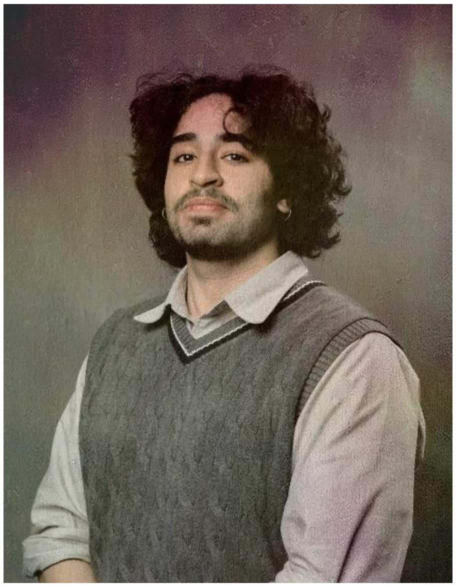
MONASH University | eSolutions



FIT IBL REPORT

eSolutions, Monash University

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Student ID: 33094977

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Figure 1.1 Monash Green Chemical Futures building

Company Overview

Monash University founded in 1958, was named after Sir John Monash, an Australian civil engineer and military commander who emphasized education for the benefit of the community [(1)].

Monash has grown from its original Clayton campus with 347 students to become Australia's largest and one of the best universities, supporting 80,0000+ students from all over the world, it has expanded its physical presence beyond Australia with campuses in Malaysia, Italy and Indonesia.

For my IBL placement, I was placed in **Monash eSolutions**, which is an organization under the Vice President's portfolio [(2)]. This acts as the university's IT backbone, from the university's websites, examinations, assessments, helpdesks and so much more is handled by eSolutions. With about 1200 staff members in eSolutions, the Enterprise Data and academic services mainly handles how education is run in the university as well as how data is handled for both students and staff. It has 6 domains, one of which is Data engineering Services (DES). Within DES, STLAR was the team I was placed in.

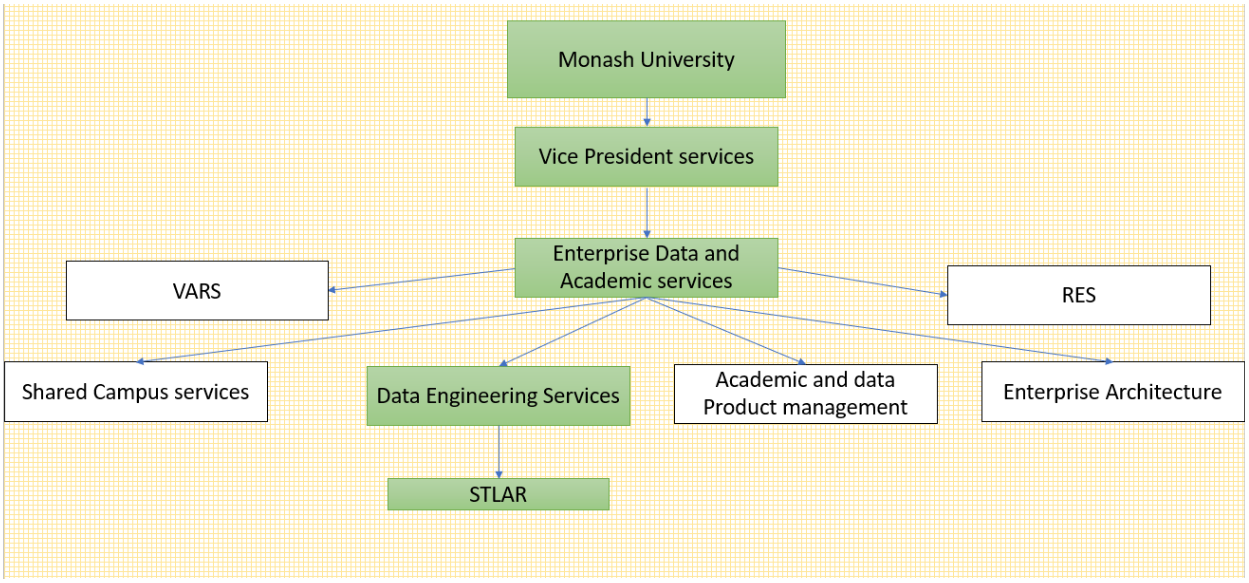

Monash University
Vice President services
Enterprise Data and Academic services
VARS
RES
Shared Campus services
Data Engineering Services
Academic and data Product management
Enterprise Architecture
STLAR

Figure 2 Org Chart

What is STLAR?

STLAR stands for Student Load Analysis and Reporting, it is Monash University’s advanced operational planning and reporting application. This system is built on the IBM Planning Analytics, with TM1 being the calculation engine. In layman terms, IBM planning analytics is Excel on steroids.
It plays a crucial role in forecasting student load and the associated revenue based on this load for up to a 10-year planning horizon. STLAR handles significant data, accounting for approximately 80,000 students and around AUD 1.8 billion in adjusted gross revenue annually.

Now that we understand the framework and significance of STLAR within Monash, let's delve deeper into my specific role and how I contributed to this dynamic team.

Role Tasks and learning experiences

Role and Tasks

In the STLAR team I was a **Quality Assurance analyst**. A QA is basically a software tester. Testing is an integral part of the software development lifecycle. It ensures that the final product is reliable and meets the end-users' needs without faults. As a QA analyst, the responsibility is significant because any oversight can lead to system failures in production.
In our agile ways of working, we followed a Kanban board where QA was the first phase of testing If something fails after deployment, it reflects directly on my team and me, so the stakes were high.

Since the nature of my work was ongoing and operational, let's go over the main tasks that I did as a Quality Assurance Analyst.

1. **Test Planning and Execution:**

   Designed and executed detailed test plans to cover all possible scenarios, ensuring that the system is robust and all functionalities are working in this first phase of the test cycle. Detailed test cases insured any defects/ bugs identified early in the software development life cycle.

2. **Defect management:**

   During the test executions if a defect/ bug has been identified then tracking it and managing it becomes crucial. This involves documenting the defects, prioritizing them based on their impact and tracking how to resolve them by close collaboration with developers.

3. **Performance Benchmarking:**

   As sometimes new functionalities had an impact on existing functionalities, I also worked on establishing benchmarks for system performance. Which involved conducting stress tests and performance tests and ensuring that the system meets the desired standard under different scenarios.

4. **Stakeholder Reporting**

   Communicating the outcome of the test plans to stakeholders is vital, this includes preparing detailed reports of test plans, test results, current system status and any risks associated with the current release.

Outside of the operational tasks for the role, I also involved myself in the wider team of **Data Quality Management** where Quality Analysts from different teams in Data Engineering Services came together to brainstorm and lead **Data Quality initiatives** in their teams.

Depending on the nature of the Ticket, the emphasis/ time spent on each task was different. Let us go through some tickets that will explain this:

An Overview of some tickets that I took on helped me learn how to perform QA tasks as a professional.

