NetBrain® Integrated Edition 7.0

System Specification

Version 7.0b1 | Last Updated 2017-11-07

Introduction

NetBrain Integrated Edition features a completely new system architecture to enable robust scalability and flexibility. The architecture is horizontally scalable, allowing for servers to be added, subtracted or consolidated according to customer requirements. For larger network environments or if you need help in defining specs for high availability (HA) environments, please contact NetBrain Support Team for further assistance.

This document introduces the system overview and requirements in terms of:

- System Architecture
- Definitions of Server Components
- Considerations for System Scalability
- Reference Specifications:

> **Note:** This table shows the number of reference machines that you need to deploy NetBrain system, depending on the number of devices and concurrent users.

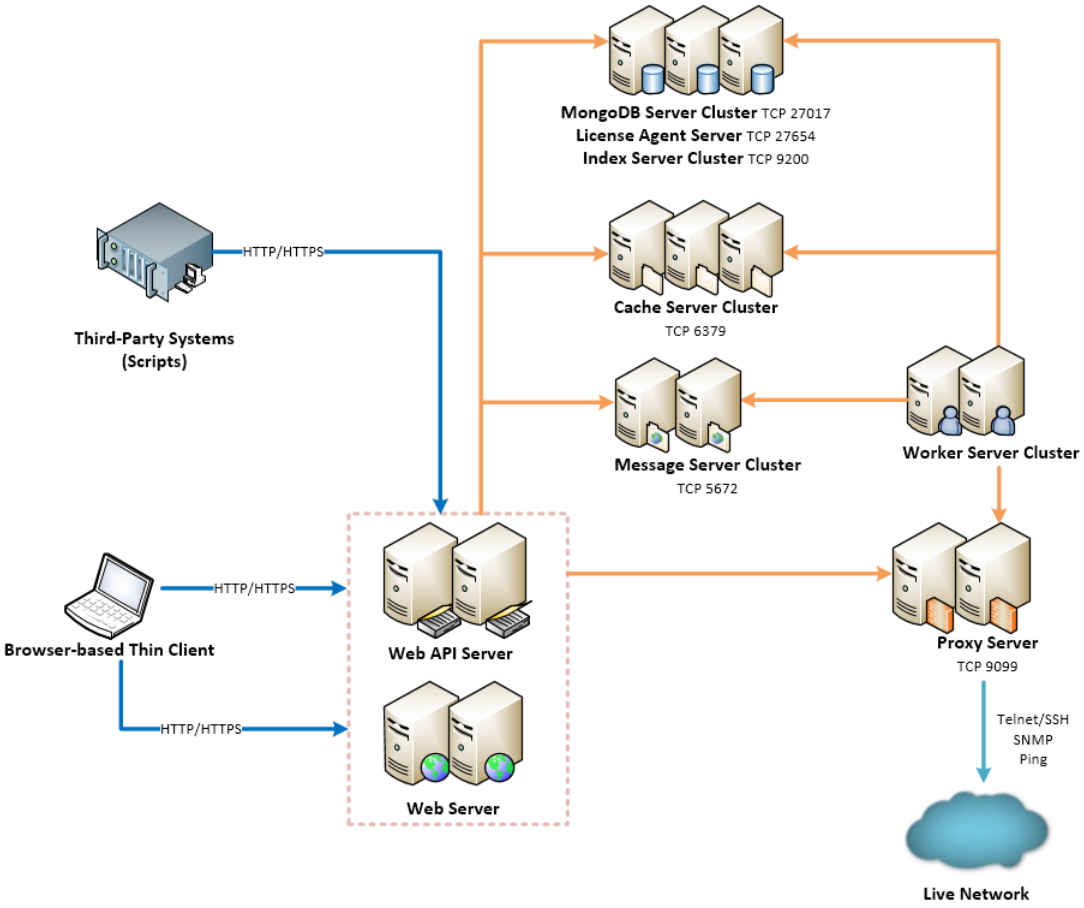
Node and Seat Size	Number of Physical Machines
≤1000 Nodes ≤10 Seats	2 Machines
1001~2000 Nodes ≤10 Seats	2 Machines
2001~5000 Nodes ≤20 Seats	4 Machines
5001~10000 Nodes ≤50 Seats	6 Machines
10001~50000 Nodes ≤200 Seats	>8 Machines

- Important Notes Before Deployments

System Overview

NetBrain Integrated Edition is a brand new Thin Client system with a complete browser server architecture, adopting advanced distributed technologies to support large scale networks with more expansion possibilities.

