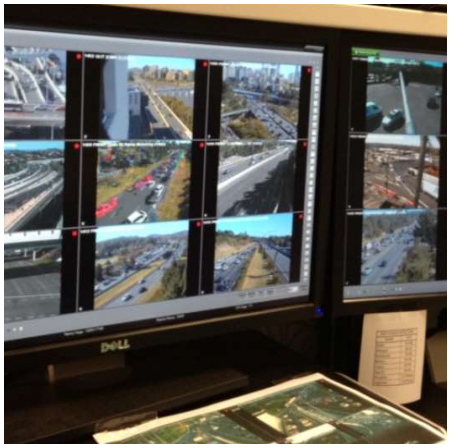
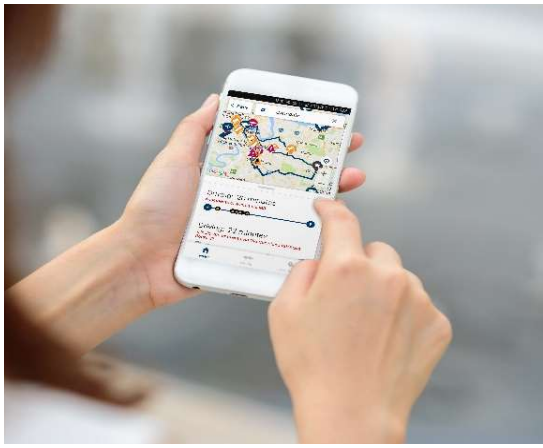
IMD ROAD OPERATIONS

RAPID

Road and public transport
incident detection



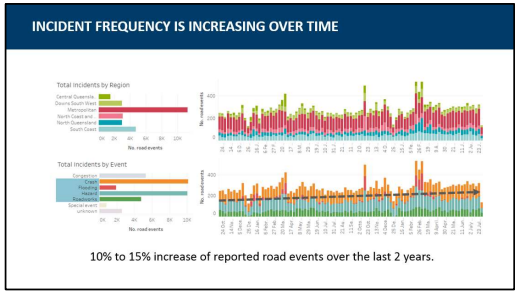


CONTENTS

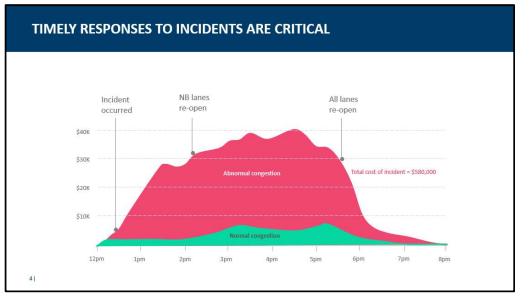
- Problem
- Stage 1,2,3 Deliverables and Learnings
- Stage 4 ongoing
- Next Steps

Problem

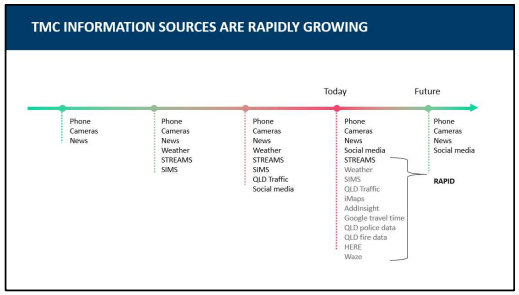
- Incident frequency over time.

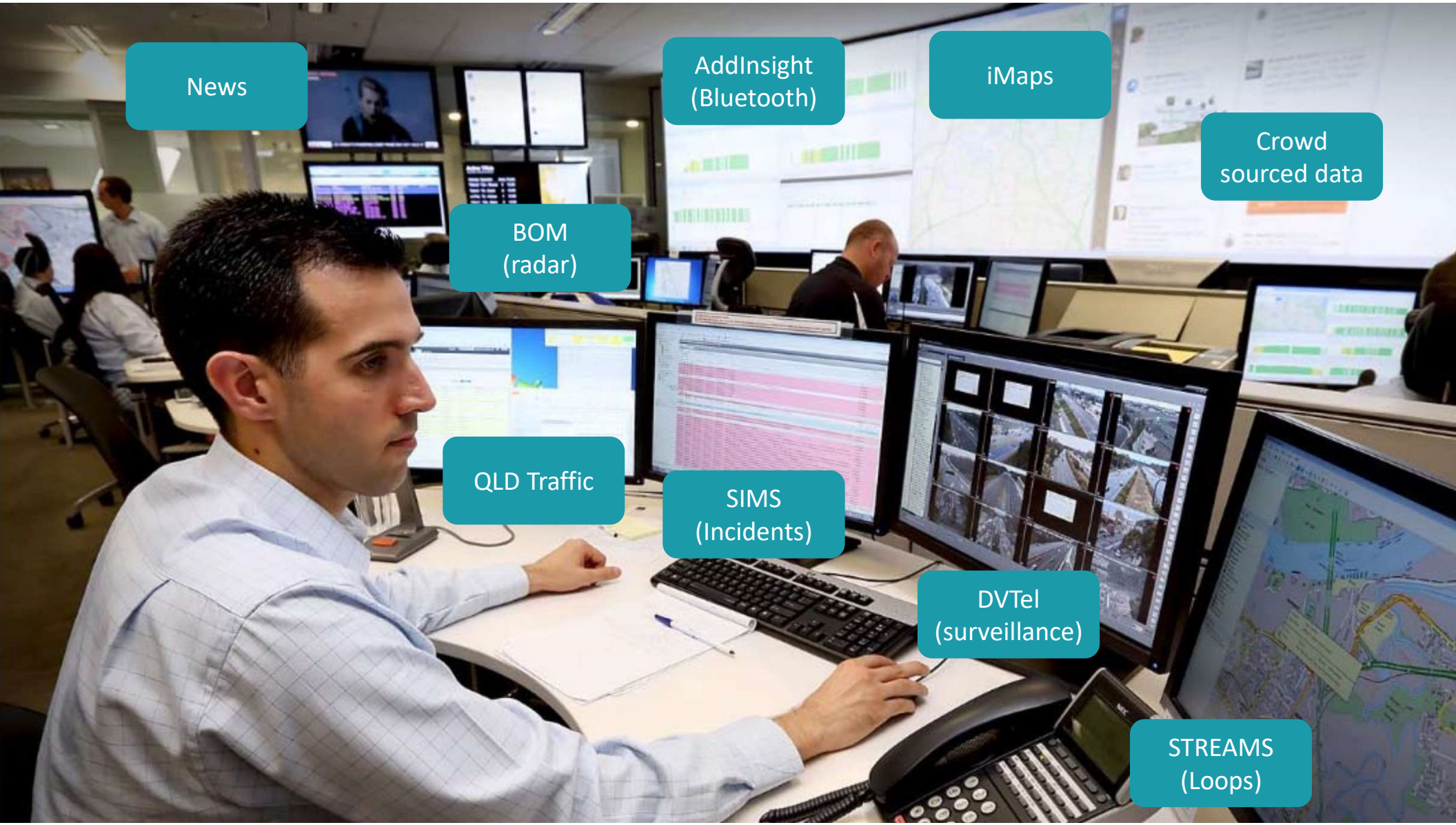


- Timely responses to incidents are critical.

