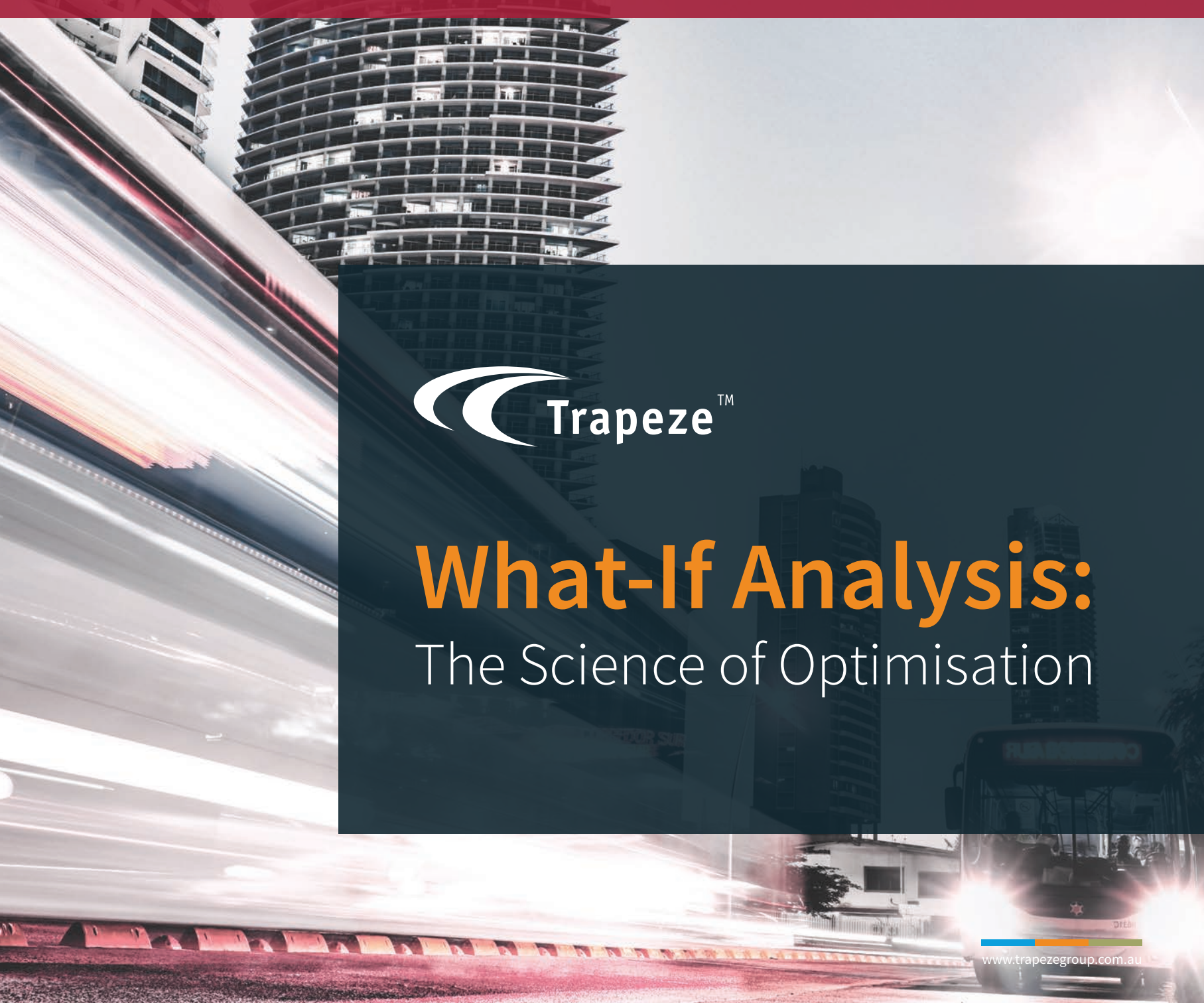


Trapeze™

What-If Analysis:

The Science of Optimisation

www.trapezegroup.com.au

2

3

INTRODUCTION

Within any bus operation, there are savings to be made – it's just a question of finding these opportunities in your network.