The system includes the following components and services:



- **Browser-based Thin Client** - provides user interface for end users to access the system.
- **Web Server** - serves static content such as HTML, JavaScript and CSS resources, which serves as the user interface of the Thin Client. Multiple Web Servers can be installed and load-balanced under your load balancing infrastructure.
- **Web API Server** - provides the front-end web applications to support the browser-based Thin Clients, and also serves RESTful API calls from third-party applications for integration. Multiple Web API servers can be installed with Web Servers and load-balanced under your load balancing infrastructure.
- **Message Server** - prioritizes and forwards requested tasks. High availability is supported with master/slave nodes.

- **Cache Server** - provides memory cache for the system. High availability is supported with master/slave/sentinel nodes.
- **Worker Server** - serves as a resource manager with system back-end business logic and infrastructures to support the distributed task processing. It relies on both Cache Server and Message Server to work. Multiple Worker Servers can be installed and load balanced.
- **MongoDB Server** - serves as system data repository. High availability is supported with primary/secondary/arbiter nodes.
- **License Agent Server** - provides services that validate and activate licenses. It must be installed on all MongoDB Servers except the arbiter node.
- **Index Server** - serves as a full-text search and analytics engine in a distributed multi-user environment. High availability is supported with master-eligible nodes.
- **Proxy Server** - serves as a polling server to collect live network data. It is the only component required to access live network.

Considerations for System Scalability

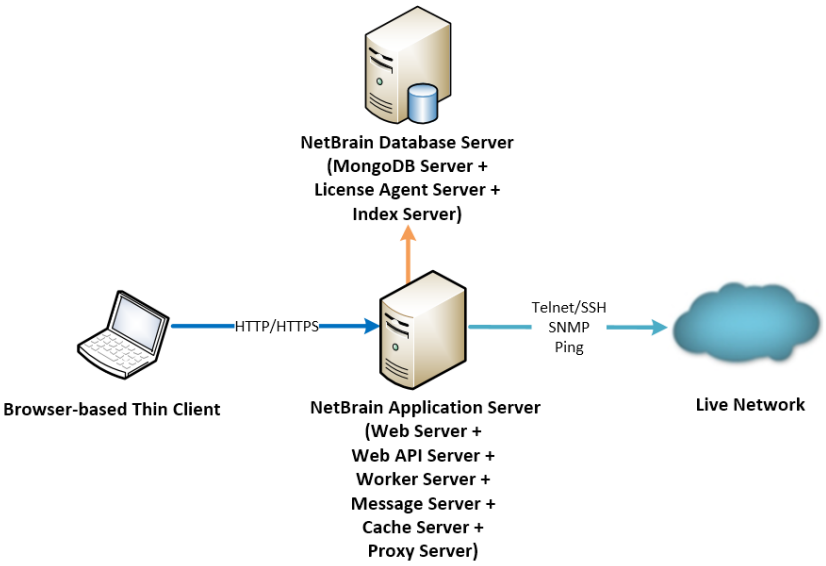
Server Name	Key Target	Scalability
Web Server Web API Server	Cross Region Concurrent Users	▪ Supports cluster deployments for a large number of users. ▪ Recommended to deploy more API Servers when there is a large number of API calls for intensive API triggered diagnosis in large networks.
Worker Server	Concurrent Computation	Supports cluster deployments for a large number of back-end network automation tasks, such as network monitoring, path discovery, runbook execution, triggered diagnosis.
Message Server	Large Messages	Recommended to deploy a cluster with 2 nodes for large network automation tasks.
Cache Server	Data Cache	Recommended to deploy a cluster with 3 nodes for high speed data access, reducing the number of visits to MongoDB Server.
MongoDB Server	Large Data	▪ Runs as a standalone server or a replica set, which is a cluster of servers that implements data replication and suitable for large scale network data storage. ▪ Supports storage of individual Tenant data in a separate MongoDB instance for multiple separate large networks managed by MSP.
Index Server	Search and Index	Runs as a standalone server or a cluster with master-eligible nodes for data replication.
Proxy Server	Large Network	Recommended to manage at most 5,000 network nodes per server.

System Requirements

The following specifications are only for reference. Make your selections based on your use case.

Reference Specification for ≤1000 Nodes & ≤10 Seats

This deployment requires one Windows server for applications and one Linux server for database. Both physical machines and virtual machines are supported.