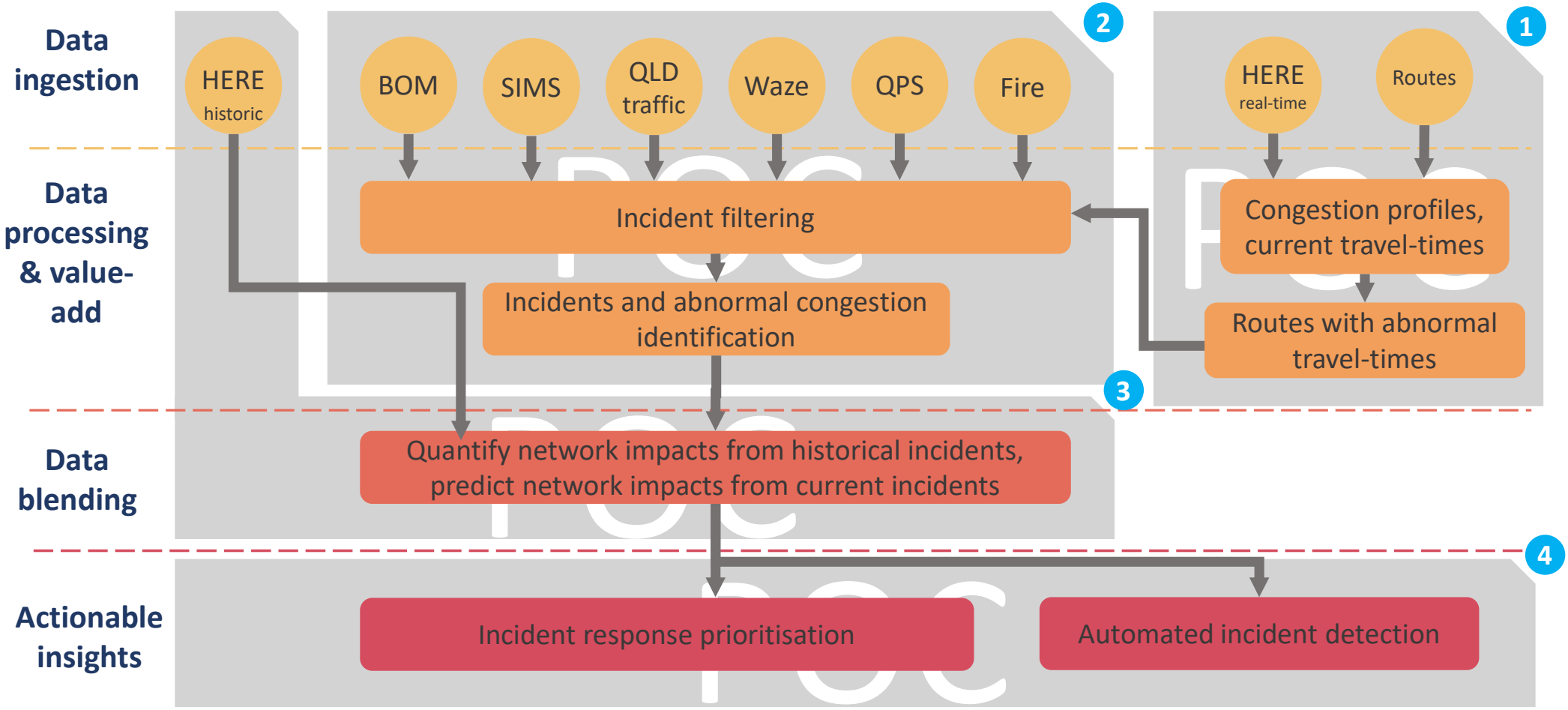


- TMC Information are rapidly growing.




News
AddInsight (Bluetooth)
iMaps
Crowd sourced data
BOM (radar)
QLD Traffic
SIMS (Incidents)
DVTel (surveillance)
STREAMS (Loops)

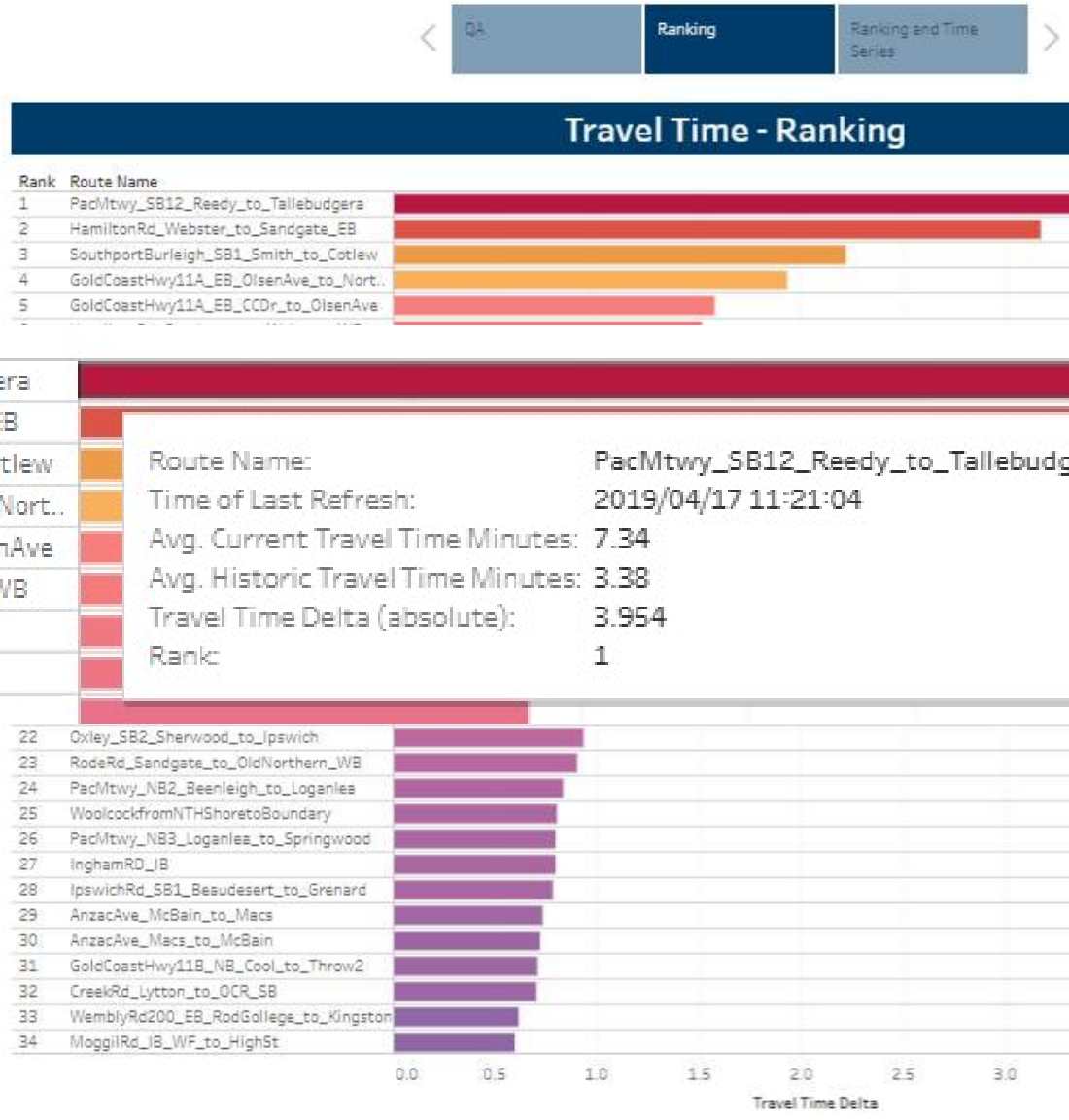
AUTOMATED INCIDENT MONITORING SYSTEM POCS



