Micron Probe Auto Scheduling System Predictive Optimiser and Real-time Troubleshooter

IE3100R System Design Project AY2023/24

Department of Industrial Systems Engineering and Management

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1. BACKGROUND

Probe Auto Scheduling System (PASS) is a system that automatically generates optimised short term tactical planning and scheduling for probe, taking into consideration all the inputs from planning, probe, and engineering team into one integrated plan for better clarity, and efficiency in scheduling.

2. PROBLEM STATEMENT

Issues may arise when PASS did not schedule a lot as expected. This may be due to the failure in full filling conditions such as high probe plan score or priority status. Reasons for these issues need to be further assessed and new scheduling logic in PASS will be released to better handle the lots and tools assignment under similar situations. However, developers are unable to validate the result of the new scheduling logic. Apart from this, improvements are required to make it easier for users to identify critical lots to handle and available tools to use.

3. CURRENT APPROACH

Developers will wait until the next occurrence of similar issues to validate the new logic result. Otherwise, they will reproduce the scenarios in the production line, which consumes significant time and resources. Additionally, it relies heavily on the log files generated by disparate components of PASS, which makes it difficult for comprehensive analysis. The current dashboard is driven by lots and without priorities. All tools are shown no matter whether there is available load ports to use.

4. SOLUTION REQUIREMENT

PASSPORT aims to provide PASS a controlled environment like a simulation where developers can retrieve historical data and replay the scenario of the issues, therefore allows them to validate the output of the modified PASS.

5. KEY TECHNICAL SKILL SETS

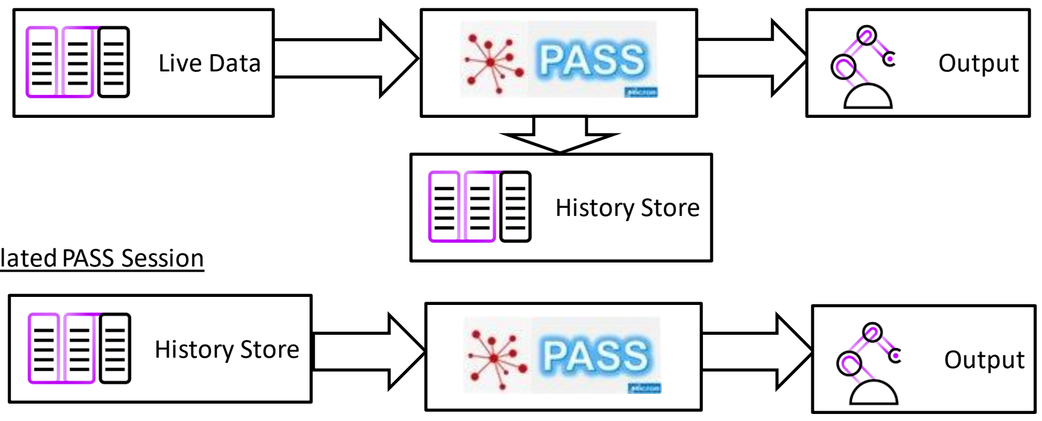
python™ tableau SQL Obsidian

6. SOLUTION METHODOLOGY

Predictive Optimiser

<u>Regular PASS Session</u>

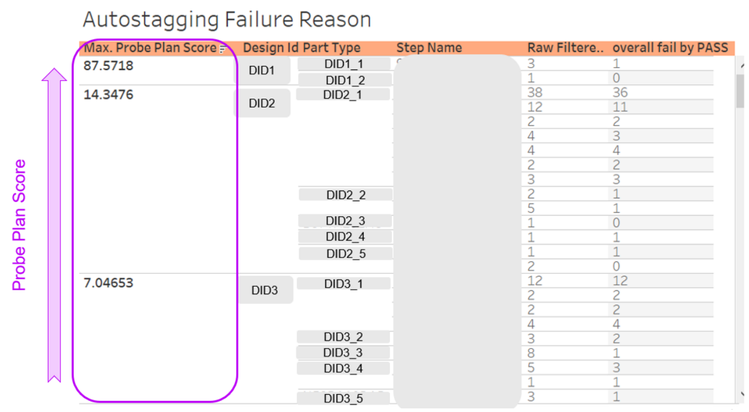
<u>Modified PASS Session</u>



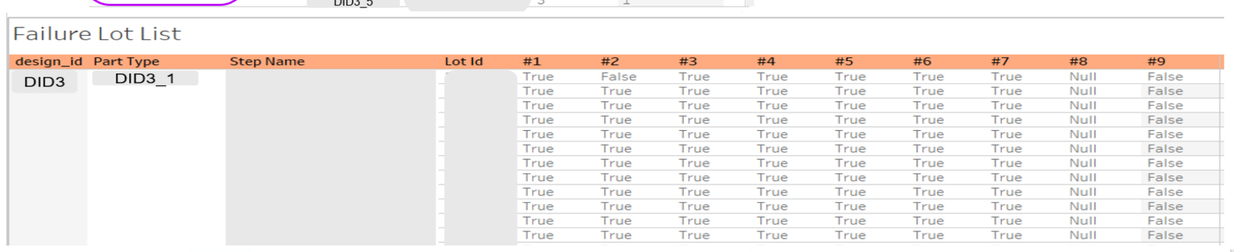
PASS will query live data and will generate an output. The current state of PASS is unable to recover the live data to revisit a time period or replay a scenario.

