CASE STUDY
Fleet Management & Integrated IoT / Telematics

How a Robust Business Intelligence Solution helped improve Fleet Operations, Customer Experience and a renewed confidence in IT for a large Australian Fleet Management Company.

A Massive BI Project with over 1,000+ Dashboards on a modernized Data Architecture

PROJECT SPONSOR: CEO , CIO

PROJECT MANAGEMENT: Business Analyst

IMPLEMETATION & MAINTAINENCE: Aays Analytics Team

THE CONTEXT

- The Company boast of over ~50K+ fleets and Drivers with ~5K+ Customers which includes leading industrial, commercial and Government businesses.

- Due to legacy Engineering issues, the existing BI platform was not flexible, robust, agile and accurate leading to a 'loss of confidence in IT' of senior stakeholders and customers. Following were critical issues

  - The UX and design experience was not great

  - Visuals were extremely slow in loading

  - Failure of Data refresh resulted in inaccurate results

- The CIO was looking for a robust and modernized architecture so that data can be used a core business offering to provide stats on Operational Planning, Customer experience and almost real time analytics in the field of 'Telematics' and 'driver behavior' monitoring

THE CHALLENGE

The Company already had a proprietary BI tool viz. BIRST for which the Customer experience was not good due to the following reasons:

- Poor BI performance with visuals not loading properly

- Difficult to maintain and improve due to legacy engineering

- Data not showing accurate information due to Data failures

The major task was to completely reverse engineer and migrate it in a modernized Data architecture in Azure cloud consisting of

- Azure Data Factory (ADF),

- Azure Data Lake Store (ADLS),

- SQL DWH, Azure Analysis Service / SSAS

- Power BI and

- Web embedding with secure User access and security filters

THE SOLUTION

a) Created a Data Architecture layer for BI reporting purposes on top of over 1,000+ raw tables available from 6+ source systems and visualize them over 200+ Dashboard to be integrated in a web application for over 5K+ Clients

i. Centralized all Data in a single schema ("Single Source of Truth") which can fetch to over 5K+ end clients via multiple Dashboards

ii. With Row Level security, administrators could manage the data access levels. This means, you don't have to build different reports for different clients. Build one report and show different data to different clients. This drastically reduces the report building and report management effort

b) Created SaaS solution for secure Report distribution, administration and data management tool to onboard, off-board clients, Users and Reports on their web application.

i. Users could access and view over 200+ Dashboards based on their access levels

ii. Administrators could know how the users were engaging with their reports (what is the most seen report, how much time they spend of each report etc.) through an admin dashboard

c) Created the entire Solution in incrementally so that the ROI of the investments are well measured and the risks of failure are well capped.

| Create scalable data architecture with security filters | → | Visualize Data as per UI and Design standards | → | Web embedding and administer Client on-boarding |

WHAT WE ACHIEVED

A comprehensive Business Intelligence solution is not just about Technology but an interplay of Business Strategy, User experience, Stakeholder expectation, Data management and the art of story telling
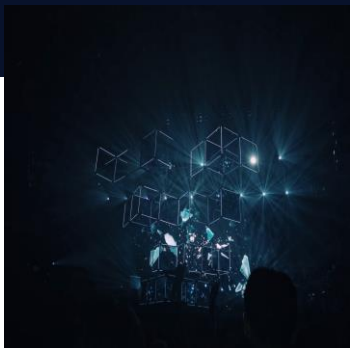
Database Integration

Connected over 6 enterprise systems which includes Vehicle Info, Financial info, Operational Info, Telematics Data, Driver Data and Client Information

Improved BI Performance

The Visualization load time is now less than 5 seconds with huge data of over 30 GB loading time reduced from 8-10 hours to <1 hour

Reduced Total Ownership Cost

The infrastructure cost got reduced by over 75% and maintenance could be easily handled by a BI resource which was earlier marred by legacy issues.

