

V E N N

Modernising Auckland Transport's Contractual KPIs

1

Client Overview & Background

2

Challenges

3

Project Objectives & Success Criteria

4

Implementation Streams

5

Key Success Factors

6

Outcomes

7

Conclusion



Client Overview

Auckland Transport, a controlled organisation of Auckland Council, is responsible for delivering and maintaining the region's integrated transport system—serving over 1.6 million residents and millions of annual visitors. From roads and footpaths to buses, trains, ferries, and cycleways, AT plays a pivotal role in shaping a connected, accessible, and sustainable Tāmaki Makaurau. Its technology and data strategies underpin efforts to improve mobility, reduce congestion, and support evidence-based planning for a growing city.

Project Background

The Public Transport Operating Model (PTOM), introduced in 2013, aimed to improve the planning and delivery of urban bus and ferry services through partnerships between regional councils and private operators.

For Auckland Transport, PTOM KPIs calculated by the EDW are critical for provider payments. In 2024, AT introduced a new version of operator contracts with updated KPIs, starting with Unit 110, with all existing contracts set to transition over time.

The previous KPIs, in place for nearly a decade, had become outdated and difficult to maintain. The new framework was designed to streamline reporting, reduce manual effort, and eventually retire legacy data feeds that no longer meet operational needs.

Challenges

- 1. Legacy code structure poorly suited to dealing with significant shift in Business requirements** – The legacy KPIs were built with inconsistent data merging and logic across the various KPIs, and no clear separation between landing, processing, and publishing stages—making secure versioning nearly impossible,
- 2. Technical Debt and Funding Constraints** – The legacy KPIs predate current AT ETL standards, and rely on outdated or decommissioned data streams, which couldn't be rebuilt as part of new KPI project, due to time and budget limitations.
- 3. Limited Auditing Capability** - The variables used to calculate the KPIs are not persisted in the Monthly KPI tables, preventing automated volumes reconciliation and making subsequent investigation of PROD issues delicate. The Business also had no way to confirm trip failure records and KPIs sent to the externally managed CMS application matched what was actually visible to them in that application.
- 4. Significant time lost due to lack of drill-down** – Without stop-level trip details, users couldn't investigate issues directly in reports and had to revert to source systems for daily operator interactions.
- 5. Poor Documentation** – Only high-level requirements exist, unchanged for 7 years, with no glossary, models, or technical mappings.
- 6. Standards Mismatch and Limited versioning capability** - Earlier KPI versions were bespoke, hard to extend, and built out of standards, which would not pass current change management expectations on release.

Project Objectives

- 1. Meet aggressive Production deadlines (imposed by contractual negotiations)** – Contract negotiations were already progressing when new Business requirements emerged. Given Auckland Transport’s regulatory and operator reporting obligations, it became critical to implement the updated solution on time.
- 2. Create standardised and extensible processing patterns** – Establish a modular, standardised ETL framework with minimal intermediary steps, clear processing stages (landing, merging, rules, publication), and future-proof patterns for easy evolution.
- 3. Ensure fully auditability of Publication method to CMS** - To create a formal Data Council with clear roles, responsibilities, and escalation pathways, enabling ongoing stewardship, policy enforcement, and alignment with council-wide strategic objectives.
- 4. Ensure full match of new version to current AT ETL standards** – Standardise the ODS for the various source systems in presence and ensure every field is commented, ensuring standard reprocessing ability across the board and documentation can be generated from code (AT has a Catalogue solution implemented). This is particularly critical for the CMS system which is both source and target for the solution.
- 5. Improve Data Quality and reduce historical dependencies** - Implement at each processing step basic volume reconciliations that will fail the stream early, ensuring any PROD issue can be detected and Business does not have to manually regenerate KPIs after an already completed billing phase, due to EDW technical errors. Sever technical dependencies to historical EDW models with major technical debt by going back to source whenever possible.
- 6. Provide an additional rules engine version for future proofing** – Auckland transport is looking at a migrating their enterprise data warehouse in the next few years, which would open additional integration and transformation capability (APIs, Python).

