

# MEASURING APPLICATION PERFORMANCE AND LOAD TESTING WITH SCENARIO SCHEDULES

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**Abstract:** In this Paper it is intended at verifying the Application performance like response time, transactional throughput and number of concurrent users and performs the Load Testing using Load Runner Tool. Performance testing is used to accurately measure the end-to-end performance. It Includes Measuring End-User's Response time, repeating the load consistently, monitoring the system components under controlled load, providing robust analysis and reporting engines. Load Testing Results are performed by using Various Scenario Schedules. With the help of Performing Testing we can verify Application's response for the intended number of users, Application's maximum load resisting capacity, Application's capacity of handling the number of transactions required by the Business, Application's stability under expected and unexpected user load, Ensuring that users have proper response time on production.

**Keywords:** Load Runner; Scenario Schedules; Response time; Transaction Time; Load Testing, VuGen;

## I. INTRODUCTION

Load tests are performance tests, which are focused on determining or validating performance characteristics of the product under test when subjected to workload models and load volumes anticipated during production operations. Load testing is a compulsory test which will do prior to any test. This frequently simulate existing consumer load on AUT. Typically peak load for the request is measured for this test. This check guarantee that the AUT is suitable and grip predictable peak load once the request is deployed. We have many benefits using this Load Testing, Which helps in Evaluate the adequacy of a load balancer, Detecting functionality errors under load, Determine the scalability of the application OR for capacity planning purposes as the need may be[1].

### Scenario for Load Testing:

In this Paper for Load testing we used Mercury Sample Project. With the aid of Transactions Concept and Scenario Schedule Concept we will get the Application Performance. Below Steps indicated Scenario Details?

Scenario name: Lost Test on Mercury Sample scheme Application

Scenario type: Load Test

Scenario objective: To create the peak load and to observe the performance of the Mercury Sample Project.

Steps: This Contain a variety of transactions [4].

### Entry Criteria:

- Test data is setup
- Shakedown completed successfully

#### Exit Criteria:

- Response times meet the SLA
- Test conclusion details is decided upon by stakeholders

#### Categories of users

- Application users/online users
- Concurrent users

## II. VIRTUAL USER GENERATOR

This is one of the Load Runner Component. Using This Component We will perform the Transaction Process. VuGen is the foremost constituent of Load runner which is used to generate scripts to simulate user actions of the AUT.

- Scripts are formed in C language of JS Language.
- The script is regularly produced by recording the actions among client and server.
- VuGen component provides the Performance Tester with the replay option.

Hear Script are carry out with VuGen for not relate the load. It is finished only debugging purpose. Transactions are comes under Control Icons, It Measures the time takes for the server to respond to specify Vuser requests.

**Control Icons:** Each Control icon in the Vuser script represents a control used during load testing. Control steps include transactions, rendezvous points, and think time. We can add control steps either while recording, or after recording.

#### VuGen uses these Control icons:

- Start Transaction
- End Transaction
- Rendezvous
- Think Time

## III. RELATED WORK

Monika Sharma et.al Load testing helps us to identify the performance of the system under heavy load. This is achieved with the help of a Load Testing Tool. This paper mainly focuses on comparing load testing tools-Apache JMeter, HP LoadRunner, and Web LOAD. The Grinder on the basis of parameters like Server Monitoring, Unlimited Load generation, eases of use, cost, etc. The primary objective is to study these load testing tools and identify which one of them better and more efficient [1].

Vikas Nandal and Dr. Kamna Solanki Software development life cycle (SDLC) has many phases and testing is one of them. Testing plays an important role in the quality of the product. Testing takes place from the first phase to complete life cycle of the software. Web testing is the process of software testing which describes the testing of the web-based applications. The testing process includes the basic functionality of the application, user interface, accessibility, performances on the heavy traffic etc. There are many testing risks which affecting web applications. To remove these testing risks many testing Tools and Methods are developed by the software companies. In this paper LoadRunner used as web testing tool and methods have been explained which help in the resolving some of the risks in web applications development [2].

Santoso Wibowo and Srimannarayana Grandhi This research work demonstrates a performance-based approach to evaluate the quality performance of group buying websites under uncertainty. Linguistic variables are assigned with values using triangular fuzzy numbers approach for effectively modeling the vagueness and imprecision of the decision making process. An effective algorithm grounded on the deviation degree and absolute area of a fuzzy number is developed for generating a general performance index for each alternative. This would help companies understand the performance quality level of their group buying websites. A group buying website quality performance evaluation example demonstrates how performance based approach can be used to assess the quality [3].