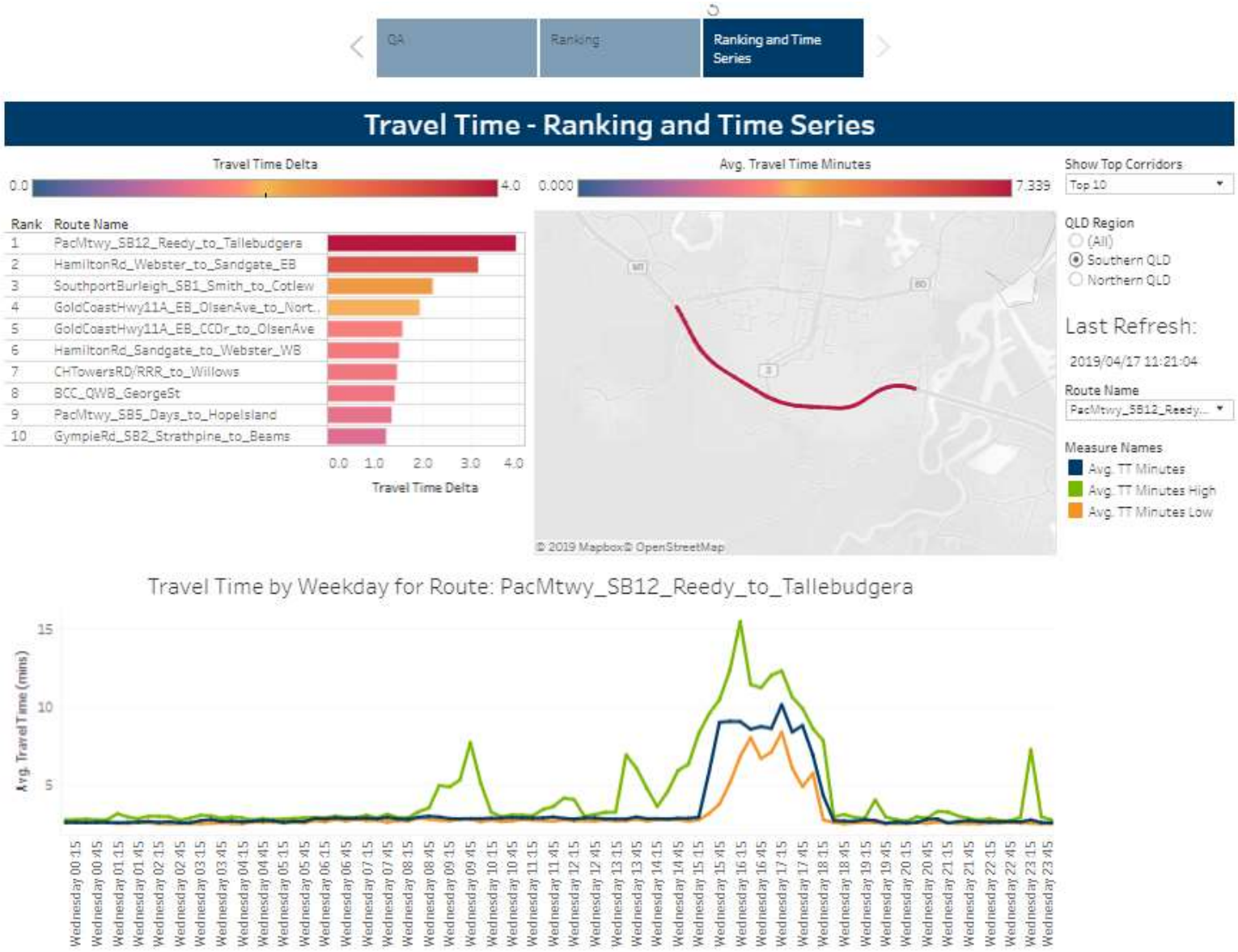
Overall – Stage 1 Complete

- ✓ Implement Google replacement HERE Travel Time Dashboard.
- ✓ Data Ingestion in TMR Data Lake for a number of Roads Ops datasets.
- ✓ Serverless Technology proven capability/open data and algorithm available.
- ✓ Collaboration with stakeholders ITB/TMC/Council/AWS, upskill TMR staff.
- ✓ Under budget. 1/3 of forecasted AWS cost.

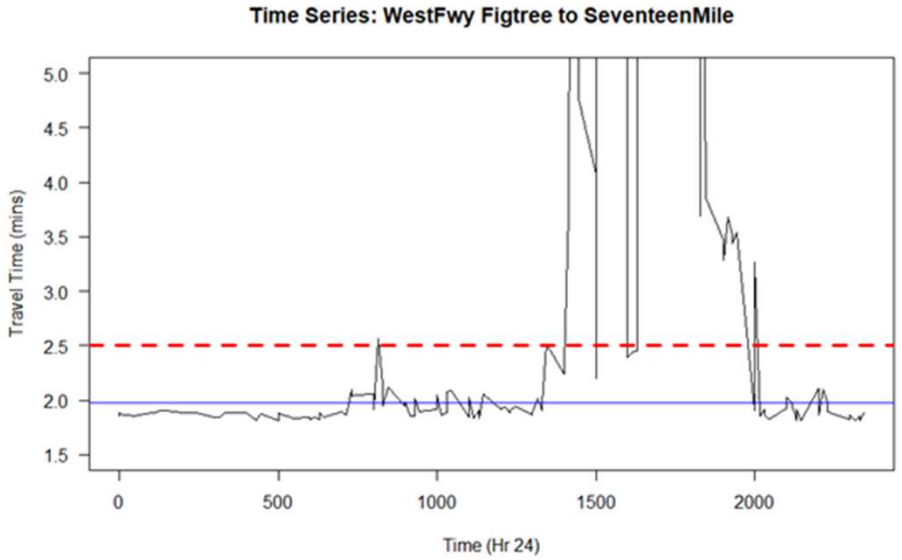
Worst preforming routes

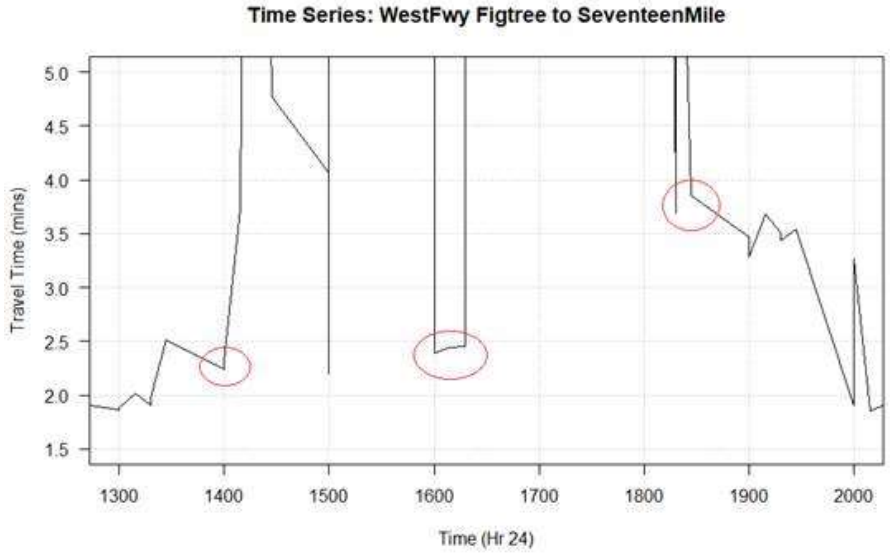


Additional metrics



Additional QA Metrics





RACQ

1413:01	Max45 Lionel Rodger responded by BMTMC over Radio to Multi Vehicle Crash, Western Freeway blocked.
1633:05	QPS brief Motorist in front of Max (hand gesture of five minutes)
	Motorists who have been waiting and walking around, all make their way back to their vehicles.
1634:46	QPS DDO Vehicle moves forward.
1825:01	Max45 contacts BMTMC, to confirm all traffic cones recovered. QPS has finished rolling blockade, all lanes reopen.

Learnings – Serverless (AWS)

Pros

Serverless Costing / Capability.

- Eliminates capacity constraints and is cost effective.

Integration with TMR's systems.