Environment	NetBrain Component	Machine Count	CPU	Memory	Hard Disk	Operating System [1)]
≤1000 nodes ≤10 users	Application Server	1	4 Core/ 8 vCPU	16GB	200GB	▪ Windows Server 2012/2012 R2 (Standard/Datacenter Edition), 64-bit ▪ Windows Server 2016 (Standard/Datacenter Edition), 64-bit
	Database Server	1	4 Core/ 8 vCPU	16GB	300GB	▪ Red Hat Enterprise Linux (RHEL) 7.0/7.3, 64-bit ▪ CentOS 7.0/7.2, 64-bit

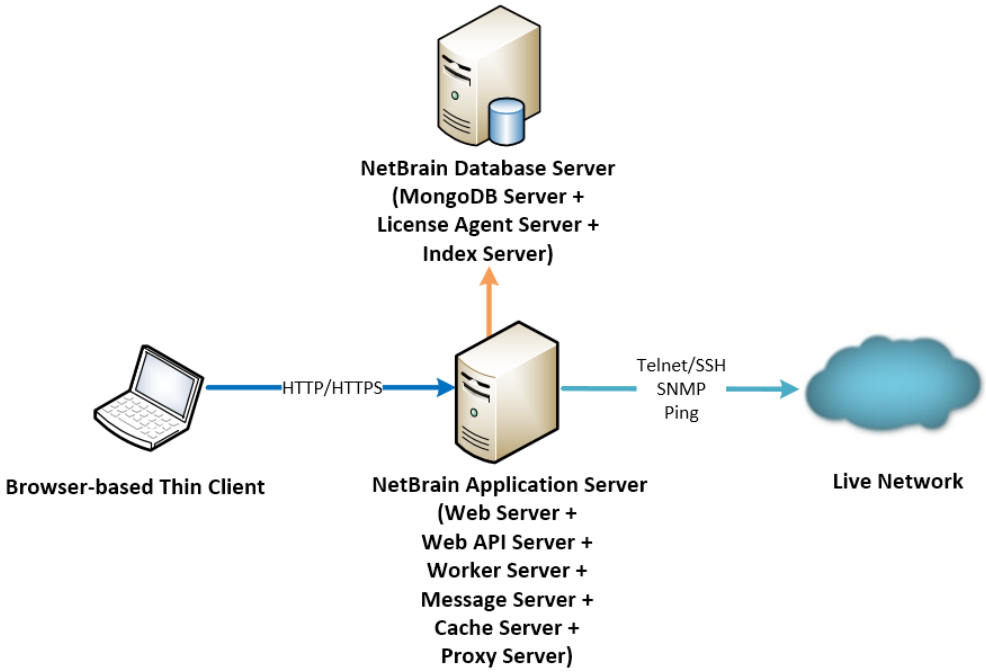
> **Note:**
> [1)] Proxy Server can be installed on Windows Server 2008 R2 SP1, 64-bit.

Network connectivity requirements for ≤1000 nodes

Source	Destination	Protocol and Port Number
Thin Client	Application Server	HTTP/HTTPS
Application Server	Database Server	TCP 27017/27654/9200
Application Server	Live Network	ICMP/SNMP/Telnet/SSH

Reference Specification for 1001~2000 Nodes & ≤10 Seats

This deployment requires one Windows server for applications and one Linux server for database. Both physical machines and virtual machines are supported.



Environment	NetBrain Component	Machine Count	CPU	Memory	Hard Disk	Operating System [1)]
1001~2000 nodes ≤10 users	Application Server	1	4 Core/ 8 vCPU	32GB	200GB	▪ Windows Server 2012/2012 R2 (Standard/Datacenter Edition), 64-bit ▪ Windows Server 2016 (Standard/Datacenter Edition), 64-bit
	Database Server	1	4 Core/ 8 vCPU	32GB	300GB	▪ Red Hat Enterprise Linux (RHEL) 7.0/7.3 64-bit ▪ CentOS 7.0/7.2 64-bit

