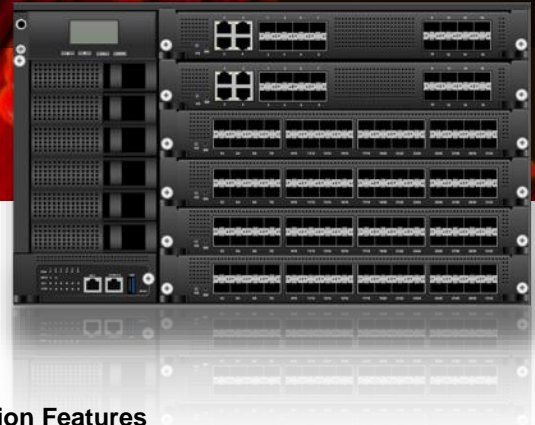


CyberElastic™ Scalable Firewall

Solution Brief



Solution Description

The Scalable CyberElastic™ combines best-of-breed components from Lanner, NoviFlow, and Fortinet to deliver a powerful cybersecurity solution. The integrated multivendor solution leverages modular hardware and software to provide up to 1 Tbps of scale-out Firewall service with unmatched flexibility and scalability, while delivering significant reductions in capital and operating costs, footprint and power consumption.

Components

- Lanner high availability HTCA Network Appliance: an all-in-one 6U chassis with pre-integrated compute and storage components, and is unique in providing a fully programmable network fabric leveraging the Intel/Barefoot Tofino chip.
- FortiGate virtual x86 Firewall from Fortinet, a trusted global leader in cybersecurity.
- CyberMapper and NoviWare software from NoviFlow deliver switching, load balancing, mitigation and High Availability (HA).
- NoviFlow's VisualAnalytics software which harvests detailed sensor and log data from all system components and presents operational health and performance via powerful, intuitive web-based dashboards.

Benefits

- Scalable – start at 145 Gbps and scale up to 1 Tbps by adding security blades ie. pay-as-you-grow.
- Deployment-ready – Quick to deploy with simple installation instructions and scripts. Out-of-the-box to deployment in a day.
- Avoid unnecessary truck rolls via sophisticated remote monitoring and management.

The CyberElastic™ is a powerful, pre-integrated Firewall solution that offers elastic scalability, pay-as-you-grow economics, massive throughput, sophisticated analytics, easy installation, configuration and remote monitoring.

Solution Features

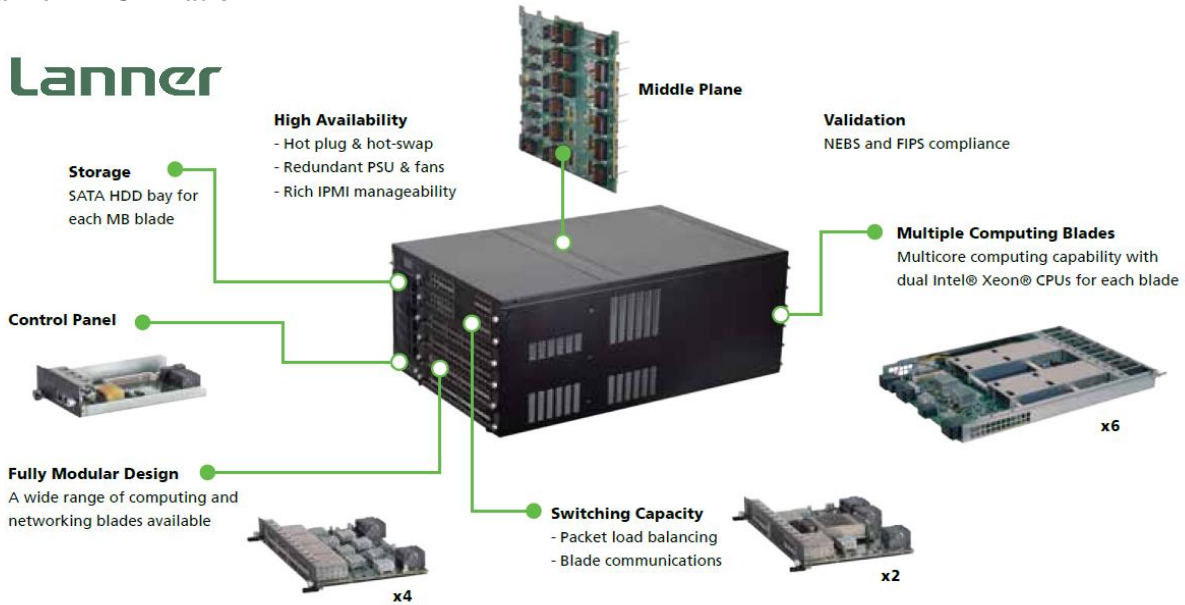
- The CyberElastic™ software components integrated with the modular and scalable Lanner HTCA platform
- Core hardware features leverage by CyberElastic framework
 - Redundant switch slots
 - 6 security blade slots
 - Up to 336 x86 cores / 732 threads
 - 1.2 Tbps backplane to each switch
 - 1.6 Tbps front ports to each switch
- CyberElastic™ core features
 - Load Balancing to Security Tool farm(s) at scale Terabit LB
 - Multiple LB instances, one for each Security Tool Farm
 - Service chaining
 - Internal Tool sequence policies
 - Packet classified by policy match
 - In-packet sequencing implantation (SRv6 and legacy VLAN)
 - External service chain request
 - A CyberElastic instance is an IPv6 addressable device
 - SRv6 implementation
 - Legacy and NG interfaces
 - bump-in-wire for IP4/6
 - IPv6 routable device for SRv6 requested services
 - Visualization of a rich array of operational data that improves monitoring and trouble shooting
 - all hardware sensors
 - NOS, CyberMapper, an Operating System logs
 - SEL major event log