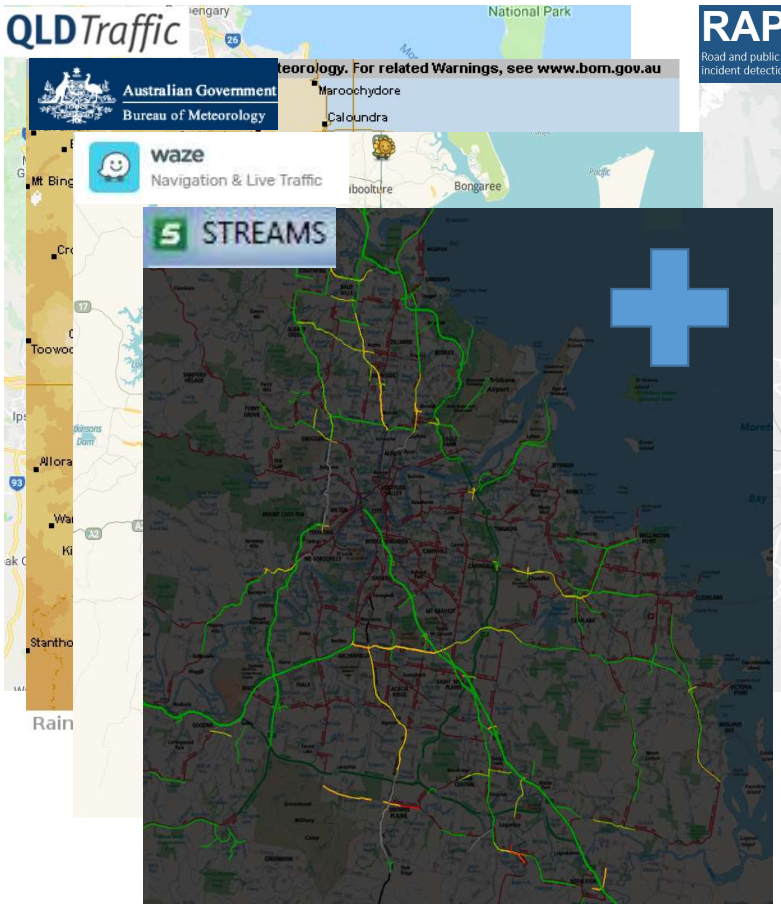
- Extremely flexible, open and scalable, i.e API's / algorithm.

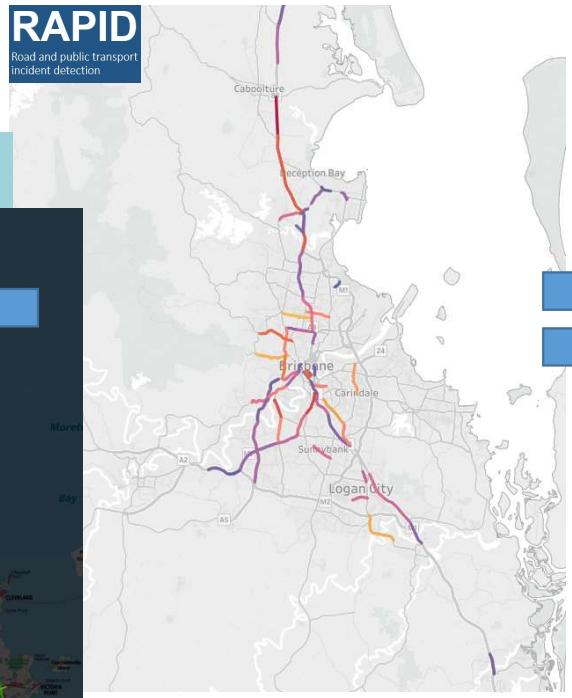
Cons

Steep learning curve with a numerous services.

- Complexity from different methods and services for opportunities.

