
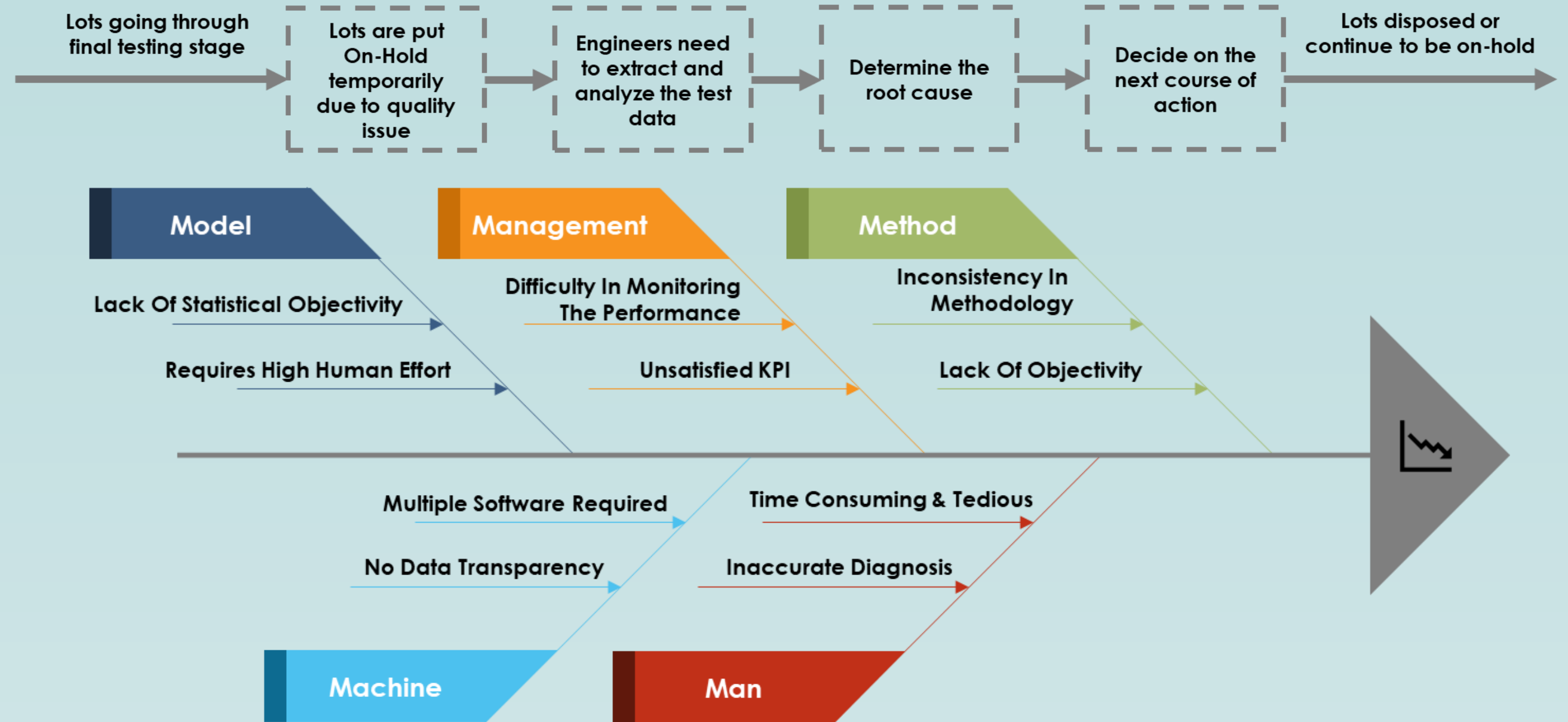


## 1. Background

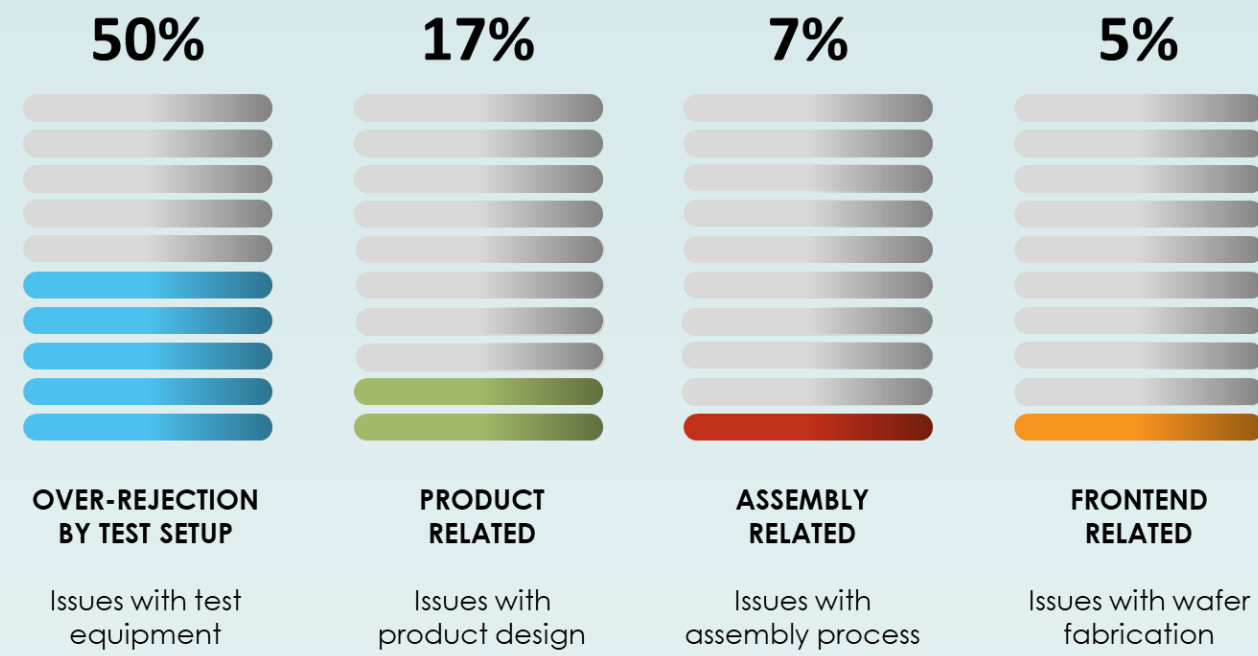
- ❖ **Infineon Technologies:**
  - A world leader in semiconductor solutions
  - Asia Pacific headquarters located in Singapore
- ❖ **Product Test Engineering (PTE) Department:**
  - Final gate of defence in the entire semiconductor manufacturing process
  - Primarily responsible for the final testing of products
- ❖ **Semiconductor Manufacturing Process:**

- ❖ **Lot-on-Hold (LOH) Diagnosis:**
  - Lots are put on-hold temporarily if they fail any test
  - Product Engineers need to analyze the lots to decide on the root cause of test failure and subsequent action

## 2. Problem Drivers



## 3. Objectives

- ❖ To develop an intelligent software that automates the LOH diagnosis process
- ❖ To improve efficiency and accuracy of current process
- ❖ To cover 80% of LOH, due to these four main reasons:



## 4. Methodology

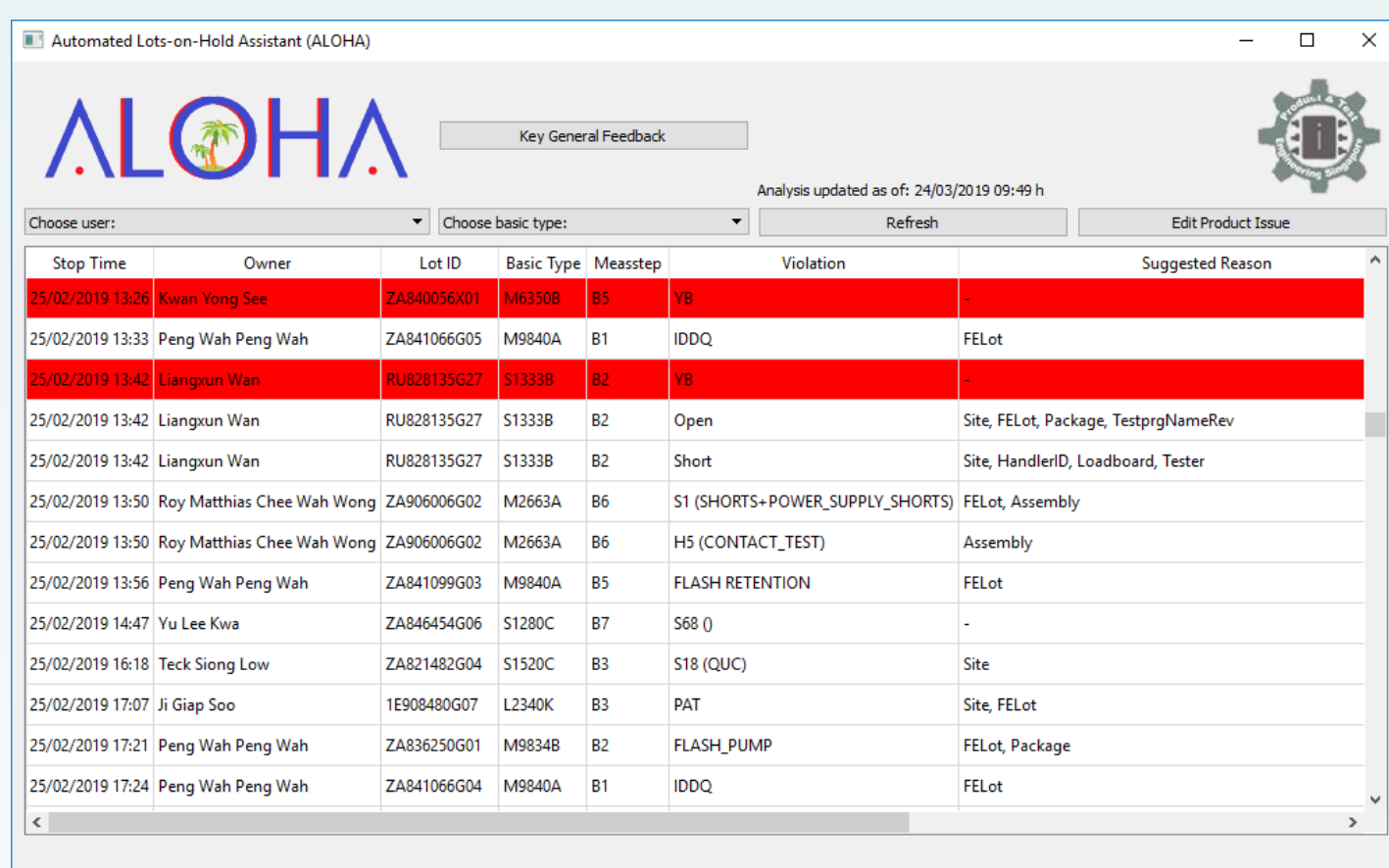


## 5. Deliverables

### Automated Lots-On-Hold Assistant (ALOHA)

#### Frontend Graphic User Interface (GUI)

##### Dashboard

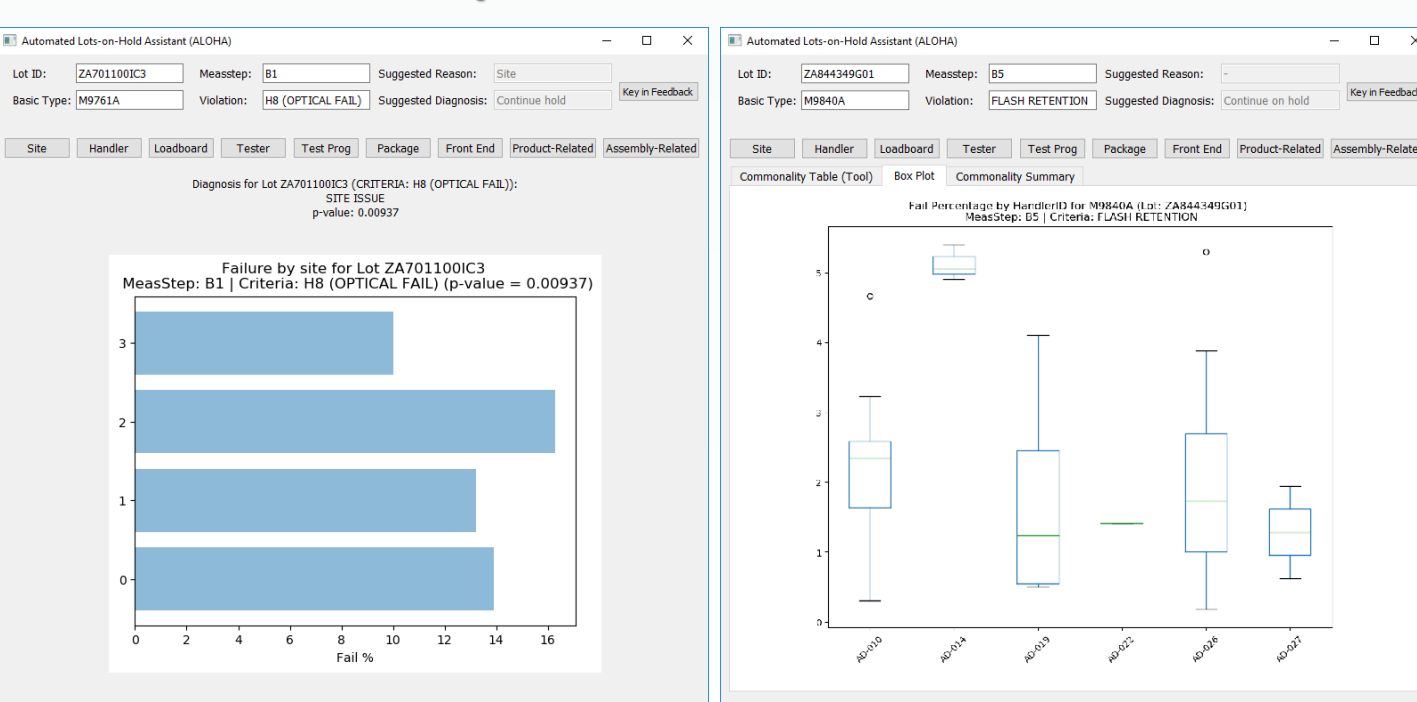


Stop Time	Owner	Lot ID	Basic Type	MeasStep	Violation	Suggested Reason
25/02/2019 13:02	Kwan Hong Jee	ZAB4002491	M984DA	B1	IS	FELOt
25/02/2019 13:33	Peng Wah Peng Wah	ZAB41096605	M984DA	B1	IDOQ	FELOt
25/02/2019 13:42	Liangrun Wan	RUR28135627	S1333B	B2	Open	Site, FELOt, Package, TestprgNameRev
25/02/2019 13:42	Liangrun Wan	RUR28135627	S1333B	B2	Short	Site, HandlerID, Loadboard, Tester
25/02/2019 13:50	Roy Matthias Chee Wah Wong	ZA906006002	M2663A	B6	S1 (SHORTS-POWER,SUPPLY,SHORTS)	FELOt, Assembly
25/02/2019 13:50	Roy Matthias Chee Wah Wong	ZA906006002	M2663A	B6	H5 (CONTACT_TEST)	Assembly
25/02/2019 13:56	Peng Wah Peng Wah	ZAB41099903	M984DA	B5	FLASH RETENTION	FELOt
25/02/2019 14:47	Yu Lee Kwa	ZAB4454606	S1280C	B7	568 ()	-
25/02/2019 16:18	Teck Siong Low	ZAB21482004	S1520C	B3	S18 (IDQC)	Site
25/02/2019 17:07	Ji Gao Soo	1E908480007	L2340K	B3	PAT	Site, FELOt
25/02/2019 17:21	Peng Wah Peng Wah	ZAB39230001	M9834B	B2	FLASH_PUMP	FELOt, Package
25/02/2019 17:24	Peng Wah Peng Wah	ZAB41066604	M984DA	B1	IDOQ	FELOt

##### Dashboard functionality:

- ✓ Filter by User ID, Basic Type
- ✓ Refresh tab
- ✓ Edit Product Issue tab for user input from product catalogue
- ✓ Columns to suggest LOH reason and disposition