Improved BI Adoption rate

Better accuracy, improved customer or user experience resulted in increased adoption of BI amongst senior stakeholders of the business

Created Data Driven Culture

Now, information is no more situated in silos but rather the entire team starting from department heads, C-suites to Business analysts working together to create a great Data culture
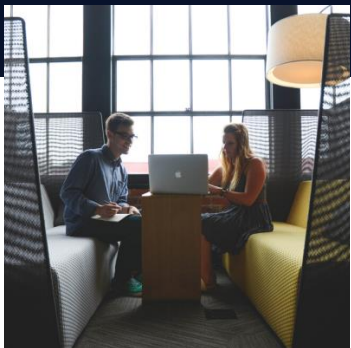
Scalable Architecture

The architecture is built in such a way that it is easier to maintain and improve on the existing reports or create new report without changing major architectural components

THE IMPACT

Parameters	Before Implementation	Post Implementation
BI Performance		
Initial Load time for concurrent 20 Users	2-5 Mins	5sec-20sec
Visual rendering time post loading	10-30 sec	0 – 2 sec
Max. # of Concurrent User for optimal user experience	~5	>=20 Users
BI Administrative SaaS Application (AIP)		
Flexibility of Navigation (Left menu)	No such feature available	Custom UI Experience
Report onboarding for new Clients	Manual	Auto
Report onboarding for Existing Clients	Manual	Auto
Report Administration and Management	Manual	Auto
ROI / Cost		
Cost for ongoing maintenance and Dev	$ 175,000 (approx..)	$100,000 (75% reduction in Cost but with huge improvement in Performance)

THE DATA SOURCES

THERE WERE OVER 1,000+ RAW TABLES SPREAD ACROSS OVER 6+ SOURCE SYSTEMS.
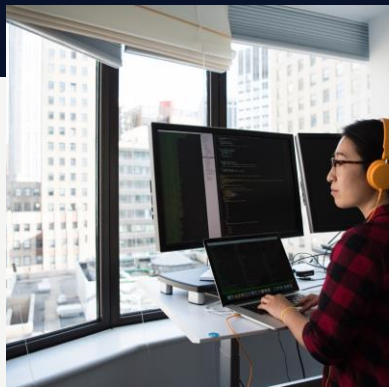PRIMARILY FOLLOWING SOURCE SYSTEMS WERE NEEDED TO BE INTEGRATED:

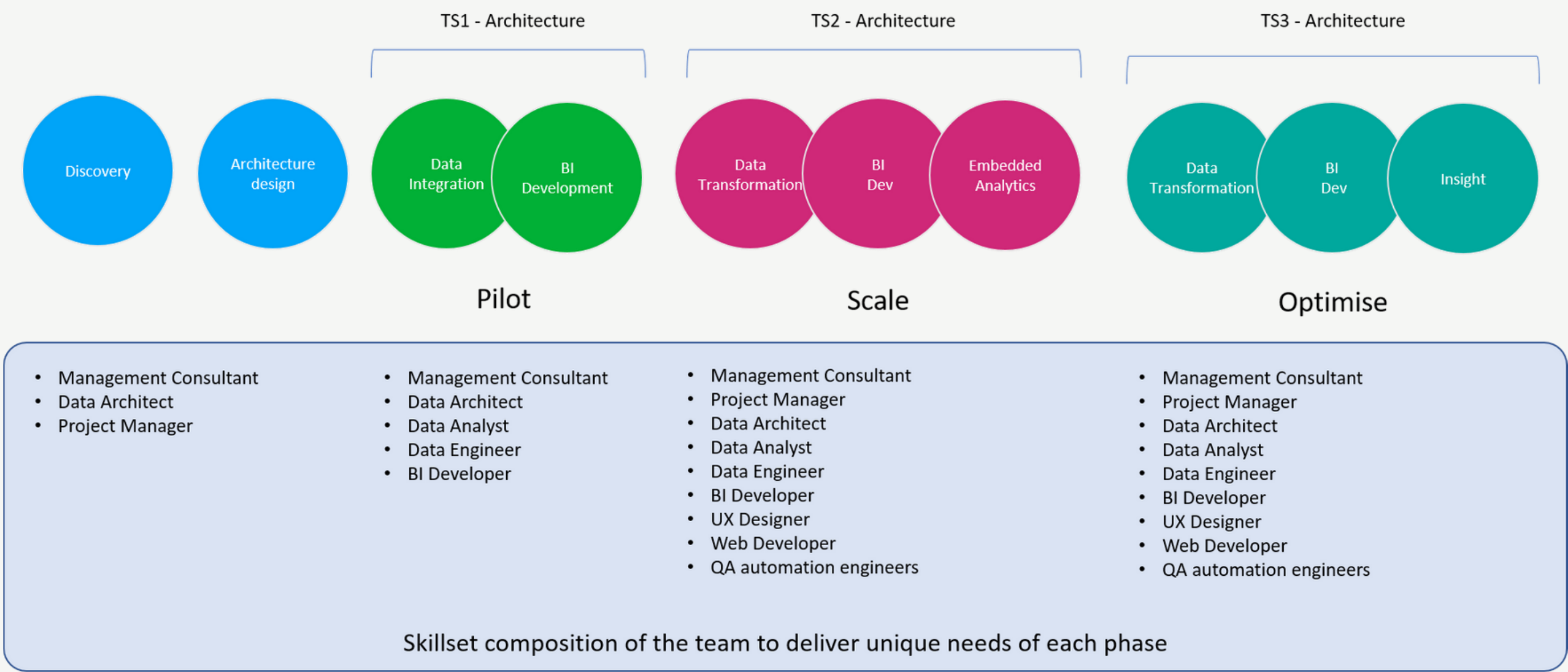| Telematics Database	Financial Database	Operational Database	Vehicle Database	Driver Database	Client Database
Each vehicle created a log every second during a Trip which contained important information like odometer reading, distance travelled, driver information, customer information, start date/time and finish date/time etc.	All finance related information was store in there. The Management was looking for this information to build Financial dashboard reconciling with other operational information	All Transactional information related to fuel expenditure; maintenance cost was kept.	All information on Vehicle viz. vehicle age,vehicle registration number, number of KMs travelled, repair / maintenance due Date etc. are available.	All information on Driver viz. name, contact information, vehicles driven etc. are available.	All information on clients are available in this.

