

Design Paper On Cloud-Based Performance Testing

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Abstract

Performance testing is used for testing the risk to application and technology. It requires web server and database server within infrastructure. In this paper, we designed different scenarios which include on-premise, infrastructure partly and completely deployed on cloud. Specifically three scenarios we have compared are on-premises, database in cloud and web application with database in cloud. The objective of this design paper is to identify the applicability of these three scenarios to different contexts. The key parameters of performance measurement like response time and throughput have been captured and analyzed to meet the objective mentioned.

Keywords: Performance Testing, Web Application, Cloud

1. INTRODUCTION

Performance Testing is the process of determining the speed or effectiveness of a computer, software program or device. It is usually done towards the end of the testing phase. If the performance tests are executed on cloud, we will have the ability to deploy an environment which will be required to test necessary performance, with minimal cost and effort; through reduced capital expenses, minimize support and administrative costs, and still retaining the confidence in expected performance [1, 4]. Even a completely bug-free web application is doomed to fail if it can only serve an average amount of traffic, but is not able to handle the significant peak loads in a real life situation. A large number of failures of

web applications in the industry have been attributed to performance flaws in the system. Each of these failures cost the businesses money and a hit on the brand. Thus effective testing of websites for performance, ability to scale up the web application when necessary is critical for the success of the channel. Cloud computing means that users are connecting to applications that run on a set of shared or pooled servers, rather than running on a single dedicated server. It provides high availability, reliability, scalability, flexibility, reduced time-to-market, and many other cloud-oriented benefits [5, 6, 7].

2. PERFORMANCE TESTING

2.1. Performance Testing Process

The success of performance testing is highly dependent on the methodical approach followed to plan, execute and analyze tests. A structured approach is depicted in the diagram below and explained.

Figure 1. Performance Testing process flow [1,2]



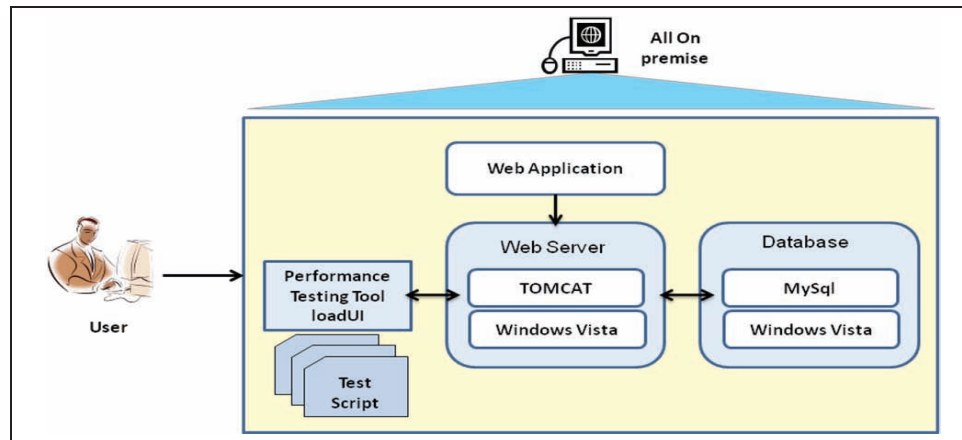
There are mainly six steps for performance testing process is as follows:

Step 1: Plan: Define the focus of the test and create a detailed test plan.

Step 2: Record: Most tools provide the capability to record test cases.

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Figure 2. Physical structure - Performance testing of web application for on-premise [1]

Step 3: Modify: Modify load test scripts defined by recorder.

Step 4: Execute: Execute the test script to achieve the test goal.

Step 5: Monitor: Monitoring the scenarios.

Step 6: Analyze: Analyzing test results.

2.2. Parameters of Performance Testing

Performance testing through automated testing tools simulates a variety of normal and abnormal peak load conditions of the system of performance indicators/parameters for testing. Performance model provides measurable standards of performance, while the standard is constituted by a series of performance parameters. Typical performance parameters are Response Time, System Throughput and System Resource Utilization [2, 3, 8, 9].

2.3. Scenario 1. Performance Testing of web Application for On-Premises

Performance testing through automated testing tools simulates a variety of normal and abnormal peak load conditions of the system of performance indicators for testing. Following diagram shows the details of testing on-premises with physical resources which are available in premise (i.e. Application server, web server and database server).

In this scenario, web application and database are loaded on physical machine and we can test the performance of

web application by using testing tool. Here we are using LoadUI testing tool for performance testing [9]. But we need all physical machines for this testing.

3. PERFORMANCE TESTING IN CLOUD ENVIRONMENT

At its simplest, cloud computing means that users are connecting to applications that run on a set of shared or pooled servers, rather than running on a single dedicated server. There are two scenarios to test the performance in cloud environment are [1, 4, 5]:

- a. Database in cloud
- b. Web application and database in cloud

3.1. Scenario 2. Database in Cloud

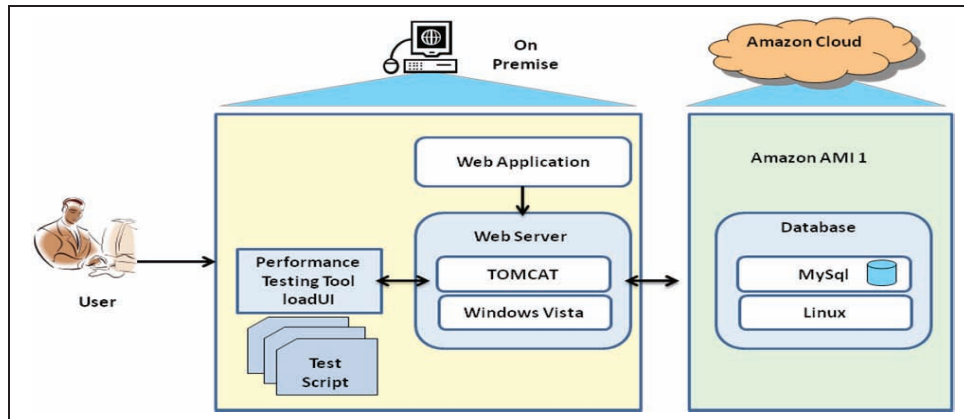
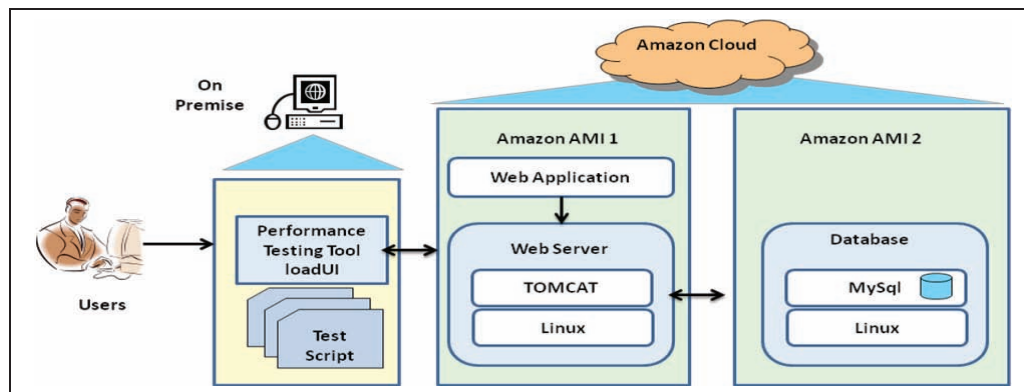
In this test scenario, we planning to moved our database in cloud. For this test, we executed our web application from local machine and linked our database with this web application. We need one micro instance for this test scenario. Following diagram will show the details.

3.2. Scenario 3. Web Application and Database in Cloud

In this scenario, the entire application was moved on the cloud.

4. CONCLUSION

To performance test each scenario a project was created in which the scripts to test the pages were created. The

Figure 3. Physical structure – Database in cloud [1]**Figure 4. Physical Structure – web application and database in cloud [1]**

purposes of the tests were to determine appropriate use of each scenario and compare performance. If the application will always be used on premise by a limited number of users (eg. Intranet, college schedules), performance will be better with on premise. But these days, every enterprise and college will allow access to intranet application types over the Internet from home. Hence these types of applications will reduce day by day. Cloud configurations can be used for performance testing – provided network latency is considered while calculations. There are testing tools which can be deployed on the cloud – which will provide better results.

5. ACKNOWLEDGMENTS

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REFERENCES

- [1] Ganon, Z. & Zilbershtein, I. E. (2009). Cloud-based performance testing of network management system. *Computer Aided Modeling and Design of communication Links and Networks*. CAMAD '09. IEEE 14th International Workshop, 1-6. doi:10.1109/CAMAD.2009.5161466
- [2] Meyer, B. (2008). Seven principles of software testing. *Computer*, August, 41(8), 99-101. doi:10.1109/MC.2008.306.
- [3] Romano, B. L., e-Silva, G. B., de-Campos, H. F., Vieira, R. G., da-Cunha, A. M., Silveira, F. F. & Ramos, A. C. B. (2009). *Software Testing for Web-Applications Non-Functional Requirements*. Sixth International Conference on Information Technology: New Generations (pp. 1674-1675).
- [4] Zhu, K., Fu, J. & Li, Y. (2010). *Research the performance testing and performance improvement strategy in web Application Education Technology and Computer (ICETC)*. 2010 2nd International Conference, 2, V2-328 - V2-332. doi: 10.1109/ICETC.2010.5529374.
- [5] Vogels, W. (2008). *A Head in the Cloud - The Power of Infrastructure as a Service*. " O ' R e i l l y MySQL Conference & Expo. Santa Clara, CA.
- [6] Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R. H., Konwinski, A., Lee, G., Patterson, D. A.,

- Rabkin, A., Stoica, I. & Zaharia, M. (2009). *Above the Clouds: A Berkeley View of Cloud Computing*. Berkeley: EECS Department, University of California.
- [7] Varia, J. (2009). Virtual Stress-free Testing in the Cloud. Retrieved from <http://aws.typepad.com/aws/2009/02/virtual-stressfree-testing-in-the-cloud.html> (accessed on February 24, 2009)
- [8] Wu, Q. & Wang, Y. (2010). *Performance Testing and Optimization of J2EE-based Web Applications*. In 2nd International Workshop on Education Technology and Computer Science, 2, 681-683.
- [9] Mustafa, K. M., Al-Qutaish, R. E. & Muhairat, M. I. (2009). *Classification of Software Testing Tools Based on the Software Testing Methods Computer and Electrical Engineering*. ICCEE '09, 2nd International Conference, 229-233.doi: 10.1109/ICCEE.2009.9