Introduction

Agenda

1. Defining Opportunities
2. Common Use Cases
3. Planning a Service
4. Simulation and Iteration
5. Building the Case for Microtransit
6. The Here-Future of Microtransit

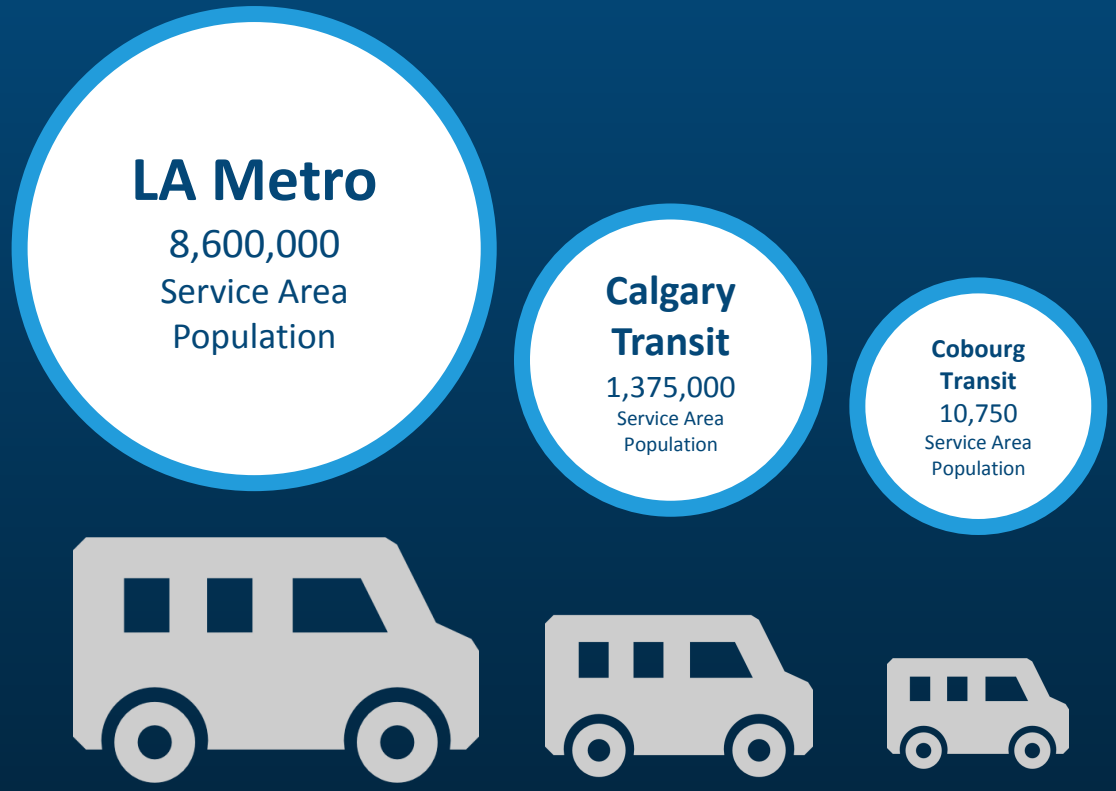
Defining Opportunities

1. From Regional to Local
2. Targeting the Pain Points
3. Pilot Projects

Defining Opportunities

From Regional to Local, Urban to Rural, Big to Small

Planning Level	Example Opportunities
Provincial/State	Improving Rural Transit
Regional Plans	FM/LM to Regional Services
TMPs or Network Plans	Gaps and Underperforming Routes
Secondary Plans	Interim Transit Service for a new community
Site Plans/Traffic Impact Study	TDM, Parking Reductions



Defining Opportunities

Targeting the Pain Points

Across the industry, agencies big and small face a wide range of challenges and are wondering how Microtransit can help address them. This is what we are hearing:

- Deliver a more equitable system
- Improve travel times and frequency
- Become more cost efficient
- Improve reliability
- Improve accessibility
- Communicate better with passengers
- Collect useful data for decision making
- Engage a larger market
- Serve new areas
- Driver or vehicle shortages