Determining the schedule changes that will generate the best outcome may seem like trying to predict the future, but the science of **what-if analysis** is as far from crystal ball-gazing as you can get. What-if scenarios are a proven way to find savings for your business.

4

INTRODUCTION

The scenarios may vary from network to network, but savvy bus operators use their planning and scheduling tool to perform what-if analyses and determine the costs or benefits of various options.

A what-if analysis allows you to examine your existing or proposed business rules to see where you may be able to do things more efficiently.

For example:

Reduce dead kilometers

Improve on-time running

Reduce the daily or weekly overtime bill

Save costs through more effective fleet and crew scheduling

All of these are influenced by operating rules and can be forecasted using a planning and scheduling tool. Before you decide on any changes or implement new options to drive efficiencies, make sure you fully cost and measure it to understand the ramifications to your operating expenses.

Let's have a look at some what-if scenarios you could explore to optimise a new or existing operation and uncover the savings within.

PLANNING

Satellite & Layover Depots

Alternate locations for parking buses near a common terminus will help you drive efficiencies, not only in total kilometers travelled but also driver hours.

Many depots have been operational for over 40 years, and your network and key passenger hubs may have changed over time. Pretend you are not constrained by history and look for an opportunity to reduce your total costs over the period of the contract.

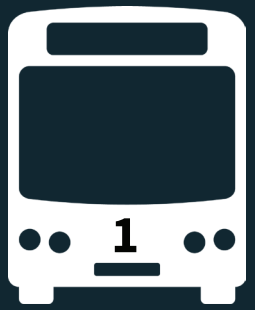
This could be in the form of a Bus & Driver Sign On/Off Depot or a bus layover location to park buses during the middle of the day. Being able to park your buses at a central location during the day will help you save tens of thousands of dead kilometres.

For example, after the AM peak 10 buses can be parked and the 11th bus and driver can take the other 10 drivers back to depot. The same can happen in reverse in the afternoon.

6

PLANNING

This can be set up while you are planning your network by creating dead running records. Once complete, this will provide you with all the data required to optimise your fleet and crew and extract the costings for this new location, such as:



Number of vehicles and staff required

Fleet and crew statistics

Dead running percentage

FLEET

Vehicle Classes

When optimising your vehicles, it's a good idea to strip back any restrictions you may have created with vehicle classes as potentially this could be costing you buses.

An easy example is when you have two peak trips: one is flagged as an 'Articulated Vehicle only' and the next trip is flagged 'Standard Vehicle only'. These trips will not be linked together in an automated system, which is programmed to respect your vehicle class rules.

If both trips have the potential to be either type, removing the class restrictions will save you one bus.

Interlining

Having the ability to interline and run special from one route to another has the ability to save buses.

Take this scenario, for instance: a bus comes off Route 1 and runs back to the depot empty while another bus leaves the depot running empty to take over Route 2. This creates an overlap of two buses and two drivers performing this movement.

However, if the first driver was able to finish on Route 1 and run empty to take over Route 2, this would save a bus and a driver.

You can also try interlining the bus, but not the driver. For example, a bus may go from one route to another to keep the vehicle numbers down, while the driver goes on a break and returns to work with another bus and route.

This allows you to maximise the use of your buses while respecting the rules of the driver's operating routes.

Even though you may not have done interlining previously, there could be potential to do so for a few routes with a common terminus or swapping drivers and buses.

Your automated system's algorithm needs the maturity and sophistication to process this and the ability to do this automatically, so you can cost these options and weigh up the pros and cons for your network.

FLEET

Trip Shifting

Do you have the ability to move a school or service trip at critical peak times? A shift of just one minute could save a bus.

For instance, a school trip that leaves a couple of minutes earlier or later could link up with a service bus to save a bus.

Your automated solution should have the ability to identify and highlight these potential trip movements to save a bus.