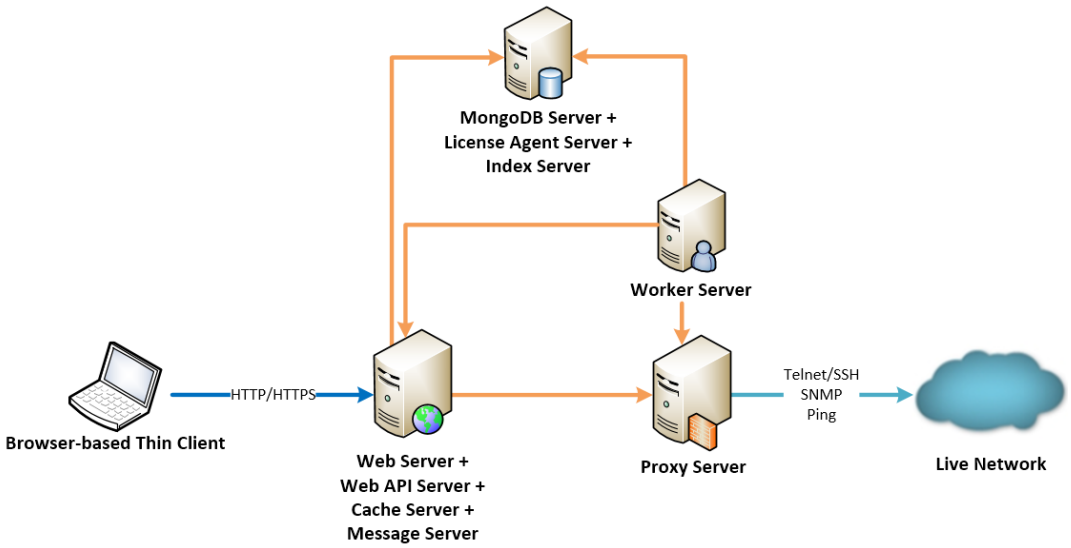
> **Note:**
> [1)] Proxy Server can be installed on Windows Server 2008 R2 SP1, 64-bit.

Network connectivity requirements for 1001~2000 nodes

Source	Destination	Protocol and Port Number
Thin Client	Application Server	HTTP/HTTPS
Application Server	Database Server	TCP 27017/27654/9200
Application Server	Live Network	ICMP/SNMP/Telnet/SSH

Reference Specification for 2001~5000 Nodes & ≤20 Seats

As the number of network devices and concurrent users increase, the system requires a distributed environment. The distributed deployment method is flexible based on your network scale, requiring more machines to provide more scalability and resiliency. Both physical machines and virtual machines are supported.



Environment	NetBrain Component	Machine Count	CPU	Memory	Hard Disk	Operating System [1)]
2001~5000 nodes ≤20 users	Web Server Web API Server Cache Server Message Server	1	4 Core/ 8 vCPU	32GB	200GB	▪ Windows Server 2012/2012 R2 (Standard/Datacenter Edition), 64-bit ▪ Windows Server 2016 (Standard/Datacenter Edition), 64-bit
	Worker Server	1	8 Core/ 16 vCPU	32GB	200GB	
	Proxy Server	1	4 Core/ 8 vCPU	8GB	200GB	

Environment	NetBrain Component	Machine Count	CPU	Memory	Hard Disk	Operating System [1)]
	MongoDB Server License Agent Server Index Server	1	4 Core/ 8 vCPU	32GB	500GB	▪ Red Hat Enterprise Linux (RHEL) 7.0/7.3, 64-bit ▪ CentOS 7.0/7.2, 64-bit

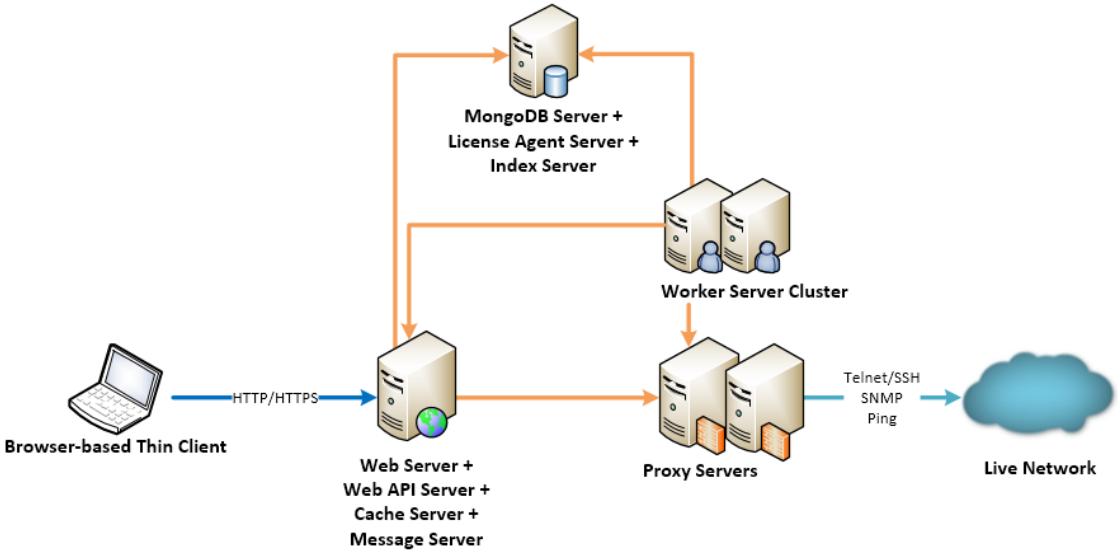
> **Note:**
> [1)] Proxy Server can be installed on Windows Server 2008 R2 SP1, 64-bit.