Defining Opportunities

Pilot Projects

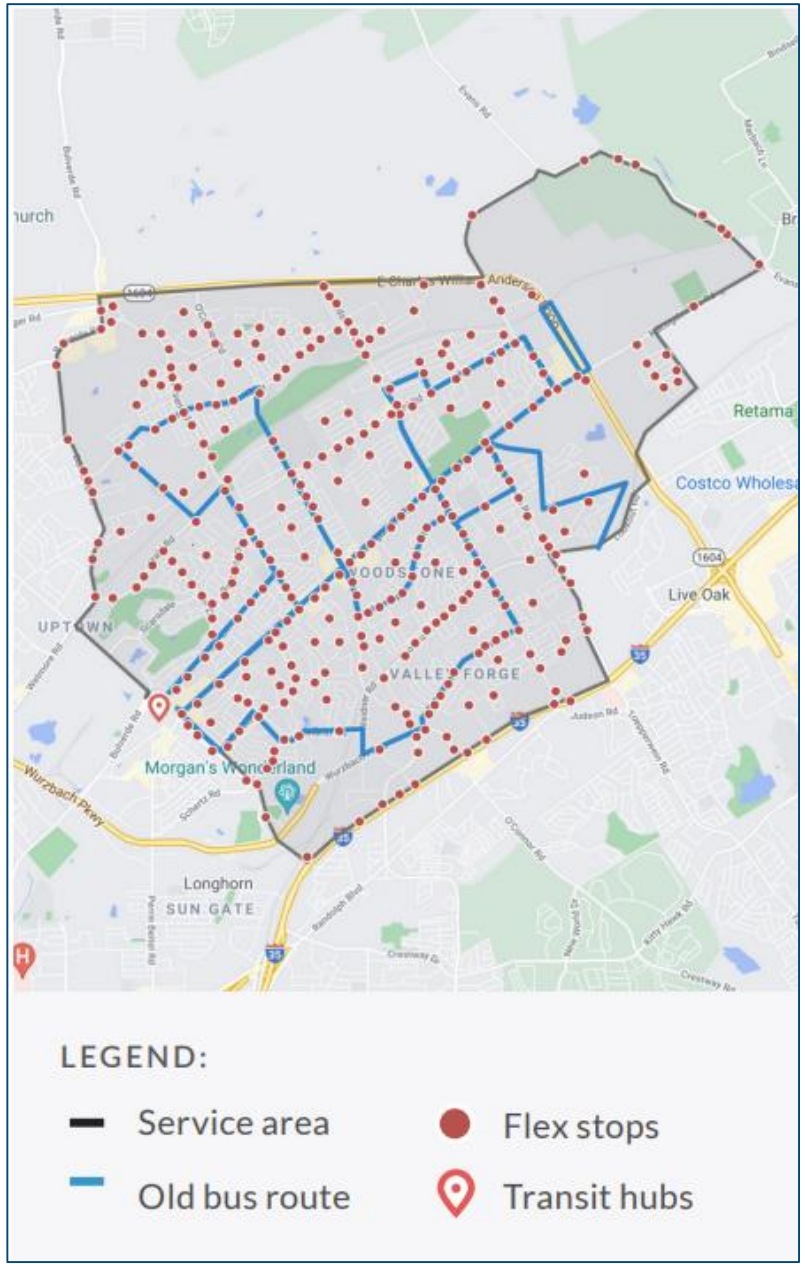
Pilots are a great way to test the viability of a service in a specific context.

Some important things to consider:

- Planning, Benchmarking, Case Studies
- Community Engagement (before, during after)
- Engagement with Industry
- Understand the baseline
- Allow a sufficient timeline
- Achievable, measurable objectives

