Design Review 2

TLD WorkerBee
Mentor: Austin Sanders

Austen Christensen
Morgan Lovato
Wei Song

Introduction

- Time Limited Dispatch
  - Engine Control Unit
  - Data Dump

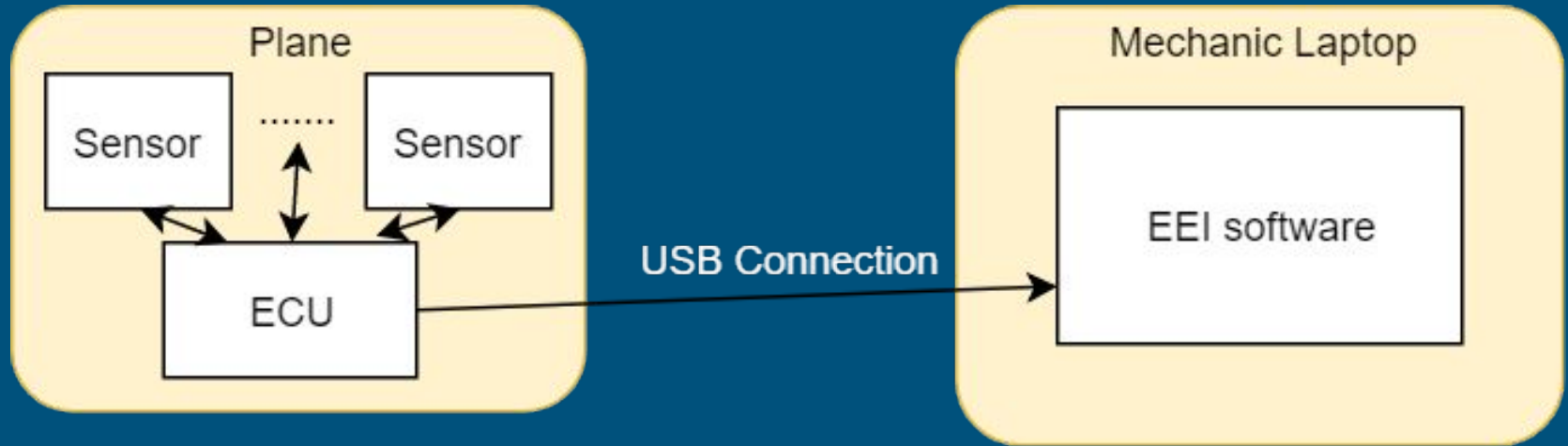- Preventative Maintenance

Harlan Mitchell

- Graduated from NAU in 1997 with a degree in Computer Science
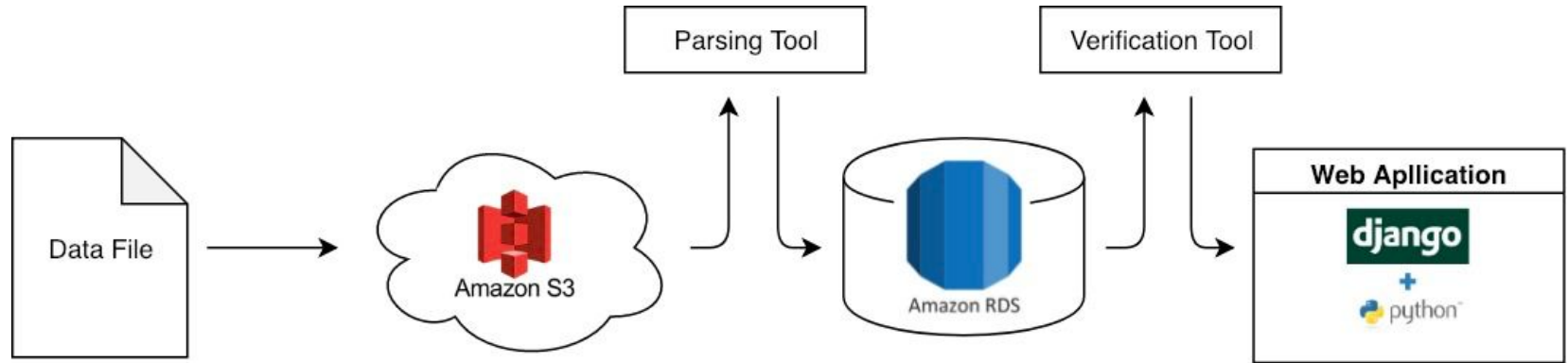- Systems Technical Manager at Honeywell