Contact Lanner today for a demo of CyberElastic, email: contact@lannerinc.com

Lanner HTCA Platform

Lanner



Multiple Computing Blades

Offering extreme performance and processing power, Lanner's HTCA network appliances can host up to 6 CPU blades, supporting up to 12 Intel® Xeon® processor Processor Scalable Family with a total of 336 cores.

Fully Modular Network I/O Blades

Lanner's HTCA network appliances feature up to 6 front-cabling, swappable network I/O blades. The top 2 blade slots are reserved for switch or Ethernet NI blades, while the other 4 slots are solely used for Ethernet NI blades.

High-speed Switching Capacity

To meet the requirement of carrier-grade network traffic, Lanner HTCA platform leverages the latest packet processors to offer 100GbE high speed throughputs with capacity up to 3.2Tbps.

Full Redundancy and High Availability

All CPU blade, network I/O blades, N+1 cooling fans and power supply units are in full-redundancy design to ensure carrier-grade high-availability and 99.9999% uptimes.

NEBS and FIPS Compliance

HTCA appliances are compliant with NEBS/FIPS design to meet the key carrier-grade requirements required for telecom network.

PCI-Express and Storage Options

To meet the requirements for open compute architecture, Lanner HTCA Series can support up to six 3.5" HDD/SSD storage drives and 6 PCIe slots for expansion with acceleration cards.

2U HTCA-6200 System	
Compute Blade	2x compute blade
I/O Blade	Blade 1~2: Switch fabric blade or Blade 1~6: Ethernet I/O blade
Storage	2 x 2.5" swappable HDD drive bays
Dimension & Weight	588 x 924 x 625 mm, 36kg

6U HTCA-6600 System	
Compute Blade	6x compute blade
I/O Blade	Blade 1~2: Switch fabric blade or Blade 1~6: Ethernet I/O blade
Storage	6 x 3.5" swappable HDD drive bays
Dimension & Weight	720 x 905 x 660 mm, 85kg

Compute Blade HMB-6110	
Processor Options	Intel® Xeon® Processor Scalable Family (Skylake-SP/Cascade Lake-SP)
Chipset	Intel® C621/C627
Security Acceleration	Intel® QuickAssist Technology (By SKU)"
Memory	DDR4 2666MHz REG DIMM, 512GB Max.

