Evaluating the Quality of Real-Time Transit Information at Marin Transit



October 29, 2026

marintransit.gov

Background



What is Real-Time?

- The tracking system that gives passengers live information about when the bus is going to arrive at their stop.
- It can be produced by the Computer-Aided Dispatch/Automatic Vehicle Location(CAD/AVL) system that or any other software that has access to the bus's GPS system.
- The quality of the real-time information varies based on the algorithms that each real-time producer uses, the access to quality gps information, latency, etc.
- Growing importance as more riders move online!



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Historic Real Time Source

Contractor	CAD/AVL System	Real-Time Producer
Golden Gate Transit	init	Legacy Real-Time
Marin Airporter	Legacy CAD/AVL	Legacy Real-Time

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Historic Real Time Source

Contractor	CAD/AVL System	Real-Time Producer
Golden Gate Transit	init	Legacy Real-Time
Marin Airporter	~~Legacy AVL~~	Legacy Real-Time

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New Real-Time Source Possibilities

Contractor	CAD/AVL System	Real-Time Producer
Golden Gate Transit	init	Legacy Real-Time
		OR
Marin Airporter	SYSTRANS AN EQUANS COMPANY	SYSTRANS AN EQUANS COMPANY

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Legacy Real-Time's Initial Stats (From Transit App)

85%

of predictions fall within an accurate range

97.5%

of trips captured

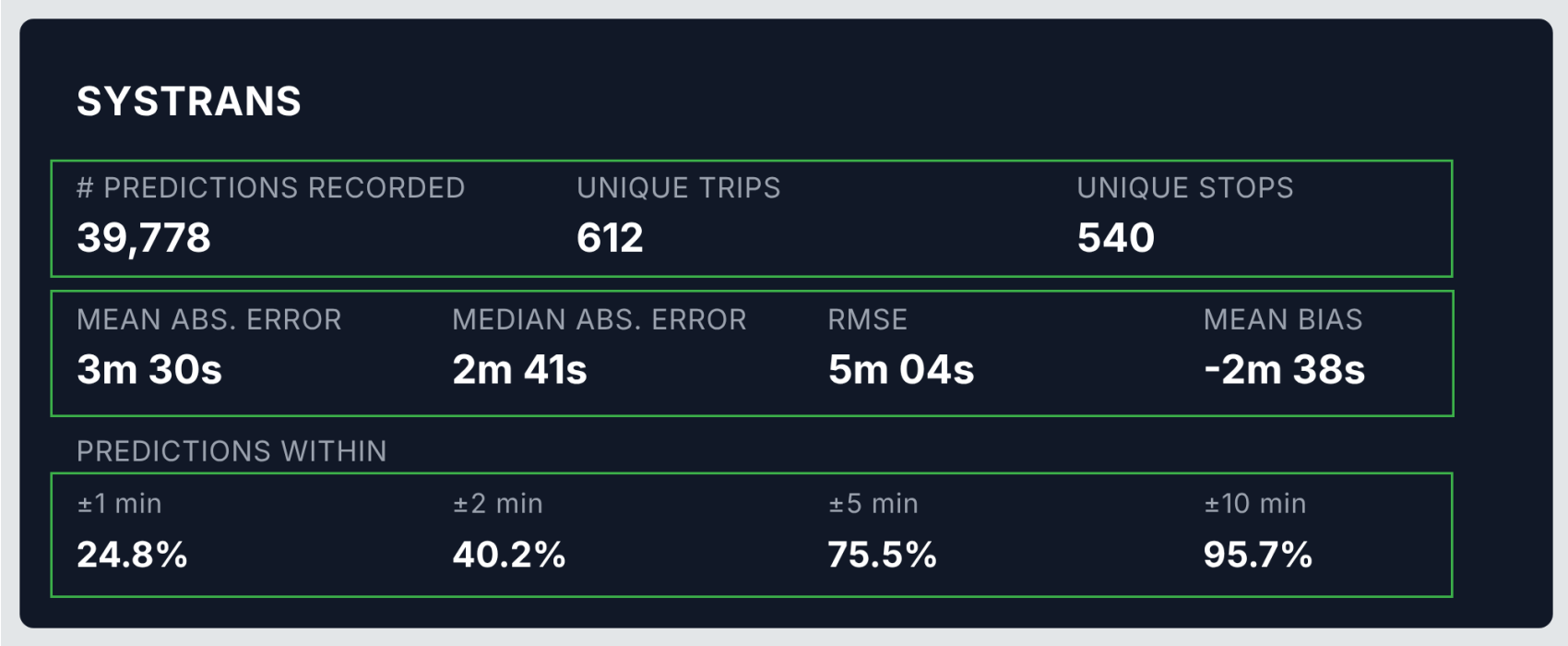
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Testing Methodology – Daily Stats