SETTING UP THE RIGHT RESOURCES, PROCESS AND TECHNOLOGY AND STAKEHOLDER BUY-INS

While the problem statement appeared more about having the right Technology architecture in place, it was of critical importance to setup the right resources along with processes and manage stakeholders' expectations along the way to make it a success.

TS1 - Architecture | TS2 - Architecture | TS3 - Architecture

Discovery | Architecture design | Data Integration | BI Development | Data Transformation | BI Dev | Embedded Analytics | Data Transformation | BI Dev | Insight

Pilot | **Scale** | **Optimise**

- Management Consultant
- Data Architect
- Project Manager

- Management Consultant
- Data Architect
- Data Analyst
- Data Engineer
- BI Developer

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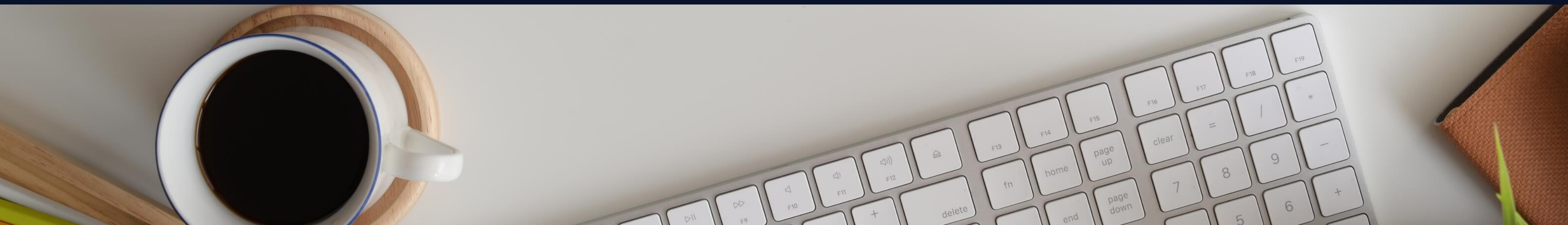Skillset composition of the team to deliver unique needs of each phase

DESIGNING THE SINGLE SOURCE OF TRUTH

A single source of truth is a central, controlled and "blessed" source of data from which the whole company can draw. It is the master data. When you don't have such data and staff can pull down seemingly the same metrics from different systems, inevitably those systems will produce different numbers. Then the arguments ensue.

 You get into a he-said-she-said scenario, each player drawing and defending their position with their version of the "truth." Or (and more pernicious), some teams may unknowingly use stale, low-quality or otherwise incorrect data or metrics and make bad decisions, when they could have used a better source.