P4 Switch Blade HLM-1100	
Processor Options	Barefoot Tofino T10-032D switch controller
Switch I/O	12x100GbE Fabric Interface channels 16x 100GbE QSFP28 8x 25/10GbE

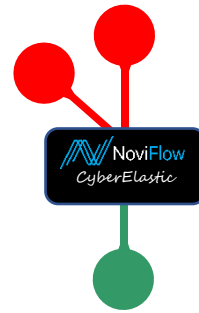
CyberElastic Scalable Firewall

Deployment Scenarios



Bump in the Wire

CyberElastic is easy to install into any legacy network when deployed as a bump in the wire. Furthermore, it creates a security domain inside which Firewall services are invisible and independent of the rest of the network. This is ideal for adding Terabit scalable, dynamically load balanced Firewall services to network edges and peering points.

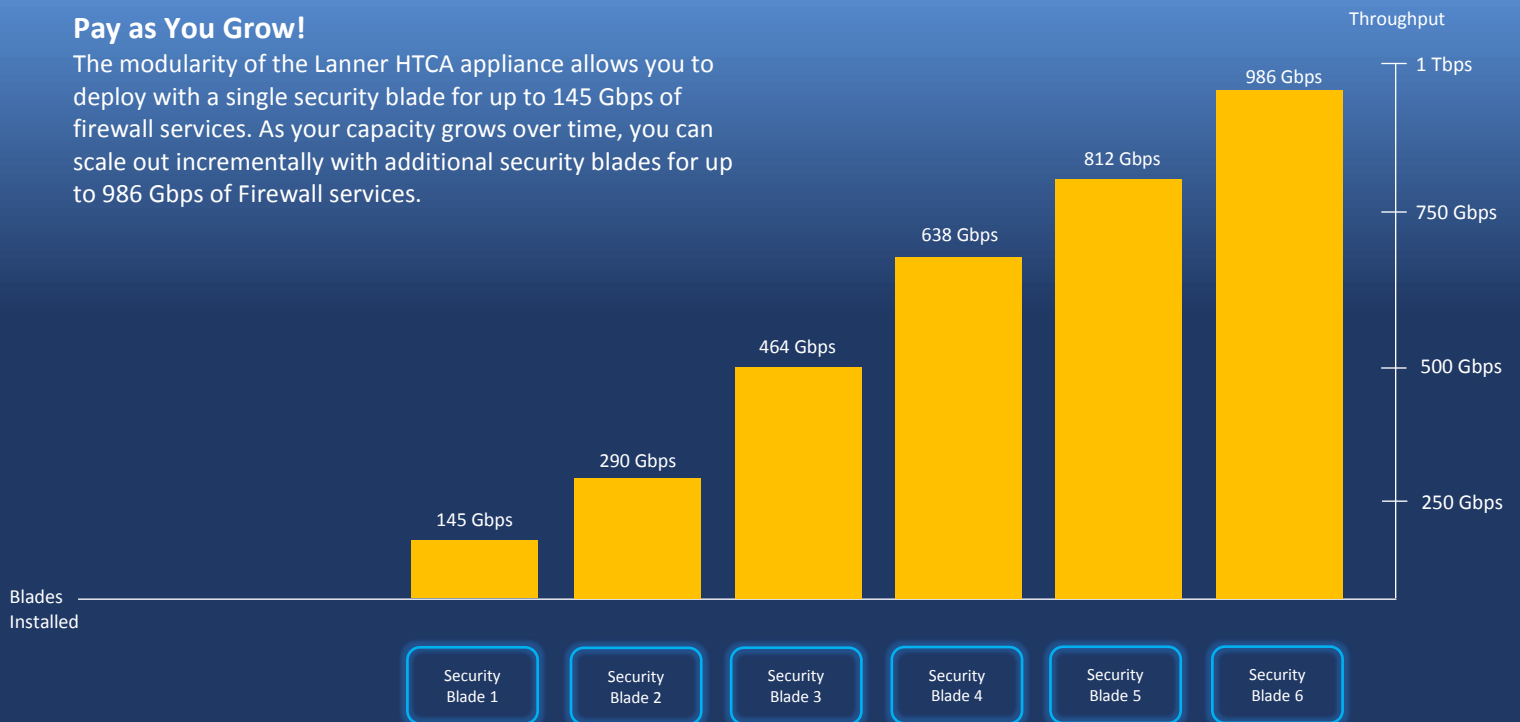


SRv6 Addressable

CyberElastic supports SRv6, making Firewall resources addressable from anywhere in the network. With SRv6, the Scalable NGFW can be part of a global network service chain reducing the need to overprovision Firewalls to meet peak local demand. With VisualAnalytics, you can see trends in Firewall usage evolve over time, enabling capacity planning based on utilization. It also allows operators with network orchestration to divert traffic to underutilized firewalls and thus recover unused capacity.