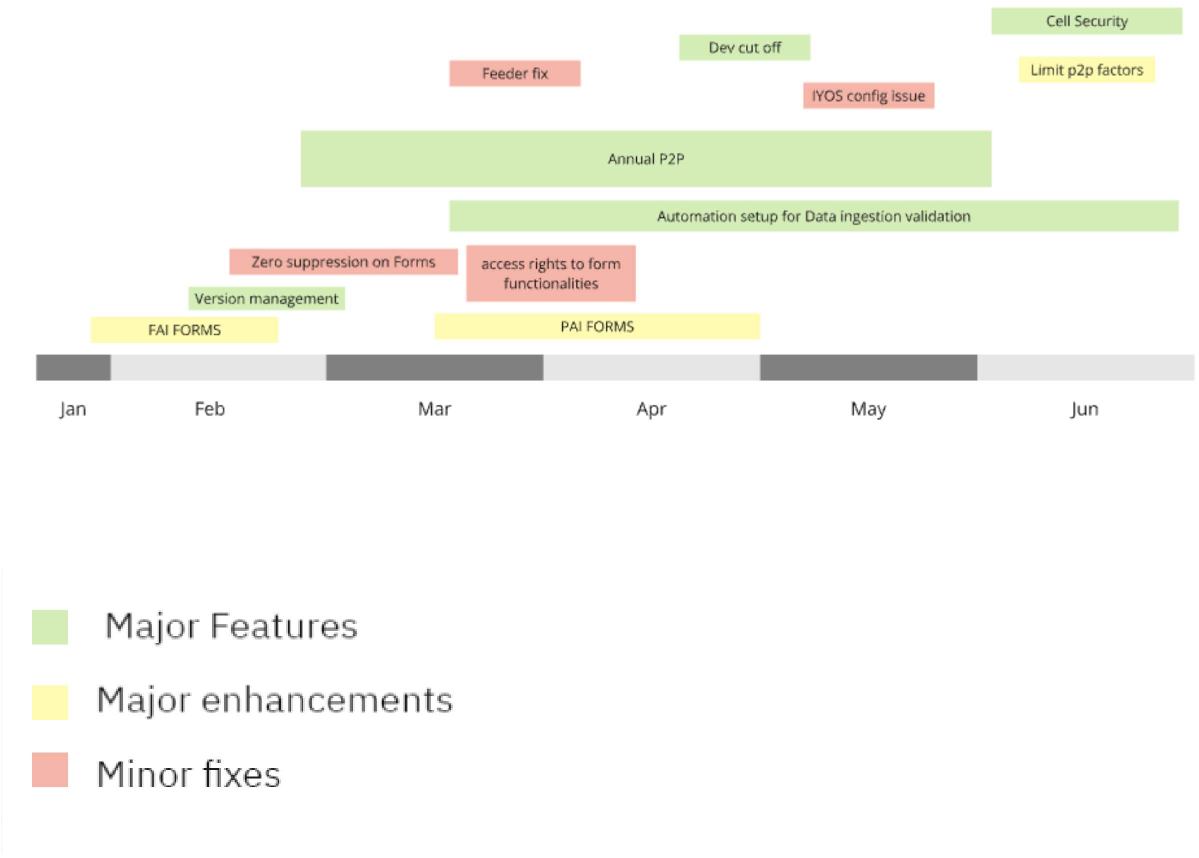
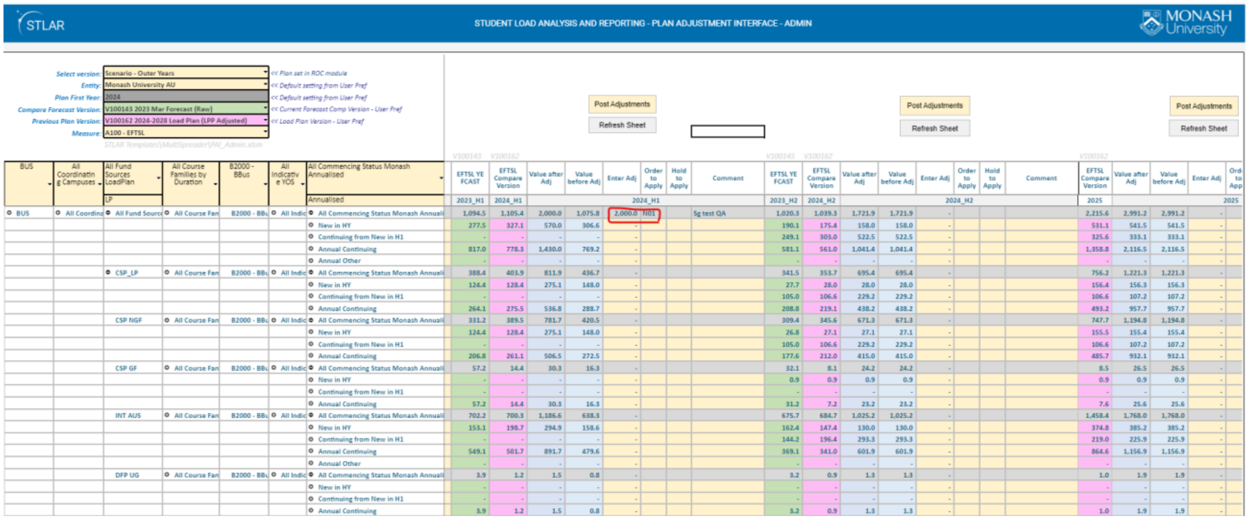


Figure 3 Timeline of Placement work (Majorly)

(The Major features, Annual P2P and Version Management will be covered as a Major project in part C).

The **Plan adjustment Interface (PAI) and Faculty Adjustment Interface (FAI) forms** serve as a pivotal tool within the STLAR system at Monash University. It facilitates effective top-down review and adjustment mechanisms, especially tailored for the student load modelling part of the system. They are used by different campuses and faculties to modify/ adjust student load based on their own predictions so that the forecast can input the manual perspective of users.



Select version: Scenario - Outer Years << Plan set in ROC module
Entity: Monash University AU << Default setting from User Pref
Plan First Year: 2024 << Default setting from User Pref
Compare Forecast Version: V100143 2023 Mar Forecast (Raw) << Current Forecast Comp Version - User Pref
Previous Plan Version: V100162 2024-2028 Load Plan (LPP Adjusted) << Load Plan Version - User Pref
Measure: A100 - EFTSL
STLAR Templates\MultiSpreader\PAI_Admin.xlsm

							V100143	V100162						
BUS	All Coordinating Campuses	All Fund Sources LoadPlan	All Course Families by Duration	B2000 - BBus	All Indicative YOS	All Commencing Status Monash Annualised	EFTSL YE FCAST	EFTSL Compare Version	Value after Adj	Value before Adj	Enter Adj	Order to Apply	Hold to Apply	Comment
		LP				Annualised	2023_H1	2024_H1	2024_H1					
BUS	All Coordina	All Fund Source	All Course Fan	B2000 - BBu	All Indic	All Commencing Status Monash Annuali	1,094.5	1,105.4	2,000.0	1,075.8	2,000.0	N01		Sg test QA
						New in HY	277.5	327.1	570.0	306.6	-			
						Continuing from New in H1	-	-	-	-	-			
						Annual Continuing	817.0	778.3	1,430.0	769.2	-			
						Annual Other	-	-	-	-	-			
		CSP_LP	All Course Fan	B2000 - BBu	All Indic	All Commencing Status Monash Annuali	388.4	403.9	811.9	436.7	-			
						New in HY	124.4	128.4	275.1	148.0	-			
						Continuing from New in H1	-	-	-	-	-			
						Annual Continuing	264.1	275.5	536.8	288.7	-			
		CSP NGF	All Course Fan	B2000 - BBu	All Indic	All Commencing Status Monash Annuali	331.2	389.5	781.7	420.5	-			
						New in HY	124.4	128.4	275.1	148.0	-			
						Continuing from New in H1	-	-	-	-	-			
						Annual Continuing	206.8	261.1	506.5	272.5	-			
		CSP GF	All Course Fan	B2000 - BBu	All Indic	All Commencing Status Monash Annuali	57.2	14.4	30.3	16.3	-			
						New in HY	-	-	-	-	-			
						Continuing from New in H1	-	-	-	-	-			
						Annual Continuing	57.2	14.4	30.3	16.3	-			
		INT AUS	All Course Fan	B2000 - BBu	All Indic	All Commencing Status Monash Annuali	702.2	700.3	1,186.6	638.3	-			
						New in HY	153.1	198.7	294.9	158.6	-			
						Continuing from New in H1	-	-	-	-	-			
						Annual Continuing	549.1	501.7	891.7	479.6	-			
						Annual Other	-	-	-	-	-			
		DFP UG	All Course Fan	B2000 - BBu	All Indic	All Commencing Status Monash Annuali	3.9	1.2	1.5	0.8	-			
						New in HY	-	-	-	-	-			
						Continuing from New in H1	-	-	-	-	-			
						Annual Continuing	3.9	1.2	1.5	0.8	-			

	V100143	V100162							V100162				
All Commencing Status Monash Annualised	EFTSL YE FCAST	EFTSL Compare Version	Value after Adj	Value before Adj	Enter Adj	Order to Apply	Hold to Apply	Comment	EFTSL Compare Version	Value after Adj	Value before Adj	Enter Adj	Ord to App
Annualised	2023_H2	2024_H2	2024_H2						2025	2025			
All Commencing Status Monash Annuali	1,020.3	1,039.3	1,721.9	1,721.9	-				2,215.6	2,991.2	2,991.2	-	
New in HY	190.1	175.4	158.0	158.0	-				531.1	541.5	541.5	-	
Continuing from New in H1	249.1	303.0	522.5	522.5	-				325.6	333.1	333.1	-	
Annual Continuing	581.1	561.0	1,041.4	1,041.4	-				1,358.8	2,116.5	2,116.5	-	
Annual Other	-	-	-	-	-				-	-	-	-	
All Commencing Status Monash Annuali	341.5	353.7	695.4	695.4	-				756.2	1,221.3	1,221.3	-	
New in HY	27.7	28.0	28.0	28.0	-				156.4	156.3	156.3	-	
Continuing from New in H1	105.0	106.6	229.2	229.2	-				106.6	107.2	107.2	-	
Annual Continuing	208.8	219.1	438.2	438.2	-				493.2	957.7	957.7	-	
All Commencing Status Monash Annuali	309.4	345.6	671.3	671.3	-				747.7	1,194.8	1,194.8	-	
New in HY	26.8	27.1	27.1	27.1	-				155.5	155.4	155.4	-	
Continuing from New in H1	105.0	106.6	229.2	229.2	-				106.6	107.2	107.2	-	
Annual Continuing	177.6	212.0	415.0	415.0	-				485.7	932.1	932.1	-	
All Commencing Status Monash Annuali	32.1	8.1	24.2	24.2	-				8.5	26.5	26.5	-	
New in HY	0.9	0.9	0.9	0.9	-				0.9	0.9	0.9	-	
Continuing from New in H1	-	-	-	-	-				-	-	-	-	
Annual Continuing	31.2	7.2	23.2	23.2	-				7.6	25.6	25.6	-	
All Commencing Status Monash Annuali	675.7	684.7	1,025.2	1,025.2	-				1,458.4	1,768.0	1,768.0	-	
New in HY	162.4	147.4	130.0	130.0	-				374.8	385.2	385.2	-	
Continuing from New in H1	144.2	196.4	293.3	293.3	-				219.0	225.9	225.9	-	
Annual Continuing	369.1	341.0	601.9	601.9	-				864.6	1,156.9	1,156.9	-	
Annual Other	-	-	-	-	-				-	-	-	-	
All Commencing Status Monash Annuali	3.2	0.9	1.3	1.3	-				1.0	1.9	1.9	-	
New in HY	-	-	-	-	-				-	-	-	-	
Continuing from New in H1	-	-	-	-	-				-	-	-	-	
Annual Continuing	3.2	0.9	1.3	1.3	-				1.0	1.9	1.9	-	

