Red Piranha
unified threat management

CRYSTAL EYE
SPEED AND PLACEMENT GUIDE

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This document provides guidelines for choosing the best Crystal Eye appliance based on performance benchmarks and also feature guides and how they relate to real-world deployments.

CRYSTAL EYE SPEED AND PLACEMENT GUIDE

Overview

Red Piranha's Crystal Eye Consolidated Security Platforms offer some of the fastest throughput speeds available on the market today using the latest generation hardware coupled with leading edge security features in the Crystal Eye OS packaged in an easy to deploy form factor.

Unlike other providers, Crystal Eye appliances deliver the same feature set across the entire range with the only differences in the hardware to cater for various applications. This guide is designed to help you find the right Crystal Eye appliance for your use case.

Choosing the right base model

Crystal Eye On Premise Appliances come in 9 base models with the ability to include options ensuring a wide range of solutions available to be tailored to specific requirements.

Small to Medium business solutions

The Crystal Eye Series 10 to Series 30 appliances are well suited to the small or medium enterprise with simplified features allowing rapid deployment while still delivering the full Crystal Eye feature set as delivered in high performance models.

Series	CE 10	CE 20	CE 25	CE 30
Processor	Intel Generation 14 Core i3 14100, 4 Cores, 4.5GHz Z790 Chipset, Socket 1700	Intel Generation 14 Core i3 14100, 4 Cores, 4.5GHz Z790 Chipset, Socket 1700	Intel Generation 14 Core i5 14400, 14 Cores, 4.6GHz Z790 Chipset, Socket 1700	Intel Generation 14 Core i5 14400, 14 Cores, 4.6GHz Z790 Chipset, Socket 1700
RAM	16GB DDR5	32GB DDR5	32GB DDR5	32GB DDR5
WAN	1 x Intel Gb/s	2 x Intel Gb/s	2 x Intel Gb/s	2 x Intel Gb/s
LAN	1 x Intel Gb/s	4 x Intel Gb/s	4 x Intel Gb/s	4 x Intel Gb/s
Wireless	802.11ax	802.11ax	802.11ax	-
System Storage	240GB Gen 4 M.2 NVMe	240GB Gen 4 M.2 NVMe	500GB Gen 4 M.2 NVMe	500GB Gen 4 M.2 NVMe
Storage Option	1 x 2.5 SSD up to 8TB	1 x 2.5 SSD up to 8TB	1 x 2.5 SSD up to 8TB	1 x 2.5 SSD up to 8TB
Form Factor Dimensions (mm)	W x Dx H 280mm(w)300mm(d) 80mm(h) Weight 5Kg	W x Dx H 280mm(w)300mm(d) 80mm(h) Weight 5Kg	W x Dx H 280mm(w)300mm(d) 80mm(h) Weight 5Kg	1U Rack 248mm(w) 423mm(d) 88mm(h)

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Large business solutions

The Crystal Eye Series 40 to Series 80 are designed with the larger enterprise and telecommunications provider in mind capable of supporting demanding applications with flexible configurations packaged in low profile enclosures.

Series	CE 40	CE 50	CE 60	CE 70	CE 80
Processor	DUAL SYSTEM Intel Generation 14 Core i5 14400, 14 Cores, 4.6GHz Z790 Chipset, Socket 1700	Intel Generation 14 Core i7 14700, 20 Cores, 5.2GHz Z790 Chipset, Socket 1700	Intel Generation 14 Core i9 14900, 24 Cores, 5.6GHz Z790 Chipset, Socket 1700	Dual Intel XEON Gold 6526Y Total 32 Cores, 64 Threads @ 2.8GHz/3.9GHz max.	Dual Intel XEON Platinum 8462y+ Total 64 Cores, 128 Threads @ 2.8GHz/4.2GHz max.
RAM	64GB DDR5 (32GB per system)	32GB DDR5	32GB DDR5	128GB DDR5	512GB ECC DDR5
WAN	4 x Intel Gb WAN port (2 per CPU)	1 x Intel Gb WAN port, 1 x 10Gb WAN port	1 x Intel Gb WAN port, 1 x 10b WAN port	See SFP ports	See SFP ports
LAN	8 x Intel Gb LAN port (4 per CPU)	4 x Intel Gb LAN port, 4 Intel 10GB LAN	4 x Intel Gb LAN port, 4 Intel 10GB LAN	4 x Intel X710-T4 10Gb LAN	4 x Intel X710-T4 10Gb LAN
Management Port	-	-	-	1	1
SFP Ports	-	2 x DUAL SFP 10Gb	2 x DUAL SFP 10Gb	2 x Intel XL710-QDA2 Dual Port 40Gb WAN Total 80gb 2 x Intel XL710-QDA2 Dual Port 40Gb LAN Total 80gb	2 x Intel XL710-QDA2 Dual Port 40Gb WAN Total 80gb 2 x Intel XL710-QDA2 Dual Port 40Gb LAN Total 80gb
System Storage Included	2 x 500G Gen 4 M.2 NVMe (1 per CPU)	1 x 500GB Gen 4 M.2 NVMe	1 x 500GB Gen 4 M.2 NVMe	1 x 500GB Gen 4 M.2 NVMe	1 x 500GB Gen 4 M.2 NVMe
Storage Option	Up to 4 x 2.5-inch SATA 3 SSD up to 8TB/drive (2 per CPU)	Up to 4 x 2.5-inch SATA 3 SSD up to 8TB/drive plus 1 additional M.2 512GB NVMe	Up to 4 x 2.5-inch SATA 3 SSD up to 8TB/drive plus 1 additional M.2 512GB NVMe	Up to 4 x 2.5-inch SSD up to 8TB/drive	Up to 4 x 2.5-inch SSD up to 8TB/drive
Form Factor	2U Rack	2U Rack	2U Rack	2U Rack	2U Rack