Current Process

Proposed Solution

Requirements

[P-SYS3] The web viewer tool shall create a MD5 hash value based on the data after receiving it from the cloud.
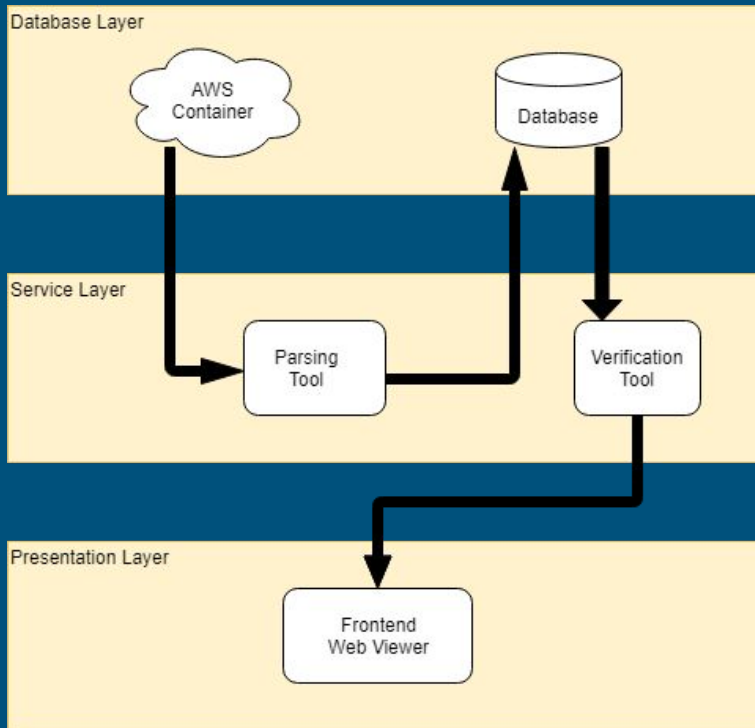
[P-SYS4] The web viewer tool shall validate the data by comparing MD5 hash values

[F-SYS1] The web viewer tool shall download the raw data file from the cloud to the user's computer upon user's request.
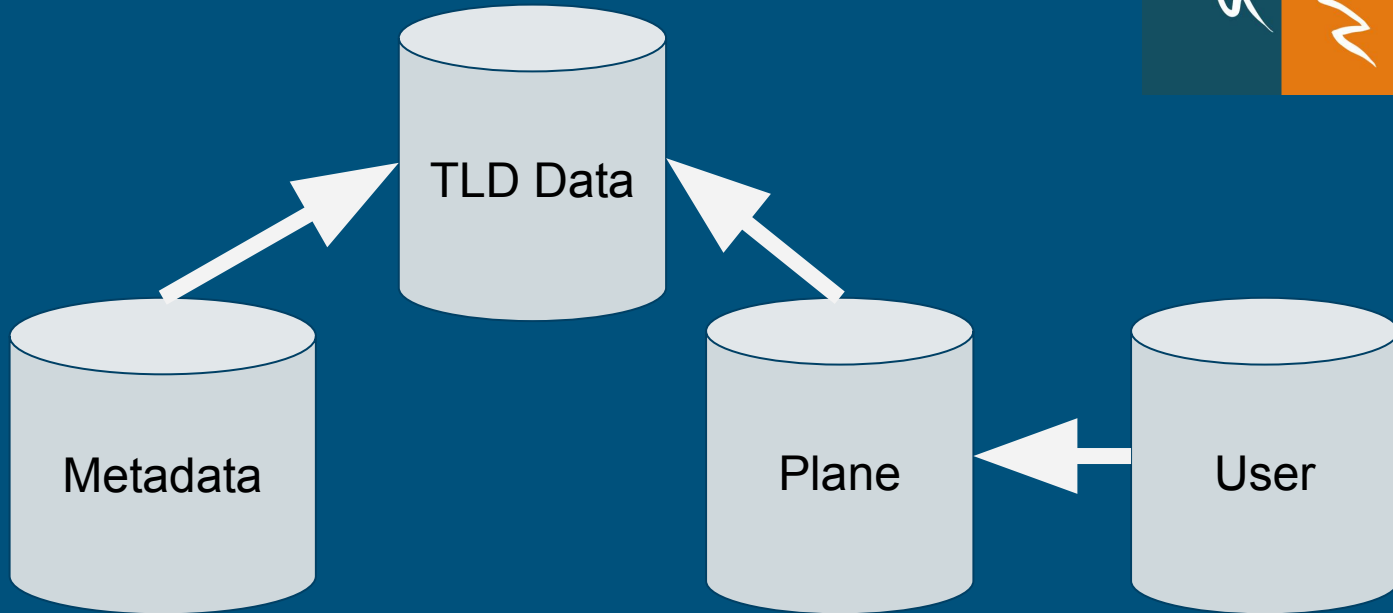
Architectural Overview