Figure 4 PAI admin interface

Test Planning:

- Developed detailed test cases that outlined scenarios for each functionality including posting adjustments, holding values and entering values at consolidation levels

Test executions:

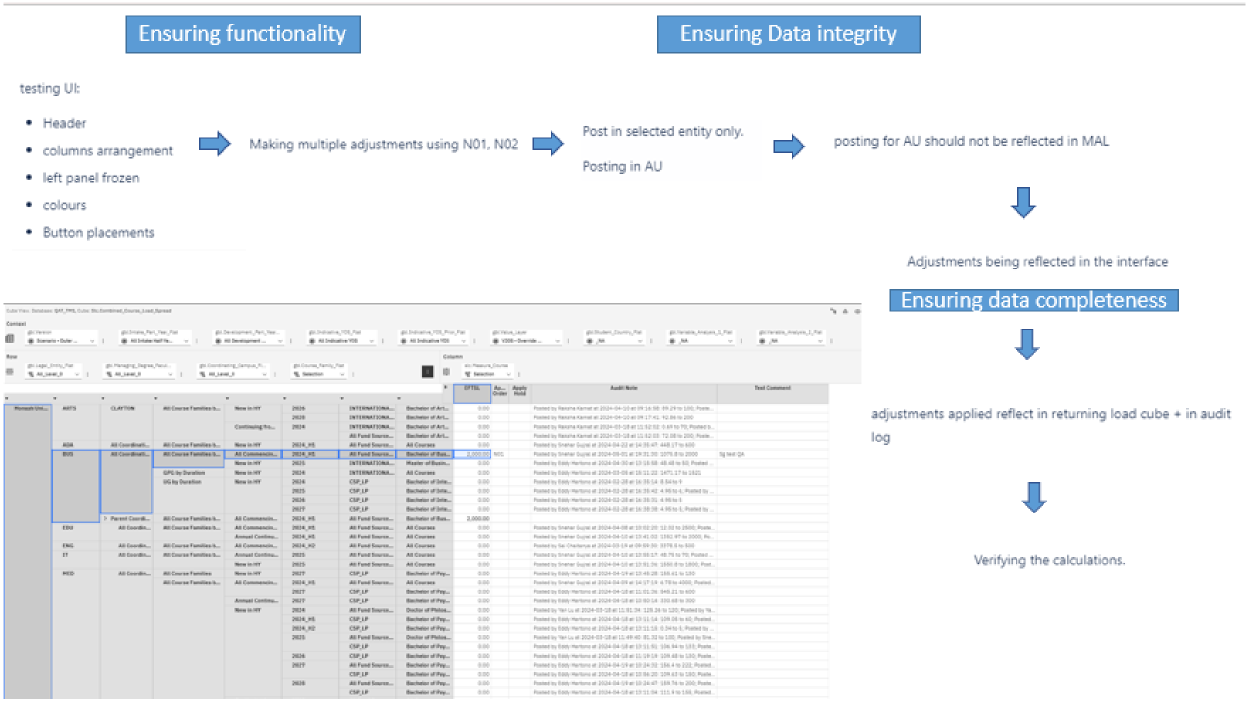
- Tested each functionality such as the ability to freeze panels for better user navigation, the ability to put in adjustments correctly, etc.

Audit and Security Verification:

- Regularly checked the audit logs to confirm that all entries were accurate and reflected the correct adjustments, user details and timestamps.

Performance Testing:

- This included testing the load times for initial template loading, post-adjustment processing and template refreshing. We also stress tested the interfaces with multiple users to ensure that performance meets the desired standards.



Ensuring functionality

Ensuring Data integrity

testing UI:

- Header
- columns arrangement
- left panel frozen
- colours
- Button placements

Making multiple adjustments using N01, N02

Post in selected entity only.

Posting in AU

posting for AU should not be reflected in MAL

Adjustments being reflected in the interface

Ensuring data completeness

adjustments applied reflect in returning load cube + in audit log

Verifying the calculations.

Figure 5 Testing for the PAI and FAI

Touching upon the minor enhancements/ fixes affecting the PAI and FAI forms:

Zero Suppression on the forms:

The objective was here to test the refinement of the zero-suppression logic in these interfaces to ensure that no rows with valuable data (actuals, plans, or forecasts) were inadvertently hidden from the user view.

User Access rights for the form's functionalities:

The objective here was to test the admin access rights, the faculty user rights, etc. to ensure each user could only make and view adjustments for their respective legal entities, safeguarding against unauthorized access or data leakage. Also making sure that some functionalities such as deleting all adjustments is only accessible for certain privileged users.

Now integrating and testing these new minor enhancements/ fixes to existing functionalities taught me a very important QA responsibility:

Regression Testing:

Regression testing is an essential component of the Quality Assurance (QA) process, especially in contexts where systems are regularly updated or upgraded. It plays a vital role in maintaining and enhancing the stability, functionality and performance of software applications.

With these new fixes coming into the QAT (quality assurance testing) environment, I had to test the functionalities of the PAI and FAI from scratch, to ensure that no new code disrupts existing working things.

As I mentioned before I involved myself in Data Quality Management capability team to spearhead initiatives in our squad.

- We presented our current scope of work and testing strategies to the wider team on a team day and got feedback to include **health check dashboards** at source levels to ensure any major changes **in daily data ingestion** are sent as alerts so the matter could be investigated at the start of the day rather than finding out after functionalities failing in the system.

- We got feedback from the wider team to host our current automation scripts on Jenkins to ensure operational efficiency by setting **daily data ingestion checks** as daily jobs.

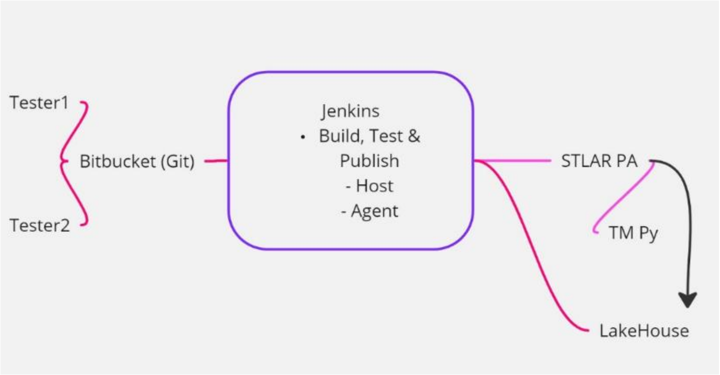
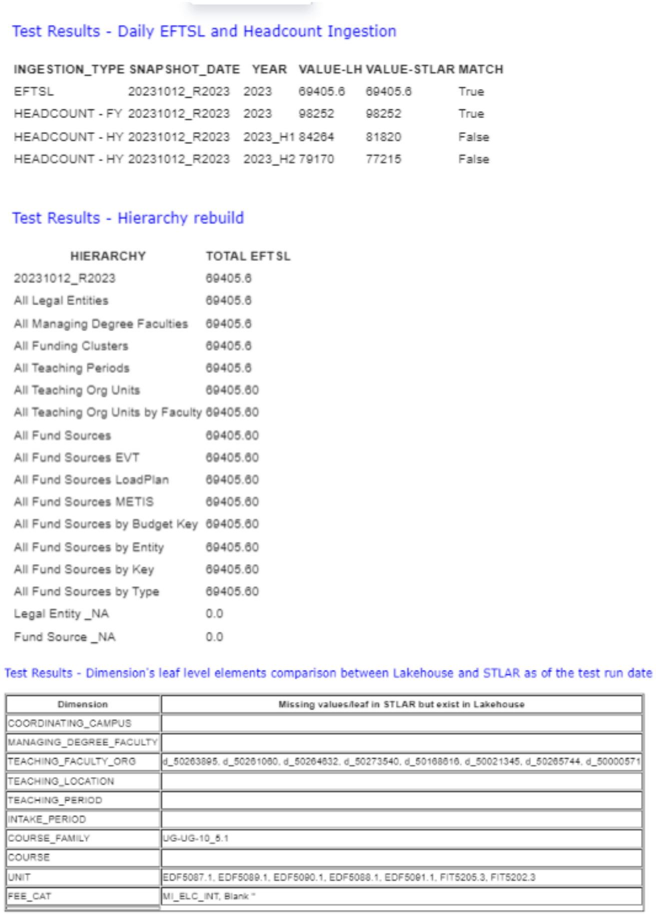