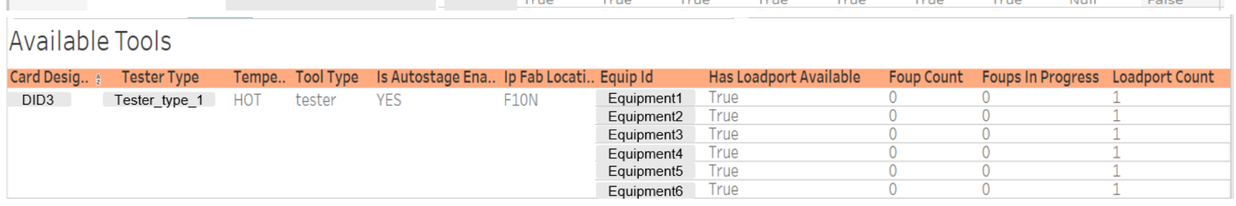
To preserve historical data, simulation will modify PASS to generate history and make a copy every time it runs. To rerun the scenario, history copy is feed to PASS, which allows the developers to study the system.

Real-time Troubleshooter



For dashboard, lots will be sorted by prob plan score which indicates lot priority. Tools without available load port will be filtered out.





7. RESULRS DELIVERED

12 hrs potential save

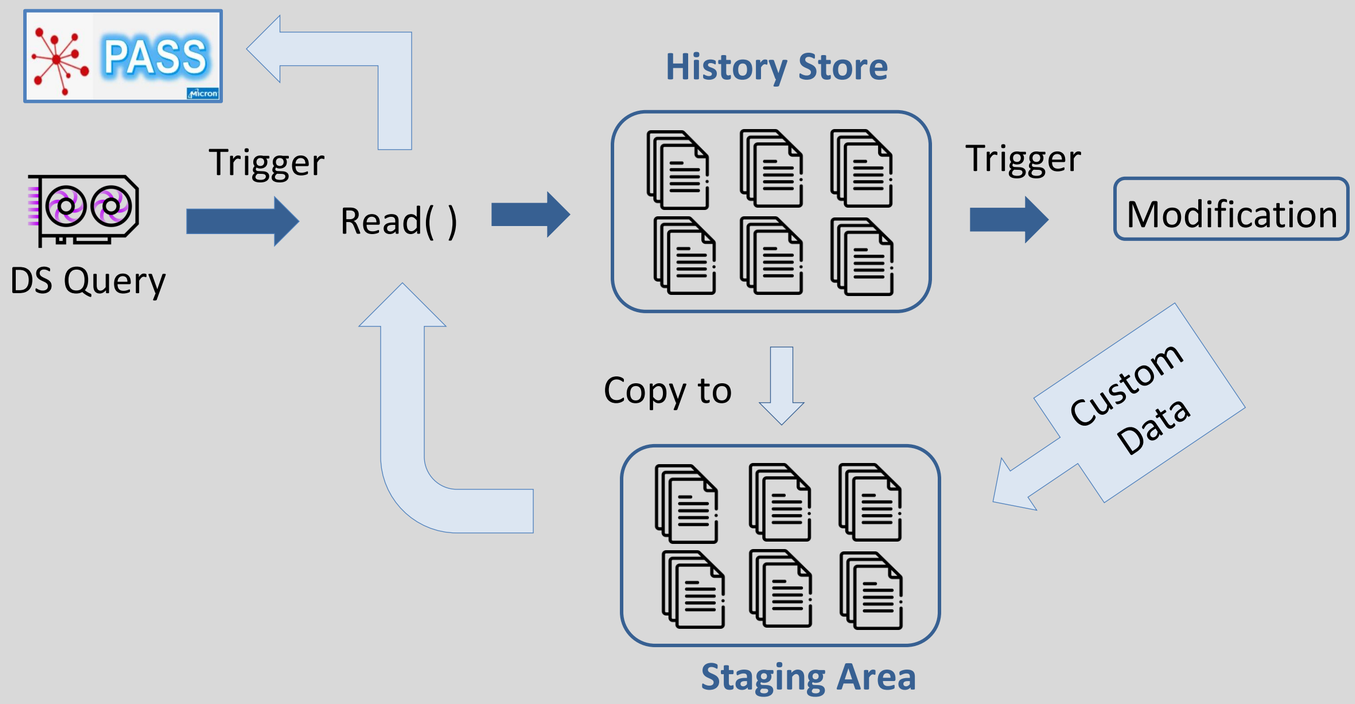
The simulation tool allows the PASS developers to retrieve historical data and identify issues. This results in an average 12 hours of time saved per incident. Timeline for incident is shown:

- Day 1: Carrier got stuck, PASS developers start to fix on the issue.
- Day 2: Released fixed version of PASS without validation.
- Day 3: Carrier still got stuck.
- Day 5: Release another version of PASS.

However, with simulation, the issue can be resolved in only 2 days, with a 60% time saved.

Additionally, dashboard allows users to identify critical lots and find available tools, which improved the efficiency in lot arrangement.

8. FUTURE DIRECTION



Simulation data customisation: allows users to modify or create new scenarios by creating a staging area for data sources to test new features of the PASS.