Success Criteria

Meet aggressive Production deadlines

- Contractual negotiations were well under way when the new needs reached development team
- Imperative for Auckland Transport to have the new solution up and running in time, to meet their reporting obligations (to operators and to regulator)

Create standardised and extensible processing patterns

- Organise processing in clear steps that can be evolved with minimal side-impacts (landing, AT reference sets merging, Business rules engine, Publication)
- Minimise the number of intermediary steps required in ETL code
- Standardise ETL patterns to ensure better future extensibility.

Establish full auditability of KPIs

- The KPIs are used as an input for operators payments and must be auditable, including enabling code-based reconciliation of CMS data to EDW data,
- Include KPI variables and enable stop-level drill-down by operator, route, and trip, providing full transparency without needing to manually check multiple source systems.

Alternate rules engine version for future proofing

- Proof of Concept in Python showing the modular approach can easily be evolved to fit within the future AT data landscape

Improve Data Quality

- Automate volume reconciliations between each step, ensuring any PROD issue can be detected and dealt with as early as possible at source, and most importantly BEFORE the KPIs are used by CMS provider and Contract Business teams to calculate the Operator payments.
- Sever dependency to Tech Debt models

Full match of new version to current AT ETL standards

- ODS structures are standardised across all source systems, with consistent field naming and definitions.
- All fields are fully documented in-code, enabling automated documentation generation via AT's Catalogue solution and supporting consistent reprocessing.

Implementation Streams

Venn structured the engagement into four integrated workstreams:

Elicitation and Technical Requirements Translation

- Review of old and new operator contracts and documentation
- Workshops with Business, CMS owner and reporting team to confirm requirements
- Feedback phase with Business and Technical SMEs

Solution Modelling, Technical ETL Design, Build

- Define systems interactions and detailed technical requirements with CMS owner (external party to AT),
- Define technical transformation rules based on the above and AT internal system, following the go back to source principle wherever possible
- Detailed Design document of a modular, easy to evolve solution,
- Technical Leadership of a team of 2 Data Engineers (one AT employee, one Venn) to build the solution
- Environment set-up, Release planning and actual deployment in collaboration with AT EDW and Change Management teams