Figure 6.1 Automation strategy



Test Results - Daily EFTSL and Headcount Ingestion

INGESTION_TYPE	SNAPSHOT_DATE	YEAR	VALUE-LH	VALUE-STLAR	MATCH
EFTSL	20231012_R2023	2023	69405.6	69405.6	True
HEADCOUNT - FY	20231012_R2023	2023	98252	98252	True
HEADCOUNT - HY	20231012_R2023	2023_H1	84264	81820	False
HEADCOUNT - HY	20231012_R2023	2023_H2	79170	77215	False

Test Results - Hierarchy rebuild

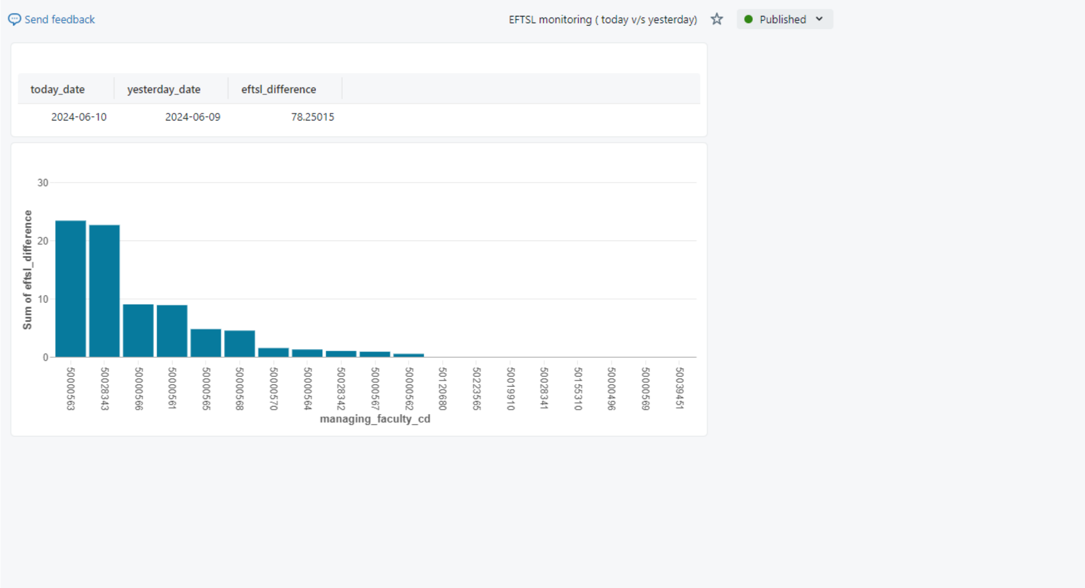
HIERARCHY	TOTAL EFTSL
20231012_R2023	69405.6
All Legal Entities	69405.6
All Managing Degree Faculties	69405.6
All Funding Clusters	69405.6
All Teaching Periods	69405.6
All Teaching Org Units	69405.60
All Teaching Org Units by Faculty	69405.60
All Fund Sources	69405.60
All Fund Sources EVT	69405.60
All Fund Sources LoadPlan	69405.60
All Fund Sources METIS	69405.60
All Fund Sources by Budget Key	69405.60
All Fund Sources by Entity	69405.60
All Fund Sources by Key	69405.60
All Fund Sources by Type	69405.60
Legal Entity _NA	0.0
Fund Source _NA	0.0

Test Results - Dimension's leaf level elements comparison between Lakehouse and STLAR as of the test run date

Dimension	Missing values/leaf in STLAR but exist in Lakehouse
COORDINATING_CAMPUS	
MANAGING_DEGREE_FACULTY	
TEACHING_FACULTY_ORG	d_50263895. d_50261060. d_50264632. d_50273540. d_50168616. d_50021345. d_50265744. d_50000571
TEACHING_LOCATION	
TEACHING_PERIOD	
INTAKE_PERIOD	
COURSE_FAMILY	UG-UG-10_5.1
COURSE	
UNIT	EDF5087.1. EDF5089.1. EDF5090.1. EDF5088.1. EDF5091.1. FIT5205.3. FIT5202.3
FEE_CAT	MI_ELC_INT, Blank ''

Figure 6.2 Test Results

These images are the result of that feedback that was incorporated into the team by my senior and I. We made sure that this allowed us to perform daily checks and balances without the need for manual oversight. This not only saved time but also reduced the potential for human error, ensuring our data was ready and reliable for use across the organization.



today_date	yesterday_date	eftsl_difference
2024-06-10	2024-06-09	78.25015

Figure 6.3 Health check dashboard example

Legacy

For my legacy, the following will be used by the company after I have left and contributes to the host company in a major positive way:

1. **Documentation and Knowledge Transfer:**

    - Comprehensive Documentation: Prepared detailed documentation of all processes, test cases and user guidelines associated with the STLAR system enhancements.

    - Long-term Impact: This documentation serves as a valuable resource for ongoing and future projects, ensuring continuity and facilitating onboarding and training of new staff.

2. **Data Quality Initiatives:**

    - Spearheaded the integration of health check dashboards and automated alert systems to monitor daily data ingestion.

    - Long-term Impact: By automating the monitoring process, I have helped reduce manual oversight and minimize human error, thereby ensuring that the data used for forecasting and reporting is consistently accurate and reliable. By incorporating insights from the wider capability team members, more data quality initiatives would still be worked upon, even after having left.

3. **Annual P2P in production:**

    - Led the Quality Assurance testing of the Annual P2P feature that will account for Annual courses data into the forecasting cycles. This will majorly benefit the Medicine faculty with their resource planning and allocation.

    - Detail covered in Major project report.

Learning Experiences

When I first joined eSolutions Monash, I couldn’t help but think is my role going to be answering calls at Monash Connect? How does answering calls fit into a software development life cycle? This was my limited understanding of what eSolutions did and I was very naïve to the Agile ways of working in the tech industry. So, turns out eSolutions at Monash isn't just about handling helpdesk queries; it's a core component of the **university's operational backbone.**

I have grown a lot technically and non-technically throughout the placement.

Technical Skills

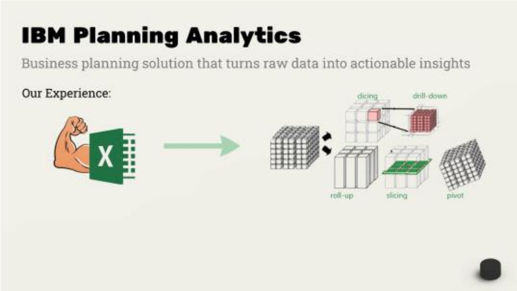
Let us walkthrough the Tech stack I picked up on during my role as a Quality Assurance Analyst.

Throughout the testing phases, I applied an array of technical skills acquired during my placement. Using **JIRA** and **Xray**, I managed test cases and tracked their execution meticulously.

Figure 7.1 Jira logo

Figure 7.2 Xray logo

Jira is a product by Atlassian that is used for agile project management. We used **a Kanban board** for the STLAR team. Through this I developed proficiency in creating, updating and managing tickets. This included defining ticket priorities, attaching relevant documentation and linking other tickers to ensure better traceability.
We had XRAY plugin for JIRA, through which I developed the test case, test plan and execution tracking and management.



IBM Planning Analytics

Business planning solution that turns raw data into actionable insights

Our Experience:

Figure 7.3 IBM planning analytics

IBM Planning Analytics is the platform for STLAR, understanding the architecture of **TM1**, the principles of multidimensional data storage, getting exposure to dimensions, cubes, TI processess and so on. Learning IBM Planning Analytics has not only expanded my technical toolkit but also made me understand how data analytics can drive strategic business decisions.

Figure 8.1 Jenkins logo

Figure 8.2 Bitbucket logo

Integrated Python scripts with **Jenkins** to automate the execution of data ingestion validation checks daily. Jenkins provided a reliable platform for managing these automation scripts, facilitating continuous data updates without manual oversight. **Bitbucket** was used for version control.

Figure 10.1 SQL logo

Figure 9.2 Databricks logo

Used **SQL** within the **Databricks** environment to perform data queries and manipulations necessary for developing health check dashboards.

Figure 11 R logo

Exposure to **R** scripts and modifying them to test p2p calculations, to test if the calculations in Returning Load cube are correct or not.

Figure 12 Confluence logo

Used **Confluence** for Creating Documentations revolving Version management, Annual P2P version creation, Data quality checks within STLAR initiatives, User access configurations in PAW and so on.

Soft Skills

Adaptability: Stepping into a complex, fast-paced environment required quick adaptation. It took me time at the start feeling puzzled and confused at times but the habit of asking silly questions and the concept of no question is stupid helped me integrate into the team easily.