Model View Presenter:
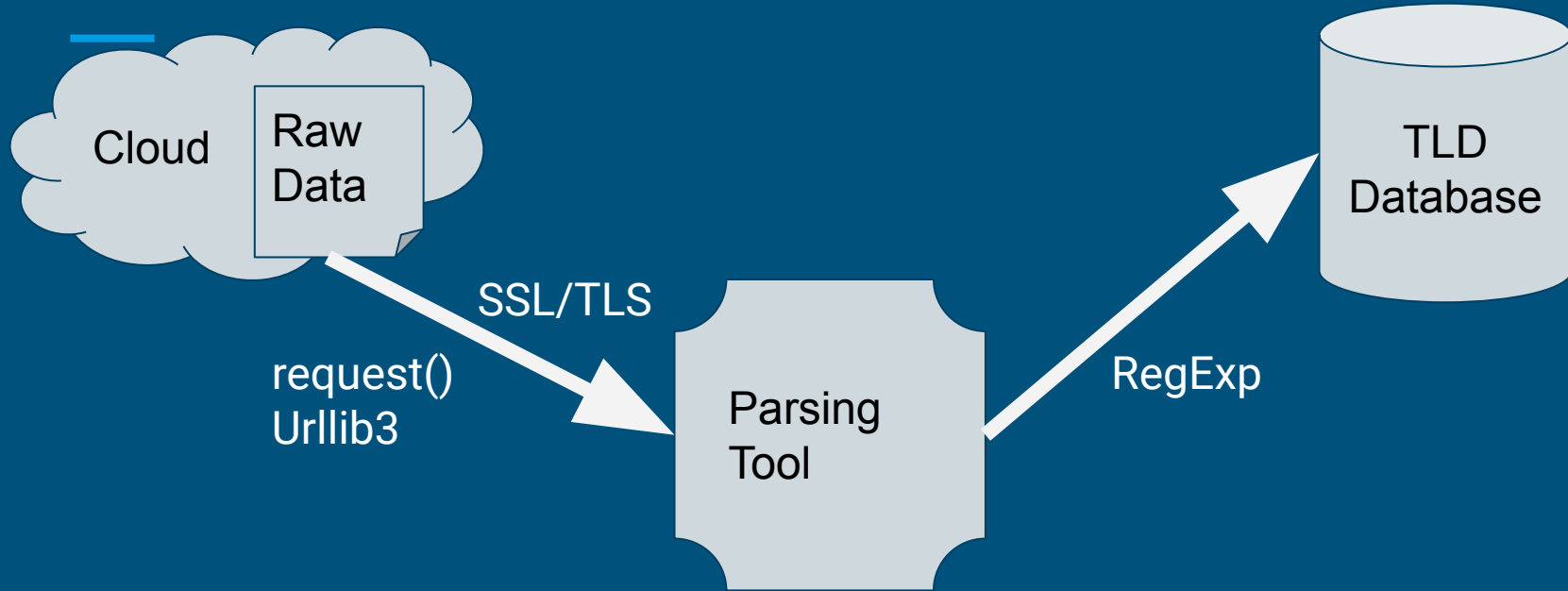
- Database Layer (Model)