Daily Prediction Stats

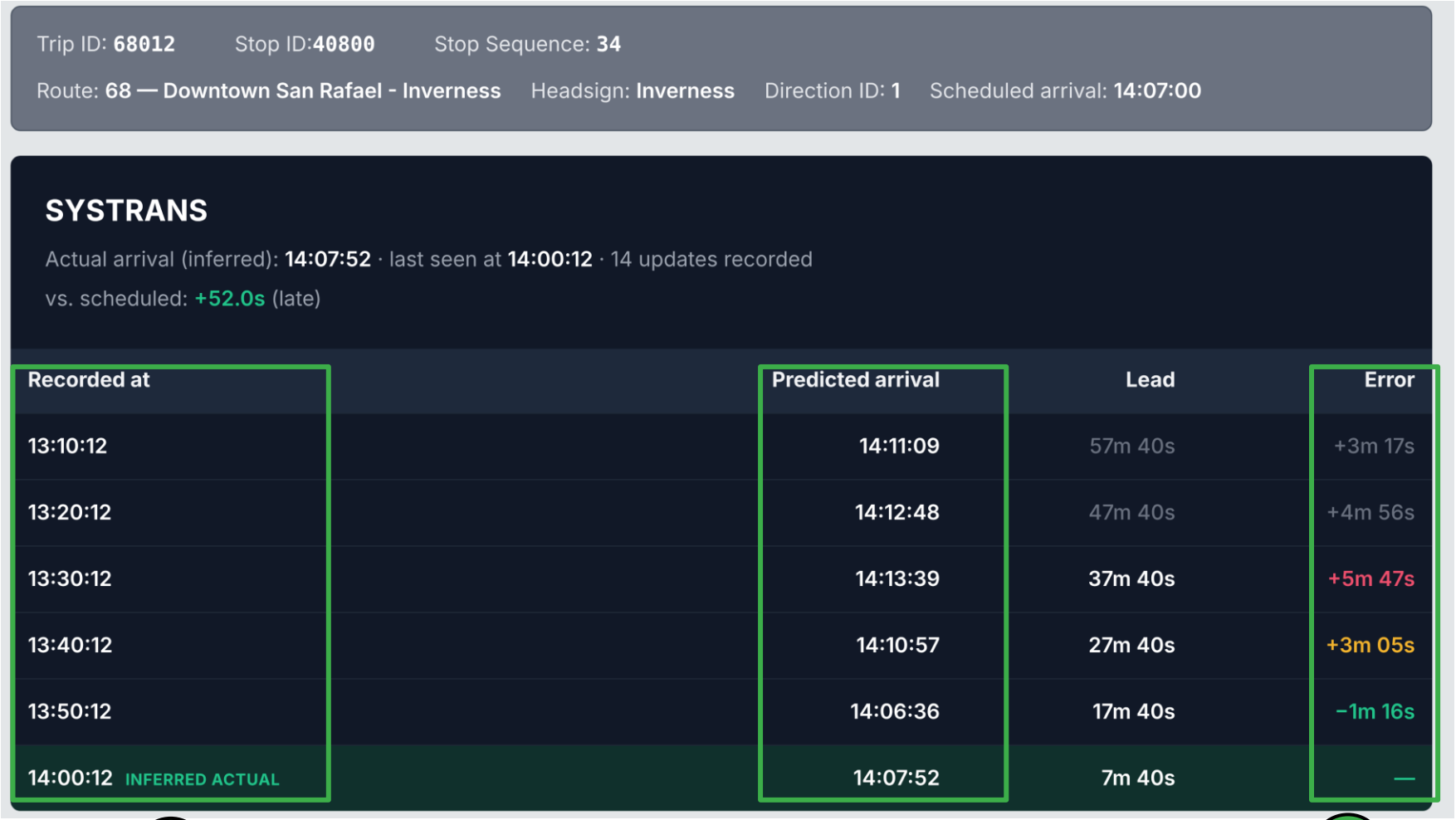
1. Basic Daily Stats
2. Error Rates
3. The percentage of predictions that fell in each accuracy bucket.