Shalini and Jawahar Thakur Performance testing is a process of determining the system parameters in terms of responsiveness and stability under various loads. The focus of performance testing is checking speed, stability, and scalability of a software program. Performance testing is necessary before marketing any software product. There are a wide variety of performance testing tools available in the market. The tools used for testing depend on factors response time, type of testing, throughput, memory and CPU utilization, language support, browser support, etc. In this paper various performance testing tools are reviewed on the basis of their attributes, types of testing, their advantages and disadvantages [4].

Rijwan Khan and Mohd Amjad This paper includes the importance of performance testing of web applications and analyses the application's bottleneck based on hardware, software and resource utilization. The main focus of this paper is performance testing based on load test.

It has been seen that everyone wants a very fast application, but at the same time, reliability of the application takes an important role; so, customer's satisfaction is the push for performance testing of a given application. Performance testing determines how fast some aspects of the system perform under a pre-defined workload.

The performance testing is calculated by analyzing the production, which comes from the application hosted on the server. The main performance is calculated when business is at its peak by its hits [5].

Reenu Bhatia and Anita Ganpati Load testing is used to monitor the changes in system performance with increase in load to the system. Load testing is a non functional testing which is used to understand the system behavior under a specific expected load. At present there is a huge shift towards web applications and large numbers of tools are available in the market for web application performance analysis. In this paper three load testing tools namely Apache JMeter, Load Complete and WAPT are compared. The main focus of the study is to discuss these load testing tools and compare them on the basis of key parameter called response time. The response time of these tools is compared by varying number of concurrent users. The primary objective is to study these load testing tools and identify which one of them is better and more efficient. In this study it is concluded that in term of response time WAPT has better performance than that of Apache JMeter and Load Complete [6].

Jatinder Manhas This manuscript revises inclination in page consignment time which is an significant part of any website's user knowledge. And various times we'll allow it slide to put up improved Core design plan, new clever functionality or to add more facts to web pages. Unfortunately, website visitors tend to care more about speed than all the bells and whistles we want to add to our websites. Additionally, page loading time is appropriate a more significant thing when it comes to search engine grade [7].

Mohammed Abdul Razack Maniyar et.al. The present study gives an effective approach for Performance testing of Software applications or Products. The bottom-up approach would help in identifying the core Performance bottlenecks in software applications irrespective of technology and specifications. It covers end-to-end including client-server setup. This approach helps in fine-tuning and optimizing the system from software code level to the server level. It also helps in achieving the expectations of the end user with respect to the application interface speed, end-to-end transit times and for more consistent performance. This approach for Performance testing of software applications or products would thus be helpful in identifying the performance bottlenecks at an early stage thereby saving cost and time [8].

#### IV. EXISTING SYSTEM

In Existing System of Performance Testing Tools Script Configuration is less and it cannot support Protocol Adviser. Run time setting also very a smaller amount possessions.

#### V. PROPOSED SYSTEM

In this System we can see the Response time using Transactions and Waste time also will be calculated for the application. Protocol Adviser will evaluate the finest protocol for our script. In Controller will perform Scenario Schedule accordingly we will get Rampup, stedy state and Ramp down data for each Transaction. Analyzer Component will generate the Test Scenario without any vagueness. CPU and Memory Utilization also we will see in the result sector. Web Server, Application Server and Data base Server will carry out most important task in the Application Test.