Network connectivity requirements for 2001~5000 nodes

Source	Destination	Protocol and Port Number
Thin Client	Web Server Web API Server	HTTP/HTTPS
Web API Server Worker Server	MongoDB Server License Agent Server Index Server	TCP 27017/27654/9200
Worker Server	Cache Server Message Server	TCP 6379/7000/5672
Web API Server Worker Server	Proxy Server	TCP 9099
Proxy Server	Live Network	ICMP/SNMP/Telnet/SSH

Reference Specification for 5001~10000 Nodes & ≤50 Seats

As the number of network devices and concurrent users increase, the system requires a distributed environment. The distributed deployment method is flexible based on your network scale, requiring more machines to provide more scalability and resiliency. Both physical machines and virtual machines are supported.



Environment	NetBrain Component	Machine Count	CPU	Memory	Hard Disk	Operating System [1)]
5001~10000 nodes ≤50 users	Web Server Web API Server Cache Server Message Server	1	4 Core/ 8 vCPU	32GB	200GB	▪ Windows Server 2012/2012 R2 (Standard/Datacenter Edition), 64-bit ▪ Windows Server 2016 (Standard/Datacenter Edition), 64-bit
	Worker Server	2	8 Core/ 16 vCPU	32GB	200GB	
	Proxy Server	2	4 Core/ 8 vCPU	8GB	200GB	
	MongoDB Server License Agent Server Index Server	1	8 Core/ 16 vCPU	64GB	1TB	▪ Red Hat Enterprise Linux (RHEL) 7.0/7.3, 64-bit ▪ CentOS 7.0/7.2, 64-bit

> **Note:**
> [1)] Proxy Server can be installed on Windows Server 2008 R2 SP1, 64-bit.

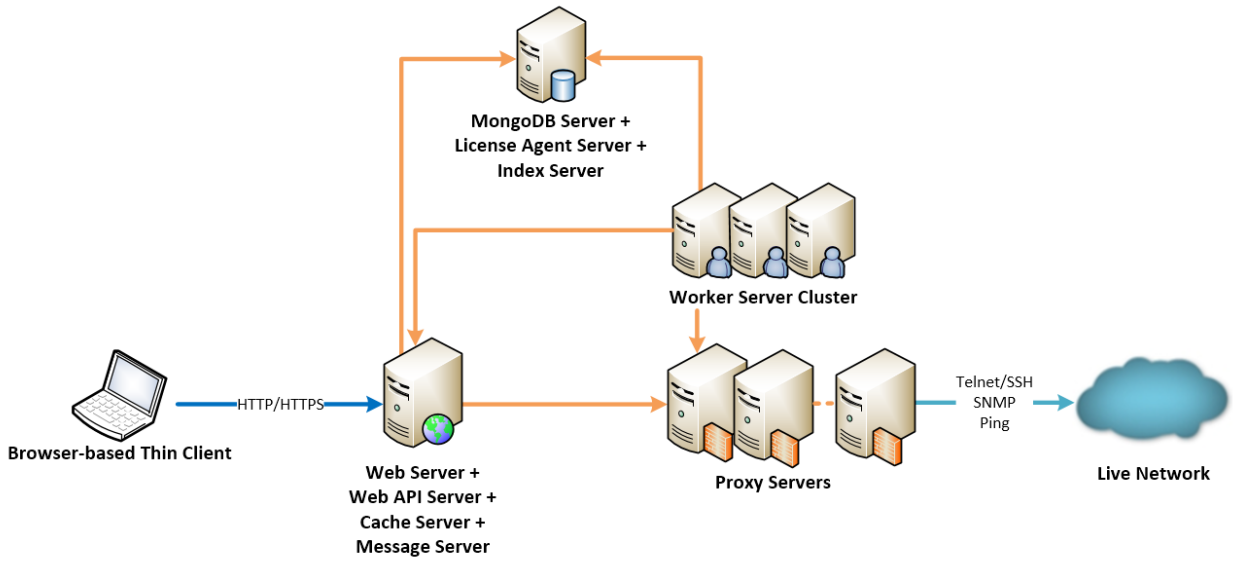
Network connectivity requirements for 5001~10000 nodes