Common Microtransit Use Cases

1. New Service Areas
2. Replacing Underperforming Routes
3. Modernizing Legacy Systems
4. Commingling



Underperforming Fixed Routes

San Antonio

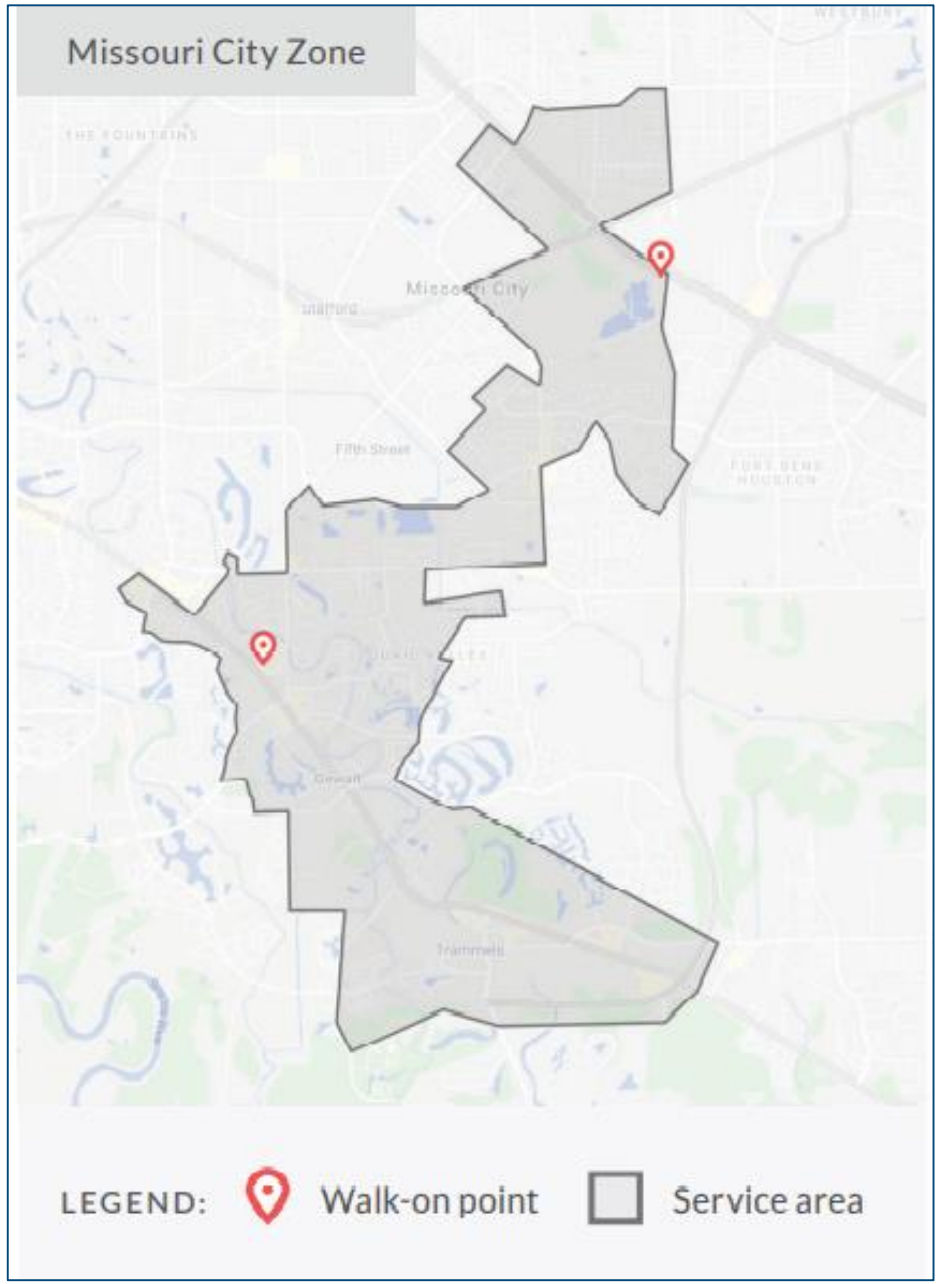
The Problem

This region's three fixed-routes were inconvenient, hard to access, and expensive to operate.

The Solution

The buses were replaced with microtransit. providing stop-to-stop service, using the previous fixed route stops and a number of new virtual stops.

Service Results	
5.0 daily avg pax/vehicle hour	**12 min** wait for pickup Previously 60 mins
650+ passengers per weekday	**36%** reduction in cost per passenger
70% Shared rides	**4.7** Star trip rating



