interface</b>			
1 GE Copper	6	0	0
1 GE Fiber (SFP)	2	0	0
1/10 GE Fiber (SFP+)	4	16	16
40 GE Fiber (QSFP+)	0	4	4
Management Interface	Yes	Yes	Yes
Lights Out Management	Yes	Yes	Yes
Console Port	Yes	Yes	Yes
Solid-state Drive (SSD)	Yes	Yes	Yes
Processor	Intel Xeon Quad-core	Intel Xeon Octo-core	2 x Intel Xeon Octo-core
Memory (ECC RAM)	16 GB	64 GB	128 GB
<b>Hardware Acceleration</b>			
64-bit Linear Decoupled Architecture	Yes	Yes	Yes
Flexible Traffic Acceleration	Software	2 x FTA-3 FPGA	4 x FTA-3 FPGA
Switching/Routing	Software	Hardware	Hardware
Power Consumption (Typical/Max)	131W / 139W	450W / 550W	590W / 680W
Heat in BTU/hr (Typical/Max)	447 / 474	1,535 / 1,877	2,013 / 2,320
Power Supply (DC option available)	Dual 600W RPS	Dual 1100W RPS	Dual 1100W RPS
	80 Plus "Platinum" efficiency, 100 - 240 VAC, Frequency 50 – 60 Hz		
Cooling Fan	Hot Swap Smart Fans		
Dimensions	1.75 in (H), 17.5 in (W), 17.45 in (D)	1.75 in (H), 17.5 in (W), 30 in (D)	1.75 in (H), 17.5 in (W), 30 in (D)
Rack Units	1U	1U	1U
Unit Weight	20.1 lbs	34.6 lbs	39 lbs
Operating Ranges	Temperature 0° - 40° C   Humidity 5% - 95%		
Regulatory Certifications	FCC Class A, UL, CE, TUV, CB, VCCI   China CCC <sup>†</sup> , BSMI <sup>‡</sup> , RCM (replace C-Tick) <sup>‡</sup> , GOST-R <sup>‡</sup> , FAC <sup>‡</sup> , NEBS <sup>‡</sup> , FIPS 140-2 <sup>‡‡‡</sup>		
Standard Warranty	90-day Hardware and Software		

\* Except Thunder 5430S, 6430 | \*\*Except Thunder 3030S | \*\*\*Thunder 5430S (FIPS model must be purchased)

	vThunder CGN Specification
Throughput	Up to 8 Gbps
Supported Hypervisors	VMware ESXi 4.0 or higher KVM 0.14 or higher
Hardware Requirements	See installation guide
Licenses	Versions vary by price, bandwidth and hypervisor. For example, VMware ESXi: <b>Lab/Developer Edition Production- Entry Level/Lab Editions:</b> 200 Mbps and 1 Gbps <b>Production – High-performance Editions:</b> 4 Gbps and 8 Gbps
Standard Warranty	90-day Software