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Trip-Level Prediction Comparison

1. Time prediction was recorded
2. Predicted arrival time
3. Error (predicted vs. actual arrival)



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Testing Methodology – CAL-ITP Analysis



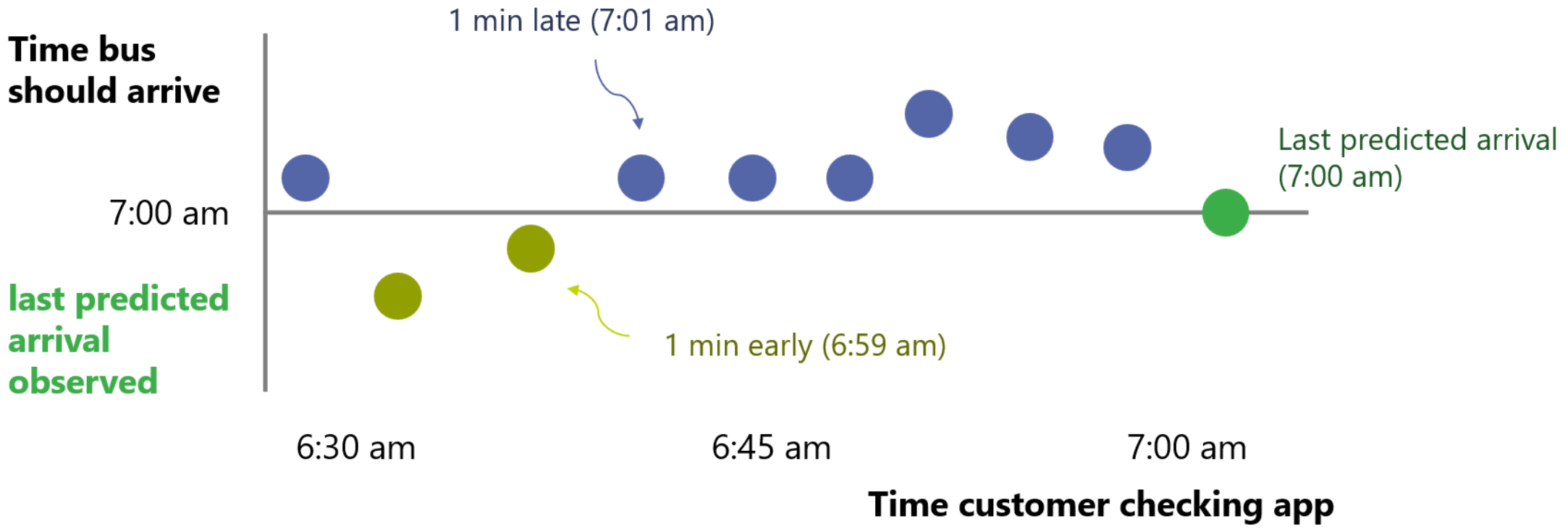
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The customer wants to…

- See the predicted bus arrival on their way to the bus stop
  - Update availability and completeness
  - ETA-Completeness-Benchmark
- Trust the predictions and catch the bus
  - Bus catch likelihood and average prediction error (agencies decide thresholds)
  - ETA-Accuracy-Benchmark