Pay as You Grow!

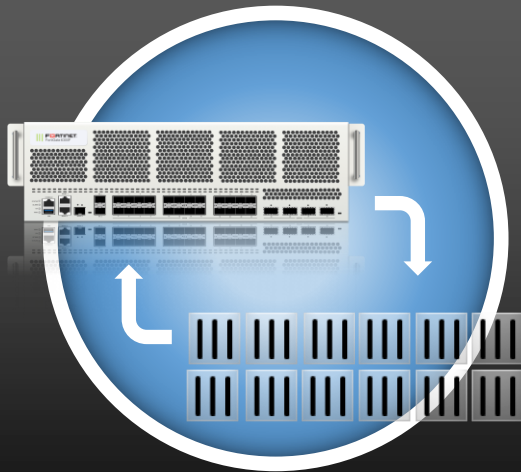
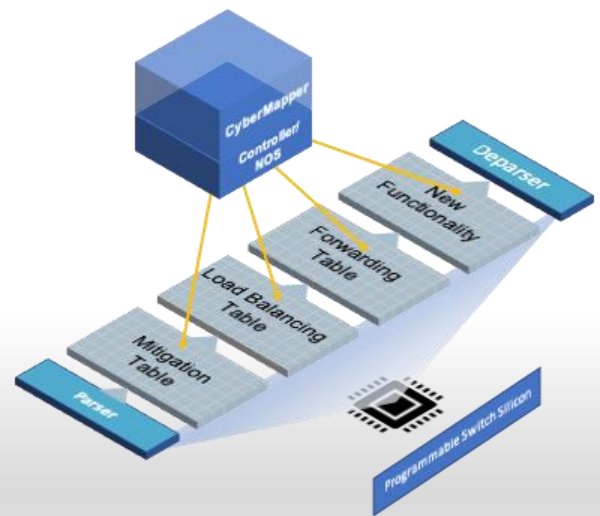
The modularity of the Laner HTCA appliance allows you to deploy with a single security blade for up to 145 Gbps of firewall services. As your capacity grows over time, you can scale out incrementally with additional security blades for up to 986 Gbps of Firewall services.



CyberElastic Scalable Firewall

Line Rate Programmable Network

At the heart of the platform, is the embedded hardware-based load balancer which utilizes the Barefoot Networks 3.2 Tbps Tofino programmable silicon. You get the flexibility of sophisticated load-balancing and traffic mitigation features written in software and executed in silicon at line rate. Utilizing this architecture built on commercial silicon, you eliminate the need to deploy expensive dedicated load balancers to scale out your firewall services.



Virtual + Physical Appliances

There's no need for a forklift upgrade of your firewall environment with CyberElastic. Utilize your existing physical appliances seamlessly by connecting them to the CyberElastic switching fabric and add security blades to the CyberElastic platform as capacity is needed. With proportional load balancing, you can mix and match virtual and physical appliances with different throughput capacity, CyberElastic can be configured to load balance traffic for the capacity available for that device.