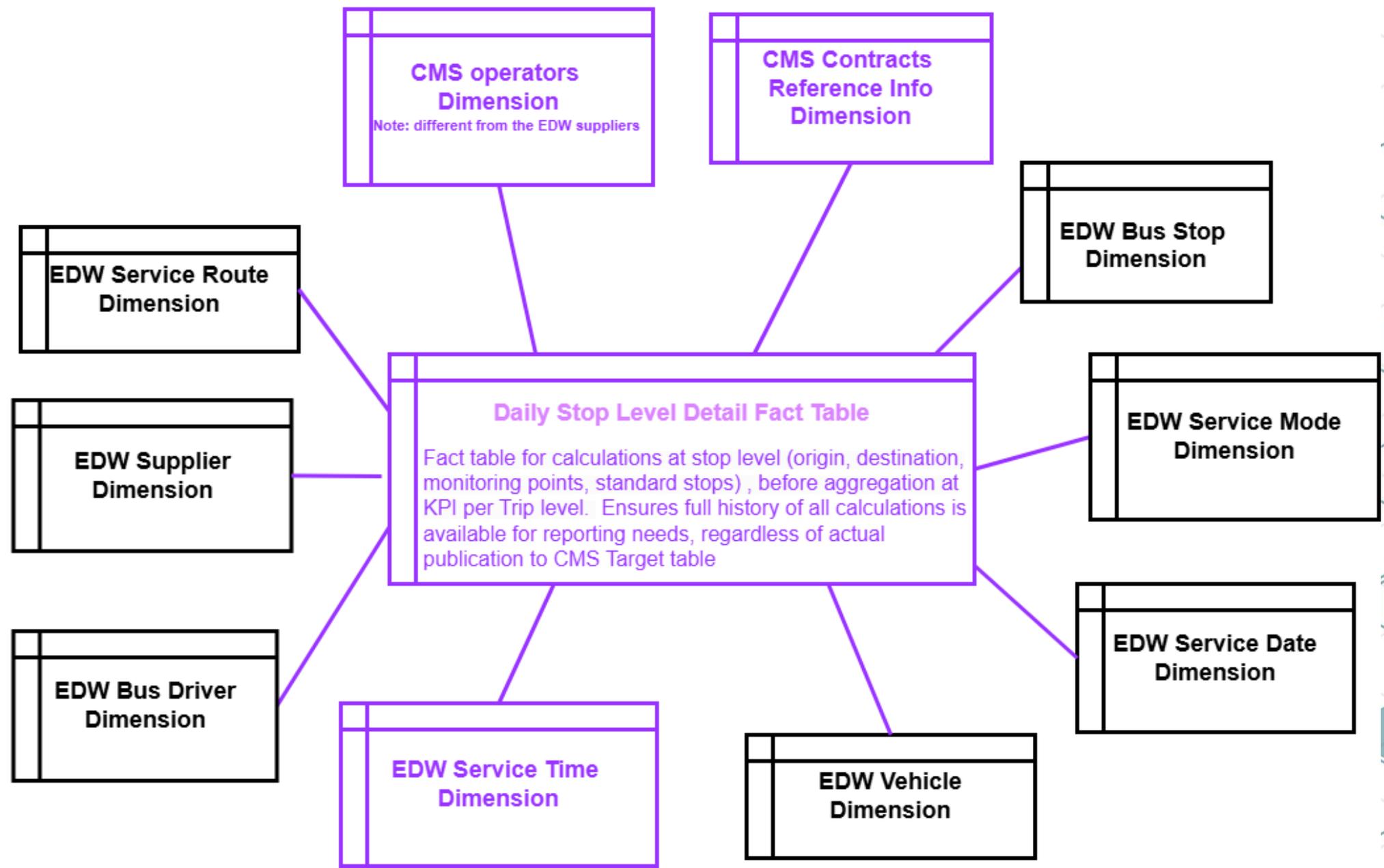
Data Quality and Testing

- Automatic volume reconciliation across code for fail fast and early
- Participation in System Testing
- Support to User acceptance Testing