From the data administrator's side, a single source of truth is preferable, as well. It is easier to document, prevent name collisions across tables, run data quality checks and ensure that the underlying IDs are consistent across the tables.
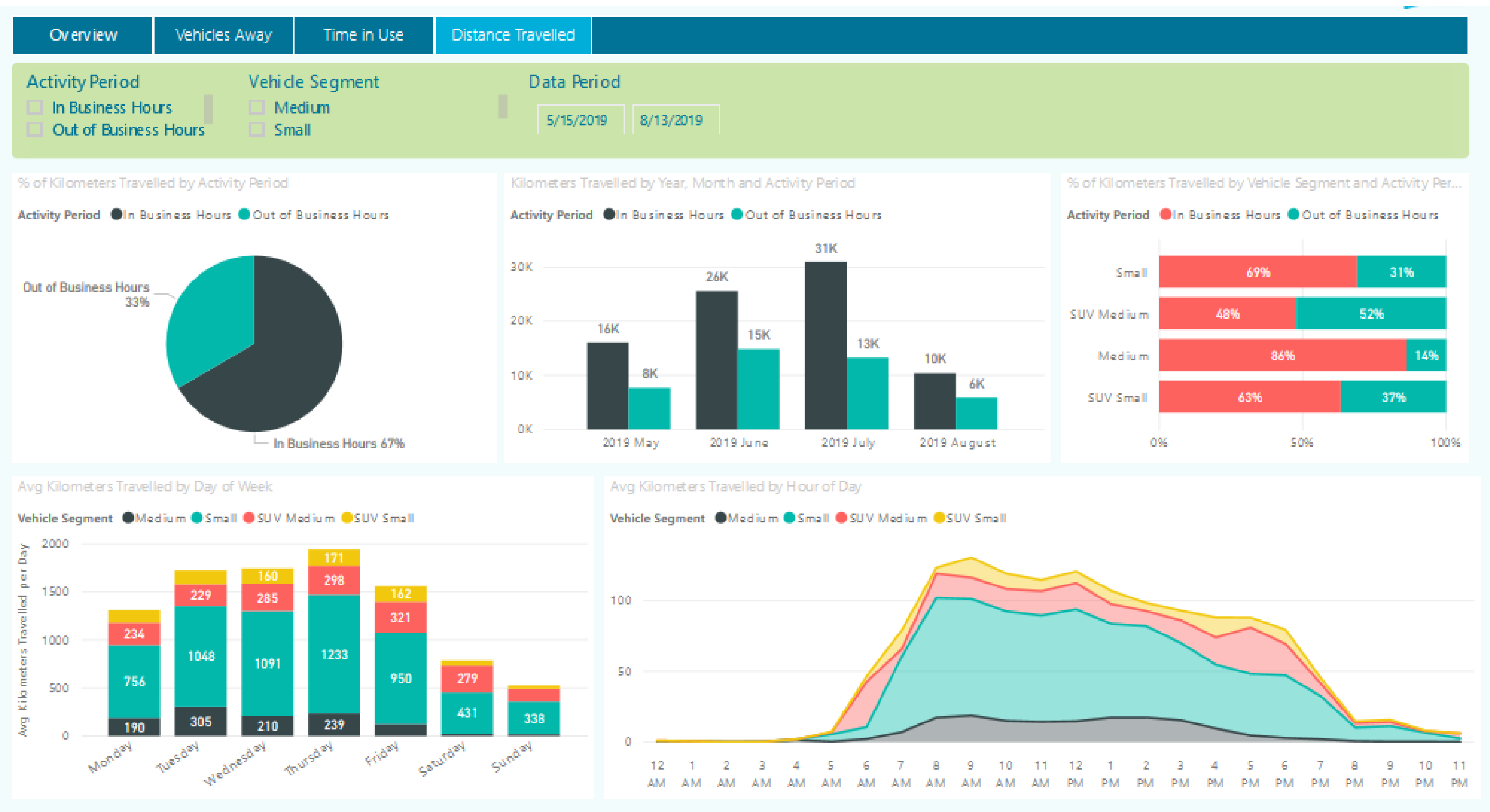
It also is easier to provide flattened, easier-to-work-with views of the key relations and entities that, under the hood, may