#### IV. METHODOLOGY OF COMPONENTS

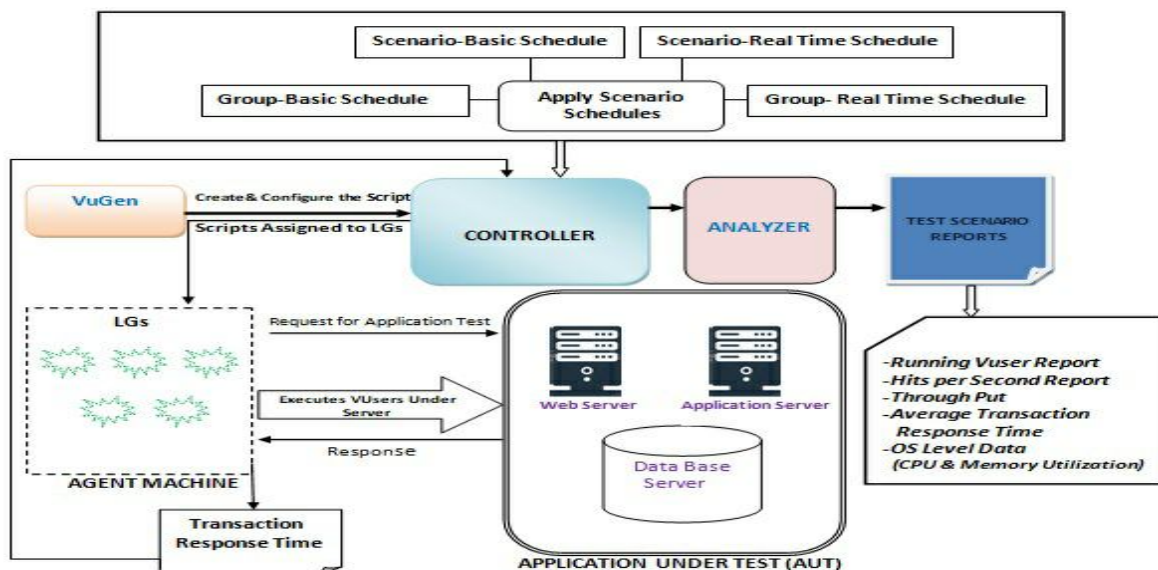


Fig 1: Methodology of Application Performance

Above Diagram designate the Architecture of Measuring Application Performance. Hear VuGen (Virtual Generator) Creates the Script and Configures that Script in to the Controller. Controller also Configure with LGs (Load Generators).Once Scripts are received from the VuGen then Controller will assign each script into Agent Machine.

This is also called as Load Generators. One Script Assigned to One LG. While the Script is being executed by these LGs we apply the Load on the Application Under Test (AUT) i.e. Continuously request will be sent to the AUT. After receiving the request from Agent machine (AM) / LG the Web server and Data Base server will give the response to the Agent machine (AM). Now Agent Machine or LG will be ready to compute the Response time for each Transaction. This computation again sends to the Controller. In this way through Controller we will obtain the Response Time for each Transaction.

Next, we need to configure the Scenario Schedules to the Controller. We have few combinations in Scenario Schedules like Scenario-basic Schedule, Scenario- Real Time Schedule, Group-Basic Schedule, and Group-Real Time Schedule. Based on these combinations Controller will provide the execution for each script. Execution Result will be analyzed by Analyzer. Finally Test Scenario Report will consist of Running Users, Hits per Second of Transaction, Through Put Time, and Average Transaction Response Time for each Transaction. In this way we will measure the Application Performance.

## V IMPLEMENTATION RESULTS

### V.I Response Time with Transactions

#### Insert the Transactions:

To measure the performance of the server, you define transactions. A transaction represents an action or a set of actions that you are interested in measuring. You define transactions within your Vuser script by enclosing the appropriate sections of the script with start and end transaction statements. Vuser Script consists of three parts 1. Vuser\_init 2. Action 3. Vuser\_end. In Action section we can play the Application Script using Virtual User Generator Load Runner Component [3].

Method for Start Transaction: `lr_start_transaction ("Transaction name");`  
Transaction Name indicates any of our Action or script, which is performed by User.

Method for End Transaction: `lr_end_transaction ("Transaction Name", "Status Of Transaction");`  
In End Transaction also we need to provide Transaction name and addition to that we should use Status of Transaction, which provides status of action. Start Transaction should be placed in starting of any action and End Transaction should be placed in End of the Action. In this process we can think of Time also, which gives the Delay caused by the user between two subsequent requests. It will be inserted automatically by VuGen during recording depending upon the Recording Options [8].

