Role of testing parameters in cloud service performance testing framework

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Abstract:
Cloud services play a vital role in overall implementation of cloud infrastructure. Here performance measurement and is mostly used to retrieve details of current status and to identify scope of improvement to provide reliable cloud services. Considering commercial cloud services values of cloud service parameters related to return on investment and financial value estimate both are playing curtail role in the stage for a strong benefits reliable process. The main parameters which are highly associated can be identified and the same can be reviewed. Its results are being used for verification of different organization that has actually adopted the new processes and is delivering the targeted result. If not, then once again parameters of related resources can be focused to find the scope of improvement or related problem and can be resolved by taking required actions to take in range in expected zone to update values of financial results.

Key words: Cloud services, performance, testing, SLA, service provider

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INTRODUCTION:
Minimum acceptable level of cloud service can be defined with reference to various landmarks and its related benchmarks. It helps to increase reliability and build confidence in cloud service consumer community and also attracts related people to migrate from their existing implementation to the cloud service framework. It is difficult to immediately tie business finance outcome to a particular business migrate requirement, the model built for the business review comes in the picture. Directly measured main performance related parameters can show scope of improvement and can be converted to estimates of the value in the income statement of the organizations.

Related study:
It not only requires rigorous study of related parameters associated with cloud service performance modeling but also analysis of macro performance parameters which effects cloud service performance. The goal is to simply plan a model that should provide believable rough route map with its related approximate values to achieve expected performance level of cloud services. Performance analysis is a subset of performance engineering. Analysis of performance testing leads us to measure application’s quality of service based on actual application’s actions. In the span of last few years, cloud computing has evolved into a rapidly growing sector with an ability to handle large volumes of data in an impeccable manner, while ensuring enhanced performance and scalability. Cloud service performance evaluation testing focus the application has to be tested for various features like availability, security, scalability, fault tolerance etc. while it is being hosted on the Cloud. It has to be evaluated for system throughput, latency, the number of
parallel users using the app, and the speed under different load conditions along with other performance metrics. The bugs and issues need to be detected and fixed suitably before the cloud service reaches to live stage. The cloud performance testing relies that the cloud service runs efficiently and shall remain available at critical time. It also supports to maintain status of SLA.

Done aptly, this considerably reduces costs and risks and requires lower maintenance. Data backup, disaster recovery, and business continuity is far simpler and less expensive with the cloud. Moreover tons of data can be managed in no time, by selecting one or more services from what cloud service is offering enhanced scalability, productivity, and performance.

**Designing a Cloud Performance Testing Strategy:**

It is important to find the right strategy for conducting performance testing in the cloud. According to various literature surveys different techniques were proposed with different constraints but it focuses for specific criteria only. The project environments, business drivers, technology stack, acceptance factors, skill set and resource availability are some of the factors that should be taken into account before building up a strategy. Also, the ease of infrastructure access, cost savings, shorter cycle times, and the cloud type must be synced well with the strategy. Here various customized test should be generated to consider effective tests of such cloud service applications, and different implications of testing on a public cloud against a private cloud must be taken into account. It should also be considered that there are performance tests that are not completely applicable in a cloud set-up, and they should be dealt with accordingly. Consider focus on different parameters for typical tests applicable in the context of cloud, and the strategies that should be applied:

1. **Load Testing:** Considering public cloud platform, detail information should be retrieved and extracted from cloud service provider on load statistics of various customers sharing the same platform to get detail idea for expected response time. Here implementation of cloud and non-cloud setup is different and accordingly it should be considered that the response time in a non-cloud environment may not be the same as the response time taken in cloud environment. The tests must be iterative with same and different parameters for low and high number of concurrent users. When the load is expected to be high, we can observe a range of response times to establish minimum, maximum and average response time. This shall be helpful in mimicking actual load situations and maintaining a track on the app’s response time.

2. **Stress Testing:** Performance characteristics can be confirmed using stress tests of the system under test when it is subjected to conditions to put more focus on selected cloud service parameters. It helps to determine load capacity that the system may handle before it reaches to breaking levels. Mostly public cloud is shared by multiple users hence, testing in public cloud requires to go for robust planning and then its execution in proper guided manner. Here test plans are to be prepared with specific goals, and the tools must be evaluated to get its effectiveness by measuring parameters to materialize the goals.

3. **Scalability and Elasticity Testing:** Expansion of the cloud service system can be managed by scalability which also affects SLA. An extra load can be managed by using an important cloud feature namely elasticity. Testing of this parameter ensures synchronization between SLA and existing performance of cloud service system, and is additionally scalable up to next required expected level.
Generally it is conducted by slowly increasing the load to go beyond the threshold of the current limit, to confirm whether the system scales down as the load decreases and scales up as the load increases. To identify threshold level analysis of such boundary value might be helpful.

4. Testing service capacity: To fulfill diversified need, cloud service consumers started demanding various typical services. To fulfill such demand X number of concurrent users from various geographical locations should be selected and its data should be used for service testing. Sometimes exact cloud service cannot be provided by service provider as need and demand of cloud service consumers are getting diversified. For implementation part some bridging technology are also required to satisfy cloud service consumers need as the existing structure of the service could not be capable to provide services as per the exact requirement. It helps the testing experts to have a better idea of possible execution errors and also helps to prepare companies for identification of peak time demand and also provide ideas of the number of users. Such testing may be used at design phase to have benchmark about maximum number of users a system may handle for a particular set of circumstances. Additionally, the capacity testing, also motivate the user to proactively increase infrastructure related services before any limits are reached.

5. Latency Testing: Delay between request sent by cloud service consumer and cloud service provider’s reply can be referred as latency. Its measurement is a quite complicated in the cloud. Trace route and pings type of tools can work best with ICMP packets, which are not generally used. Accordingly one can use hoping and using it the packet can be crafted with the specific protocol and its flags one wants.

6. Failover Testing: System failover and data recovery can be possible using cloud infrastructure in remarkably affordable way. Here such recovery plan and its implementation can effectively work if it has been systematically designed and thoroughly tested to ensure that it operates well time to time with updated last moment data and its related configurations. Implementation of such failover structure using cloud services helps organization to continue with their work without any interrupt. Under such scenario sometimes partial shutdown may require to reconfigure selected area of such system.

7. Browser Performance Testing: Cloud service may work differently with different OS and browsers. Considering different scenario with multiple browsers may reach to different results. Using cloud, the companies can simulate the scenario of such production in different environments. At this juncture verification of browser’s latest version along with installation of required add on plug-in and various patches are also playing important role.

8. Endurance Testing: When extended load is applied to the system such tests helps to ensure that the app is capable enough to handle such extended load applied without any deterioration of response time. To ensure the same monitoring tools for memory can be installed in the virtual environment itself. Endurance testing helps to verify response time, database connection and memory leakage in the app etc. This is the last testing stage of system performance testing cycle.

CONCLUSION:
In the age of digital transformation, scalability, high performance and end-user experiences are the main keys toward successful implementation of the system. The end-user shall be ready to adopt the system only if such systems performance well. Conducting performance
testing for cloud services before releasing it helps achieve speed, scalability and stability. It also helps to identify scope of improvement at different phases of the system. Performance engineering services are required in multiple delivery models, including a cloud-enabled performance testing environment. It also requires to setup very close to actual test environment and deploys specialist performance engineering teams to ensure that load and stress testing can be conducted from different geographies. At end expectation is to make available reliable cloud services with expected features, presence of customer satisfaction ensuring performance level and saving the cloud service consumers valuable time and money.

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