- Service Layer (Presenter)

- Presentation Layer (View)

Database Layer

Service Layer

Presentation Layer

Table View
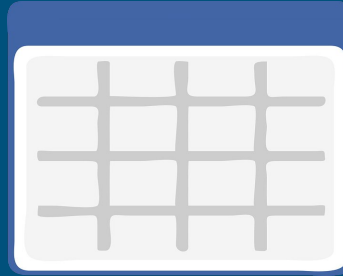
Chart View
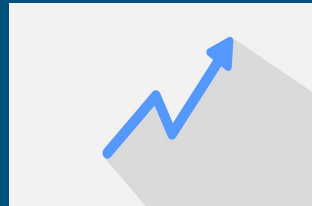
MD5
Verification

TLD
Database

Django
Administrator
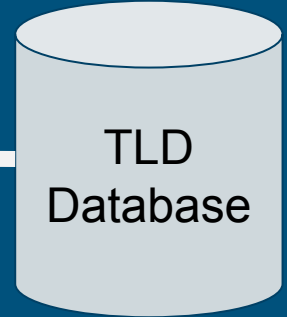
User Authentication

Username:

• This field is required.

Password:

• This field is required.

Submit

Don't have an account? Sign up   Forgot password?

Search
Sign out

Dashboard

YOUR PLANE

plane 53465

plane 14936

Setting

Hello, david

<-- Please select a plane on the left to view the TLD data.

Honeywell is currently developing a product to allow engine downloads to be completed autonomously with the data uploaded wirelessly to the cloud where it will then be accessible remotely. The software that communicates to the ECU and does the download to a secure cloud server will be hosted on a small embedded computer located on the aircraft.

The data that will be captured and saved to the cloud falls into three distinct categories: Real time data collected while the A/C is in flight, snapshot data that is collected at various events and flight transitions, and fault data. Fault data can further be broken down into Time Limited Dispatch (TLD) faults and all otherfaults. The data file will include a CRC but additional mechanisms may be required to be carried with the data to ensure validity.

Engine control systems can be allowed to operate with faults for a specified period of time provided:

- Resulting system operation and overall average reliability is adequate
- Operating exposure, in this less redundant state, is appropriately limited

TLD is only concerned with faults that affect the loss of thrust control. TLD is specified in the following periods of time:
- Short time (ST) – typically 125 hrs. before performing maintenance
- Long time (LT) – typically 500 hrs. before performing maintenance
- No Dispatch (ND) – fault must be corrected before next flight

Using the existing EEI tool, users can evaluate faults and determine the A/C TLD status and make the appropriate maintenance decisions. Because EEI is used to make maintenance decisions it has to be a qualified tool per the FAA software development process.