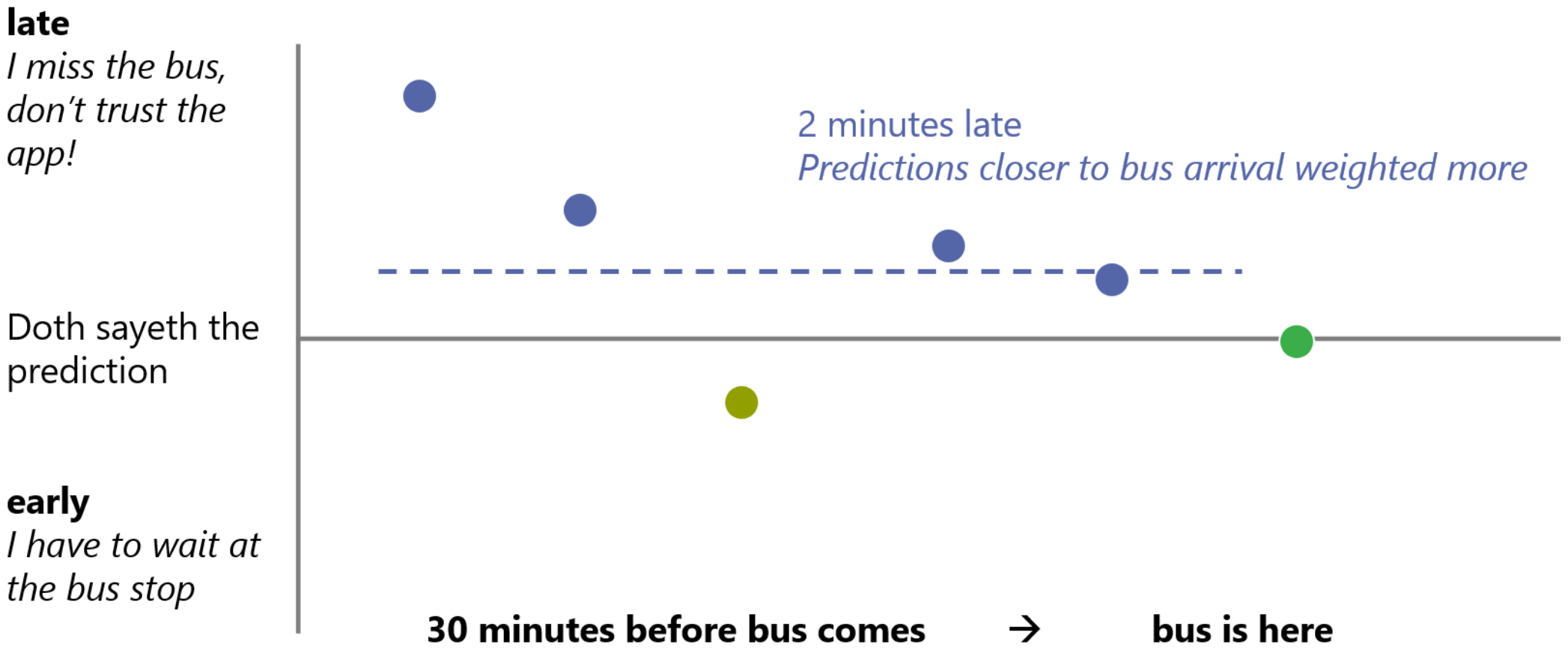
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How to measure prediction accuracy



