AUTOMATED NETWORK FAULT INFERENCE TOOL (ANFIT)

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Executive Summary Report

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INTRODUCTION

The lack of specialized experts in diagnosing network faults, inconsistencies of diagnose results and professional opinions, time-consuming and growing complexity of this task; has motivated the development of our **Automated Network Fault Inference Tool (ANFIT).** Fixing network related problems in a timely manner requires methodical troubleshooting techniques. These issues has encouraged us in coming up with a simple, automated and extensible network fault diagnosing tool that is user-friendly to different type of users; be it the normal network users or the advanced users such as the network experts or professional support teams respectively. This system aims to serve as an intelligent diagnostic system that will be able to produce fast, accurate, user-friendly and appropriate suggestions. However, at present we narrow down our focus on Web Service application but by all means encouraging and welcoming the extension to other network services or adding in new test cases as future development for the benefit of all network users.

OBJECTIVE AND SCOPE

- To assist users in detecting problems why they cannot access certain web sites by diagnosing the network and display out the error messages.
- To provide users with simple and practical suggestions where necessary.
- To integrate isolated yet related existing probing tools/applications into one unify Web Service tool.
- To produce a tool that is understandable and workable to users with varying degrees of skills.
- To enhance knowledge gain by comprehending profoundly on how the normal network behavior actually works in term of Web Service application.
- To initiate a tool that can serve as a huge community supportive due to the extensible framework of the system.

Due to the complexity of the project and the broad range of application services offered by the Internet, the group had to agree on to narrow down the scope of the project; which focusing only on the Web Service and no other types of Internet applications such as File Transfer Protocol (FTP) or email. The final output, which is the error messages that will be displayed by ANFIT will only provide a result illustrating where the network has gone wrong based on the Problem Categories which comprises of Local Host Problem, Network Problem, DNS Problem, Reachability Problem and Remote Server Problem. ANFIT also gives simple suggestions in command line form, not detailed solutions for troubleshooting.

METHODOLOGY

This project is designed upon case-based diagnostic approach as it suggests the use of previously experienced, concrete problem or cases instead of rules or modelling queries evaluation. We incorporated the use of failure scenarios (cases) as guidelines to develop ANFIT.

Users will need to enter the URL of the web page that they are having problem as input to ANFIT. Prior to that, they are required to provide their user level, either a normal Internet user or the advanced user in order for ANFIT to supply the appropriate error messages to

them accordingly at the end of the session. These pertinent information will then be passed to Framework which is the heart of ANFIT as here lies the inference engine. The mechanism that involved is that all the relevant information to be processed in this inference engine are based on the inference table which comprises a set of diagnostic tests, problem layers and the mappings of diagnostic results and decisions. Besides being the central repository of all the results obtained from executing the diagnostic tests, Framework also functions as the inference engine that decides whether or not to launch the further detailed diagnostic test for the particular problematic layers. The results of these thorough diagnostic tests will then again be sent to Framework as to allow the final mapping of error codes to the corresponding error messages. Eventually, these error messages or warning messages (where necessary) generated by Framework will be displayed to the users as based on their user level which will inform them the cause of failure to obtain a web page that has been detected by ANFIT.
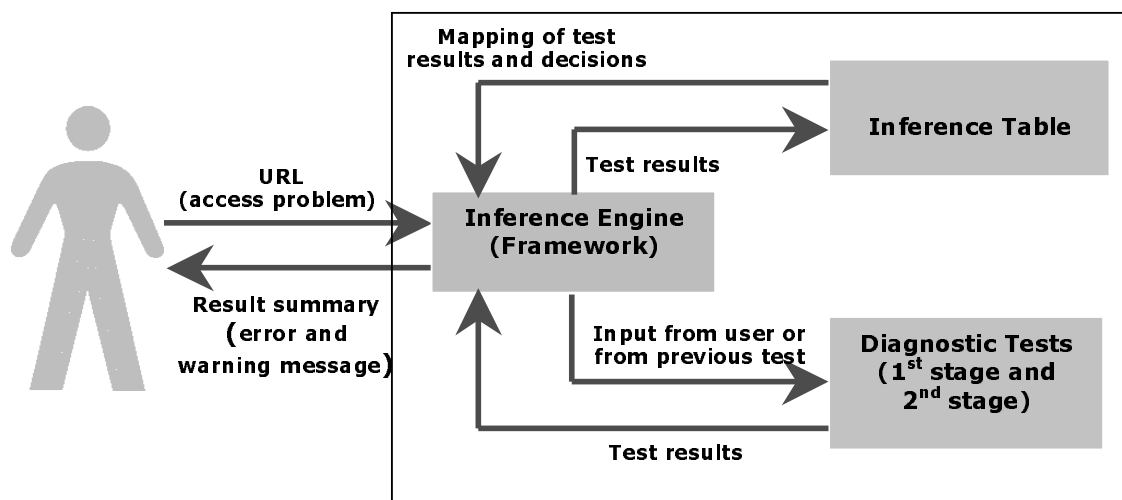
ANFIT Overview Diagram

RESULTS

To measure the success of the system, four Key Performance Indicators (KPI) have been identified as evaluation metrics which are coverage, accuracy, time and response. Hence, unit testing, integration testing and usability has been conducted to obtain the assessment results

CONCLUSION

In order to come out with this solution, the group has embarked on a course of researching and studying on the normal network behaviour on how different things are working together in order to obtain a Web page. We then gather and understand how the existing technical implementations, algorithms and protocols that are associated to the network actually operate. Subsequently, we then determine a set of possible failure cases that may occur in the network followed by figuring out the set of diagnostic tests that can be executed in order to reveal the failures. Some of the related and appropriate protocols, tools and technologies are then adopted and customized to our project needs. All these initial preparations then encourage us in a great deal of coming out with the inference table which is the heart of the project. After all are set, we then automate those set of different diagnostic tests into code where we then sum up everything with the displaying out of different error messages to the different level of users in a command line form.