Get more information by visiting our Team Website

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TLD Wokerbee

Search

Sign out

Plane Data: 53465

Refreh

id	MD5	block num	Event 1 ECU Operating Time	Event 1 Leg Number	Event 1 N1	Event 1 N2	Event 1 EGT	Event 1 ITT	Event 1 ECU TT2	Event 1 ECU PS	Event 1 CGV position	Event 1 Power Lever Angle	Event 1 Vibration Average	Event 1 Oil Temperature	Event 1 Oil Pressure	Even Temp
1	11	match	26.924999999998825	0	0	0	3	0.0	0.0	62.625	0.9765625	17.0546875	13.353515625	215.4375	7.890625	0.0
2	11	match	27.924999999998768	0	0	0	3	0.0	0.0	62.625	0.96875	17.0703125	13.353515625	215.203125	7.890625	0.0
3	11	match	28.92499999999871	0	0	0	3	0.0	0.0	62.625	0.98046875	17.0625	13.353515625	215.953125	7.890625	0.0
4	11	match	29.924999999998654	0	0	0	3	0.0	0.0	62.625	0.9765625	17.0625	13.353515625	215.6875	7.890625	0.0
5	11	match	30.924999999998597	0	0	0	3	0.0	0.0	62.625	0.9765625	17.078125	13.353515625	215.390625	7.890625	0.0
6	11	match	31.92499999999854	0	0	0	3	0.0	0.0	62.625	0.9765625	17.0859375	13.353515625	215.390625	7.890625	0.0
7	11	match	32.924999999998484	0	0	0	3	0.0	0.0	62.625	0.9765625	17.078125	13.353515625	215.390625	7.890625	0.0
8	11	match	33.92499999999843	0	0	0	3	0.0	0.0	62.625	0.9765625	17.0546875	13.353515625	215.765625	7.890625	0.0
9	11	match	34.92499999999837	0	0	0	3	0.0	0.0	62.625	0.9765625	17.0625	13.353515625	215.765625	7.890625	0.0
10	11	match	35.92499999999831	0	0	0	3	0.0	0.0	62.625	0.9765625	17.0859375	13.353515625	215.765625	7.890625	0.0
11	11	match	36.924999999998256	0	0	0	3	0.0	0.0	62.625	0.98046875	17.09375	13.353515625	215.765625	7.890625	0.0
12	11	match	37.9249999999982	0	0	0	3	0.0	0.0	62.625	0.9765625	17.078125	13.353515625	215.390625	7.890625	0.0
13	11	match	38.92499999999814	0	0	0	3	0.0	0.0	62.625	0.9765625	17.078125	13.35546875	215.390625	7.890625	0.0
14	11	match	39.924999999998086	0	0	0	3	0.0	0.0	62.625	0.9765625	17.078125	13.35546875	215.390625	7.890625	0.0

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Plane Data: 53465

Refreh

Oil Pressure

Oil Temperature

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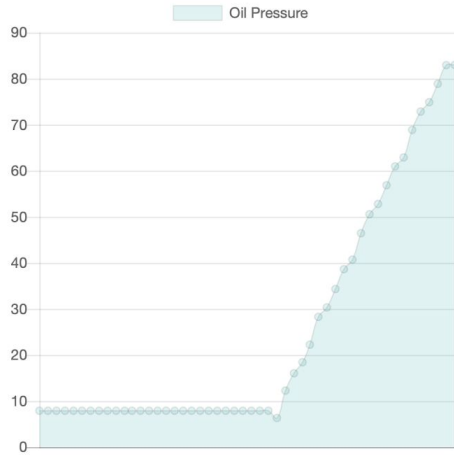
Challenges and Resolutions

- Cloud and database error
  - Introduce a backup mechanism
  - Medium severity
  - Likelihood: 3/10
- Network connectivity
  - Keep using the current EEI solution as a backup plan
  - High severity
  - Likelihood: 7/10
- Network security
  - Techniques to avoid SQL injections
  - Medium severity
  - Likelihood: 7/10

Team Schedule

ID	Task Name	Duration	Jan 2019		Feb 2019				Mar 2019				Apr 2019				May 2019	
			3W	4W	1W	2W	3W	4W	1W	2W	3W	4W	1W	2W	3W	4W	1W	2W
1.0	Requirement Revisions	2	2 Weeks 100 %															
2.0	Understand Test file format	1			1 Week 100 %													
3.0	Database Layer	2				2 Weeks 100 %												
4.0	Service Layer	3				3 Weeks 100 %												
5.0	Presentation Layer	3				5 Weeks 65 %												
6.0	Evaluation	5											5 Weeks 0 %					

Conclusion

- Project overview
  - Current solution: slow and inefficient
  - Proposed solution: fast and secure

- Solution overview:
  - Cloud - Amazon S3
  - Database - Amazon RDS/ MySQL
  - GUI - Django