Specialist custom solutions

Red Piranha will also build custom deployments to order from the cluster ready Crystal Eye 100 single unit equipped with Napatech 100Gb/s networking and hardware level programmable firewall suitable for extremely high-speed throughput applications and the Crystal Eye 200, a custom solution packaged in a dedicated rack configured to cater to high performance or unique applications.

Crystal Eye Throughput

Red Piranha Crystal Eye appliances offer some of the fastest throughput speeds available today using the latest generation hardware coupled with leading edge security features in the Crystal Eye OS packaged in an easy to deploy form factor. This guide is designed to help you find the right Crystal Eye appliance for your use case. Each of the Crystal Eye appliance models is rated with the following throughput.

Crystal Eye speed and throughput metrics

Series	Firewall[2]	IDS/IPS[3]	Max Seats / Devices[4]	True Security Throughput[5] (TST)	Typical Usage
10	1Gb/s	400Mb/s	25/50	100Mb/s (under moderate load)	Small office or home office of up to 25 users with business grade NBN under moderate load.
20	2Gb/s	800Mb/s	50/100	275Mb/s (under higher load)	Small office or branch office of up to 50 users with business grade NBN under higher load.
25	4Gb/s	1.4Gb/s	75/150	880Mb/s (under moderate load)	Medium sized enterprise of up to 75 users with moderate network traffic with 500Mbps or 1Gbps business link under moderate load.
30	4Gb/s	1.4Gb/s	75/150	880Mb/s (under moderate load)	Medium sized enterprise of up to 75 users with moderate network traffic with 500Mbps or 1Gbps business link under moderate load.
40	4Gb/s	1.4Gb/s	75/150	880Mb/s (under moderate load)	Medium sized enterprise of up to 75 users with high traffic volume capable of serving 1Gbps in mission critical applications needing High Availability in a single package.
50	34Gb/s	2.5Gb/s	150/300	1.4Gb/s (under heavy user load)	High performance enterprise of up to 150 users and telecommunications class environments.
60	34Gb/s	4.8Gb/s	250/500	2.5Gb/s (under heavy user load)	High performance enterprise of up to 250 users and telecommunications class environments.
70	40Gb/s	9Gb/s	750/1400	4Gb/s (High speed Telco grade with major infrastructure)	High-performance enterprise and telecommunications class environments of up to 750 users with heavy user loads.
80	74Gb/s	17Gb/s	1000/2000	12Gb/s (High speed Telco grade with major infrastructure)	High-performance enterprise and telecommunications class environments of up to 1000 users with heavy user loads.

Defining Throughput Metrics

There are typically 4 different speed ratings quoted for different security appliances –

- Firewall throughput
- IDPS throughput
- Secure Web Gateway / Deep Packet De-Crypt capability
- True security throughput.

Firewall throughput

(aka 'wire speed' or 'wire rate') simply means that you can take two ports of the same bandwidth, and transfer data between them with no packet loss. If there is a bottleneck somewhere inside the device (for example, a slow CPU on a lower-end device), then it's possible it will drop packets along the way, and not be able to forward at 'wire rate'.

So, the claim of 'wire rate' implies that there is a non-blocking end-to-end data path, and that the forwarding engine can make enough forwarding decisions on packets to not congest that data path (including features such as policing, shaping, queuing, compliance etc). Remember that this only considers the data path between two ports on the system. A totally non-blocking system on all ports simultaneously only exists in the dreams of hardware design teams.

IDPS throughput

It is a measure of the bandwidth of the internal architecture of the appliance under intrusion detection and prevention mode and is most used for determining the ability of the appliance to process IDPS rules against incoming traffic without dropping packets.