Communication and Presentation Skills: Regular stakeholder reporting and participation in meetings improved my communication skills.
I learned to present complex information without technical jargon, ensuring that all stakeholders, regardless of their technical background, could understand the testing outcomes and strategic directions.

Collaboration and Teamwork:

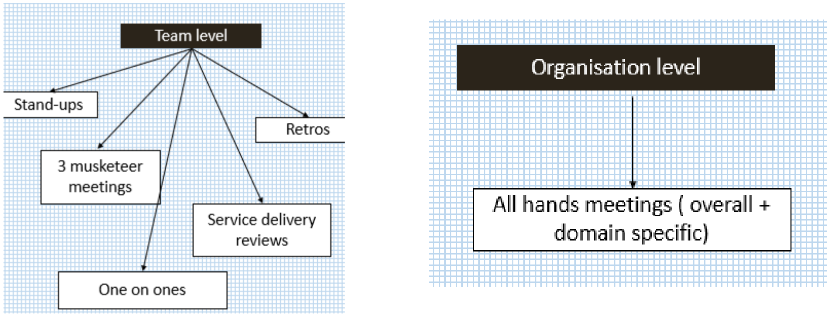


Figure 13 Team meetings

In the early days of my placement the frequency of meetings was overwhelming, it seemed like there were too many meetings. I wondered about their necessity and their impact on my productivity. But as I integrated into the team, I got to understand the importance of each meeting from team level to organizational level, these frequent interactions taught me critical skills in teamwork and communication.

Problem-Solving:

Through brute force taking head on responsibility for tickets when my senior was on leave, I developed a hardcoded mindset of figuring out problems on my own. I developed a systematic approach to troubleshooting and resolving issues.

Constructing a positive feedback loop:

Before coming into this placement, I did not know how to take criticism well, but my team members were honest and very critic to my working because they cared which opened myself to be comfortable enough to receive feedback in a positive manner. I implemented the habit of asking for feedback from team members and seniors. Receiving feedback for the team day presentation helped me come up with an approach that involved less technical jargon and helped convey my message in a clear and concise manner. Receiving feedback on my testing reports helped me become more aligned with business demands. I even presented my IBL presentation in front of my core team, which helped me add more reflections and emotion to it, which made the experience for the audience more engaging.

Professional Growth and Networking:

From long walks to the campus centre to endless chats near the coffee machines, I expanded my professional network and gained insights into career development in the IT sector. These interactions provided me with a broader understanding of the industry and potential career paths. Throughout my placement I made good relations with our business stakeholder team members, our outside vendors from Cubewise. With guidance and support from my mentors, whether it be my supervisor, past IBL interns at eSolutions working as permanent employees, our previous product owner, I have grown a lot from my naïve self to a better professional within 6 months.

This placement was more than just a practical application of my classroom learning; it was a journey of personal and professional growth. The skills and experiences I gained are invaluable and will undoubtedly influence my future career in the IT industry

Major Project Report

Annual P2P

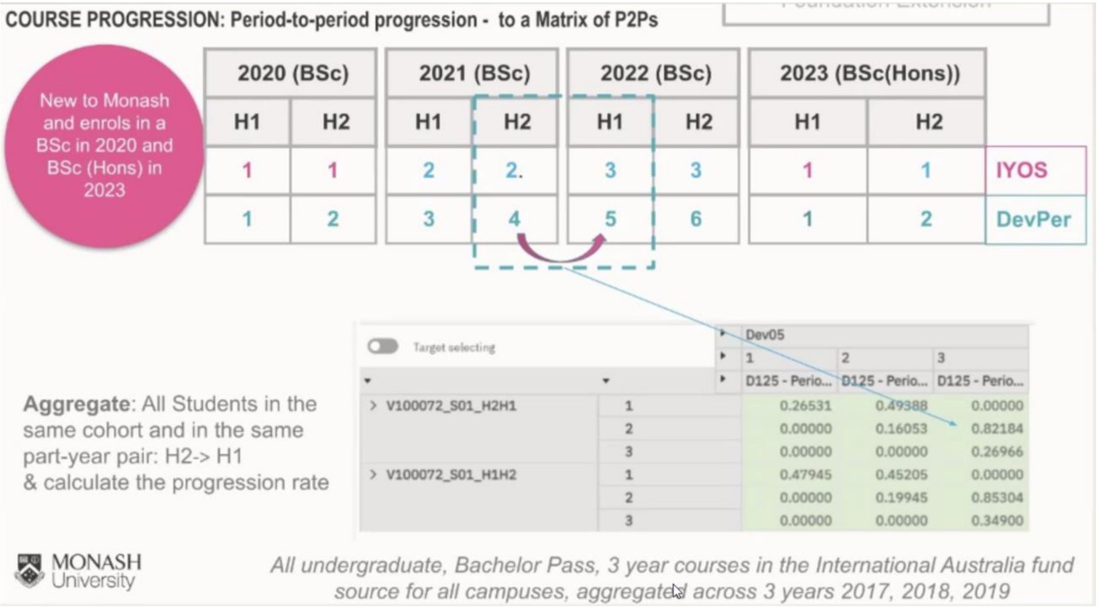
I decided to nominate Annual Period to Period Progression as my Major Project for my placement as this is the project I took on without any supervision of the senior QA and took sole responsibility of completing the testing.

Summary

In STLAR, **Period-to-Period (P2P)** progression is a crucial aspect of forecasting student loads and calculating revenue based on student continuity between semesters. It measures how students move from one half of the academic year (H1) to the next (H2), or vice versa, across different courses, fund sources and campuses.

But there were some courses from the Medicine faculty that had semesters that ran for the whole year. They were being considered in the forecasting calculations. This caused about 2000 student equivalent data to be missed out on.

Annual P2P is a new variation specifically designed to handle courses that run on a yearly basis rather than semesterly. Annual P2P models progression from one year to the next, taking into account full-year courses.



COURSE PROGRESSION: Period-to-period progression - to a Matrix of P2Ps

New to Monash and enrols in a BSc in 2020 and BSc (Hons) in 2023

2020 (BSc)		2021 (BSc)		2022 (BSc)		2023 (BSc(Hons))		
H1	H2	H1	H2	H1	H2	H1	H2	
1	1	2	2.	3	3	1	1	IYOS
1	2	3	4	5	6	1	2	DevPer

Aggregate: All Students in the same cohort and in the same part-year pair: H2-> H1 & calculate the progression rate

		Dev05		
		1	2	3
		D125 - Perio...	D125 - Perio...	D125 - Perio...
V100072_S01_H2H1	1	0.26531	0.49388	0.00000
	2	0.00000	0.16053	0.82184
	3	0.00000	0.00000	0.26966
V100072_S01_H1H2	1	0.47945	0.45205	0.00000
	2	0.00000	0.19945	0.85304
	3	0.00000	0.00000	0.34900

All undergraduate, Bachelor Pass, 3 year courses in the International Australia fund source for all campuses, aggregated across 3 years 2017, 2018, 2019

Figure 14 Course progression example

Stakeholder analysis

The success of Annual P2P project is not only relevant to the technological enhancements, but it brings out on the cooperation and input from various stakeholders.

PACE squad members: Developers, Data analysts, Testers and Project Manager directly involved in the project. They work together to deliver a robust, error free Annual P2P interface.

LPP Business stakeholders: Load Planning Business stakeholders from Vice Chancellor portfolio. They extensively use STLAR for student load forecasting and planning resources for the university. This would allow the LPP team to take into account annual courses in their forecasts, this would roughly include 2000 students per year as per in the annual courses for Medicine.

University Administration: whose strategic decisions depend on accurate forecasting done by LPP team. Their interest would be that the new functionality does not cause any disruptions by the LPP team.

University Faculties: who rely on the data for operational planning and resource allocation. Their interest would be mainly that the new functionality does not cause them any sort of disruption. Highly beneficial for the Medicine faculty as majorly the annual courses are taught in that faculty.

Students: are indirect stakeholders by how changes in the forecasts might affect policies and resource allocation.