	Thunder 3030S HVA*	Thunder 3530S HVA
vThunder Virtual Appliances Instances (Included)	8	40
<b>Network Interface</b>		
1 GE Copper	6	4
1 GE Fiber (SFP)	2	2
1/10 GE Fiber (SFP+)	4	12
Management Interface	Yes	Yes
Lights Out Management	Yes	Yes
Console Port	Yes	Yes
Solid-state Drive (SSD)	Yes	Yes
Processor	Intel Xeon Quad-core	2 x Intel Xeon Deca-core
Memory (ECC RAM)	32 GB	128 GB
<b>Hardware Acceleration</b>		
64-bit Linear Decoupled Architecture	Yes	Yes
Flexible Traffic Acceleration	Software	Software
Switching/Routing	Software	Software
SSL Security Processor (SR-IOV enabled)	Single	Quad
Power Consumption (Typical/Max)	131W / 139W	380W / 476W
Heat in BTU/hr (Typical/Max)	447 / 474	1,297 / 1,624
Power Supply (DC option available)	Dual 600W RPS 80 Plus "Platinum" efficiency, 100 - 240 VAC, Frequency 50 - 60 Hz	Dual 750W RPS 80 Plus "Gold" efficiency, 100 - 240 VAC, Frequency 50 - 60 Hz
Cooling Fan	Hot Swap Smart Fans	Hot Swap Smart Fans
Dimensions	1.75 in (H), 17.5 in (W), 17.45 in (D)	1.75 in (H), 17.25 in (W), 22.8 in (D)
Rack Units (Mountable)	1U	1U
Unit Weight	20.1 lbs	29.6 lbs
Operating Ranges	Temperature 0° - 40° C   Humidity 5% - 95%	
Regulatory Certifications	FCC Class A <sup>‡</sup> , UL <sup>‡</sup> , CE <sup>‡</sup> , TUV <sup>‡</sup> , CB <sup>‡</sup> , VCCI <sup>‡</sup>   China CCC <sup>‡</sup> , BSMI <sup>‡</sup> , RCM (replace C-Tick) <sup>‡</sup> , GOST-R <sup>‡</sup> , FAC <sup>‡</sup>	
Standard Warranty	90-day Hardware and Software	

\*Available 1H 2014 | ‡ Certification in progress



## Detailed Feature List

### High Performance, Scalable Platform

- ACOS (Advanced Core Operating System)
  - Multi-core Support
  - Linear Application Scaling
  - Linux on Control Plane
- ACOS on data plane

### Networking

- Integrated Layer 2/Layer 3
- Transparent Mode/Gateway Mode
- Routing – Static Routes, IS-IS (v4/v6), RIPv2/ng, OSPF v2/v3, BGP4+
- VLAN
- Trunking
- Access Control Lists (ACLs)
- Basic Stateful Firewall
- Traditional IPv4-->IPv4 NAT/NAPT
- IPv6-->IPv6 NAPT

### IPv4 Scaling/IPv6 Transition

- Full native IPv6 management and feature support
- SLB-PT (Protocol Translation), SLB-64 (IPv4<->IPv6, IPv6<->IPv4)
- Application Level Gateways (ALGs) for FTP, TFTP, RTSP, PPTP, SIP, ICMP, DNS
- Insert headers (XFF, X-MSISDN)
- Carrier Grade NAT (CGN/CGNAT), Large Scale NAT (LSN), NAT444, NAT44
- NAT64/DNS64, DS-Lite, LW4o6, 6rd

### Management

- Dedicated Management Interface (Console, SSH, Telnet, HTTPS)
- Web-based Graphical User Interface (GUI) with Language Localization
- Industry-standard Command Line Interface (CLI)
- SNMP, Syslog, Alerting
- Port mirroring
- REST-style XML API (aXAPI)
- RADIUS attributes in logs
- Policy from RADIUS

### Virtualization

- aVCS (Virtual Chassis System)
- vThunder Virtual Appliance for VMware vSphere, Microsoft Hyper-V, XenServer and KVM
- Multi-tenancy with Application Delivery Partitions (ADPs)
  - Role Based Administration (RBA)
  - Partition-based management
  - L2/L3 virtualization
- Hypervisor acceleration and management integration

### Carrier-grade Hardware

- Advanced hardware architecture
- Lights Out Management ((LOM/IPMI)
- Hot swap Redundant Power Supplies (AC and DC)
- Smart Fans (hot swap)
- Solid-state drive (SSD) and Compact Flash
- Error Correcting Code (ECC) memory
- 10 GE and 40 GE ports

## About A10 Networks

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](http://www.a10networks.com)

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To learn more about the A10 Thunder Application Service Gateways and how it can enhance your business, contact A10 Networks at: [www.a10networks.com/contact](http://www.a10networks.com/contact) or call to talk to an A10 sales representative.

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