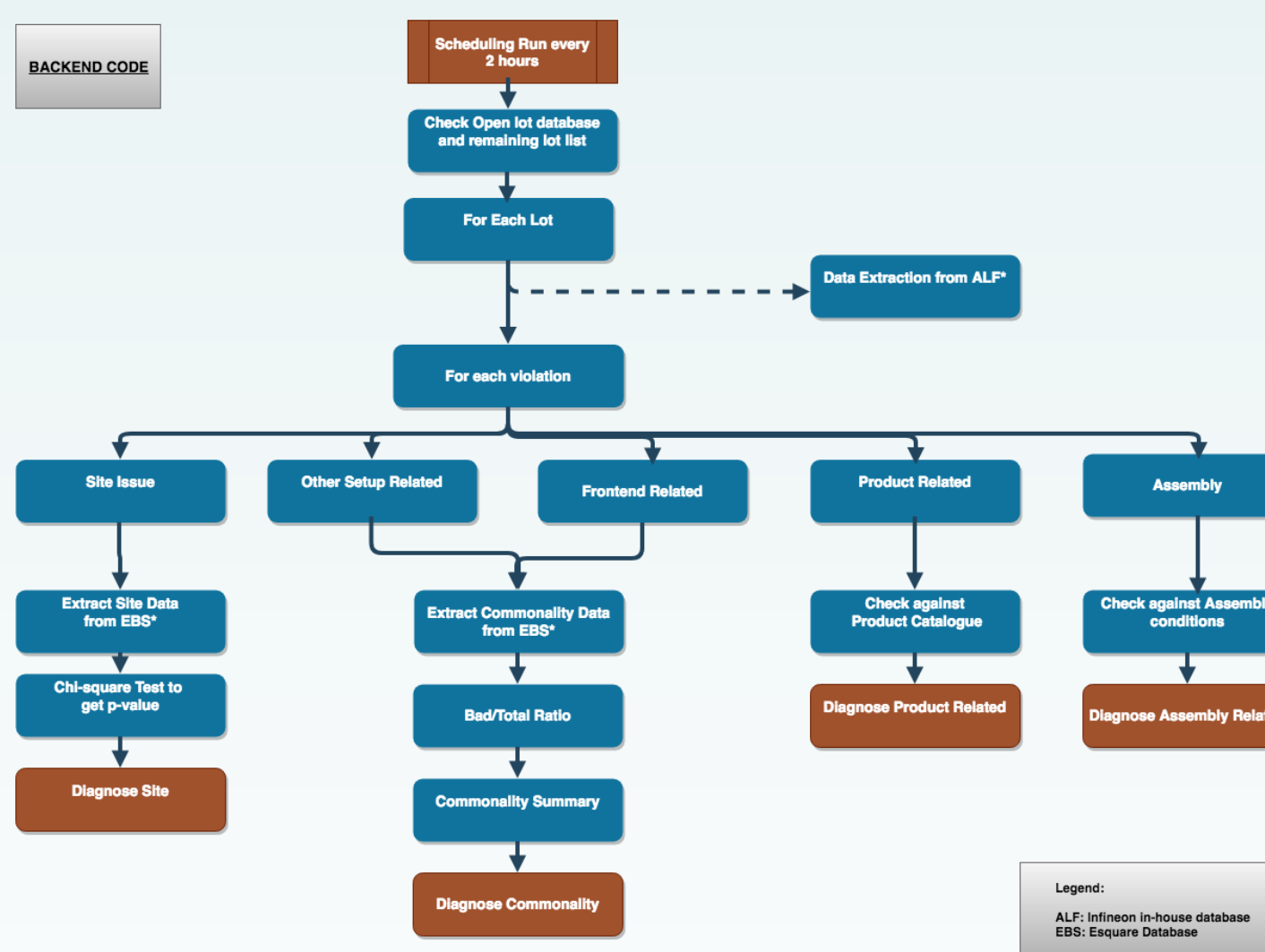
##### Individual analysis window for each lot