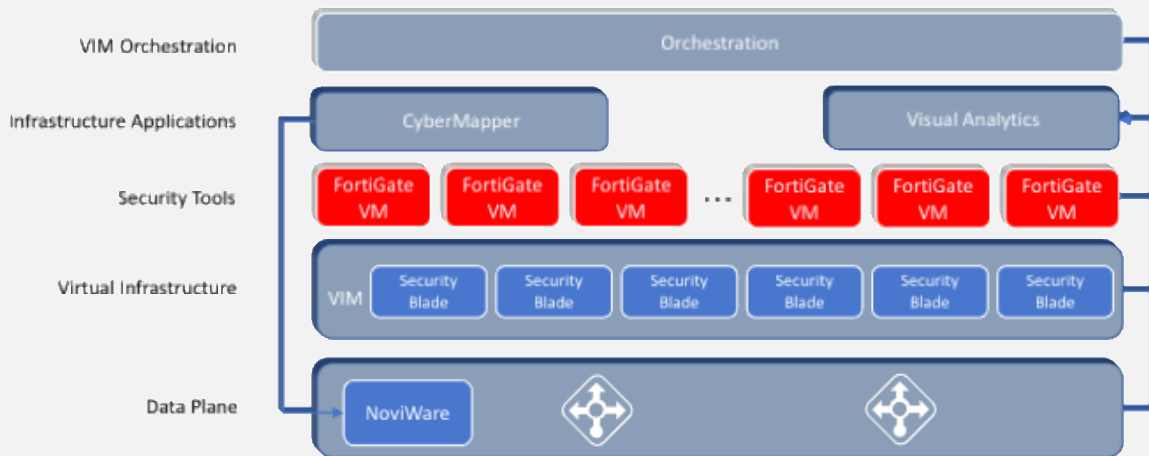
High Availability Features

CyberElastic was designed to be resilient with multiple redundancies in the hardware platform. At the firewall service level multiple features were built into the hardware load balancer to deal with failures:

- In the event of a security blade failure, **Affinity Load Balancing** will move the traffic from the failed blade to the other security blades in the chassis; when a new security blade comes online, CyberMapper will move the traffic back to the replacement blade with minimal state disruption.
- In the event that maintenance needs to be performed or service is degraded, you can put CyberElastic in Bypass Mode. This will divert all incoming traffic around the firewall. You can also configure CyberMapper to automatically bypass traffic if firewall services drops below a certain percentage of normal capacity.



CyberElastic Software Architecture



NoviFlow’s **CyberMapper** accelerates and dynamically scales cybersecurity services and virtualized network functions into the Terabit scale by implementing a powerful **Security Load Balancer, packet filtering and telemetry solution** that leverages a high-performance programmable network fabrics. **CyberMapper** achieves unprecedented performance, flexibility, and scale by leveraging the power of programmable match-action pipelines, white-box hardware, and open standard interfaces such as OpenFlow, gRPC and P4-runtime.



Using the advanced FortiOS™ operating system, **FortiGate** appliances effectively neutralize a wide range of security threats facing your virtualized environment. Whether deployed at the edge as a front-line defense, FortiGate appliances protect your infrastructure with some of the most effective security available today by enabling security features you need.



The **NoviWare™ Network Operating System** is the networking industry’s highest performance implementation of SDN, featuring Open, programmable match-action pipelines optimized for high performance switching chipsets such as Barefoot’s Tofino chip. Architected from the ground up to be a reliable, scalable platform for gRPC, and P4-Runtime, NoviWare offers the industry’s most complete implementation of the next generation of PISA architecture based SDN applications and solutions.



Visual Analytics visualizes times series data from sensors, counters and logs from all of the major subsystems within CyberElastic. Visual Analytics converts these streams of information into dashboards so that customers can make operation decisions on actionable information. Information collected can be used to look for trends or anomalies to preempt unplanned outages and reduce the number of truck rolls needed for operational maintenance.

Specifications

# of Security Blades	1	2	3	4	5	6
System Performance						
Firewall Throughput (Gbps)	145	290	464	638	812	986
Concurrent Sessions (TCP)	95M	190M	304M	418M	532M	646M
New Sessions/Second (TCP)	750,000	1,500,000	2,400,000	3,300,000	4,200,000	5,100,000
IPsec VPN Throughput (AES256+SHA1, 512 Byte) (Gbps)	7.5	15	24	33	42	51
Gateway-to-Gateway IPsec VPN Tunnels (VDOM/System)	25,000/50,000	50,000/100,000	80,000/160,000	110,000/220,000	140,000/280,000	170,000/340,000
Client-to-Gateway IPsec VPN Tunnels	320,000	640,000	1,024,000	1,408,000	1,792,000	2,176,000
SSL-VPN Throughput (Gbps)	25	50	80	110	140	170
Concurrent SSL-VPN Users	125,000	250,000	400,000	550,000	700,000	850,000
IPS Throughput (HTTP/Enterprise Mix) (Gbps)	145 / 67	290 / 133	464 / 214	638 / 294	812 / 374	986 / 455
Application Control Throughput (Gbps)	40	80	128	176	224	272
CAPWAP Throughput (Gbps)	18	35	56	77	98	119