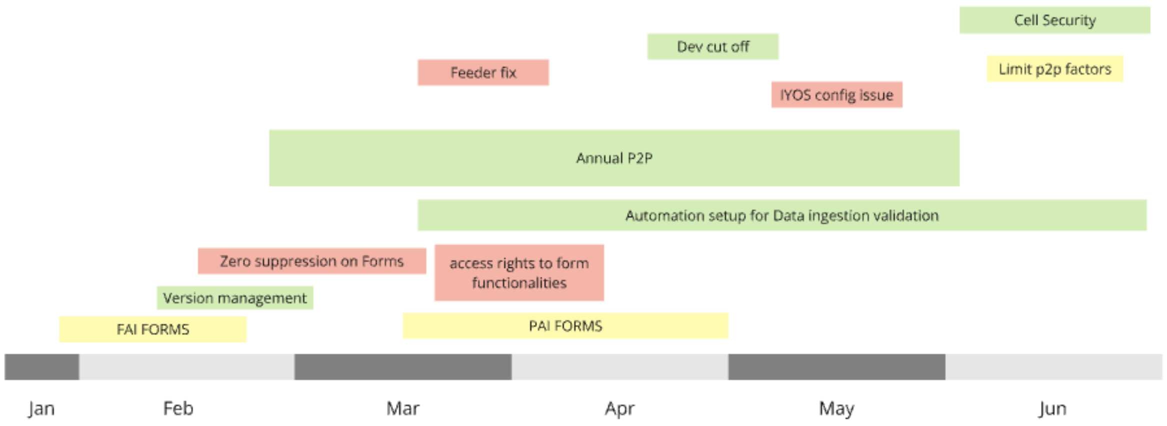


Figure 15 Timeline

Tasks

This major feature had been introduced very early on during the start of my placement. And as you can see it took about **5 months** for it to go live, with **3 months of on and off testing**.
When this piece came onto our kanban board we were having continuous meetings with business stakeholders and the development team to sort out the solution design for this. Thanks to these **3 musketeer meetings** where all team members came and brainstormed together, this helped me to get an early idea about the project.

When this ticket and 3 other linked tickets came into the QA block, my senior was on leave. I was really excited to take this opportunity head on, meanwhile I was also nervous to do complete justice to my work without senior supervision.

After going through countless confluence documents, hosting several meetings with the whole team, going through old tickets, I managed to come up with a very detailed test plan that would serve as the base of our testing approach for the next 3 months. This experience again highlighted the importance of team collaboration and feedback integration.

The main thing here was how to set up the environment for testing. STLAR is highly versioned in the sense that we can create versions inputting data and configurations according to the desired need to get the calculations**. Version management in STLAR** is a systematic approach to maintaining multiple iterations of student load and revenue planning data.

The PAW version management workbook facilitates the creation, configuration and maintenance of these versions:

- **Create live versions**: that actively calculate data based on rules and assumptions.
- **Create static versions:** that serve as data snapshots.
- **Copy versions**: to replicate data from one version to another, essential for tasks such as seeding new forecasts or creating data archives.
- **Configure versions**: by setting parameters such as the version horizon, part-year calculations, snapshot selections and specific conversion factors like P2P, E2H and EvT.
- **Perform maintenance tasks**: such as locking/unlocking versions to prevent unauthorized changes or running overnight chores to refresh data and apply updates.

For example, creating one version required around **4-5 hours** of running configuration processes. Majorly it involved:

- Selecting snapshot dates: using actual data, adjusted data from faculties or planners, or using current snapshots
- Select the method to do the calculations

- Adding further configurations for the calculations based on the users’ needs and so on
- Selecting what courses to apply the calculations on.
- Loading data into P2P factor cube, loading data into Returning load cube
- Running feeder refreshes

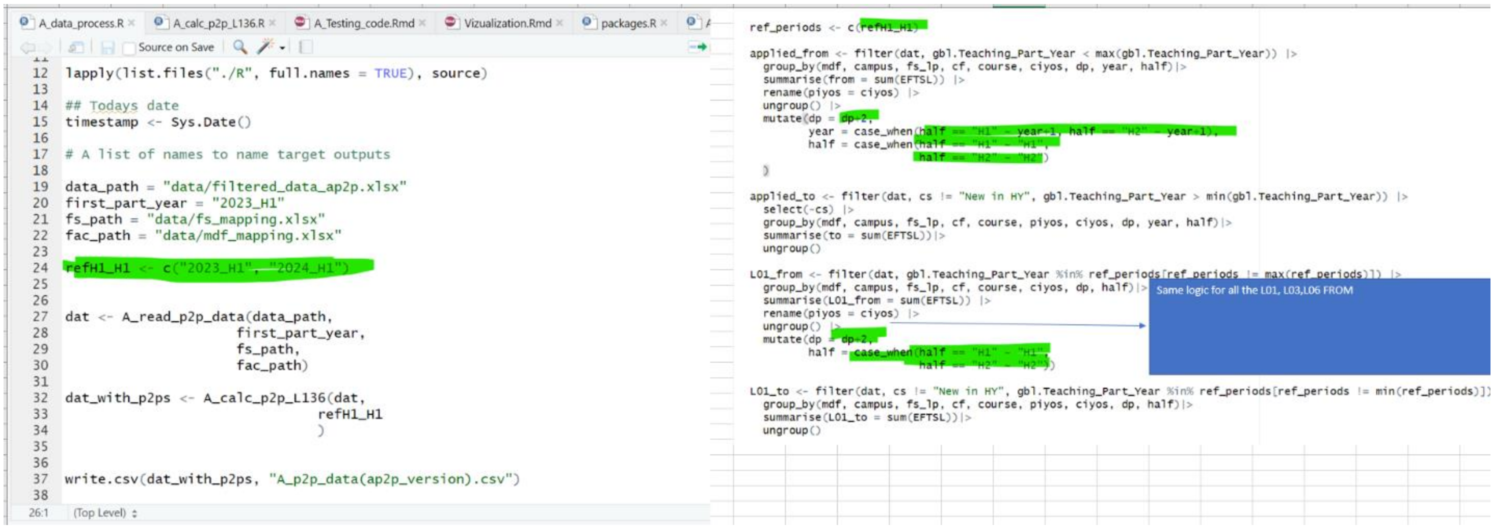
Believe me or not, while testing Annual P2P I have made and configured **over 30 versions**. Which also meant spending overtime hours in the office. I had to master the art of version configuration, where there was a lack of documentation and internal knowledge in the core team, I had to try to reach out to the LPP team planners, which also did not come easy as most of the times they were busy with the forecasting cycle.

The comprehensive test plan covered:

1. **UI testing of Version management:** covered making sure that new screens and functionalities added work and are user friendly. From button clicking to response times to screen layouts, User interface testing was the first step.

2. **Regression testing on Version management:** covered creating new live versions, making static version copies, version locking and other configurations were working as intended.

3. **Regression testing on Half yearly p2ps:** This involved running R scripts on Returning load cube data to check whether the functionality of Annual p2p does not interfere with the old p2p functionality and the calculations for D125: applied p2p are correct.



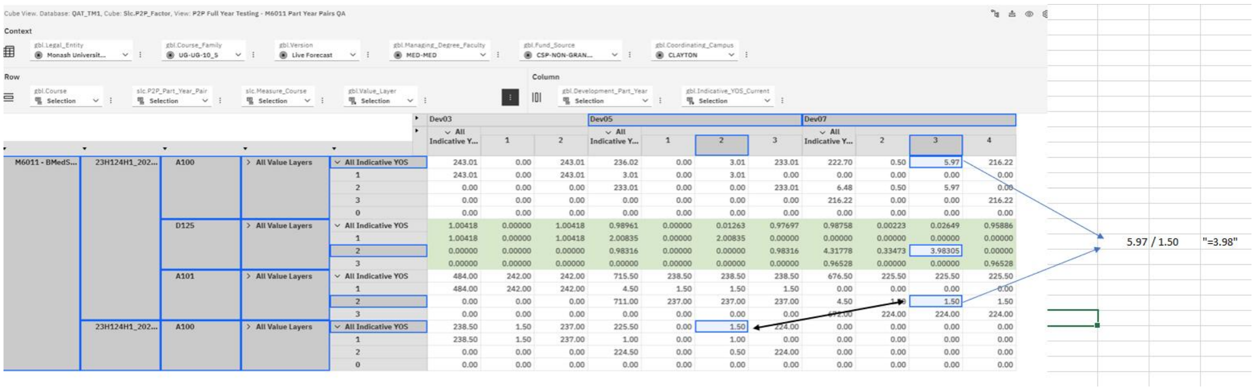
```r
lapply(list.files("./R", full.names = TRUE), source)

## Todays date
timestamp <- Sys.Date()

# A list of names to name target outputs

data_path = "data/filtered_data_ap2p.xlsx"
first_part_year = "2023_H1"
fs_path = "data/fs_mapping.xlsx"
fac_path = "data/mdf_mapping.xlsx"

refH1_H1 <- c("2023_H1", "2024_H1")


dat <- A_read_p2p_data(data_path,
                       first_part_year,
                       fs_path,
                       fac_path)

dat_with_p2ps <- A_calc_p2p_L136(dat,
                                 refH1_H1
                                 )


write.csv(dat_with_p2ps, "A_p2p_data(ap2p_version).csv")
```

```r
ref_periods <- c(refH1_H1)

applied_from <- filter(dat, gbl.Teaching_Part_Year < max(gbl.Teaching_Part_Year)) |>
  group_by(mdf, campus, fs_lp, cf, course, ciyos, dp, year, half)|>
  summarise(from = sum(EFTSL)) |>
  rename(piyos = ciyos) |>
  ungroup() |>
  mutate(dp = dp+2,
         year = case_when(half == "H1" ~ year+1, half == "H2" ~ year+1),
         half = case_when(half == "H1" ~ "H1",
                          half == "H2" ~ "H2")
  )

applied_to <- filter(dat, cs != "New in HY", gbl.Teaching_Part_Year > min(gbl.Teaching_Part_Year)) |>
  select(-cs) |>
  group_by(mdf, campus, fs_lp, cf, course, piyos, ciyos, dp, year, half)|>
  summarise(to = sum(EFTSL))|>
  ungroup()

L01_from <- filter(dat, gbl.Teaching_Part_Year %in% ref_periods[ref_periods != max(ref_periods)]) |>
  group_by(mdf, campus, fs_lp, cf, course, ciyos, dp, half)|>
  summarise(L01_from = sum(EFTSL)) |>
  rename(piyos = ciyos) |>
  ungroup() |>
  mutate(dp = dp+2,
         half = case_when(half == "H1" ~ "H1",
                          half == "H2" ~ "H2"))

L01_to <- filter(dat, cs != "New in HY", gbl.Teaching_Part_Year %in% ref_periods[ref_periods != min(ref_periods)])
  group_by(mdf, campus, fs_lp, cf, course, piyos, ciyos, dp, half)|>
  summarise(L01_to = sum(EFTSL))|>
  ungroup()
```

Same logic for all the L01, L03,L06 FROM

Figure 16 R script for P2P calc

4. **Annual p2p calculations in p2p factor cube**: This involved checking if D125 (applied percentage p2p) is calculated correctly in the p2p factor cube.