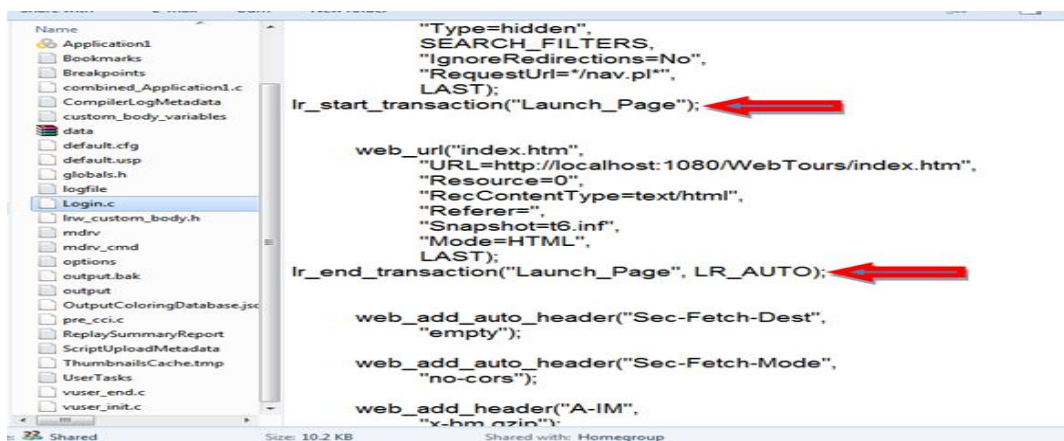


Fig 2: Sample Script/Action using Virtual User Generator

In the Fig 2 diagram indicates Launch page script. This script is executed using Virtual User Generator (VuGen). In this we used start and End Transactions between Launch page script or Action. Fig 3: It shows the script passed status. In Output or View Summary shows the Transaction Response Time for the given Application. That is 0.2619 Sec. It will generate Wasted Time also. In above application wasted time is 0.1607 Sec. This Transaction concept we can apply during the Application Process or After Application Process. So like this we will get Response Time for our Application. In this Controller Component we will perform Scenario Schedule with the help of 'New Scenario' Option. In New Scenario Our All Applications are found in 'Available Scripts' Combo box. We should drag all our Applications into 'Script in Scenario' Text Area. After that 'Scenario Scripts' will be generated.

