CHAPTER 9

CONCLUSION

# 9.1 Summary & Recommendations

Adaptive Lifecycle Management is a structured methodology geared toward ensuring successful implementation of automated testing. The ALM approach mirrors the benefits of modern rapid application development efforts, where such efforts engage the user early in the development cycle. The user of the software product is actively involved throughout analysis, design, development, and test of each software build, which is delivered in an incremental fashion may be called as beta versions.

Many organizations have adopted the ALM. Many companies have adopted the book and ALM as their company standard for automated software testing. Others believe that industry automated tool vendors will soon be incorporating the book's structured methodology within their tools. Instead of performing the entire test lifecycle haphazardly, software managers will use an ALM-compliant test tool that automatically supports (and possibly enforces) the book's sound building-block approach to the test effort.

Almost all of the modern cloud or API applications are developed in the new micro-services architecture, there are certain factors or requirements the application should closely adhere to make sure it is cloud ready or can be used to easily expand and change services/behaviours as per market demand. These standards help us achieve applications to be in sync with the cloud computing definition from NIST as closely as possible to be used and deployed on a cloud infrastructure.

A Practical implementation of Adaptive automation system by setting up Automated Build System with Continuous Integration and Continuous delivery is demonstrated using setting up (deploying) Free/Open source Software (Jenkins) over cloud for accomplishing multiple tasks such as triggering software build as soon as check-ins made in repo, or then running unit tests, Code Coverage and Static Code Analysis and parsing code for bugs, running integration tests etc. As there are many plugins freely available, if configured properly it encompasses (approaches to) adaptive learning as per environment and schedule.

This research continue demonstrating patterns used in adaptive automation testing. It includes continuously Learning, Speculate and Collaborate, Spiral model have Plan, Build and Revise continuously. It can be understood with Complex Adaptive Systems Theory. It includes Adaptive Software Development with conceptual perspective and particle perspective. CAs have concepts of Emergence, Complexity and Quality.

Rapid Application Development can be used for adaptive development because it’s iterative, time boxed and change tolerant.

Adaptive S/W development management has polices namely Passive and Active Management and Leadership-Collaboration Management. Adaptive Automation Testing have some patterns named as Data Patterns, Technical Patterns, Proxy Patterns, Business Patterns, Page Object Patterns, Façade Patterns, Factory Patterns, and Singleton Patterns.

There are some tools and technologies available to achieve results on Run Time Dynamic Adaptive Automation Testing (RTDDA). These tools are mainly divided in two categories Free/Open Source Tools and Commercial Tools. There are some tools used for cross platform testing, Hence in the list of many tools there should be strategy to choose right tools on the basis of Market research, Experts View and Personal Experience. Sometime if required tools may be developed in-house.

A study of Adaptive Algorithm is done used to develop adaptive software algorithms and tools mainly categorized in Heuristic Strategy and Fuzzy Logic.

# 9.2 Customized adaptive algorithm for taking decision in run time dynamic networked cloud storage environment.

Step 1: Collect maximum possible parameters or variables (System Environment) need to run/execute the system.

Stop 2: Define set for variables, based on components and functionalities.

Step 3: Collect the variables in Set or arrange them in group.

Step 4: As there will be large number of set, and different states of variables so apply Heuristic Evaluation Functions to calculate the cost of optimal path between two states.

Step 5: Every set will become a node so apply pure heuristic search, in which nodes will be expanded as per their heuristic values. This step will result a list of unique shortest paths between nodes and dispose long paths.

Step 6: Now apply Best First search to get the cost of path with cost of goal. By using priority queue, it will return optimized weighted cost.

Step 7: As nodes in networked dynamic cloud storage environment has various sizes and capabilities; hence next fuzzy logic will be applied which works on the levels of possibilities of input to achieve the definite output.

Step 8: To get acceptable reasoning and overcome the uncertainties, covert node values in fuzzy sets called a fuzzification.

Step 9: Convert/arrange fuzzy sets into logical constructs, decision making statements.

Step 10: Evaluate and combine results with the help of (Inference Engine).

Step 11: Then output data need to be converted back into non-fuzzy values. (Called as de-fuzzification)

Step 12: Repeat Step 7 to 11 for all data sets.

Step 13: Repeat Step 4 and 5 if required and there is a larger set of data.

Step 14: Go to step 2 to check if any data/functionality is remaining. Follow step 3 onwards if necessary.

Step 15: End of execution of Adaptive Algorithm in dynamic environment.