Cube View. Database: QAT_TM1, Cube: Slc.P2P_Factor, View: P2P Full Year Testing - M6011 Part Year Pairs QA

Context

- gbl.Legal_Entity: Monash Universit...
- gbl.Course_Family: UG-UG-10_5
- gbl.Version: Live Forecast
- gbl.Managing_Degree_Faculty: MED-MED
- gbl.Fund_Source: CSP-NON-GRAN...
- gbl.Coordinating_Campus: CLAYTON

Row

- gbl.Course: Selection
- slc.P2P_Part_Year_Pair: Selection
- slc.Measure_Course: Selection
- gbl.Value_Layer: Selection

Column

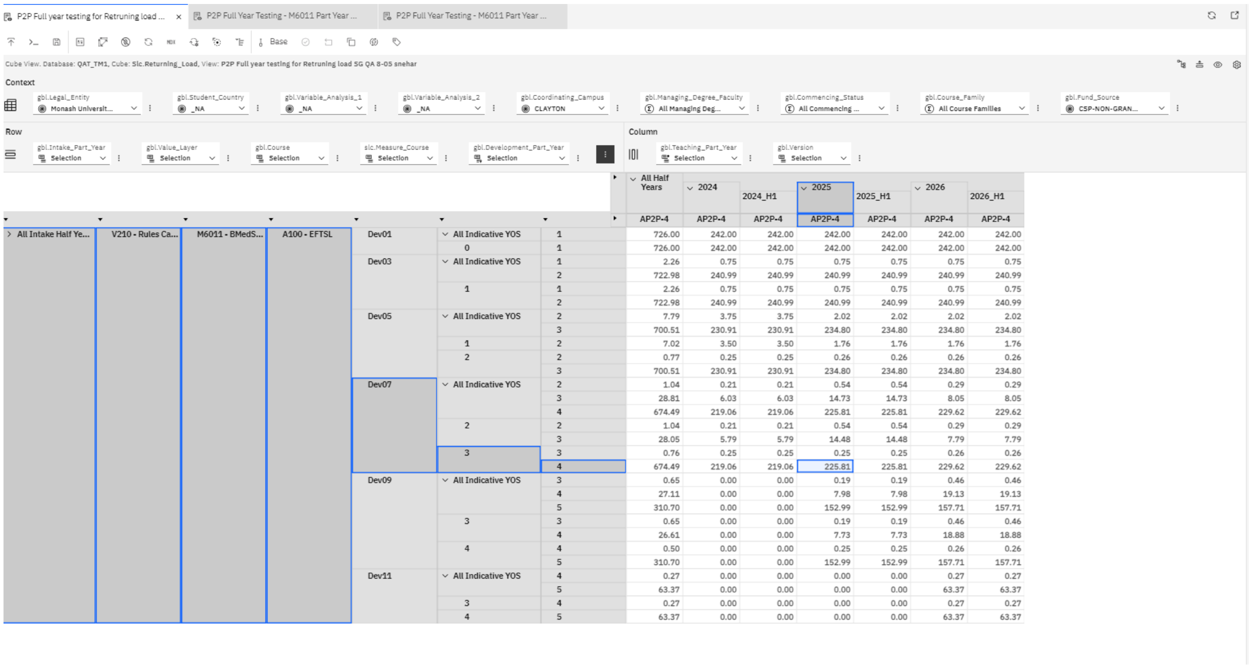
- gbl.Development_Part_Year: Selection
- gbl.Indicative_YOS_Current: Selection

					Dev03			Dev05				Dev07			
					All Indicative Y...	1	2	All Indicative Y...	1	2	3	All Indicative Y...	2	3	4
M6011 - BMedS...	23H124H1_202...	A100	> All Value Layers	All Indicative YOS	243.01	0.00	243.01	236.02	0.00	3.01	233.01	222.70	0.50	5.97	216.22
				1	243.01	0.00	243.01	3.01	0.00	3.01	0.00	0.00	0.00	0.00	0.00
				2	0.00	0.00	0.00	233.01	0.00	0.00	233.01	6.48	0.50	5.97	0.00
				3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	216.22	0.00	0.00	216.22
				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		D125	> All Value Layers	All Indicative YOS	1.00418	0.00000	1.00418	0.98961	0.00000	0.01263	0.97697	0.98758	0.00223	0.02649	0.95886
				1	1.00418	0.00000	1.00418	2.00835	0.00000	2.00835	0.00000	0.00000	0.00000	0.00000	0.00000
				2	0.00000	0.00000	0.00000	0.98316	0.00000	0.00000	0.98316	4.31778	0.33473	3.98305	0.00000
				3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.96528	0.00000	0.00000	0.96528
		A101	> All Value Layers	All Indicative YOS	484.00	242.00	242.00	715.50	238.50	238.50	238.50	676.50	225.50	225.50	225.50
				1	484.00	242.00	242.00	4.50	1.50	1.50	1.50	0.00	0.00	0.00	0.00
				2	0.00	0.00	0.00	711.00	237.00	237.00	237.00	4.50	1.50	1.50	1.50
				3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	672.00	224.00	224.00	224.00
	23H124H1_202...	A100	> All Value Layers	All Indicative YOS	238.50	1.50	237.00	225.50	0.00	1.50	224.00	0.00	0.00	0.00	0.00
				1	238.50	1.50	237.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
				2	0.00	0.00	0.00	224.50	0.00	0.50	224.00	0.00	0.00	0.00	0.00
				0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.97 / 1.50 "=3.98"

Figure 17 P2P factor cube

5. **Annual p2p calculations in Returning load cube**: This involved data extraction and running R scripts to check if calculations for returning load cube reflected correctly.



P2P Full year testing for Retruning load ...
P2P Full Year Testing - M6011 Part Year ...
P2P Full Year Testing - M6011 Part Year ...
Base

Cube View. Database: QAT_TM1, Cube: Slc.Returning_Load, View: P2P Full year testing for Retruning load SG QA 8-05 snehar

Context

- gbl.Legal_Entity: Monash Universit...
- gbl.Student_Country: _NA
- gbl.Variable_Analysis_1: _NA
- gbl.Variable_Analysis_2: _NA
- gbl.Coordinating_Campus: CLAYTON
- gbl.Managing_Degree_Faculty: All Managing Deg...
- gbl.Commencing_Status: All Commencing ...
- gbl.Course_Family: All Course Families
- gbl.Fund_Source: CSP-NON-GRAN...

Row

- gbl.Intake_Part_Year: Selection
- gbl.Value_Layer: Selection
- gbl.Course: Selection
- slc.Measure_Course: Selection
- gbl.Development_Part_Year: Selection