Correlation Investigation



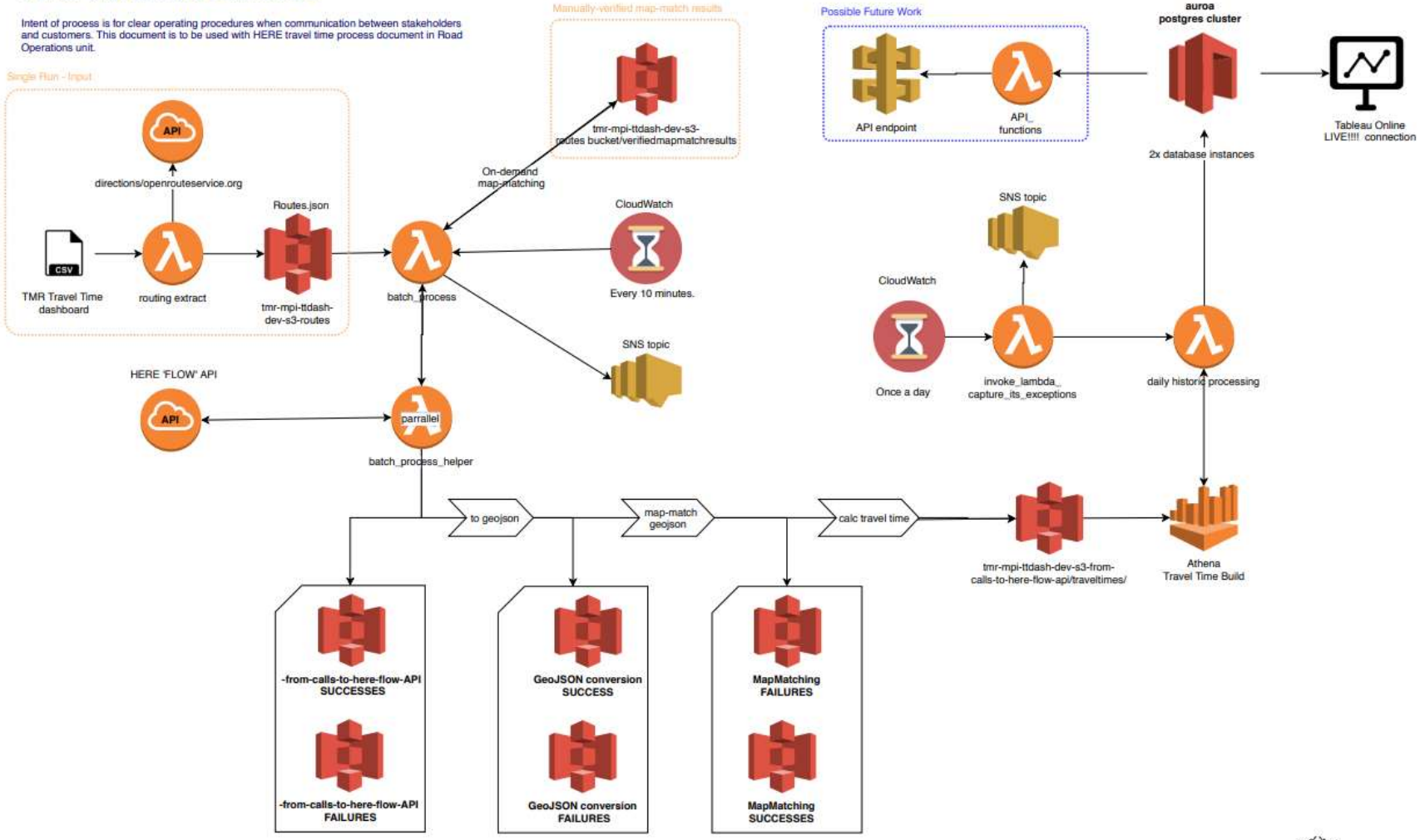


Record uid	Datasource	Attributes	distance m to proximate record from another datasource	proximate record from another datasource Record uid	proximate record from another datasource datasource	proximate record from another datasource Attributes
01fd175a-6b91-435d-8c2e-928b64ae3d03	qldtraffic	duration_recurrences: {event_id: 197568, impact: {delay: No delays expected, direction: Southbound, towards: Bowen Road, impact_type: N/A, impact_subtype: null}, description: Monday to Friday, 7 AM to 4 PM} | source_source_id: None | last_updated: 2019-03-18T07:08:29.222728+10:00 | event_type: Roadworks | road_summary_district: Northern | web_link: None | road_summary_locality: Hermit Park | duration_active_days: Monday, Tuesday, Wednesday, Thursday, Friday | id: 197568 | source_account: None | information: None | road_summary_local_government_area: Townsville City | tmr_datalake_ingested_at_unixtime_ms: 1553126732874 | source_provided_by_url: https://qldtraffic.qld.gov.au | event_priority: Low | impact_impact_type: N/A | source_source_name: EPS | event_due_to: None | status: Published | duration_start: 2019-03-11T07:00:00+10:00 | description: Replacement of water main in Hodel Street | advice: Proceed with caution | source_provided_by: Department of Transport and Main Roads | road_summary_postcode: 4812 | impact_impact_subtype: None | impact_delay: No delays expected | url: https://api.qldtraffic.qld.gov.au/v1/events/197568 | impact_towards: Bowen Road | duration_end: 2019-04-11T16:00:00+10:00 | next_inspection: None | impact_direction: Southbound | event_subtype: Planned roadworks | published: 2019-03-11T06:00:00+10:00 | road_summary_road_name: Bowen Road / Hodel Street	0.0	9b463c0b-1023-4f6a-884a-bd6ab7d6e6a7	trroutes	our_route_id: 53a388cf-d524-4cf8-b450-79dbe1758fbb | our_traveltime_minutes: 17.9755531968 | our_length_m: 13515.1324982 | our_route_name: CHTowersRD/RRR to_Willows | historic_traveltime_minutes_low: 18.5904346466 | historic_traveltime_minutes_high: 20.2618579865
0dff06a1f-a10d-4282-bbe9-be6e85afd46a	qldtraffic	duration_recurrences: None | source_source_id: None | last_updated: 2019-03-18T11:33:52.929052+10:00 | event_type: Roadworks | road_summary_district: South Coast | web_link: https://www.tmr.qld.gov.au/Projects/Name/P/Pacific-Motorway-M1-Varsity-Lakes-Exit-85-to-Tugun-Exit-95-upgrade | road_summary_locality: Reedy Creek / Tugun | duration_active_days: None | id: 188472 | source_account: None | information: Lane closures at various locations required during night-time hours, off-road work occurring during daytime hours. | road_summary_local_government_area: Gold Coast City | tmr_datalake_ingested_at_unixtime_ms: 1553126732874 | source_provided_by_url: https://qldtraffic.qld.gov.au | event_priority: Medium | impact_impact_type: Lanes affected | source_source_name: EPS | event_due_to: None | status: Published | duration_start: 2019-01-30T20:00:00+10:00 | description: Exit 85 to Exit 95 Varsity to Tugun: Survey & geotech investigations on and off-road | advice: Proceed with caution | source_provided_by: Department of Transport and Main Roads | road_summary_postcode: 4224 / 4227 | impact_impact_subtype: Lane or lanes reduced | impact_delay: No delays expected | url: https://api.qldtraffic.qld.gov.au/v1/events/188472 | impact_towards: None | duration_end: 2019-01-27T00:00:00+10:00 | next_inspection: None | impact_direction: Both directions | event_subtype: Planned roadworks | published: 2019-01-30T00:00:00+10:00 | road_summary_road_name: Pacific Motorway	0.0	f01100de-82df-4216-b238-fca63d6f0d99	trroutes	our_route_id: 94e97dd4-a5fd-41f5-a2ff-7743c7cddf05 | our_traveltime_minutes: 3.00983520029 | our_length_m: 4114.40698511 | our_route_name: PacMtway_SB12_Reedy_to_Tallebudgera | historic_traveltime_minutes_low: 2.81487822533 | historic_traveltime_minutes_high: 2.89138293266
191ddd78-cd92-4d7c-adb4-b8df94618b949	qldtraffic	duration_recurrences: None | source_source_id: None | last_updated: 2019-03-21T07:05:06.895693+10:00 | event_type: Roadworks | road_summary_district: Far North | web_link: https://www.tmr.qld.gov.au/smithfieldbypassproject | road_summary_locality: Barron / Smithfield / Yorkeys Knob | duration_active_days: None | id: 191952 | source_account: None | information: A new bypass of the Captain Cook Highway (CCH) will be constructed between McGregor Road and Cairns Western Arterial Road (CWAR) roundabouts providing motorists an alternative route to the CCH. | road_summary_local_government_area: Cairns Regional | tmr_datalake_ingested_at_unixtime_ms: 1553126732874 | source_provided_by_url: https://qldtraffic.qld.gov.au | event_priority: High | impact_impact_type: Lanes affected | source_source_name: EPS | event_due_to: None | status: Published | duration_start: 2018-12-04T06:00:00+10:00 | description: Smithfield Bypass Project | advice: Allow extra travel time | source_provided_by: Department of Transport and Main Roads | road_summary_postcode: 4878 | impact_impact_subtype: All lanes affected | impact_delay: Delays expected (during active hours) | url: https://api.qldtraffic.qld.gov.au/v1/events/191952 | impact_towards: None | duration_end: 2020-12-31T18:00:00+10:00 | next_inspection: None | impact_direction: All directions | event_subtype: Planned roadworks | published: 2019-02-12T06:00:00+10:00 | road_summary_road_name: Captain Cook Highway	0.0	b5206e88-60ae-4b5a-b603-ed285ae70333	trroutes	our_route_id: a1a6f77a-0ce4-403b-85c4-0b7fa86cab18 | our_traveltime_minutes: 2.21595957203 | our_length_m: 1807.26460137 | our_route_name: 32A Kuranda EB Ch1 to Ch0.x | historic_traveltime_minutes_low: 2.11749267578 | historic_traveltime_minutes_high: 2.17049002647

DRAFT Road Operations AWS Architecture

HERE Travel Time Dashboard

Intent of process is for clear operating procedures when communication between stakeholders and customers. This document is to be used with HERE travel time process document in Road Operations unit.



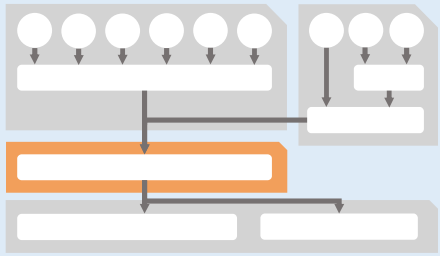
Queensland Government

CONSUMPTION LAYERS

Part 3
Blending and quantifying of congestion

Use cases:
- Real-time network impact monitoring of incidents.
- Historic reporting of incident impacts on congestion.
- Incident response prioritisation.

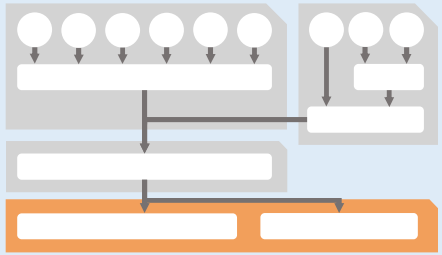
New data:
- Causes of abnormal congestion.



Part 4
Automated incident detection

Use cases:
- Real-time automated incident detection system.
- Network/incident replay.

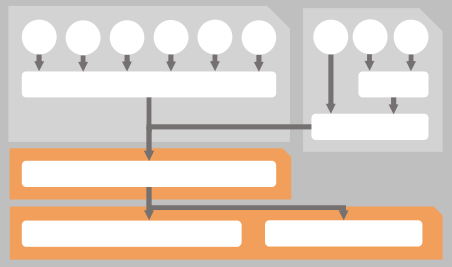
New data:
- Undetected incidents.
- Real time of network incidents.