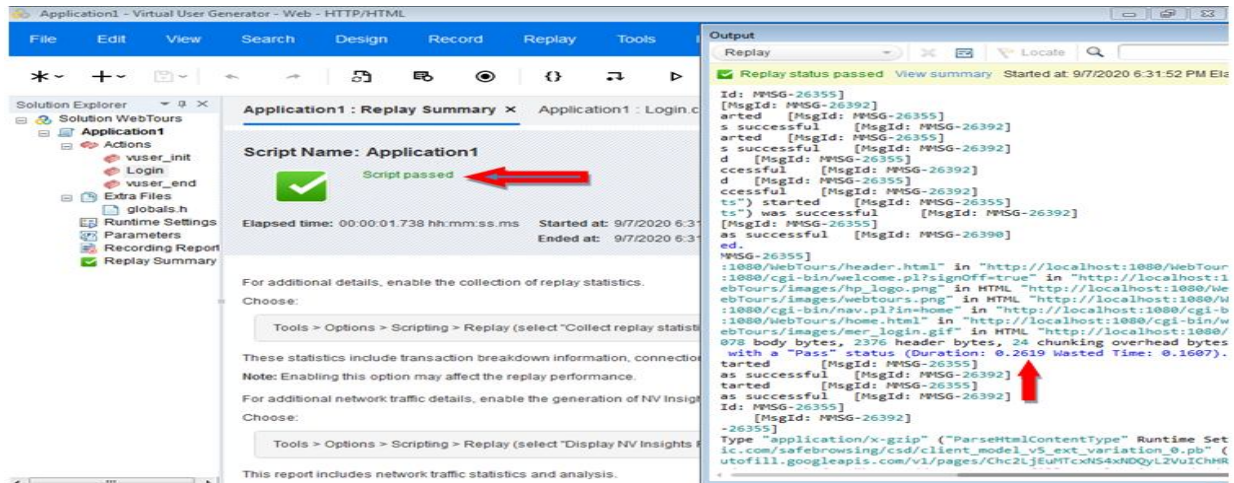


Fig 3: Application Script Passed Status

**VII. Results with Scenario Schedule:**

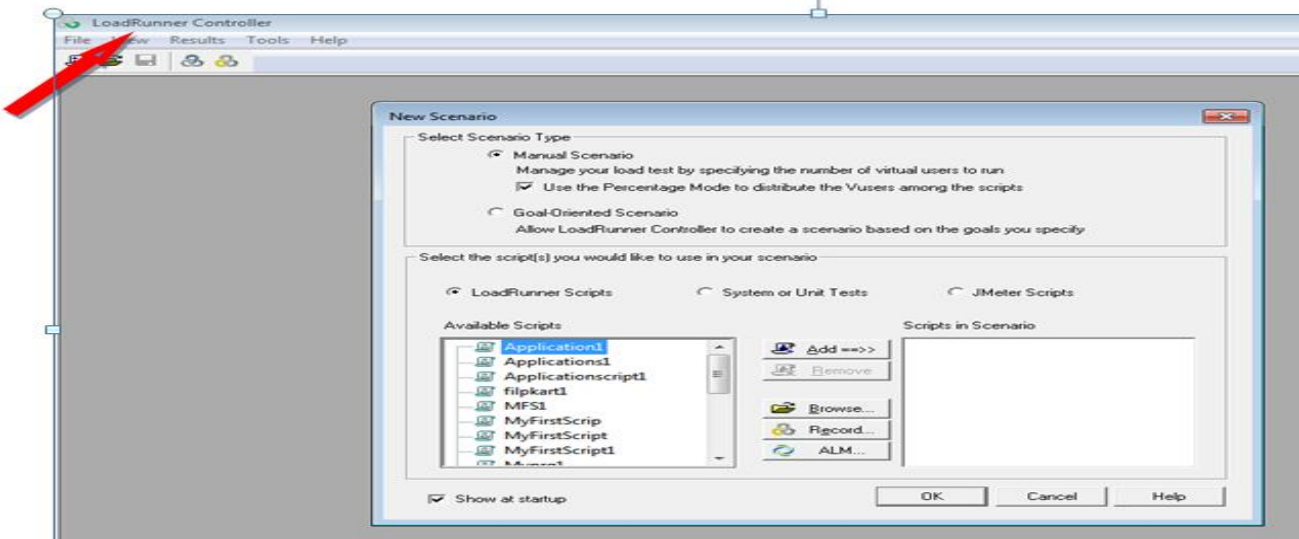


Fig 4: Controller Component in Load Runner

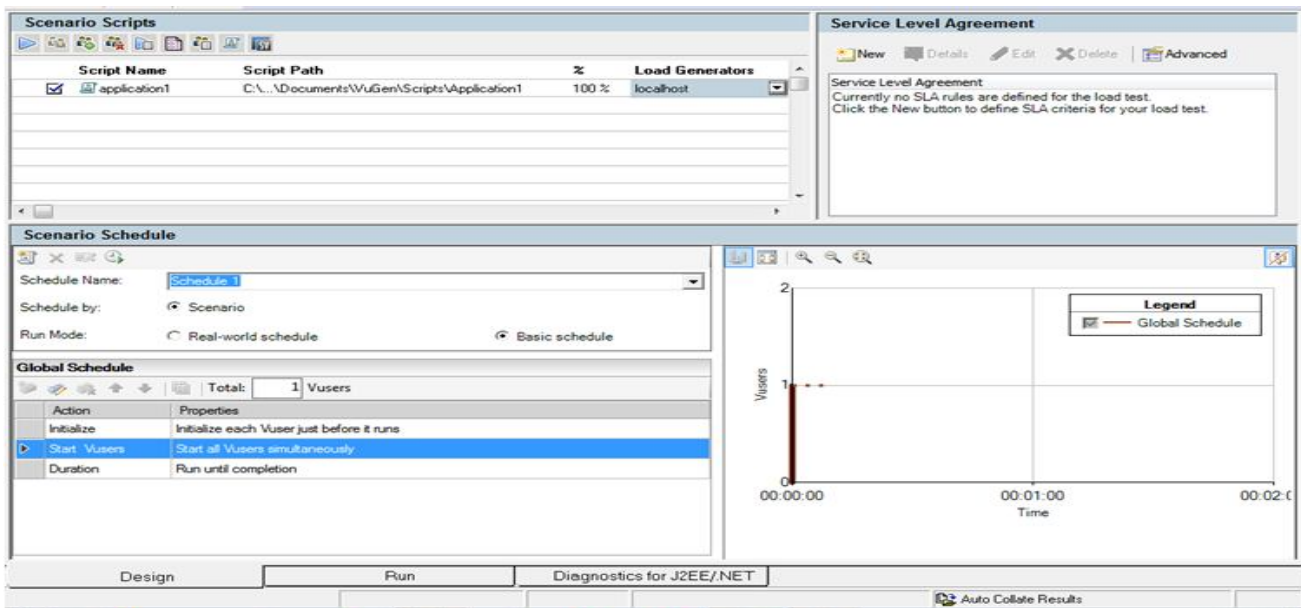


Fig 5: Scenario Script and Scenario Schedule

Above Fig 5 Shows the 'Scenario Scripts' and below it is showing Scenario Schedule. In Scenario Scripts we should configure the 'Script Path' and Configure the 'Load Generators'. Hear Local host is the Load Generator. If we want to change our Application name it is also allowed to the User.