Alternate Timetables

If you are in tender mode, your ability to show your company's vision on how you see the network growing over the life of the contract by:

- Creating timetables quickly and efficiently with different headways, and
- Costing these in a Vehicle & Crew Schedule for current and proposed network changes

is important to showcase and can be the difference between winning and losing.

Vehicle Scheduling

There is a difference between what works on paper and what actually happens on the road.

If you are being paid a bonus for on-time running, you need to make sure your running times and turnaround times are correct. Making the solution too tight can cause issues with late running and result in fines.

Run different what-if scenarios with increased turnaround time to see the cost variation. There is a tipping point between cost and reliability (especially during the peak periods), so a what-if analysis is vital to strike a balance.

In some cases, there may be a bonus paid for reliability. You will need to see if this offsets any additional costs.

CREW

Remove Restrictions

Historically, there may be many restrictions in place to satisfy past operational local agreements. If your network is due to be put out for tender, the incoming operator will not look at these restrictions – which can give them an edge over your bid. It's essential to cost these so you can see the impact of these restrictions to your business.

Schedule Your Entire Workforce

Are you scheduling your entire workforce of full-time and part-time drivers?

Some operations assign work to part-time drivers on the fly, which could be impacting your bottom line. A part-timer may need work within agreed times of the day, which may be difficult to accommodate after the fact.

The most efficient way to schedule is to include part-time staff in your full solution. This reduces the amount of work your full-time drivers need to cover, maximises the use of part-time hours and potentially saves you money.

Driver Working Conditions

It is vital to understand your working conditions, more drivers rostered on that day to even out the shifts at a maximum of eight hours to keep your total cost down. For instance, if you pay drivers overtime after eight hours on the day, it may be better to have more drivers and even out the shifts as eight hours to keep your total cost down.

Running what if analysis on different working conditions will help you understand the costs of each parameter and will help you cost these as part of your tender or revised EBA (Enterprise Bargaining Agreement).

If you are tendering for a new network, it is important to understand what conditions you will need to operate on Day 1. If these aren't properly costed, you may be the cheapest provider but your costs are incorrect – this will come back to bite you.

ROSTER

Averages

A big mistake in rostering is not thinking about it while you are scheduling your crew. You may have agreed averages that you need to satisfy in the roster.

For example, you may have an (EBA) that stipulates you must pay makeup time for under 40 hours on the week or overtime after 40 hours.

Ideally, you want each driver to work eight hours a day for five days a week. However, your most efficient schedule with your current driver headcount might be for 8.5 hours a day.

If you don't do a what-if analysis to compare this with the costs of hiring more drivers, you may be paying more overtime than necessary.

Taking averages into account at the crew scheduling stage will prevent this, as you can ensure your shifts fit into a roster without costing too much makeup or overtime.

Days Off and Shift Allocation

When in negotiations with your roster committee, use what-if analyses to maximise consecutive days off or maintain an operator's start time across the week to reduce staff fatigue.

Being able to automatically create day-off patterns and allocate shifts to a line of work effectively will help you implement changes quickly and efficiently. It may also help reduce absenteeism.

CONCLUSION

With competition in the bus industry ever increasing, it's no secret that every operator is interested in optimising their network. Having the ability to run what-if scenarios easily will not only help you improve efficiencies, but also stand out from the crowd.

Being able to simulate and thoroughly cost all your options is the first step to building a solid business case for improvements, whether within your business or the network that you operate.

If you can show transport authorities how you can provide a better service at the same cost, it could be the difference between keeping or winning contracts and losing them.

The agility and speed every modern bus company needs means it is essential to use an automated planning and scheduling solution. This solution must be built on an algorithm that can handle the industry's complex working conditions while also respecting all of your local business rules.

Make sure you have the ability to define these conditions yourself so that you can easily run what-if analyses as required. You shouldn't need to request a customisation by your software provider just to change business rules.

Trapeze™
Here for the journey

Trapeze Group works with public transport agencies and their communities to develop and deliver smarter, more effective public transport solutions. For more than 25 years we have been *Here for the Journey*, evolving with our customers around the world to help them move people from point A to Z and everywhere in between.

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