Modernizing Legacy Systems

Houston

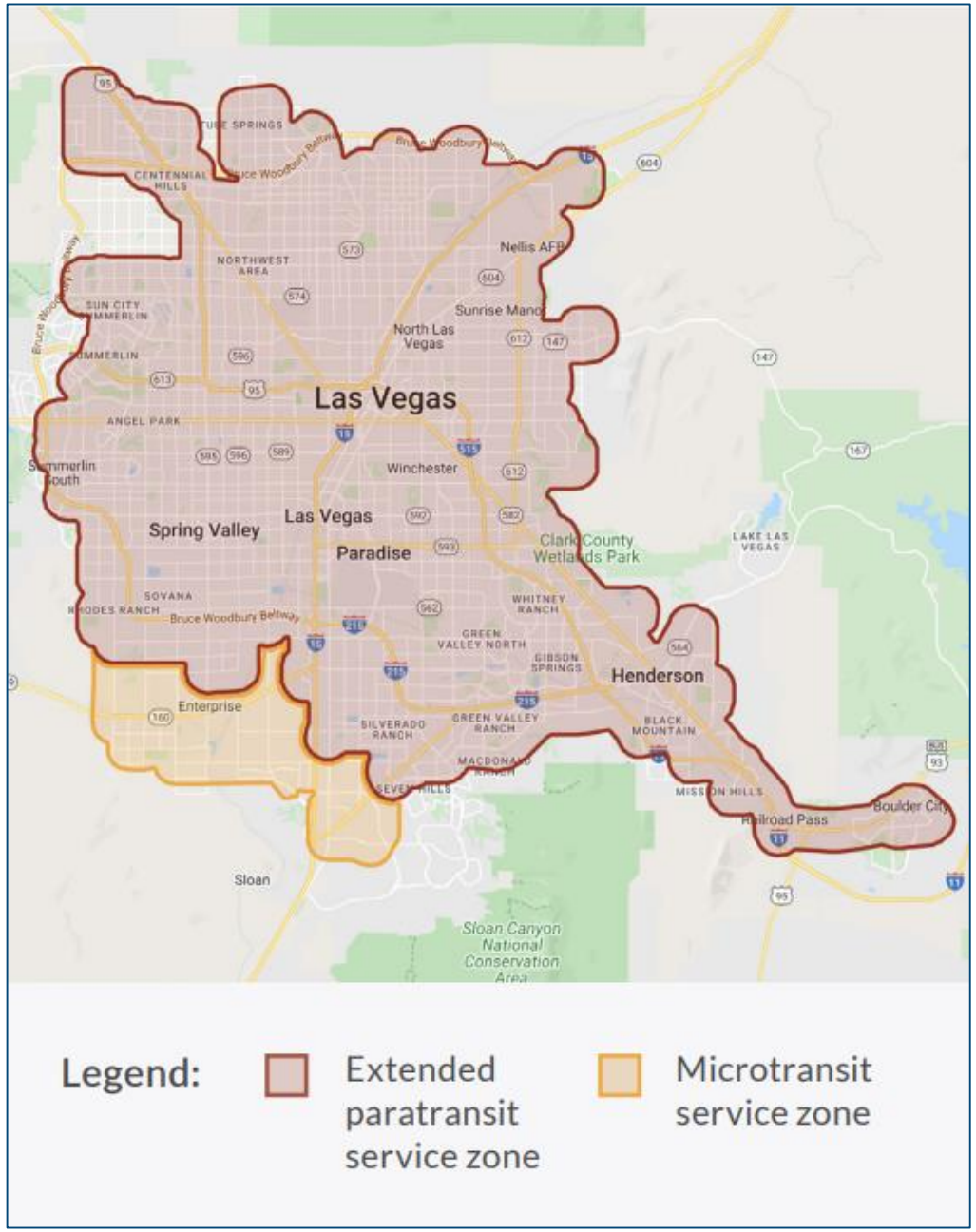
The Problem

Legacy dial-a-ride software with inefficient manual booking and scheduling required passengers to book trips in advance through the call center.

The Solution

Door-to-door microtransit service within the zone, including two walk-on points. The service uses two 16 passenger cutaways and seven 5 passenger vans.

Service Results	
>130 daily passengers	**10 min** wait for pickup Previously 60 mins
19% Increase in Ridership	**98%** on time performance
66% Reduction in call center bookings	**21%** Reduction in cost/passenger