Scenario Schedule: This consist of two categories

### 1. Schedule by and 2. Run Mode

Schedule by Represents 'Scenario' and 'Group' options

Run Mode Represents 'Real world schedule' and 'Basic schedule options [7].

In Scenario Level if we select 'Scenario' and 'Basic' Schedule' we will get One Ramp up , One Steady State and One Ramp down result for our Load Test .If we Choose combination of 'Scenario' and 'Real world schedule' we will get Any number of 'Ramp ups', 'Steady States' and 'Ramp downs' for our Load Test. In Group Level if we select 'Group' and 'Basic Schedule' it will produce different groups of our Particular test scenario.Say suppose if we have 'N' number of different groups in our particular test Scenario then it will define Ramp up, Steady state and Ramp down for all the 'N' numbers of tests.If we select 'Group' and 'Real world schedule' we can perform any number of Ramups, Steady states and Ram downs for each group in the Load Test. A Service Level Agreement will define goals for our load test. During the load test, the Controller collects performance data. Analysis compares this data against the goals defined in the SLA and displays the results in an SLA report.

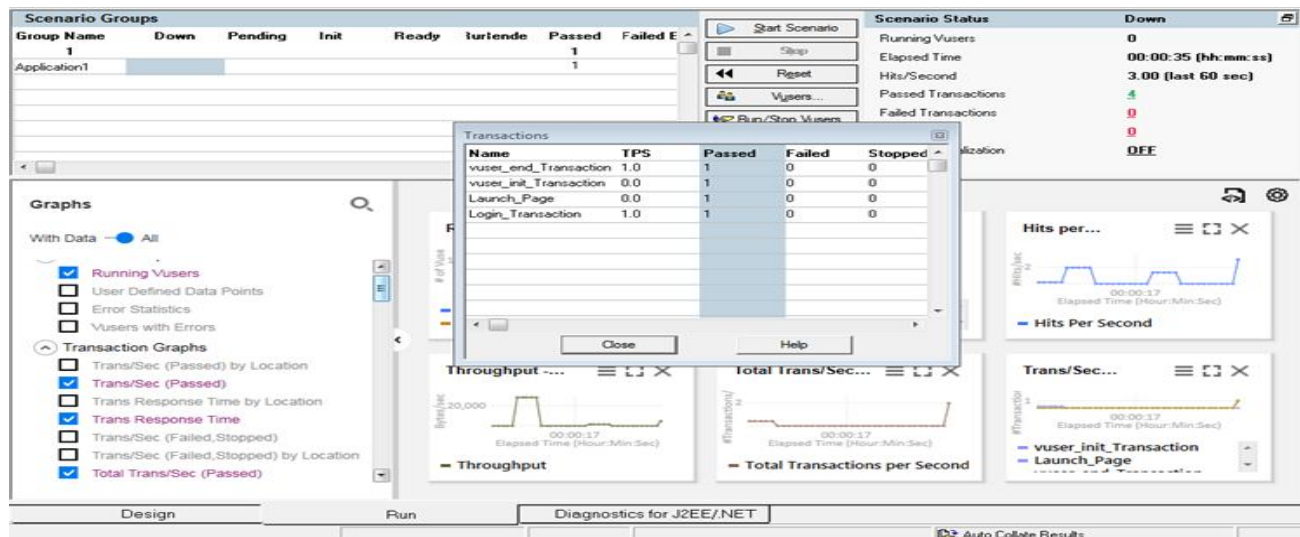


Fig 6: Scenario Schedule Result

Fig 6 shows the Result of Scenario Schedule. It consists of Running Users, Hits per second, Throughput, and Average Transaction Response Time. Virtual /Running Users: Enter a target number of Vusers that you would like your scenario to reach [5]. Hits per second: The number of requests has been sent to the server with in a second point of time is known as Hits per Second. Transactions per second: Enter a target number of transactions per second that you would like your scenario to reach. Transaction Response Time: Enter a target transaction Response time and select minimum and maximum number of Vusers. HTTP Pages downloaded per minute: Enter a target number of downloaded pages per minute and select minimum and maximum number of Vusers for the scenario.

## VI. CONCLUSION AND FUTURE WORK

In this Paper mainly focus on Virtual User Generator Transactions, which Provides Response time of Application/Product. Secondly deliberate on Scenario Schedules, which provides Load Testing for Application, which Analyze Running Vuser Report, Hits per second Report, Transactions per second, Transaction Response Time of Application. In Future work Application will restrain Page velocity with high-quality response and Optimization.

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