

# Infrastructure Performance Testing For Cloud Environment

Srikarthick Vijayakumar<sup>1</sup>, Anand R. Mehta<sup>2</sup>

## What and Why :

Infrastructure performance testing is the testing process that which includes hardware's and software's and networks. This involves the testing of any of the code that reads the configuration values from various things and references in the IT frameworks and compares them to be for intended results. As all software needs infrastructure to run.

Cloud performance testing determines how well an application performs in a cloud environment to reduce performance bottlenecks and determine and results what is needed to handle peak workloads.

The purpose of cloud performance testing is to check three main things:

**Speed** - It determines whether the application responds very quickly.

**Scalability**- it defines the maximum user load so that the application can handle.

**Stability** - It checks that the application is stable under variable load.

## Types of Infrastructure Performance Testing for Cloud

**Load test** - It measure the applications in a normal and extreme peak conditions.

**Stress Test** - it measures the applications under extreme conditions that exceeds the limits of normal conditionl operation.

**Browser Rest** - It ensures that the applications works ais intended when used in different and another browsers.

**Latency Test**– it measures the time that it takes to transfer a data packets from one point on the network to another point on the network.

**Targeted infrastructure testing** - It isolates and measures each layer and/or components of an application to test its performance.

**Failover testing** – It validates the application's ability to provide additional resources and failover in the event of a server or a system failure.

**Capacity test** – it measures how many users an applications can handle before performance degrades or comes to its lower state.

**Soak test** – It measures an applications under heavy load for a long periods of time.

## Stages of infrastructure performance testing for cloud environment:

**Step 1:** Identify the test environments.

**Step 2:** Determine the performances indicator.

**Step 3:** Plan and design performances tests.

**Step 4:** Set up the test environments.

**Step 5:** Execute the tests plan.

**Step 6:** Run the tests.

**Step 7:** Analyze, adjust and retest the performance.

**Top cloud performance testing tool :**



**Infrastructure performance tuning for cloud environment:**

**What and why -:**

Cloud performance tuning is the process of optimizing the speed, efficiency and reliability of cloud-based applications and services. It requires the combination of technical skills, analytical tools and best practices to identify and address bottlenecks, errors and wasted resources.

To define cloud computing, it need to understand the basic concepts and components of cloud computing such as virtualization, scalability, resilience, availability and security. There should be awareness of of different cloud services such as infrastructure as a service (IaaS), platform as a service (PaaS) and software as a se services (SaaS) and how they affect performance. Additionally, should be familiar with common cloud service providers such as amazon web services (AWS), microsoft azure, and google cloud platform (GCP) and their features, pricing, and service level agreements (SLA).

We use infrastructure performance tuning because to improve SQL performance query, to avoid coding loops and to improve the speed of the data retrieval options. Most tuning efforts focuses on minimizing the number of i/o operations, since i/o operations are much slower than reading data from cache.

**Types of infrastructure performance tuning for cloud environment:**

**Input/Output Operations per Second (IOPS):** It is a measurement of the read and write speed of storage devices based on several variables such as random or sequential data patterns, disk array configuration, read/write ratio, and data block size.

**Reading Vs Writing Files-:** Some applications are write-intensive, while others are read-intensive, and some applications can even balance between the two. When designing a server or application storage solution, it is important to evaluate the storage behavior of the application and allocate storage resources according to needs.

**File System Performance:** Storage devices attached to servers are typically configured as file systems at the operating system layer, and these file systems have various characteristics that affect performance. By comparing different types of Windows and Linux file system benchmarks, you can choose which one you want to use based on your needs.

**Metadata performance-** Metadata provides information about files stored on storage devices, such as file size, security permissions, and information about images, file type, and extension.

**Cache Memory-** Caching is a technique used to improve disk performance by using RAM reserves to temporarily store data that needs to be written or read from a storage device.

**Network Bandwidth-** it is an important parameter of cloud performance, and cloud service centers have multiple high-speed Internet connections and are typically connected to multiple ISPs.

**Network Latency-** It is the delay that occurs when a frame travels through a network. Each network device receives the frame, calculates a CRC error check, finds an egress interface, and sends the frame out that interface.

**Benefits of infrastructure performance tuning in cloud environment:**

- a) Cost savings.
- b) Better performance and scalability
- c) Better security and compliance
- d) Increased work efficiency
- e) Business flexibility and innovation Assessment and planning.

**References**

- [1]. Mell, P. M., and T. Grance. "The NIST of cloud computing".
- [2]. Beloglazov, Anton, and Rajkumar Buyya. "Cloud Sim: a toolkit for modeling and simulation of cloud computing environments and evaluation of resource provisioning algorithms" 2010 Wiley Online Library.
- [3]. Perla Ravi Theja, and SK. Khadar Babu. "Resource Optimization for Dynamic Cloud Computing Environment: A Survey" International Journal of Applied Engineering Research, ISSN 0973-4562 Volume 9, Number 24 (2014)
- [4]. Julian jang Jaccard and Surya Nepal (2014). A survey on performance testing and based on infrastructure for cloud computing resources journals.