Commingling

Las Vegas

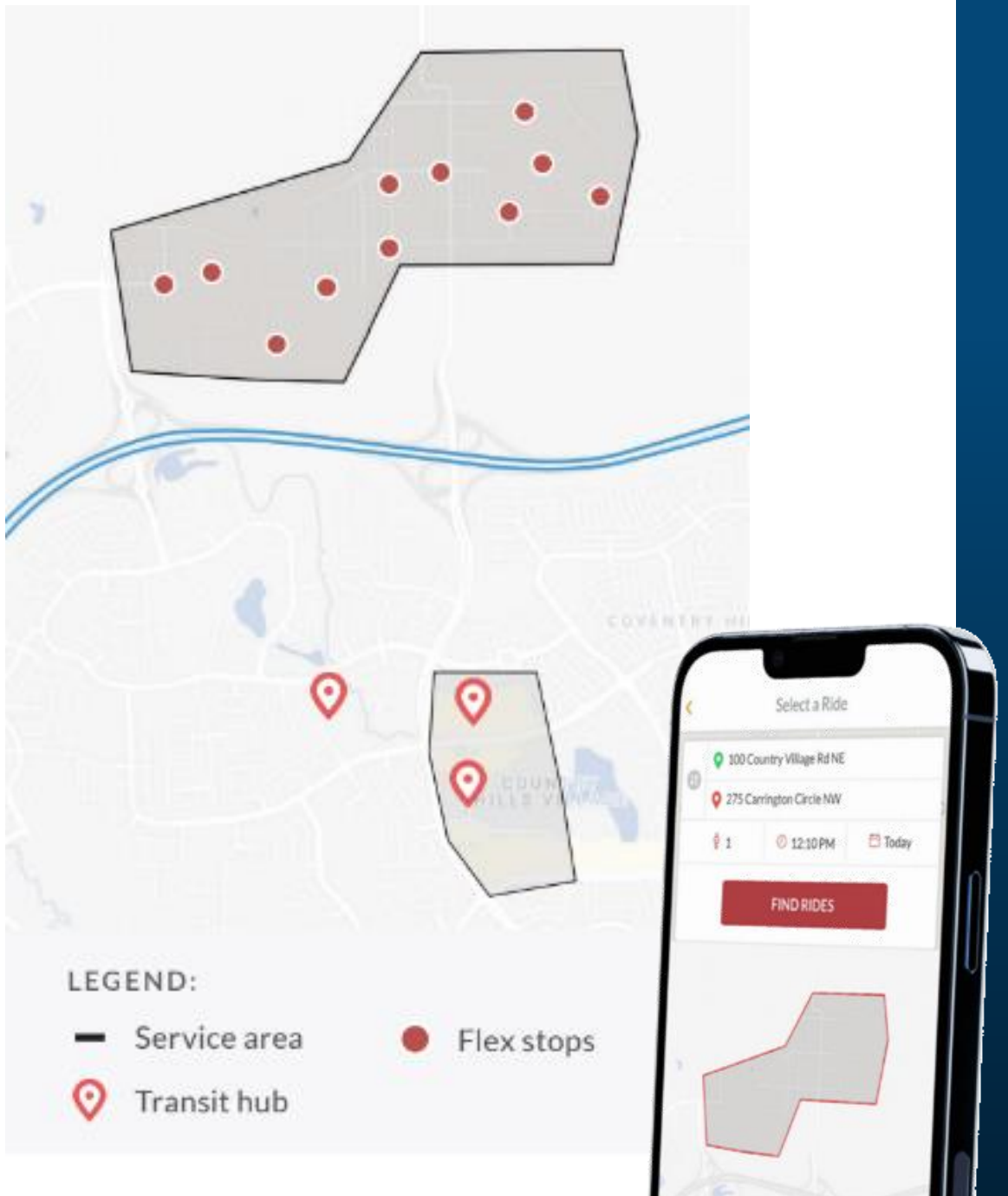
The Problem

An area of the city with no transit service and a legacy paratransit booking and dispatch system.

The Solution

Commingled service, offering door-to-door service to paratransit customers in the paratransit service zone and both microtransit and paratransit in the microtransit service zone, using the same service.

Service Results	
4.8 Avg star rating (microtransit)	**19/21 min** wait times for microtransit and paratransit respectively
79% shared rides (microtransit)	**98%** on time performance
44% in-app bookings	**45%** same-day bookings (previously 24 hr in advance)



New Service Areas

Calgary

The Problem

This newly developed neighborhood (approx. 2 square miles) had no existing transit and residents had limited first-mile last-mile access to the nearby transit hub.