Stage 2 & 3 Proposal / Opportunities for Improvement

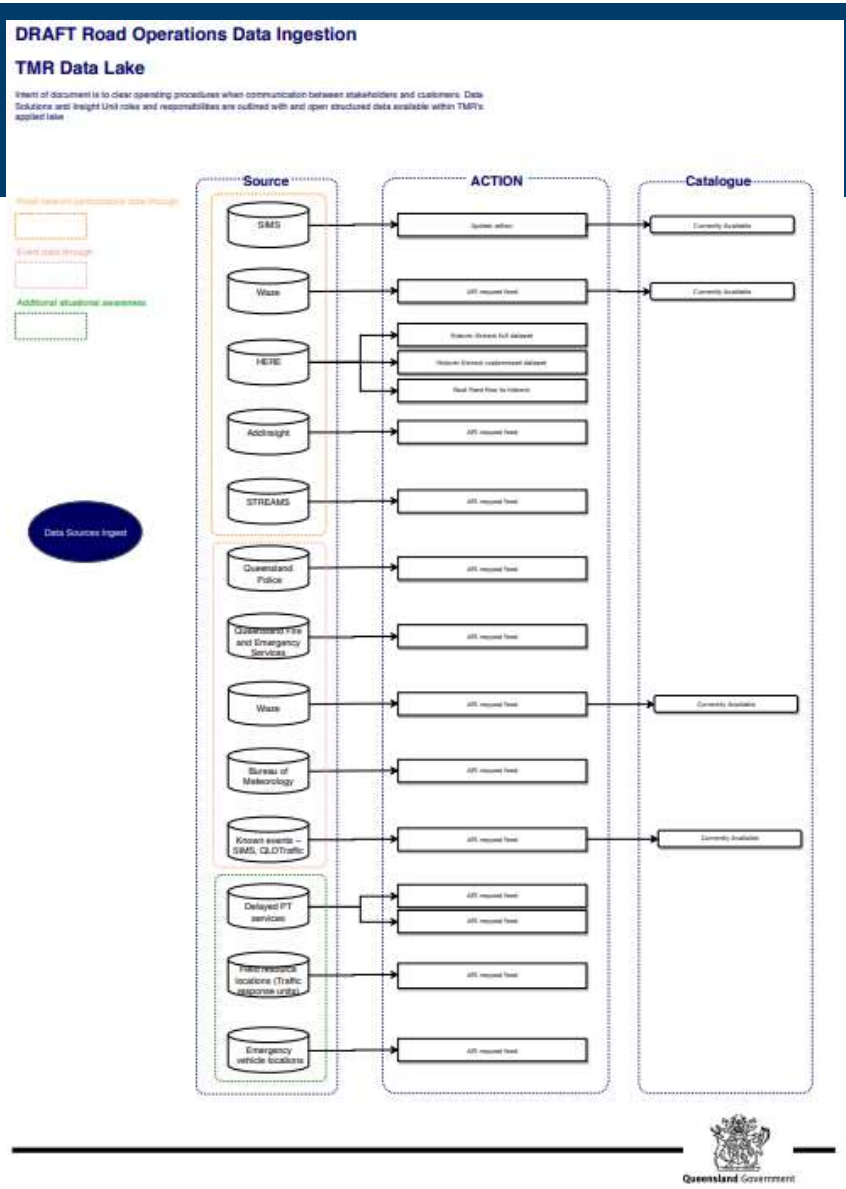
- Identify Incident feed with correlated data feeds.
- Build confidence of event.
- Impacted PT routes.
- Case study aligns with ITB investigation with serverless technology.

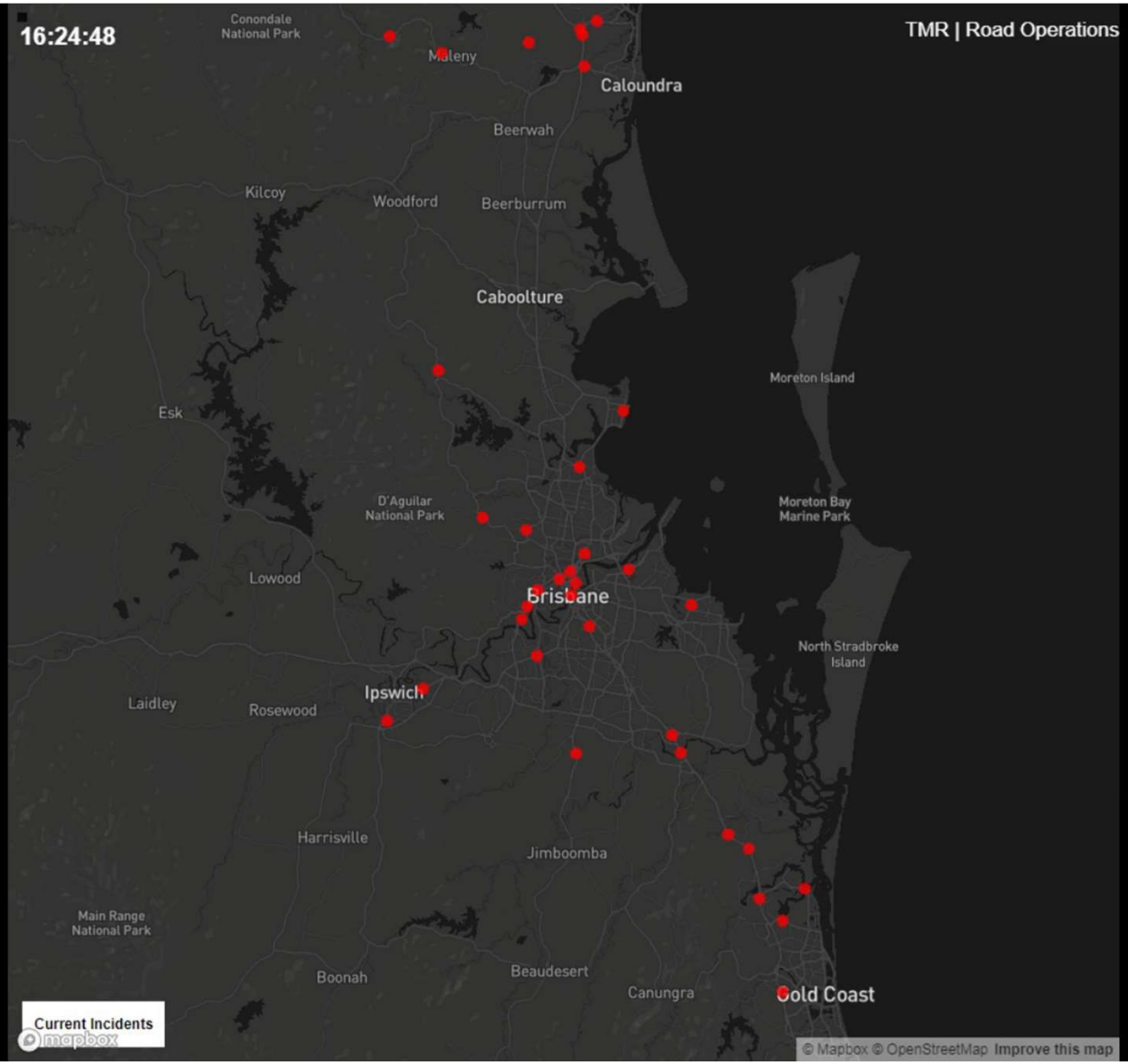
Data Hub / Collaborate with other business units