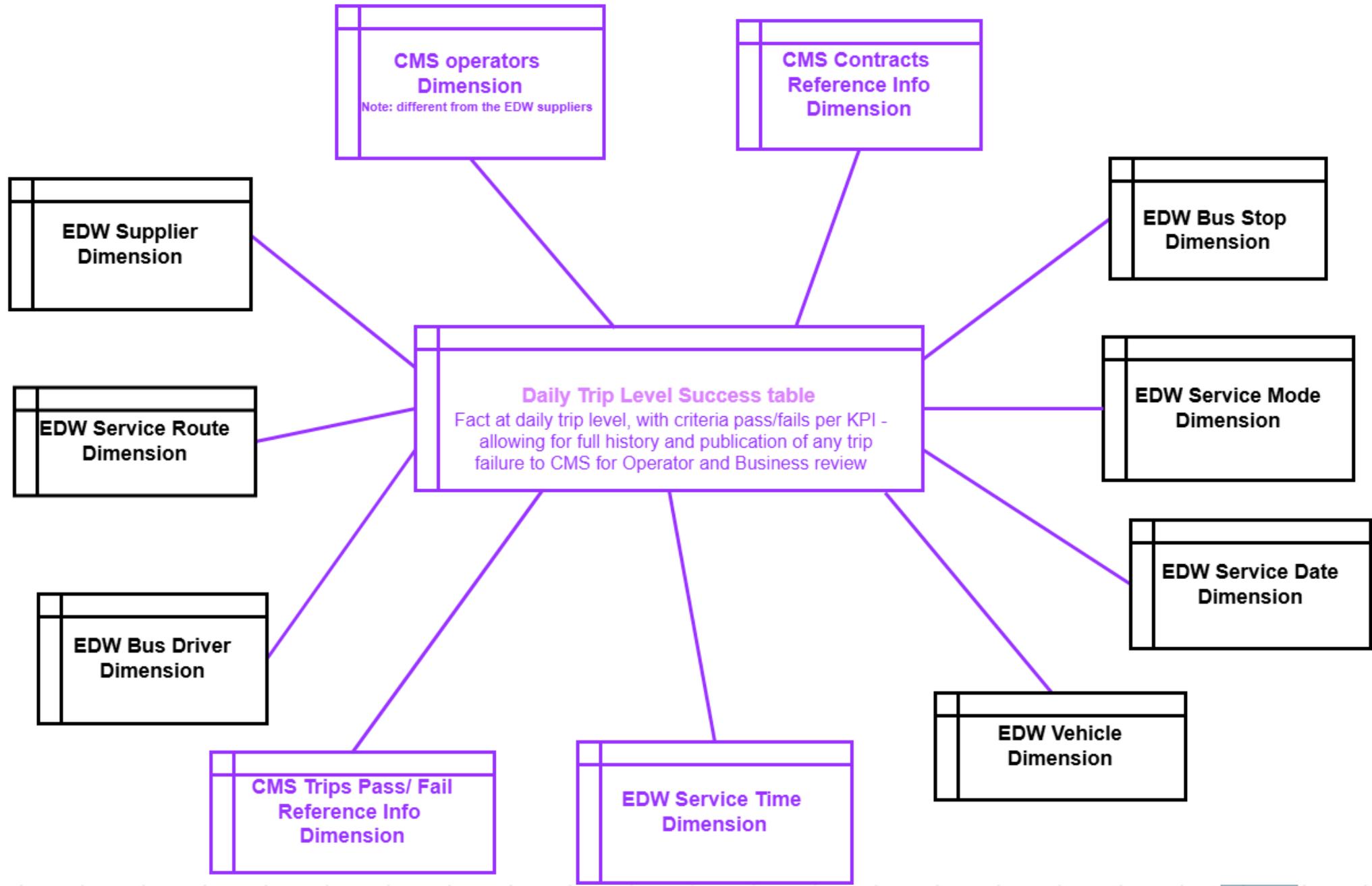
Adoption and Enablement

- Delivered 2 Business Workshops, with feedback
- Delivered 3 Design Review meeting
- Regular overview catch-up with main AT Contract domain SME
- Overall Management of 30+ change requests (Business, Reporting Team and CMS System requested) through Build and Testing phase

Reporting Models Conceptual ERDs – Stop Details



Reporting Models Conceptual ERDs – Trip Pass/Fail



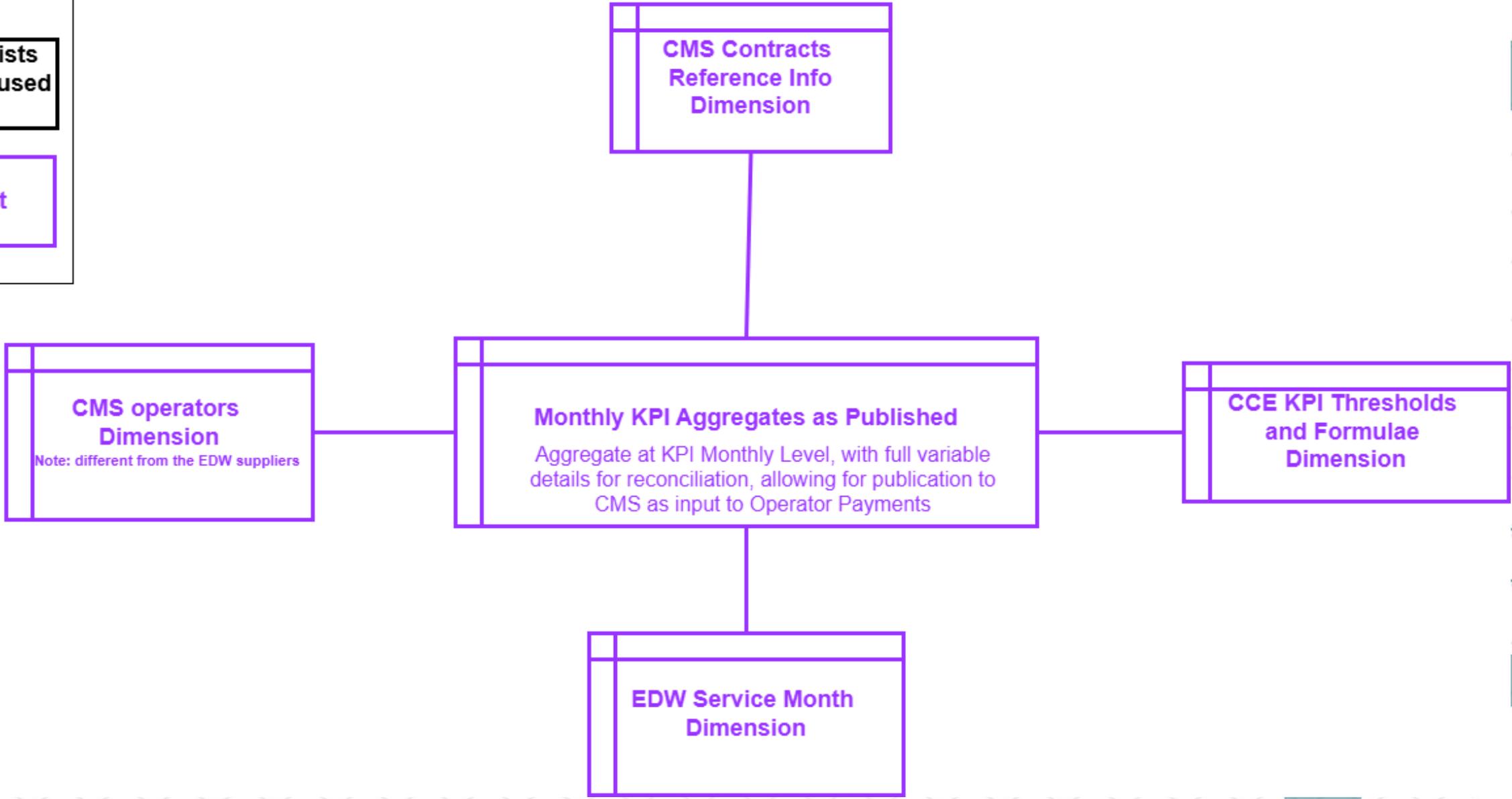
Reporting Models Conceptual ERDs – Monthly KPIs



LEGEND

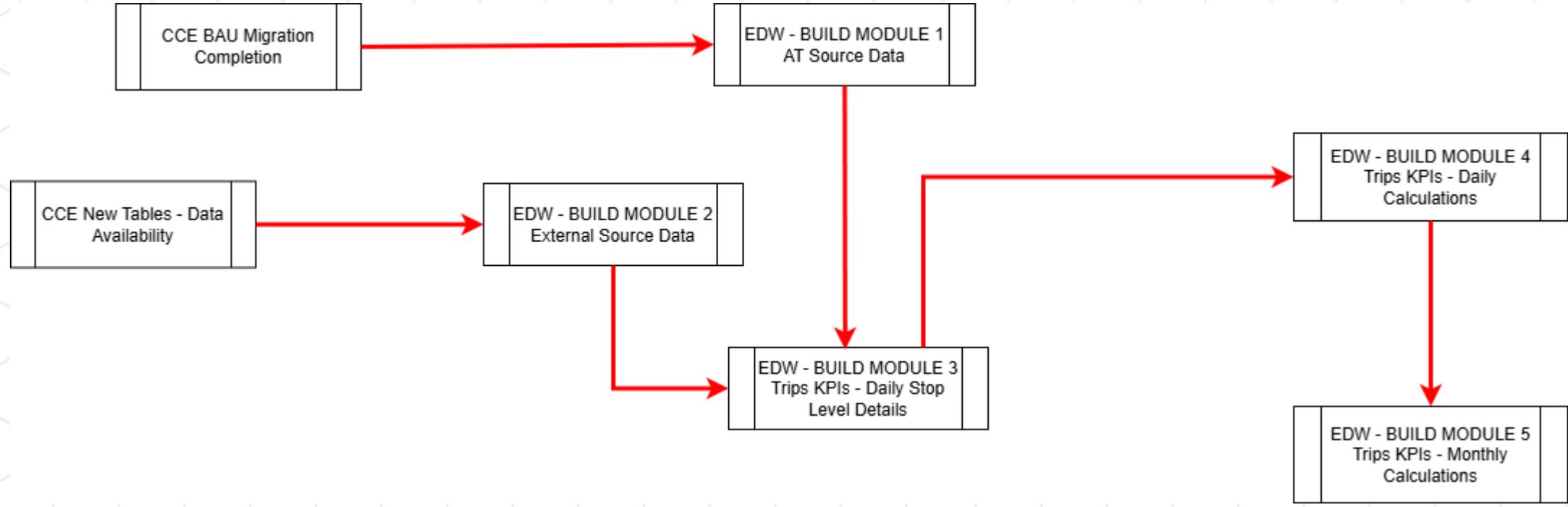
Currently Exists and can be reused as is

To be Built



ETL Processing steps

Modular approach ensuring insulation of changes



Key Success Factors

1. Close Tactical Alignment with Business Teams

- The project was directly aligned with the Business Contract Management team, focusing on ensuring new KPI solution would be easy to use and maintain, lighten the current Business load on trip level manual investigation, prevent errored / partial KPIs publication whenever possible, offering overall better transparency for operators,
- Early engagement with the Business team ensured the requirements were understood and widely supported.

2. Strong Partnership and Delivery Expertise

- Collaboration with [Venn Consulting](#) brought deep expertise in Analytics and Operational Reporting Modelling, ETL Patterns and Best Practices,
- Embedded team with external CMS provider, AT System Tester and AT Data Engineer ensured close alignment of practice for the entire Build and Test phase

3. Standardisation, and Fail Early approach

- The technical alignment to the new AT ETL standards ensured all modules were developed in a way that ensured maximum code reusability for the development of each KPI, and associated Unit Test scripts,
- The fail early reconciliation between code modules allowed the identification of PROD data issues early during the implementation phase that could have remained unchecked before testing phase otherwise, allowing for discussion with source system experts and early rework of Business rules

Outcomes

1. Version Delivered on time and ready for future contract migrations

- The new contract used for the development was the first of many to be migrating between end of 2025 and mid 2027, as each of the historical contracts expire and the new ones come into effect.
- The progress migration of these 40+ Contract agreements is now fully enabled and should require minimal overall changes in the EDW (progressive removal of filters that are currently ensuring the contracts not yet migrated are still processed under the historical stream).

2. Measurable Improvements in Data Quality

- Only 3 Prod failures to date for the streams as implemented in April, 2 due to source data issues, 1 due to a technical set-up change on the SQL server database.
- Zero PROD failures to date past the second module: as soon as the first code rules were applied, the data inconsistency was detected, ensuring no time wastage and no data clean-up required in target PROD models
- Zero Trip failure or monthly KPI missing, or published incomplete or incorrect to the AT CMS

3. Fully auditable solution

- Full detail at stop level can be investigated for each trip using the companion stop level model, drill-down has been enabled via the reporting tool for the Business to have no code access
- Full detail of the contributing variables that the KPIs are based on is also surfaced
- Full match between Published records from EDW and Available records in the CMS system can be confirmed with a single SQL Query provided to AT, with the option to include it in a future PowerBI reconciliation report

4. Reusable Frameworks and Artifacts

- Full Integration of recent AT ETL standards and modularisation ensure future scalability and ease of migration of the Rules Engine when AT decides to migrate platforms.
- This was demonstrated by the delivery of a Python version of the Rules Engine component of the solution which was done by a single developer in X weeks, including full reconciliation to current PROD ETL-only solution

Conclusion

Auckland Transport's successful delivery of the updated C110 KPI framework, in partnership with Venn Consulting, represents a major step forward in modernizing their operational reporting. By replacing legacy, ad-hoc processes with a modular, standards-aligned ETL solution, AT has significantly improved data quality, auditability, and operational transparency, empowering business teams to engage more effectively with operators and meet regulatory obligations with confidence.

The project was delivered under tight contractual timelines and driven by a strong partnership model, combining deep technical expertise with close alignment to business needs. Key enablers included a fail-fast approach to data quality, reusable ETL patterns, and a fully auditable publication pipeline that supports investigative drill-down to answer Operator questions. The solution also integrates seamlessly with AT's metadata catalogue, ensuring documentation is generated directly from code and maintained as part of the delivery lifecycle.

With the first contract now live and over 40 additional agreements scheduled for migration, Auckland Transport is well-positioned to scale this framework across its network. The delivery of a Python-based proof of concept further demonstrates the solution's adaptability to future platform changes, ensuring long-term sustainability and alignment with AT's evolving data strategy.