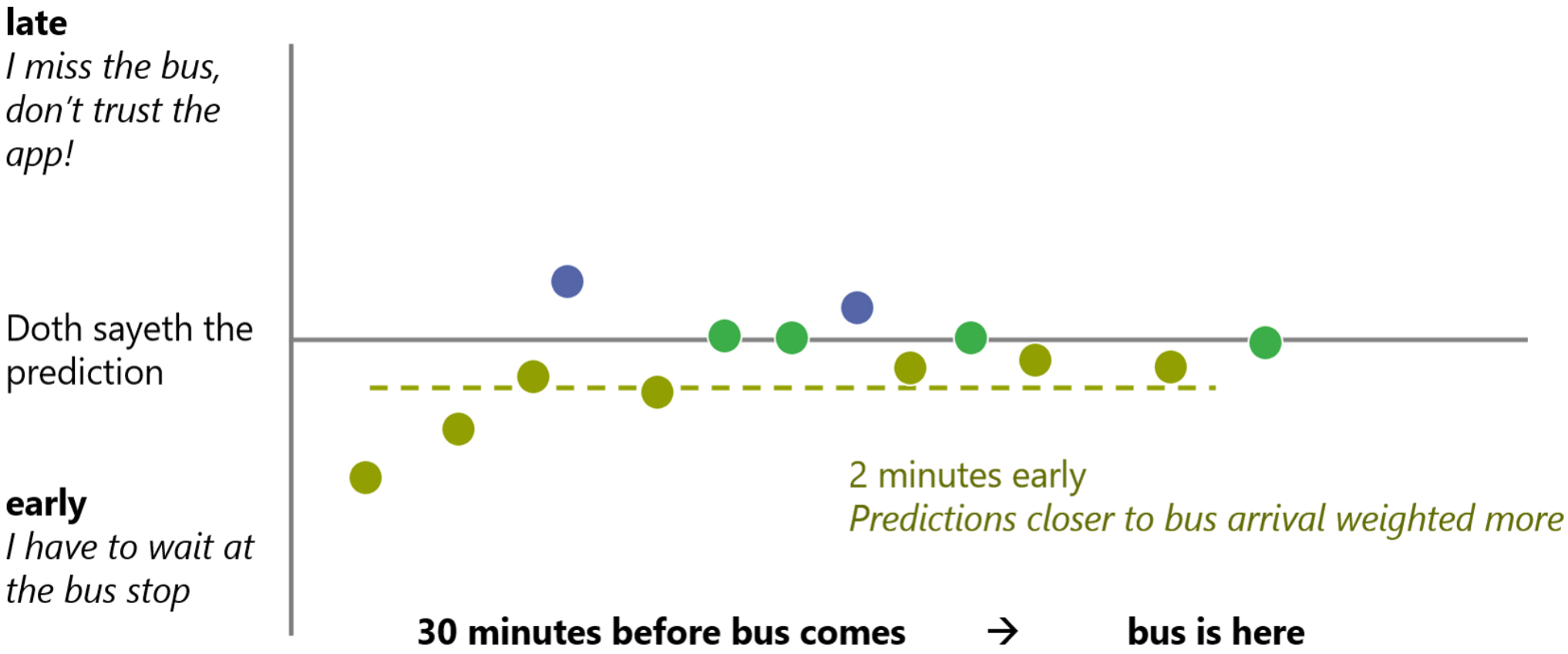
Assessing GTFS Accuracy, Professor Gregory Newmark
https://transweb.sjsu.edu/sites/default/files/2017-Newmark-Public-Transit-Statistical-Analysis.pdf

Case 1: Sparse information, predictions jump around, and on average, you miss the bus



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Case 2: Complete information, predictions stable, and on average, you catch the bus