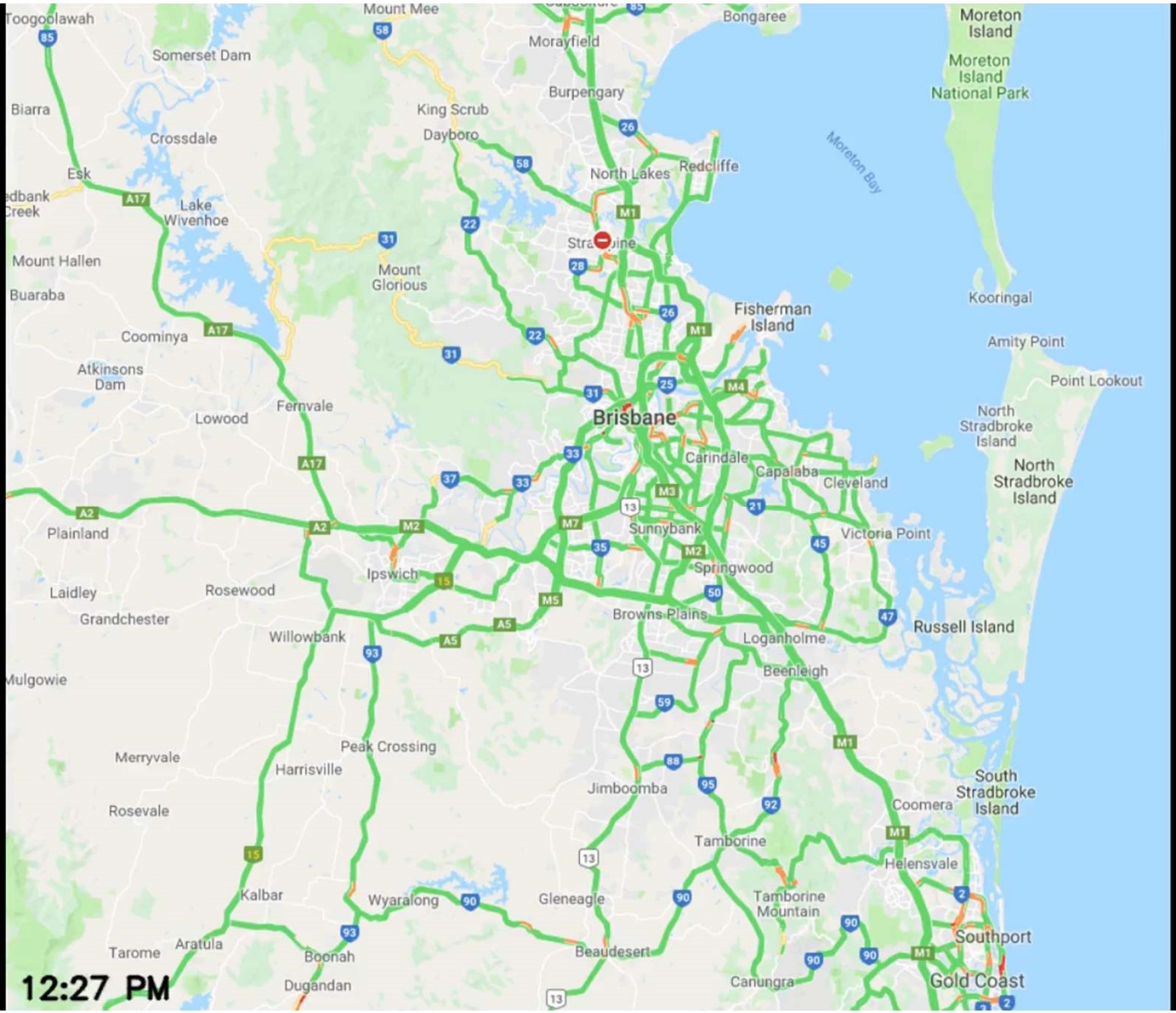


Traffic Dynamics

Sims ingestion and blending




16:24:48
TMR | Road Operations
Conondale National Park
Maleny
Caloundra
Beerwah
Kilcoy
Woodford
Beerburrum
Caboolture
Moreton Island
Esk
D'Aguilar National Park
Moreton Bay Marine Park
Lowood
Brisbane
North Stradbroke Island
Ipswich
Laidley
Rosewood
Harrisville
Jimboomba
Main Range National Park
Boonah
Beaudesert
Canungra
Gold Coast
Current Incidents
mapbox
© Mapbox © OpenStreetMap Improve this map

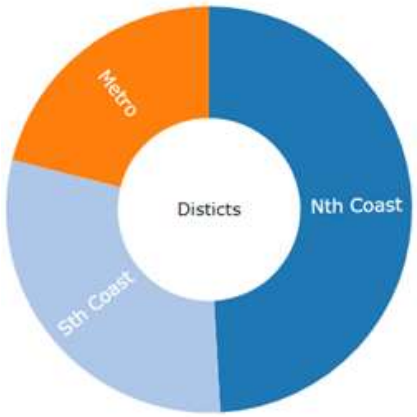

Toogoolawah
Somerset Dam
Biarra
Crossdale
Esk
Lake Wivenhoe
Mount Hallen
Buaraba
Coominya
Atkinsons Dam
Lowood
Fernvale
Plainland
Laidley
Rosewood
Grandchester
Willowbank
Mulgowie
Merryvale
Harrisville
Peak Crossing
Rosevale
Kalbar
Wyaralong
Tarome
Aratula
Boonah
Dugandan
Mount Mee
King Scrub
Dayboro
Morayfield
Burpengary
Bongaree
Moreton Island
Moreton Island National Park
Moreton Bay
North Lakes
Redcliffe
Mount Glorious
Fisherman Island
Kooringal
Amity Point
Point Lookout
North Stradbroke Island
Brisbane
Carindale
Capalaba
Cleveland
Sunnybank
Victoria Point
Springwood
Ipswich
Browns Plains
Loganholme
Russell Island
Beenleigh
Jimboomba
Coomera
South Stradbroke Island
Tamborine
Helensvale
Tamborine Mountain
Gleneagle
Beaudesert
Canungra
Southport
Gold Coast
12:27 PM

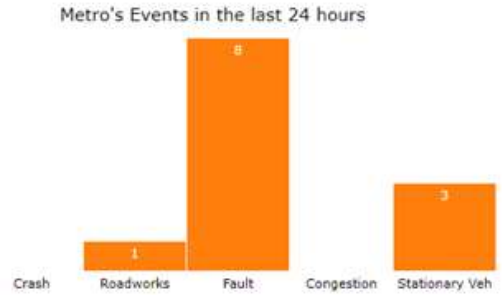
BUS ROUTES AFFECTED
744-1024
230-1020
No Buses Affected

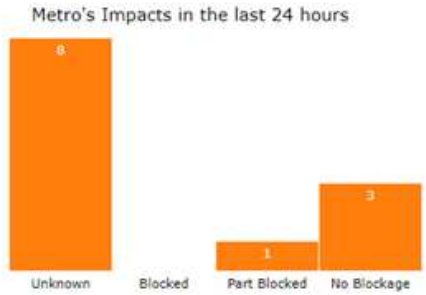
Current incidents dashboard (SEQ)