have come from different source.
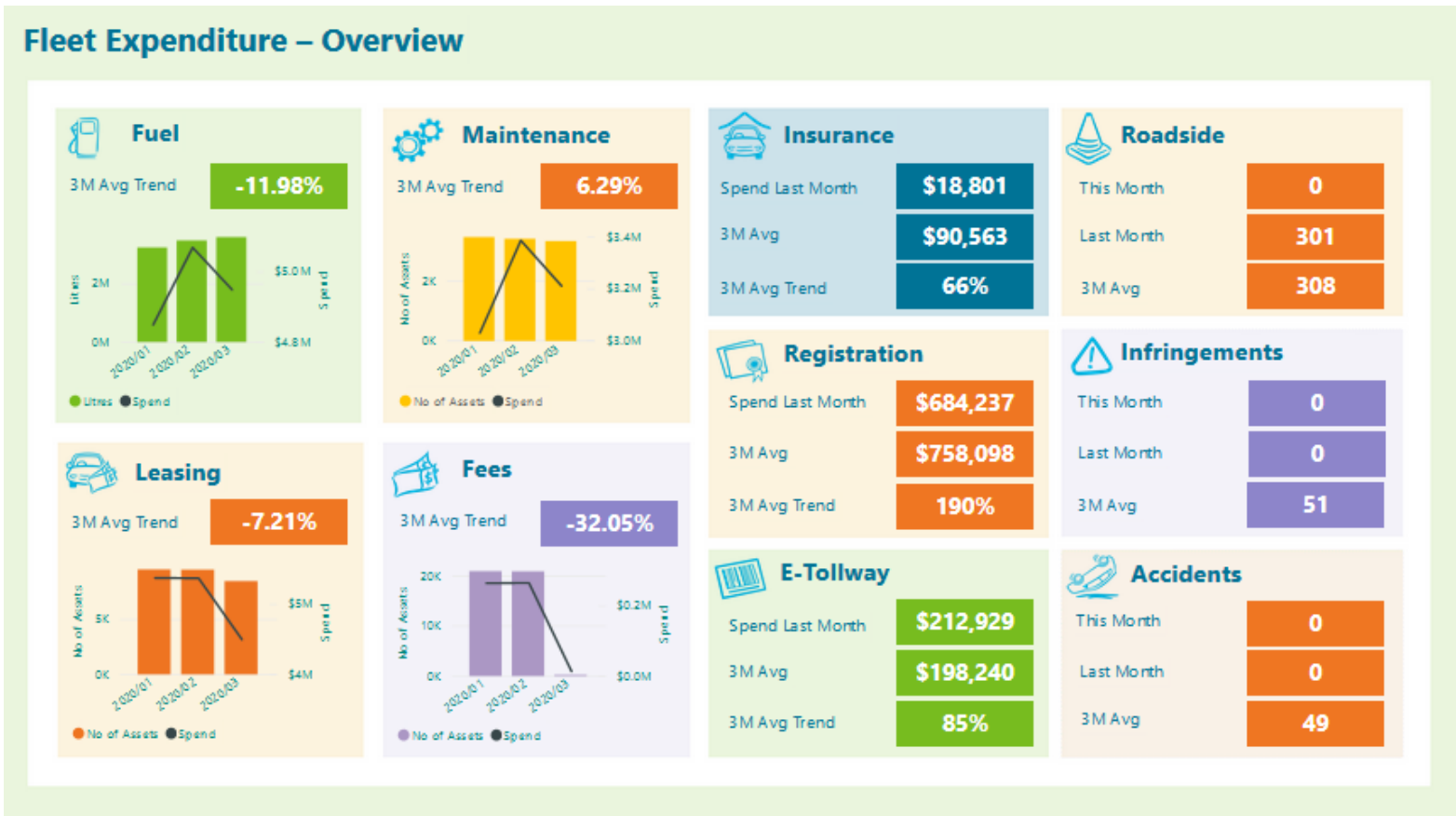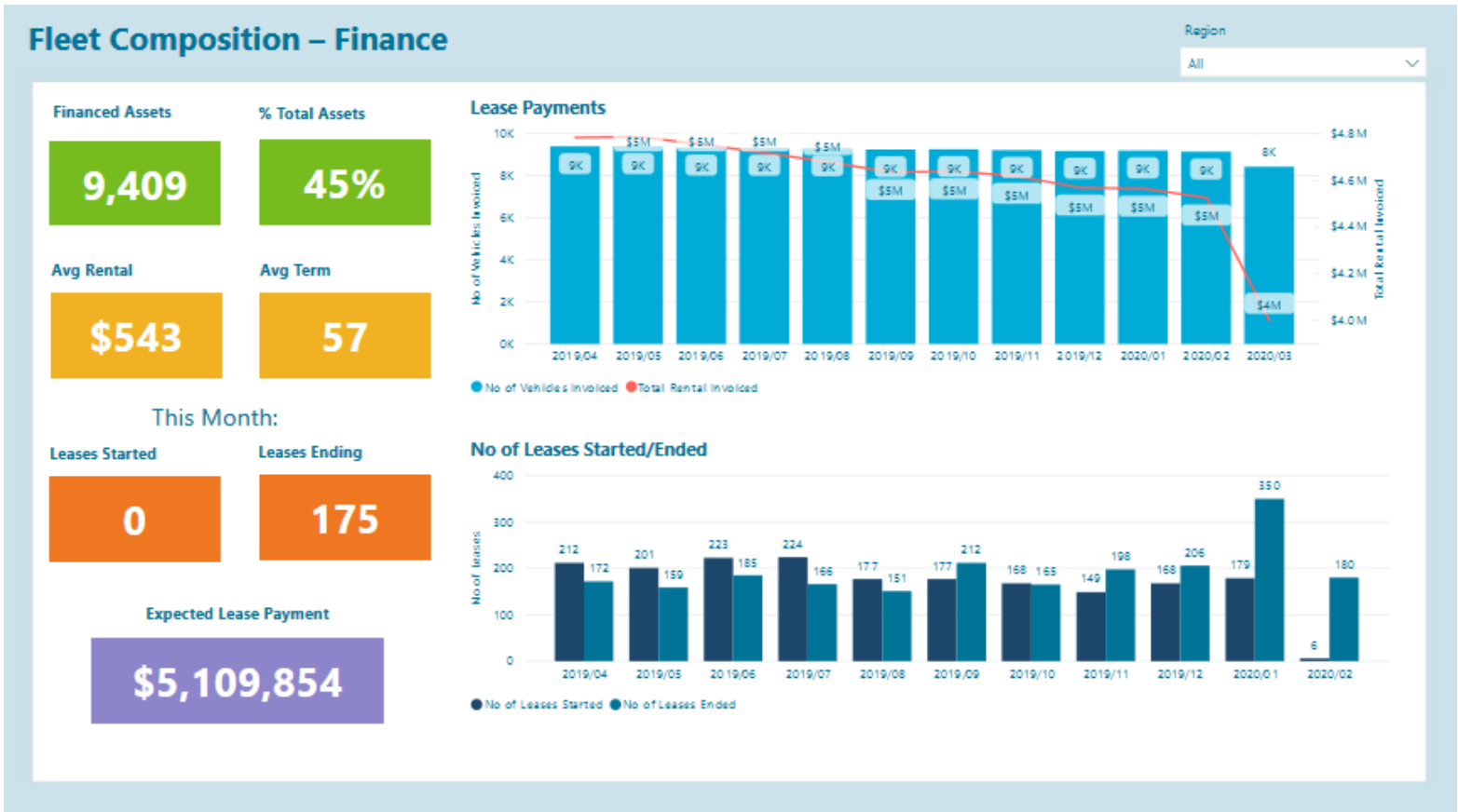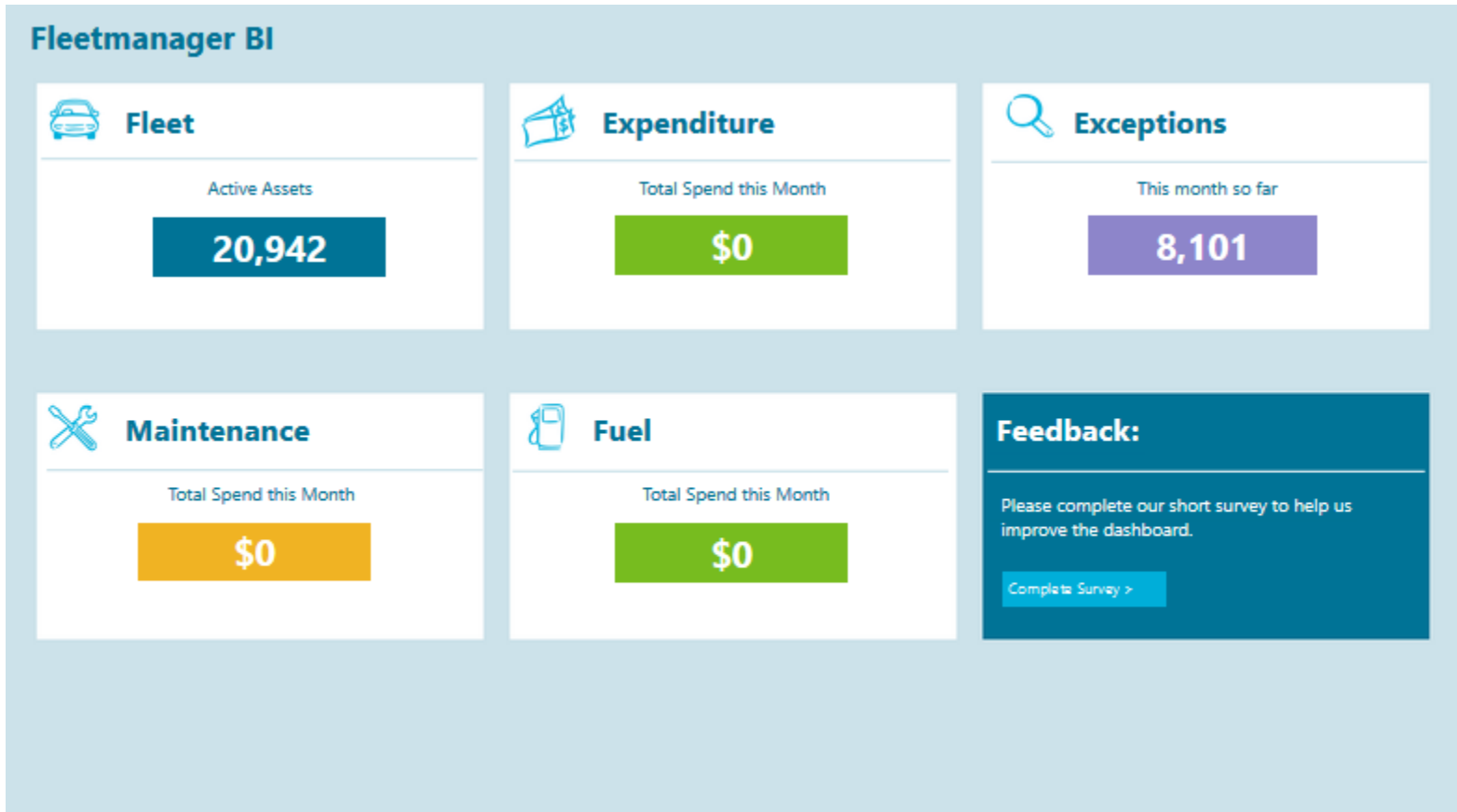
DATA VISUALIZATION ON FLEET
AND IoT/TELEMATICS DATA

