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Software Testing
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=> The Process of verifying and validation application functionalities is called as Software Testing.

=> Software Testing will happen in multiple stages

1) Unit Testing
2) System Integration Testing (SIT)
3) User Acceptance Testing

Unit Testing : Testing individual components of the application.

Note: Developers will perform unit testing by using Junit.

SIT : Testing team will perform system integration testing.

Note: Identified bugs will be reported using JIRA.

UAT : User acceptance testing. client or client side team will test our application before delivery (acceptance testing).

Note: Based on UAT client will decide GO or No-GO.

=> Go means it is green signal from client to deploy in production.

=> No-GO means client identified some issues in UAT hence production deployment got cancelled.

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What is Performance Testing ?
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=> It is used to test stability and responsiveness of the application.

1) how many users can access our application at a time

2) For 100 users what is avg response time ?

3) For 1000 users what is avg response time ?
...

4) For 1 lakh users what is avg response time ?

5) What is bottleneck / failure point of our application

Note: To implement performance testing we will use tools.

a) JMETER (open source)

b) HP Load Runner (licensed)

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JMETER
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-> JMETER is a free & open source software given by Apache Organization.

-> JMETER is used for performance testing.

-> Performance testing means the process of verifying stability & responsiveness of the application.

-> How our application is responding for different work loads we can verify using JMETER.

-> Using JMETER we can create virtual users to test our application performance.

-> JMETER is a java based desktop application.

-> Using JMETER we can test performance of any web application.

Note: Before giving project delivery to client we need to submit performance testing report.

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JMETER Setup
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1) Download JMETER software

URL : https://dlcdn.apache.org//jmeter/binaries/apache-jmeter-5.6.3.zip

2) Extract JMETER zip file

3) Go to JMETER bin folder and run "jmeter.bat" file  (it will open JMETER tool)

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Creating Test Plan
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1) Right Click on Test plan

                        - Add Threads
                        - Add Thread Group
                        - Enter Thread/users count
                            : It means if we enter 100 here then at a time 100 requests will go to the application.
2) Right Click on Thread Group   (For sampler)

                        - Add Sampler
                                - Http Request
                                - Add Server IP, Port Number, URL Pattern

3) Right Click on Thread Group (For Listerns)

                        - Add Listener
                                - Add View Results Tree
                                - Add Summary Report

4) Save the test and run the test (filename.jmx)

5) Verify the results (we can change thread group count and we can test it).


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JMETER Best Practise
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-> Create the TEST in GUI mode and run the test in CLI mode.

   Ex:  jmeter -n -t test-plan.jmx -l test-results.jtl

-> After test execution complete we can import JTL file into JMETER summary report to see the test
results.

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Root causes for performance issue
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1) System Resources Very Low

2) Network issue

3) Database Query Execution taking more time

4) Unwanted loops and conditions in code


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Note: Industry Standard Avg response time for a request is 3 secs.
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Note: Listener is used to define how the APIs are responding , Request is successful or not, Average responding time we can Monitor through JMeter.

If we are using GUI mode then the details will be directly printed on screen, If we are using CLI mode then the details will be stored in a file then we can import it in the JMeter desktop and can view the details.

Through Sampler we can test the apis, at a time we can test one APIs.

We can see the request and response in JMeter GUI, click on HTTP Request the we will be able to see Sampler result, Request, Response Data.

Possible Content Types
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application/json(For JSON data)
application/x-www-form-urlencoded(FOr Form data)
multipart/form-data(For File upload)
application/xml(For XML data)