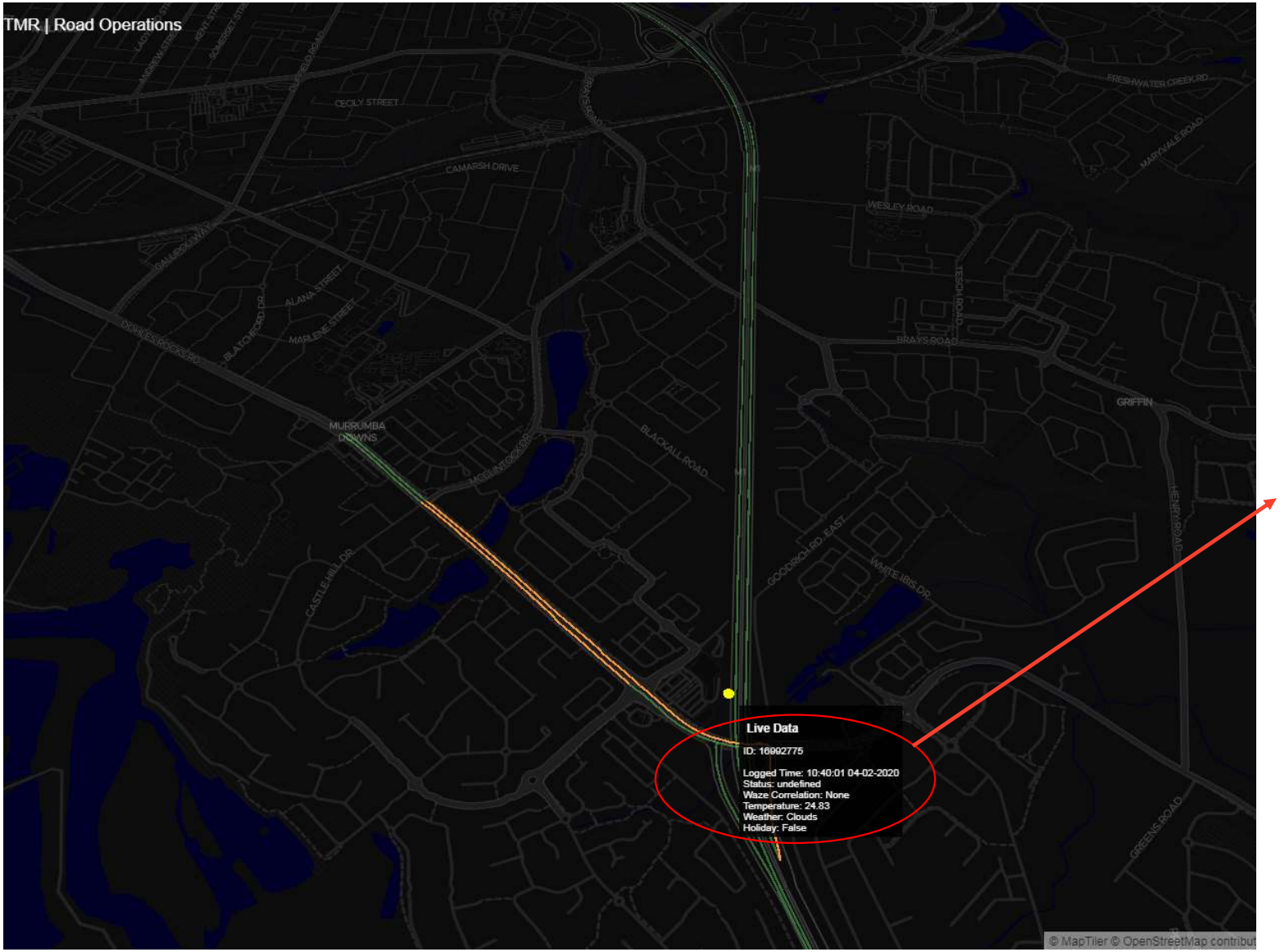
Analytics | List View | Map View | High Priority | Historic Visualisation

14:05:41

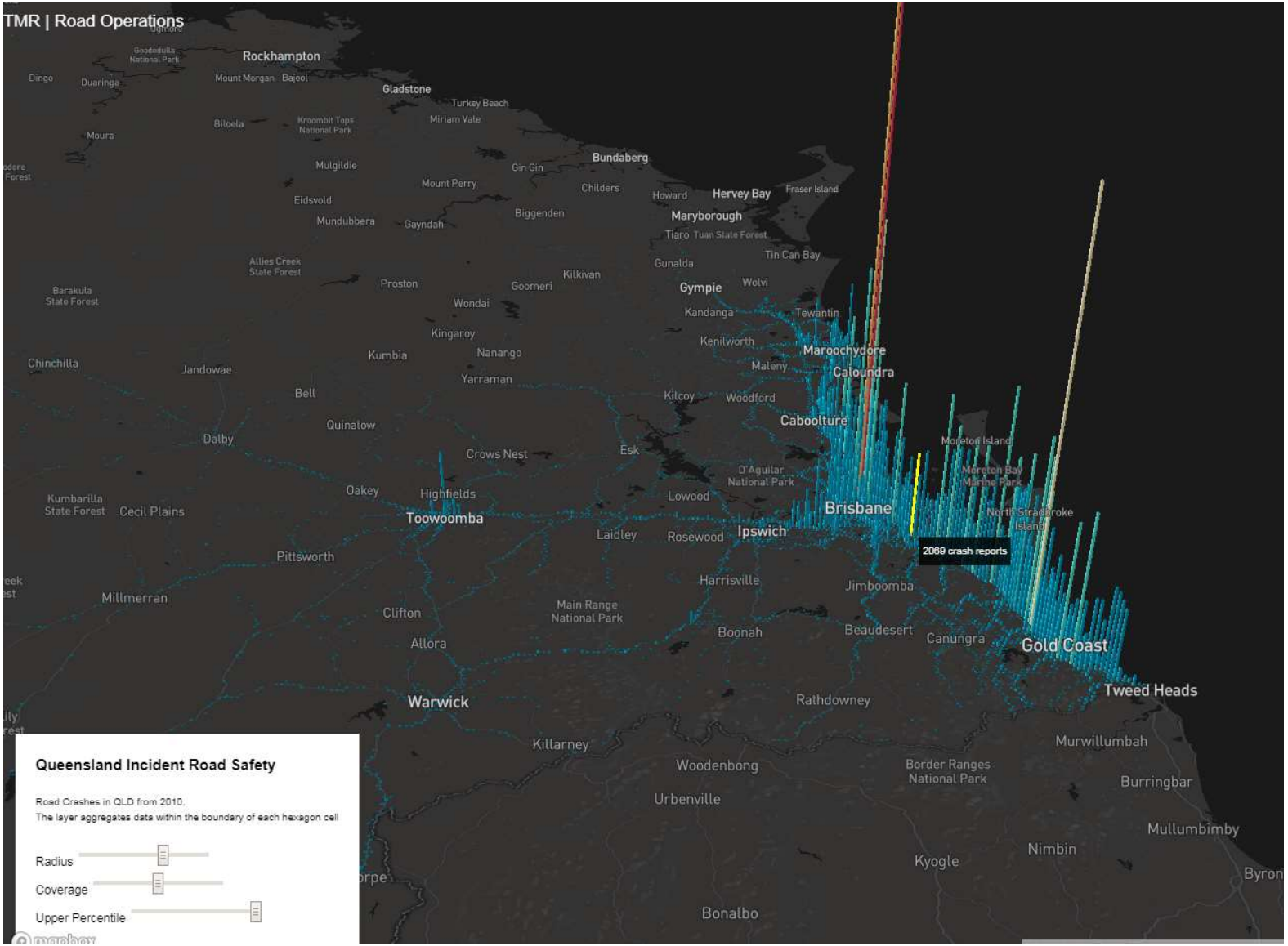








Live Data
ID: 16992775
Logged Time: 10:40:01 04-02-2020
Status: undefined
Waze Correlation: None
Temperature: 24.83
Weather: Clouds
Holiday: False


TMR | Road Operations
Rockhampton
Gladstone
Bundaberg
Hervey Bay
Maryborough
Gympie
Caboolture
Maroochydore
Caloundra
Brisbane
Ipswich
Toowoomba
Warwick
Gold Coast
Tweed Heads
2089 crash reports
Queensland Incident Road Safety
Road Crashes in QLD from 2010.
The layer aggregates data within the boundary of each hexagon cell
Radius
Coverage
Upper Percentile

NEXT STEPS

Next step: Jw

1) Delivery of artefacts (Dev + SysOps approach) and monitoring.

- infrastructure as code + documentation

2) Optimisation performance

Next steps: Cw ?

3) Continuing with Phase 4.

- Investigate machine learning algorithm for near real time.

4) Warehousing / Mart / Lake

- parquet files, redshift etc

TETS - ARRB

NACOE

Brief