Source	Destination	Protocol and Port Number
Thin Client	Web Server Web API Server	HTTP/HTTPS
Web API Server Worker Server	MongoDB Server License Agent Server Index Server	TCP 27017/27654/9200
Worker Server	Cache Server Message Server	TCP 6379/7000/5672
Web API Server Worker Server	Proxy Server	TCP 9099
Proxy Server	Live Network	ICMP/SNMP/Telnet/SSH

Reference Specification for 10001~50000 Nodes & ≤200 Seats

As the number of network devices and concurrent users increase, the system requires a distributed environment. The distributed deployment method is flexible based on your network scale, requiring more machines to provide more scalability and resiliency. Both physical machines and virtual machines are supported.

For HA deployments, please contact NetBrain Support Team for customization assistance.



Environment	NetBrain Component	Machine Count	CPU	Memory	Hard Disk	Operating System [1]
10001~50000 nodes ≤200 users	Web Server Web API Server Cache Server Message Server	1	4 Core/ 8 vCPU	32GB	200GB	▪ Windows Server 2012/2012 R2 (Standard/Datacenter Edition), 64-bit ▪ Windows Server 2016 (Standard/Datacenter Edition), 64-bit
	Worker Server	3	8 Core/ 16 vCPU	32GB	200GB	
	Proxy Server	3~10 [2]	4 Core/ 8 vCPU	8GB	200GB	
	MongoDB Server License Agent Server Index Server	1	8 Core/ 16 vCPU	128GB	2TB	▪ Red Hat Enterprise Linux (RHEL) 7.0/7.3, 64-bit ▪ CentOS 7.0/7.2, 64-bit

Notes:

[1] Proxy Server can be installed on Windows Server 2008 R2 SP1, 64-bit.

[2] Each Proxy Server is recommended to manage 5,000 network nodes at most.

Network connectivity requirements for 10001~50000 nodes

Source	Destination	Protocol and Port Number
Thin Client	Web Server Web API Server	HTTP/HTTPS
Web API Server Worker Server	MongoDB Server License Agent Server Index Server	TCP 27017/27654/9200
Worker Server	Cache Server Message Server	TCP 6379/7000/5672
Web API Server Worker Server	Proxy Server	TCP 9099
Proxy Server	Live Network	ICMP/SNMP/Telnet/SSH

Important Notes Before Deployments

In addition to the above referenced hardware specifications, please read the following notes before deploying the system.

- **Windows Server:**
  - NetBrain Integrated Edition should not be installed on the same server as an existing NetBrain Enterprise Edition (6.2 or earlier version), except that Proxy Server (IEv7.0b1) and Network Server (EEv6.2) can be installed on the same machine.
  - The operating system must be installed with an English-language version (not language packs).
  - There must be more than 3GB free space in the system drive (for example, C drive) to complete the installation no matter which drive NetBrain system will be installed on.
  - Users with administrative privileges of the machine are required to implement the installation.
  - Temporarily disable antivirus software during the installation process.
  - If the machine's firewall is turned on, make sure the firewall rules allow traffics to all the ports and protocols that will be used by NetBrain system.
- **Linux Server:**
  - The operating system must be installed with an English-language version (not language packs).
  - More than 50GB free space in the directory where the data files of the MongoDB/Index Server will be saved.
  - More than 10GB free space in the directory where the log files of the MongoDB/Index Server will be saved.
  - Users with root privileges of the machine are required to implement the installation.
  - If the machine's firewall is turned on, make sure the firewall rules allow traffics to all the ports and protocols that will be used by NetBrain system.
- **Supported Web Browser:**
  - Google® Chrome™ version 51 or higher.