##### Individual window functionality:

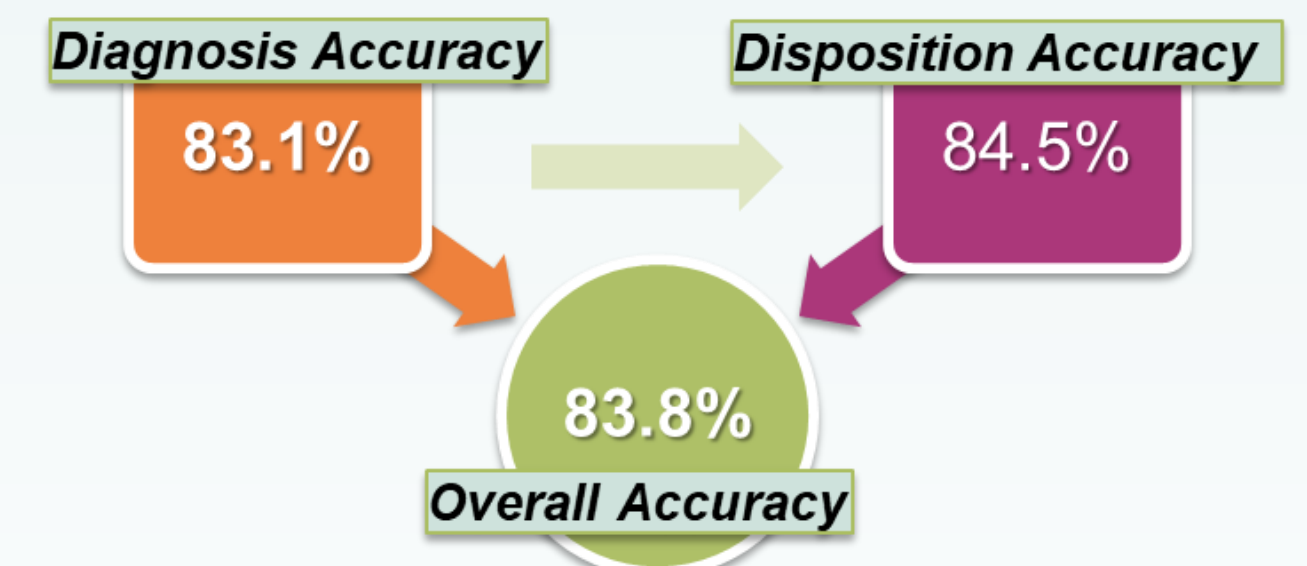
- ✓ Different tab for different diagnosis
- ✓ Commonality table, bar plot and box plot for visualization of analysis
- ✓ Output message for Assembly and Product Related issue

#### Backend Code



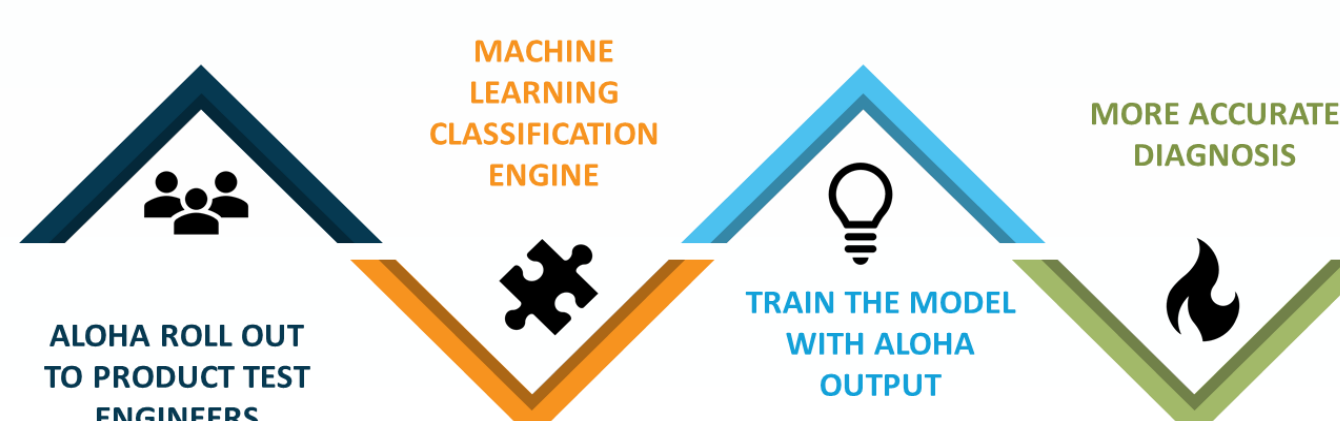
## 6. User Acceptance Testing (UAT)

- ❖ Software was piloted on selected engineers from 22<sup>nd</sup> Jan 2019 to 1<sup>st</sup> March 2019
- ❖ During the UAT period, the backend code was scheduled to run 24/7 and pilot engineers were tasked to use the GUI for their daily LOH diagnosis
- ❖ UAT Target: Accuracy of software diagnosis  $\geq 80\%$ .
- ❖ UAT Results:
  - ✓ 1143 lots analysed by software during UAT



## 7. Achievement and Future Development

- ✓ Software will be rolled out to the entire Singapore test site on 1<sup>st</sup> April 2019
- ✓ Improvements to software were made based on users' feedback during UAT
- ✓ Future Direction: Preparation for Machine Learning



## 8. Conclusion

### Skill-sets acquired in the System Design Project:

