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CASE STUDY

Queensland Department of Transport and Main Roads

Clear insights into congestion causes and costs helps guide the Department of Transport and Main Roads to improve traffic flow
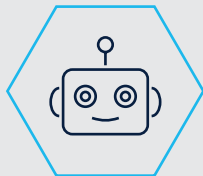
Queensland
Government

At a glance

The Department of Transport and Main Roads (TMR) keeps Queenslanders moving by managing the state's network of roads and highways

netBI's analytics tools help TMR clearly see the cause and associated costs of congestion

Insights support TMR to improve traffic operations and infrastructure development to better manage the impacts of congestion

TMR no longer needs to rely on time-consuming congestion surveys—our reporting solution draws on near real time data to map the trends and economic costs.

Overview

By adopting netBI's cloud data platform, Queensland's TMR has been able to identify congestion 'hot spots' on the state's roads and understand the costs to the community to help guide investment and planning decisions.

TMR plans, manages, and delivers Queensland's integrated transport network to achieve sustainable solutions across all modes. The Department's integrated transport planning approach contributes to the state's economic prosperity, environmental sustainability, and the wellbeing of Queenslanders. Many of its projects are aimed at keeping the community moving by upgrading, constructing and operating roads and highways in order to improve traffic flow, safety and reliability of travel.

TMR now finds itself at the **forefront of congestion management**—with analytics and BI tools that let it:

Understand statistical trends and seasonal performance of its road network based on a complete picture of all the peaks and troughs of traffic flow.

Measure state-wide congestion and costs with almost real time data insights and reports that can be generated in minutes.

Improve and automate reporting on the economic costs of its road congestion to inform better infrastructure investment decisions and economic modelling.

Monitor both short and long-term trends in congestion and costs by combining live streams and historical datasets.

Drill down to understand traffic flow issues on individual sections of road at specific time periods to inform incident management and day-to-day operational decisions aimed at improving the reliability of travel.

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The **automation and digitisation** of its road traffic data has allowed TMR to replace the traditional congestion surveys that can take weeks to complete, are limited to specific survey areas and collection periods, and can delay decision-making.

With netBI's **powerful data fusing platform and analytics**, TMR can monitor when, where, and why people get stuck in traffic—whether its planned roadworks, a crash, or bad weather—and the flow-on costs of this congestion.

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netBI and TMR worked closely with **Dave Johnston**, an engineer from Intelligent Transport Services to develop a method to learn the baseline metrics to distinguish between 'normal' and 'abnormal' levels of congestion, and a scalable methodology for attributing costs and causes across a road network, based on the costing method defined by Austroads. TMR worked closely with netBI to productionise the methodology for the Cost and Causes of Congestion.

> *"What we had developed was effectively a prototype of the methods that could be used to do these calculations, but netBI put the results at the users' fingertips—providing a wide range of tools for slicing and dicing and presenting the data,"* Dave said.
>
> *"The speed of netBI's system is incredibly fast considering the large amount of data that it's using to present the summary reports."*

TMR's Chief Engineer, **Dennis Walsh**, says:

> *"TMR first looked into creating this analytics tool about five years ago, and with the dedication and perseverance of the team here at TMR, combined with netBI's data solutions expertise, we were able to come up with an innovative solution that allows TMR to make more informed decisions ."*
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> *"The netBI team brought an impressive level of expertise and experience to the project that delivered an excellent final solution"* he said.

Innovative Solution

ML-driven insights eliminate expensive consulting reports

Understanding the reasons for, and impact of, traffic movement ensures the Department can wisely deploy its resources.

For instance, the Department can see at a glance the top five roads or intersections, the congestion levels and economic cost of this congestion to the community. TMR can readily see the best options for tackling congestion and where infrastructure funds will have the greatest economic impact on the community.

Having these insights on hand not only makes planning capital works quicker, it simplifies the monitoring and evaluation of infrastructure improvements: TMR can now track and compare congestion pre and post construction based on actual traffic movement data and not periodic sampling activities.

netBI's Machine Learning (ML) algorithms, data fusion, analytics and reporting tools have enabled TMR to:

- Determine and benchmark 'normal' traffic flows and road network performance

- Identify the specific causes of unusual and excessive levels of congestion

- Understand where and when congestion was excessive and the hours of delay caused

- Understand the costs of excessive or abnormal congestion, which includes the costs imposed on the community through increased travel time, fuel usage, and pollution.

These in-depth insights are achieved by fusing a complex collection of datasets including

- ✓ Road network model, movements, speed and volume data

- ✓ Sensor data on National Performance Indicator (NPI) links

- ✓ Weather data from the Bureau of Meteorology (BoM)

- ✓ Incident management system and traveller hotline and website data

- ✓ Fleet data from the ABS about vehicle and fuel types and usage

- ✓ Unit cost data for delays (based on ABS wages data), fuel and pollution costs

netBI's analytics and reporting tools are powered by ML algorithms, based on a comprehensive methodology for calculating the costs and causes of congestion, which enables TMR's data streams to be efficiently and reliably processed to surface meaningful insights.

Data insights enable the Department to truly understand the performance of its road network in Queensland, better target its congestion management efforts and bring greater transparency to its reporting and investment decisions. In turn, that means TMR can deliver safer and more reliable operations.

Feature Spotlight

How TMR gets a complete picture of congestion

netBI's analytics tool to uncover the costs and causes of congestion helps TMR precisely understand congestion events—as well as the broader implications of an incident on traffic up and downstream of where congestion occurs.

Each congestion event has a 'footprint' that reflects the length of time it continues and the extent to which it affects adjacent parts of the road network. netBI's reporting solution calculates the footprint of each event, spatially and temporally, for a more comprehensive understanding of the impact and cost of congestion.

For instance, a minor crash might affect a single stretch of road for 15 minutes: while a truck overturning could have a ripple effect that stretches across multiple connecting roads and blocks, and take much longer to resolve. Naturally, the specific cause of a congestion event, and the extent of its impact, also results in different costs being incurred.

Understanding the detail behind unexpected levels of congestion—and its true impact from a monetary and societal perspective—is critical to making complex decisions about where to invest and what kind of improvements are needed to keep traffic flowing.

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Would you like to clearly understand the causes and costs of congestion across your network, like TMR did? Do you want to improve your traffic management and infrastructure investment decisions?

Get in touch for more information or to request a personalised demo.

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