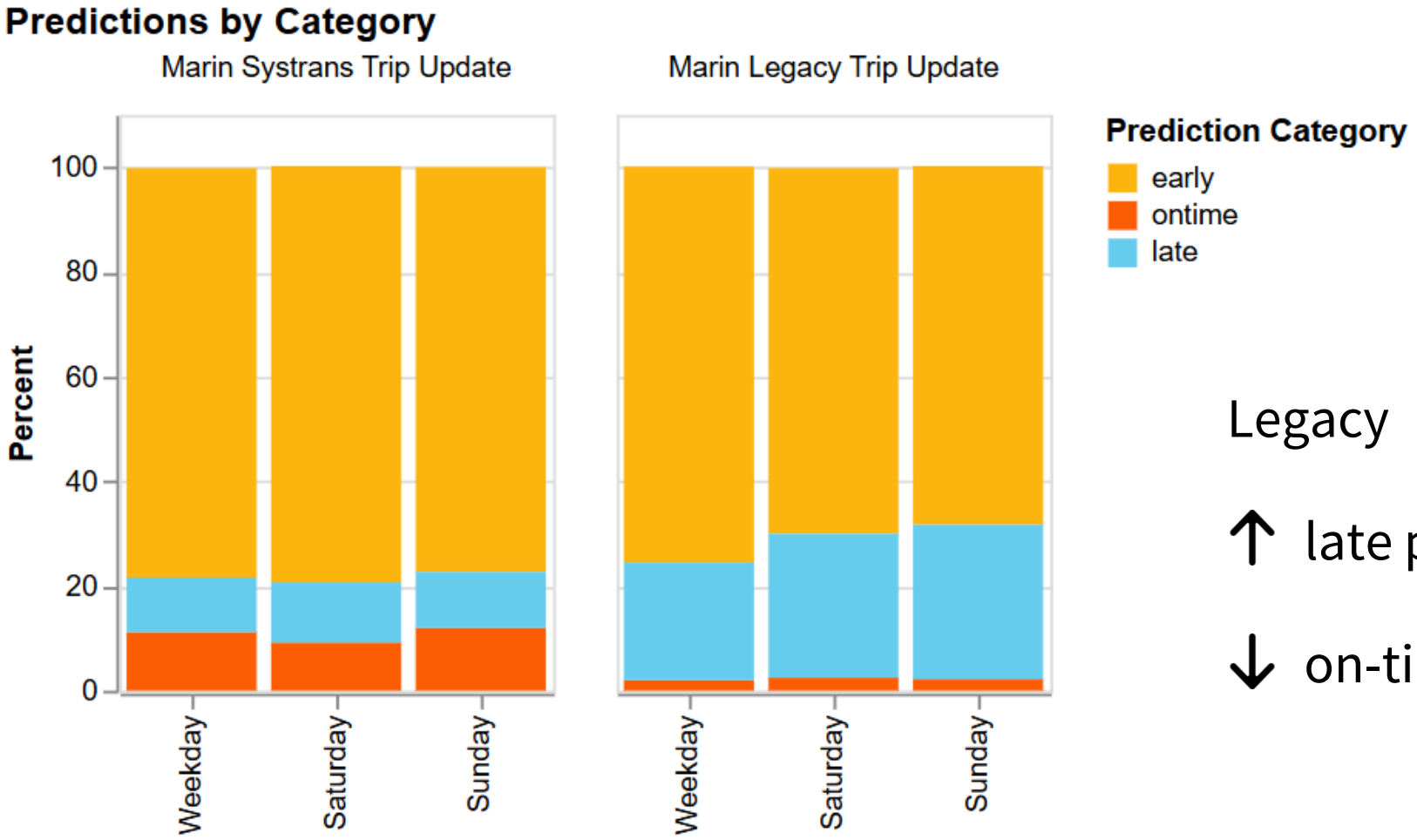


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Results and Implementation

Cal-ITP ETA Accuracy Comparison Results



Legacy

↑ late predictions

↓ on-time

Why We Chose Systrans

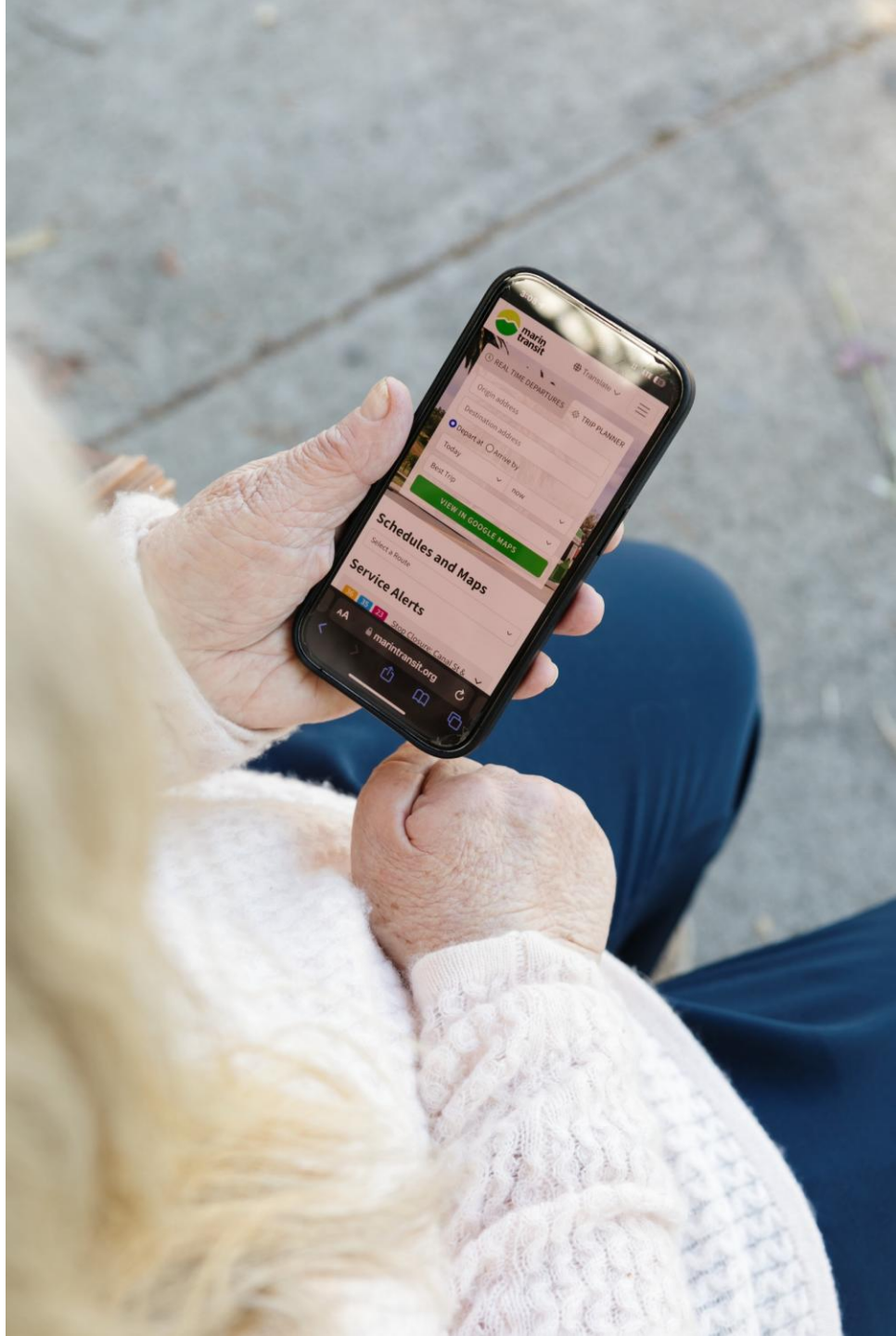
- **Legacy Real-Time:** Less variable, but more likely to cause riders to miss their bus and is an added cost to the agency
- **Systrans:** more variable, more likely to make passengers wait, but within acceptable limits
- **Decision:** switched to Systrans, with open communication on needed improvements
- **Next:** Systrans is working with another agency as a case study to improve its real-time

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Implementation

- Testing real-time with downstream software.
- Notifying partners.
- Connecting the IVR and SMS real-time to a new source.
- Communicating with Systrans about any complaints that we receive.



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Lessons Learned

- Start early! Testing environments can take a while to build.
- Determine ahead of time what metrics you want to test and don't lose sight of those metrics.
- Figure out how to port the number long before you make a real-time switch. It involves a surprising amount of bureaucracy!



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Thank you



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