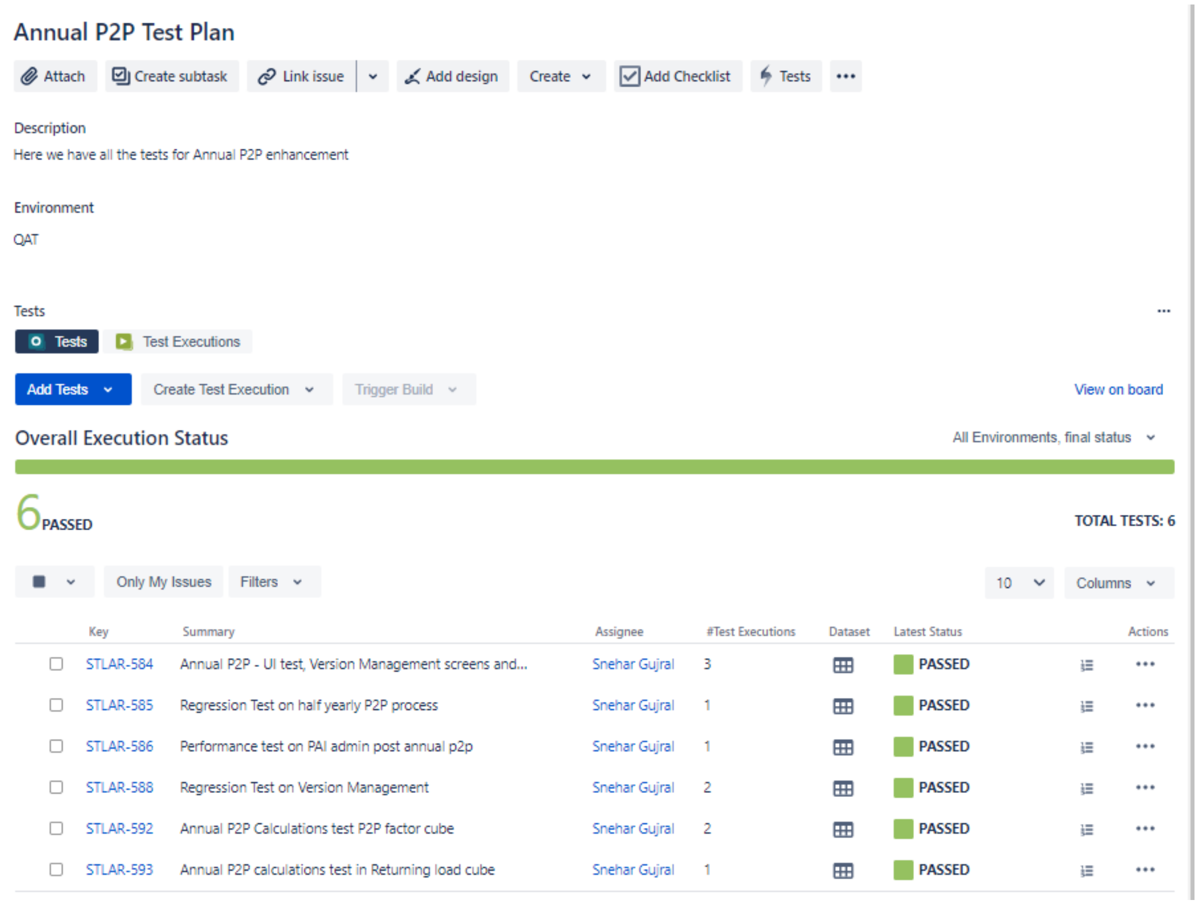
Column

- gbl.Teaching_Part_Year: Selection
- gbl.Version: Selection

							All Half Years	2024	2024_H1	2025	2025_H1	2026	2026_H1
							AP2P-4	AP2P-4	AP2P-4	AP2P-4	AP2P-4	AP2P-4	AP2P-4
> All Intake Half Ye...	V210 - Rules Ca...	M6011 - BMedS...	A100 - EFTSL	Dev01	All Indicative YOS	1	726.00	242.00	242.00	242.00	242.00	242.00	242.00
					0	1	726.00	242.00	242.00	242.00	242.00	242.00	242.00
				Dev03	All Indicative YOS	1	2.26	0.75	0.75	0.75	0.75	0.75	0.75
						2	722.98	240.99	240.99	240.99	240.99	240.99	240.99
					1	1	2.26	0.75	0.75	0.75	0.75	0.75	0.75
						2	722.98	240.99	240.99	240.99	240.99	240.99	240.99
				Dev05	All Indicative YOS	2	7.79	3.75	3.75	2.02	2.02	2.02	2.02
						3	700.51	230.91	230.91	234.80	234.80	234.80	234.80
					1	2	7.02	3.50	3.50	1.76	1.76	1.76	1.76
					2	2	0.77	0.25	0.25	0.26	0.26	0.26	0.26
						3	700.51	230.91	230.91	234.80	234.80	234.80	234.80
				Dev07	All Indicative YOS	2	1.04	0.21	0.21	0.54	0.54	0.29	0.29
						3	28.81	6.03	6.03	14.73	14.73	8.05	8.05
						4	674.49	219.06	219.06	225.81	225.81	229.62	229.62
					2	2	1.04	0.21	0.21	0.54	0.54	0.29	0.29
						3	28.05	5.79	5.79	14.48	14.48	7.79	7.79
					3	3	0.76	0.25	0.25	0.25	0.25	0.26	0.26
						4	674.49	219.06	219.06	225.81	225.81	229.62	229.62
				Dev09	All Indicative YOS	3	0.65	0.00	0.00	0.19	0.19	0.46	0.46
						4	27.11	0.00	0.00	7.98	7.98	19.13	19.13
						5	310.70	0.00	0.00	152.99	152.99	157.71	157.71
					3	3	0.65	0.00	0.00	0.19	0.19	0.46	0.46
						4	26.61	0.00	0.00	7.73	7.73	18.88	18.88
					4	4	0.50	0.00	0.00	0.25	0.25	0.26	0.26
						5	310.70	0.00	0.00	152.99	152.99	157.71	157.71
				Dev11	All Indicative YOS	4	0.27	0.00	0.00	0.00	0.00	0.27	0.27
						5	63.37	0.00	0.00	0.00	0.00	63.37	63.37
					3	4	0.27	0.00	0.00	0.00	0.00	0.27	0.27
					4	5	63.37	0.00	0.00	0.00	0.00	63.37	63.37

Figure 18 Returning load cube view

6. **Performance test on PAI/FAI forms:** The PAI/ FAI forms (mentioned in 4b) had to be stress tested again as the functionality of Annual P2P came with more data which made the forms slower and caused bugs. To address this issue, the development team came up with limiting data to desired development periods (as set by the LPP team) plus introducing feeder fixtures. This caused the testing phase to heavily focus on doing performance testing on a regular basis.



Annual P2P Test Plan

Description

Here we have all the tests for Annual P2P enhancement

Environment

QAT

Tests

Overall Execution Status

6 PASSED

TOTAL TESTS: 6

	Key	Summary	Assignee	#Test Executions	Dataset	Latest Status	Actions
□	STLAR-584	Annual P2P - UI test, Version Management screens and...	Snehar Gujral	3	▦	🟩 PASSED	•••
□	STLAR-585	Regression Test on half yearly P2P process	Snehar Gujral	1	▦	🟩 PASSED	•••
□	STLAR-586	Performance test on PAI admin post annual p2p	Snehar Gujral	1	▦	🟩 PASSED	•••
□	STLAR-588	Regression Test on Version Management	Snehar Gujral	2	▦	🟩 PASSED	•••
□	STLAR-592	Annual P2P Calculations test P2P factor cube	Snehar Gujral	2	▦	🟩 PASSED	•••
□	STLAR-593	Annual P2P calculations test in Returning load cube	Snehar Gujral	1	▦	🟩 PASSED	•••

Figure 19 Annual P2P test plan

One of the key challenges during the whole testing phase was the need to frequently integrate and remove components from the QAT environment due to their impact on other functionalities. This required not only technical adaptability but also a strong coordination with the development team to ensure timely and accurate updates. This process involved numerous collaborative sessions with the development team, often resulting in marathon Zoom meetings that could last up to six hours and some days I was in the office till late. These sessions were crucial for making incremental adjustments and ensuring that all team members were aligned with the latest changes.

Current status of Annual P2P:

Annual P2P is now in production, used by the planning team to account for the Annual courses, including extra 2000 student load data into the existing 80000 student data, which will be extremely beneficial for the Medicine Faculty to help plan out their resource allocation.

Personally, this was not just a technical achievement but also a personal growth opportunity. It pushed the boundaries of my technical skills and deepened my understanding of how perseverance is important in software testing.

Evaluation of the learning at university:

I felt that most of the skills I have learned in my units that were applicable in my work here at eSolutions were mostly **technical skills**. For example, FIT2094 Databases taught me how to write SQL, so it was easy for me to come up with queries to write the code for health check dashboards. ETC1010 and ETC2420 taught me R so I already understood the basics and they had built the foundation for my data analysis skills.

While I did not undergo any units that taught me Agile methods of working or how IT projects are run. I think that for C2001 Bachelor of Computer Science and Data Science, one unit should be made compulsory for **learning Agile methodologies**.

Other than that, working in a professional setting feels much different to doing group assignments in the classroom. In the workplace people tend to be more responsible and the stakes are higher as career reputation and livelihood is involved, whereas in university that would not be always the case. Whereas in the workplace, politics are also involved, which one must be mindful of. I feel like learning on the job is much more beneficial than learning in the classroom. When the stakes are high and the pressure is more, I tend to learn skills faster and perform better.

I feel like there is nothing negative in university's style of teaching, but whatever you learn in the **classroom is the basic building blocks**, one must expand on it by doing open-source projects or getting specialized through further certifications that reflect more on **industry standards**. The major difference is the **environment** where "learning" is conducted and **the consequences of the actions** of the individual.

References

1. *A proud history*. (2019, May 21). Monash University. https://www.monash.edu/about/who/history

2. *About us | eSolutions*. (n.d.). Www.monash.edu. https://www.monash.edu/esolutions/about-us