VISUALIZATION ON TELEMATICS/ IoT DATA

Overview	Vehicles Away	Time in Use	Distance Travelled	

Activity Period
- ☐ In Business Hours
- ☐ Out of Business Hours

Vehicle Segment
- ☐ Medium
- ☐ Small

Data Period

5/15/2019	8/13/2019

% of Kilometers Travelled by Activity Period

Activity Period ● In Business Hours ● Out of Business Hours

Out of Business Hours 33%

In Business Hours 67%

Kilometers Travelled by Year, Month and Activity Period

Activity Period ● In Business Hours ● Out of Business Hours

Period	In Business Hours	Out of Business Hours
2019 May	16K	8K
2019 June	26K	15K
2019 July	31K	13K
2019 August	10K	6K

% of Kilometers Travelled by Vehicle Segment and Activity Per...

Activity Period ● In Business Hours ● Out of Business Hours

Segment	In Business Hours	Out of Business Hours
Small	69%	31%
SUV Medium	48%	52%
Medium	86%	14%
SUV Small	63%	37%

Avg Kilometers Travelled by Day of Week

Vehicle Segment ● Medium ● Small ● SUV Medium ● SUV Small

Day	Medium	Small	SUV Medium	SUV Small
Monday	190	756	234	
Tuesday	305	1048	229	
Wednesday	210	1091	285	160
Thursday	239	1233	298	171
Friday		950	321	162
Saturday		431	279	
Sunday		338		

Avg Kilometers Travelled by Hour of Day

Vehicle Segment ● Medium ● Small ● SUV Medium ● SUV Small

FLEET MANAGER OVERVIEW – A FEW SNAPSHOTS

PILLARS
FOR A SUCCESSFUL DATA DRIVEN CULTURE

The Aays Analytics Platform brings together the core capabilities of today's most powerful BI technologies, enabling smart solutions across our offerings to augment and enhance BI development.

We're helping our clients across many different industries to optimize outcomes by leveraging these available data assets.