True Security Throughput (TST)

It is the base speed your appliance has been tested to operate under peak load with both encrypted and non-encrypted traffic types. Bandwidth numbers are tested using stateful traffic profiles that closely simulate an enterprise network. We test using a mix of HTTPS/HTTP browsing data (76%), real time applications like VoIP and video streaming (12%) in addition to other enterprise traffic types (12%). Traffic used in testing is mostly small realistic flows instead of elephant flows.

It is exceedingly rare that your network link and users will operate at this peak for any period and these tests simulate load with all security functions of the appliance turned on.

A useful way to determine your speed requirements and the most suitable Crystal Eye model for you, is to take an average of the IDPS throughput and the TST speed and match that to your internet connection speed.

For example, a 1 gigabit internet connection (which as we know does not give you the full 1 Gbps speed anyway) would be suited to the Crystal Eye Series 25 which has an average IDPS and TST speed of 1.1 Gbps and should provide more than enough bandwidth for this type of traffic. It is also important to note that this also depends on the user base and workload behind your appliance. A network with a heavier user base will sit closer to the TST number while a network with less heavy use will sit closer to the IDPS speed.

Bandwidth and Latency

Hardware speed is a practical measurement of bandwidth for a given application. There is an important distinction between the terms “bandwidth” and “latency.” Bandwidth is a measure of how much data can be transferred in each time interval and is measured in bps (bits per second), Mbps (Megabits per second) or Gbps (Gigabits per second).

Using the age-old analogy of the water hose – bandwidth is how fat the hose is, and by extension, how much water is travelling through it. Latency is a measure of how long it takes to get from one end of the system to the other end. In the water hose example – while a lot of water might be rushing through the hose, it still has some way to travel to get to the other end. Latency is usually measured in MS (milliseconds). Applications that are time sensitive usually strive for low latency.

For transferring a large file via FTP, bandwidth is the priority. You want the transfer to happen quickly, which means pushing a lot of data. For talking on the phone over a VoIP network, latency is a priority. The packets are small, but you need them to arrive quickly. High latency will result in a delay between when the speaker speaks, and the receiver hears.

[1] As at time of publication

[2] Firewall Speed, ‘Wire speed’ or ‘wire rate’ is the maximum capacity between two ports of the same bandwidth/speed possible with no packet loss. Lower end routers might claim high speed ports but a bottleneck like a slow CPU will result in a lower than advertised Firewall Speed. Crystal Eye appliances use the highest performance hardware available and can deliver on quoted speeds as recorded in lab tests.

[3] IDS IPS Bandwidth is the maximum volume of data that can be processed by the Intrusion Detection (IDS) and Intrusion Protection (IPS) modules without dropping packets.

[4] Devices is the maximum number of devices supported per Crystal Eye appliance. Seats is the maximum number of seats (users) supported per Crystal Eye appliance. Red Piranha will not support deployments that exceed the maximum recommended number of devices or seats as per Red Piranha Terms Of Service (Exclusions)

[5] True Security Throughput (TST) is the lab tested peak loads based on a typical enterprise network profile containing a mix of traffic types consisting of 76% http(s) web browsing, 12% realtime applications (VoIP, Video conferencing) and the remaining 12% representing other traffic types with all security functions in operation. Raw throughput is not an accurate representation of performance in your typical deployment.

Client Recommendation Guide

The following table approximates the number of devices that would be typical deployments for each Crystal Eye device based on average network utilization. There are three deployment modes.

Deployment modes - can be deployed in:

1) In line TDIR
2) In line Gateway
3) Out of band TDIR

The different modes can change the traffic profiling and resource requirements to attain the security outcome being targeted. If you are unsure about the selection requirements for your specific deployment, please ask your account manager to book a session with our internal solution architects to assist you with your design requirements.

Series	Typical application[6]
10	Small office or home office using business grade NBN. (Please refer to Speed and Throughput Metrics table on previous page)
20	Small office or branch office using business grade NBN. (Please refer to Speed and Throughput Metrics table on previous page)
25	Medium sized enterprise with moderate network traffic capable of 500Mb/s or 1Gb/s business link.
40	Medium sized enterprise with high traffic volume capable of serving 1Gb/s in mission critical applications requiring High Availability in a single chassis.
50/60	High performance enterprise and telecommunications class environments.
70/80	A high-performance solution designed for large IT or telecommunications operations supporting heavy user loads.

Conclusion

Each network or scenario is different in utilisation, structure, and future demands. This guide is to highlight common configurations to help you make an informed decision on the Crystal Eye Appliance that best suits your current and future requirements.

It is important to stress that planning for future growth will ensure that the Crystal Eye device you choose will be well utilised and continue to deliver consistent ROI while serving your end users for many years to come.

[6] Typical Application does not take into consideration unique conditions or requirements and is more a guide than a recommendation.

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