Deploying the NGINX IC for Kubernetes on Bare Metal Servers

NGINX Plus is the only all-in-one load balancer, content cache, and web server. It's built on NGINX Open Source, which powers over 400 million websites. NGINX Plus can be used as an IC (Ingress Controller) to integrate key capabilities into the Kubernetes load-balancing framework while maximizing performance and cost savings compared to other Kubernetes app delivery solutions available on the market.

The table below outlines the performance levels you can achieve with the NGINX IC for Kubernetes running on specific server sizes. Each row details the specifications of the hardware you need to achieve each level of performance, along with the typical cost for that hardware.

Kubernetes version 1.13.1 is installed on the cluster of two bare-metal servers (primary node and secondary node). The primary node under test is running the NGINX Ingress Controller image pulled from Docker Hub. No other containers are running on the primary node. Sizing was achieved by limiting the number of cores available to the dedicated KIC container. Flannel is used as the networking overlay stack for joining the primary node with the secondary node. The secondary node is dedicated to one web server pod. No other containers are running on the secondary node.

Hardware Cost[1]	Hardware Specs	Expected Performance
$1,400	2 CPU cores[2] 8 GB RAM 2x10 Gbe NIC 1 TB HDD	74,000 Requests/Second[3] 8,700 RSA SSL TPS[4] 9,100 ECC SSL TPS[5] 4 Gbps Throughput[6]
$2,500	4 CPU cores[2] 8 GB RAM 2x10 Gbe NIC 1 TB HDD	150,000 Requests/Second[3] 17,400 RSA SSL TPS[4] 17,600 ECC SSL TPS[5] 8 Gbps Throughput[6]
$3,600	8 CPU cores[2] 16 GB RAM 2x10 Gbe NIC 1.2 TB HDD	300,000 Requests/Second[3] 30,000 RSA SSL TPS[4] 33,000 ECC SSL TPS[5] 8 Gbps Throughput[6]
$5,600	16 CPU cores[2] 32 GB RAM 2x10 Gbe NIC 480 GB SSD	340,000 Requests/Second[3] 55,000 RSA SSL TPS[4] 57,000 ECC SSL TPS[5] 8 Gbps Throughput[6]
$7,300	24 CPU cores[2] 32 GB RAM 2x10 Gbe NIC 480 GB SSD	340,000 Requests/Second[3] 58,100 RSA SSL TPS[4] 58,500 ECC SSL TPS[5] 8 Gbps Throughput[6]

1. Prices are based on Dell PowerEdge servers with Intel NICs

2. Testing done with Intel® Xeon® Platinum 8168 CPU @ 2.70GHz

3. 1 KB response size with keepalive connection

4. RSA 2048 bit, ECDHE-RSA-AES256-GCM-SHA384, OpenSSL 1.1.0g

5. ECC 256 bit, ECDHE-ECDSA-AES256-GCM-SHA384, OpenSSL 1.1.0g

6. 1 MB response size

NOTE: NGINIX does not sell hardware; the costs presented here are typical costs you can expect to pay when purchasing from a reseller.

For more information, visit nginx.com or send us an email nginx-inquiries@nginx.com

About the Tests

Requests/Second – Measures the ability of NGINX Plus to process HTTP Requests. The client sends requests down keepalive connections. NGINX Plus processes each request and forwards it on to a web server over another keepalive connection.

SSL TPS – SSL Transactions per Second (TPS) measures the ability of NGINX Plus to process new SSL connections. Clients send a series of HTTPS requests, each on a new connection. NGINX Plus parses the requests and forwards them onto a web server using an established keepalive connection. The web server sends back a 0 byte response for each request.

Throughput – The throughput that NGINX Plus can sustain when serving large files over HTTP.

Memory Sizing

NGINX Plus memory usage grows slowly with the number of concurrently active connections. Though dependent on the configuration, it is typically less than 10–20 Kb per connection.

When caching content in NGINX Plus, additional memory may be needed. Size the memory so that there is sufficient unused memory to store the hot cached content in the operating system page cache.

Perfect Forward Secrecy

The SSL TPS numbers presented above are for SSL with Perfect Forward Secrecy (PFS). PFS ensures that encrypted traffic captured now can't be decrypted at a later time, even if the private key is compromised. PFS is recommended to provide maximum protection and user privacy in the current security climate.

PFS is more computationally expensive and as a result gives lower overall Transactions Per Second (TPS). Other vendors do not publish PFS performance; readers should keep this in mind when doing comparisons.

About NGINX Plus

NGINX Plus helps you achieve performance, reliability, security, and scale by providing a complete application delivery platform by combining load balancing, content caching, web serving, security controls, and monitoring in one easy-to-use software package.

NGINX Plus ensures maximum performance and flawless delivery for almost any application (whether a legacy application, traditional web app, or interconnected microservices) and equally for all types of infrastructure (bare metal, the cloud, or in containers).

Try NGINX Plus for free today: nginx.com/free-trial-request

For additional information and details about the tests, please see our blog posting:
Testing the Performance of the NGINX Ingress Controller for Kubernetes
(https://www.nginx.com/blog/testing-performance-nginx-ingress-controller-kubernetes/)