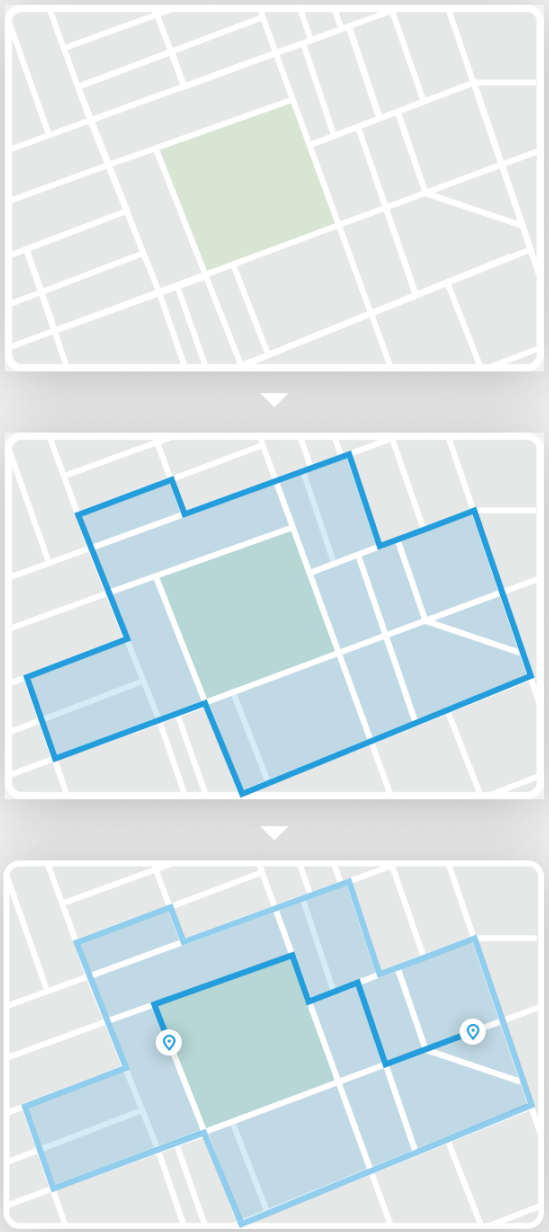
The Solution

Served efficiently by two 12-seater vehicles, this program collects passengers at virtual stops and connects them to a transit hub 3-4 km away.

Service Results	
7 (>17 in peak) pax/vehicle hour	**15 min** wait for pickup Previously no transit
120+ passengers per weekday	**4 mins** avg. walk to virtual stops Previously 30+ mins
90% Shared rides	**4.9** Star trip rating

Planning a Service

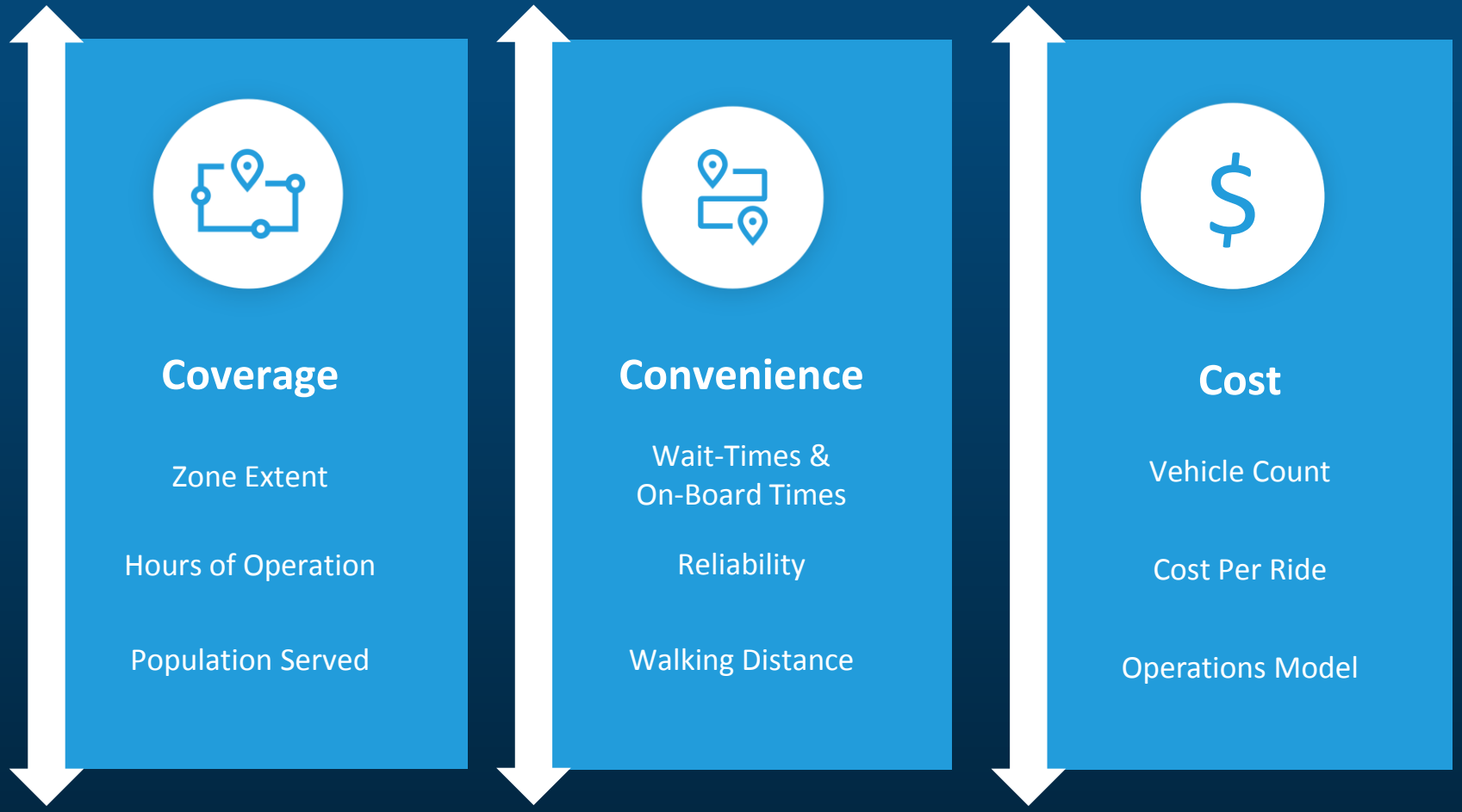
1. Balancing Priorities
2. Rider Flexibility vs Efficiency
3. Considerations
4. Setting and Measuring Targets/Objectives



