

Assembly & Test Routing Automation

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Project Overview

Company Background

- Founded in 1919, Halliburton is one of the world's leading providers of products and services to the energy industry
- Operates in two main segments: Completion and Production and Drilling and Evaluation, in over 70 countries

Project Background

- Method Analysts create routings based on established procedures and standards that assist in establishing production times for parts/assemblies

Problem Statement

The current assembly and test routing process is:

- **heavily reliant on human intervention**, needing to cross reference multiple platforms to gather key information on test fixtures, tooling and drift
- **prone to human error** and critical items are often overlooked during routing creation

As a result, missing fixtures and tooling can lead to:



costly production stoppages



significant delays and inefficiencies

Objective

Develop a centralized platform: create a **unified, easy-to-access platform** that **consolidates key information**, enabling Method Analysts to **efficiently reference during routing creation**

Key Skillsets Acquired



Python



Excel

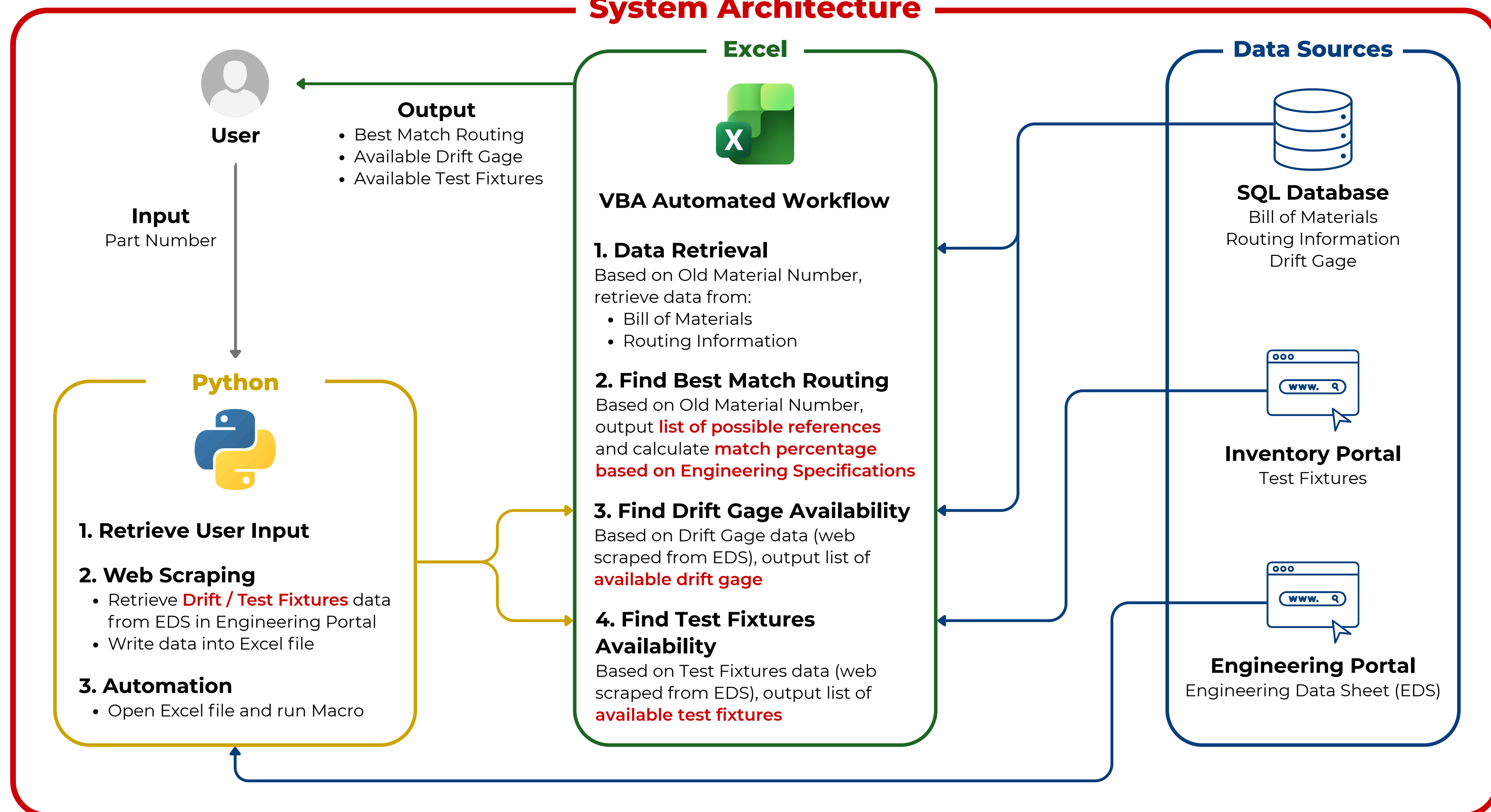


VBA

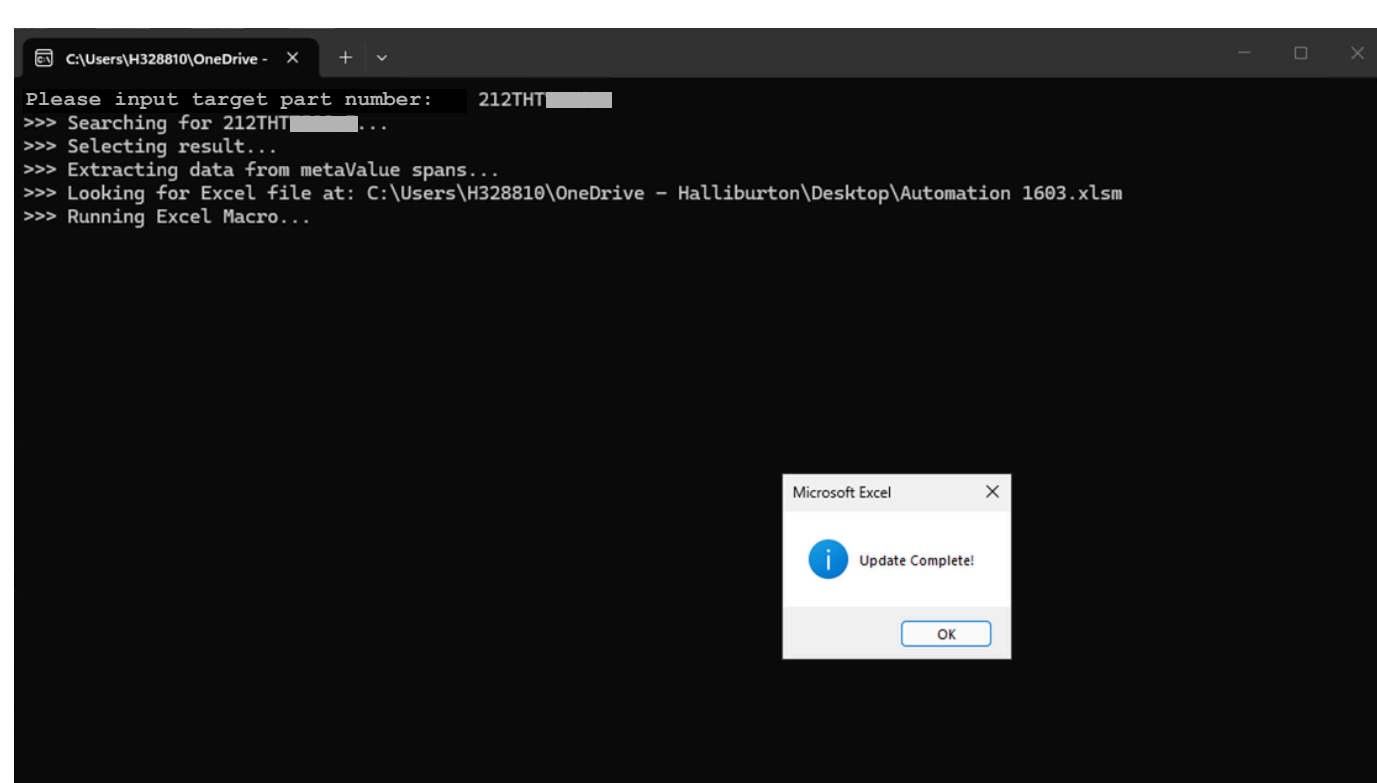


SQL

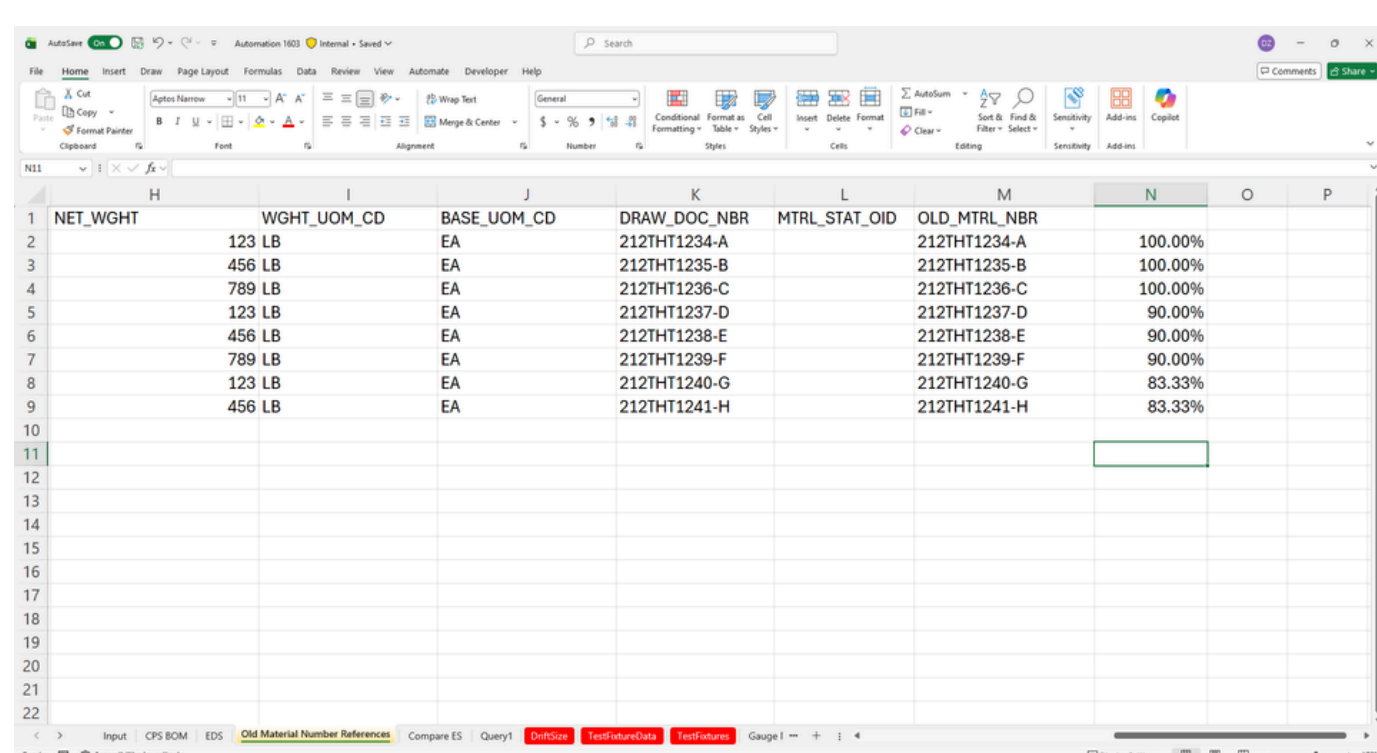
System Architecture



Project Implementation



Python Executable File



Automated Excel File

Project Outcome

Key Achievements

- Successfully designed and implemented a centralized platform that:
 - Integrates key information on test fixtures and drift
 - Recommends most relevant existing routings from the same part family
- Successfully streamlined routing creation workflow through automation
 - Web scraping using Python
 - Automation using VBA

Project Benefits

- Eliminated the need to cross-reference multiple platforms, reducing:
 - Risk of human error
 - Likelihood of missing critical items during routing creation
 - Likelihood of costly production stoppages, delays and inefficiencies
- Reduced effort and time for routing creation by providing analysts with a strong starting point through recommendations
- Improved operational efficiency through time savings of up to 30 minutes per routing

Future Direction

Limitations

1. SQL Database contains EDS data except Drift and Test Fixtures data
2. Current solution does not cover all part families
 - a. Part Number is not standardised
 - b. EDS schema is not standardised

Recommendations

1. Include Drift and Test Fixtures data in the SQL Database so that the Python web scraping process can be eliminated
2. Scale the solution further to cover the cases of various part families