Actual performance may vary depending on the network and system configuration. Performance metrics were based on Fortinet published performance specs of the FortiGate-VM16 on the Lanner HTCA 6600 Platform and KVM. 1. 24 GB RAM assigned to instance; results will be higher with more RAM added. 2. IPS performance is measured using 1 Mbyte HTTP and Enterprise Traffic Mix. 3. Application Control performance is measured with 64 Kbytes HTTP traffic. 4. NGFW performance is measured with IPS and Application Control enabled, based on Enterprise Traffic Mix. 5. Threat Protection performance is measured with IPS and Application Control and Malware protection enabled, based on Enterprise Traffic Mix. 6. CAPWAP performance is based on 1444 byte UDP packets.

CyberElastic Scalable Firewall

CyberElastic™ System Features		
Subsystem	Feature	Description
Security Blades	Processor	Dual Intel 2 nd Generation Intel® Xeon® Scalable Processors – Up to 28 core per socket. Total system capacity is 336 physical cores / 672 threads.
	Memory	16x DDR DIMMs, max. up to 512GB per security blade
	Network Connectivity	4x KR4 supports 4x 100G to backplane (2x 100Gbps link to each NUMA node) using the Intel® e810 dual 100Gbps NIC with SR-IOV
Backplane Connectivity	Dual Star	Redundant switches provides high availability for the dataplane. Each security blade has connectivity to active/standby switches
	Total Capacity	2.4 Tbps of backplane connectivity (Redundant switch configuration) with up to 400Gb/s to each security blade
	NUMA Optimized	Optimized for virtual environment performance, each socket on the security blade has a dedicated 100Gbps link to the active/standby switches
	Control/Dataplane Separation	1000Mbps internal control plane for control and dataplane separation. Allows you to isolate control traffic for management from customer traffic
Switching/Load Balancing Infrastructure	Total Capacity	Front Panel I/O: 1.8 Tbps (single) / 3.6 Tbps (redundant) Backplane: 1.2 Tbps (single) / 2.4 Tbps (redundant)
	Load Balancing	Built in stateless load balancer for line rate Terabit class load balancing to FortiGate firewalls. Supports multiple load balancer instances for partitioning firewall services.
	Modes of Operation	Support bump-in-the-wire mode for seamless integration into any environment, SRv6 for making services addressable globally
	Physical Appliance Support	CyberElastic can be added to any existing Firewall installation and provide scale. Connect physical appliances to the front panel I/O and leverage your existing firewall investment.
	Programmable Network	Switching infrastructure is based on the Barefoot Networks 3.2 Tbps Tofino processor enabling new features to be developed for in-silicon switching using the P4 language.

I/O	
Switch / Load Balancer (each)	
Total Core Bandwidth	3.2 Tbps
Backplane	12 x 100GbE (2x 100G to each slot)
Front Panel	16x 100GbE QSFP28 8x 10/25GbE SFP28
Security Blade (each)	
Backplane Connectivity	4x 100G (KR4)
Video	1x miniDP (VGA signal)
Management	1x RJ45
USB	1x USB 2.0
Chassis	
Console	1x RJ-45
USB	1x Type A
IPMI	OPMA socket to support IPMI (IAC-AST2500)
Other	Reset Button

Environmental	
Temperature	
Operating Temperature	0 to 40°C
Storage Temperature	-40 to 70°C
Humidity	
Humidity	5% - 90%, non-condensing
Mechanical	
Dimension (WxHxD) Chassis	438 x 265.9 x 685.8 mm
Chassis Weight	55 kg
Security Blade Weight (each)	8 kg
Switch Blade Weight (each)	1 kg
Mounting	Rackmount
Power	
Type / Watts	AC 1300 watt N+1 Redundant / each DC 1300 watt N+1 Redundant / each PM bus support, up to 5 PSU slots
Input	AC: 85 – 264V DC: -36 to -72V
Certifications	
EMC	CE Class A, FCC Class A