Balancing Priorities

Focusing on any one of the priorities comes with tradeoffs in the other priorities.

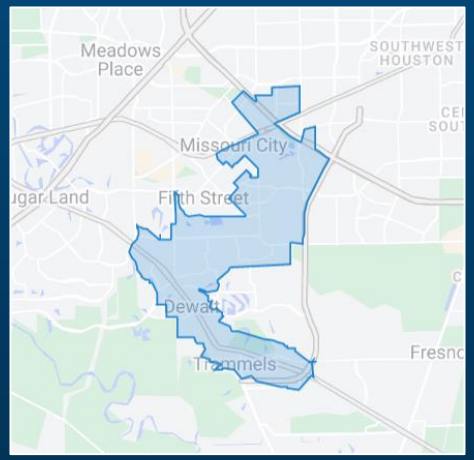
The objectives and constraints you have for your microtransit project dictate the focus areas.



Rider Flexibility vs Efficiency

Door-to-door

Travel between any address



Flexibility

Efficiency

Stop-to-stop

Travel between any stop

Flexibility

Efficiency

Stop-to-hubs

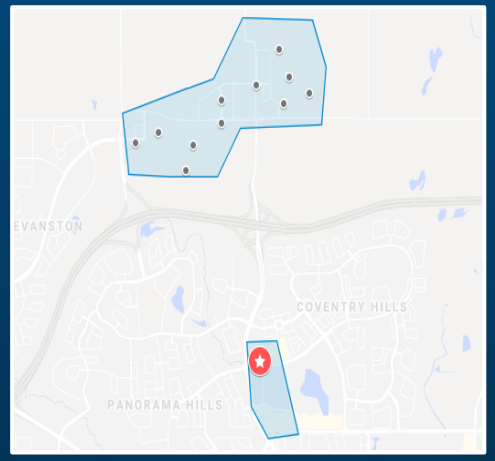
Multiple connection points

Flexibility

Efficiency

Stop-to-hub

One connection point



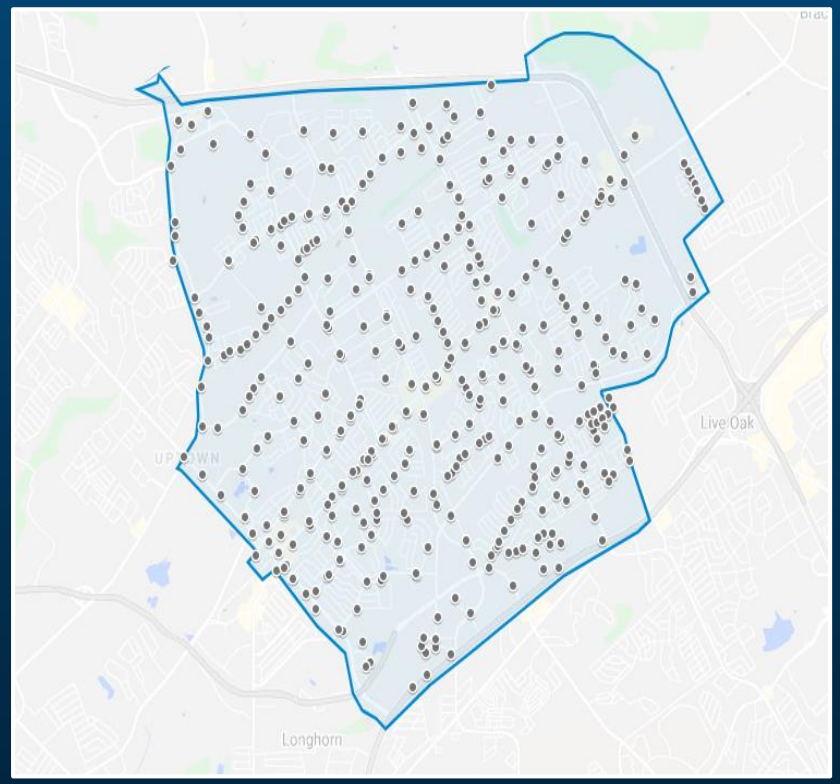
Flexibility

Efficiency

Rider Flexibility vs Efficiency

General Rider: Stop-to-stop

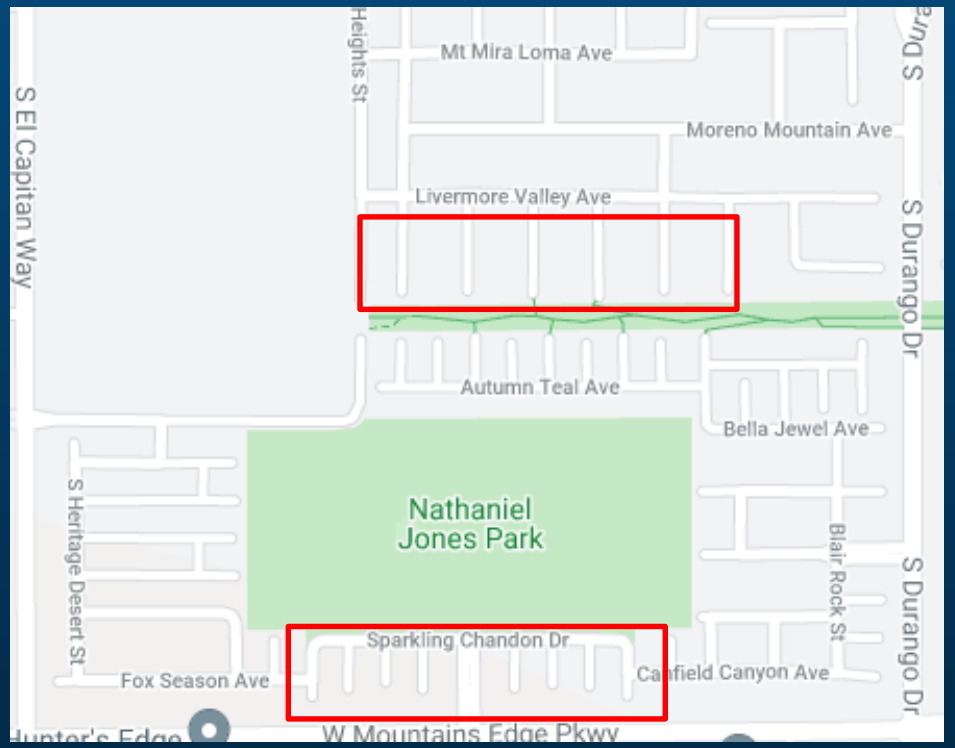
Travel between any stop



Approved Eligible Passengers: Door-to-door

Travel between any address

Consideration: Road Network



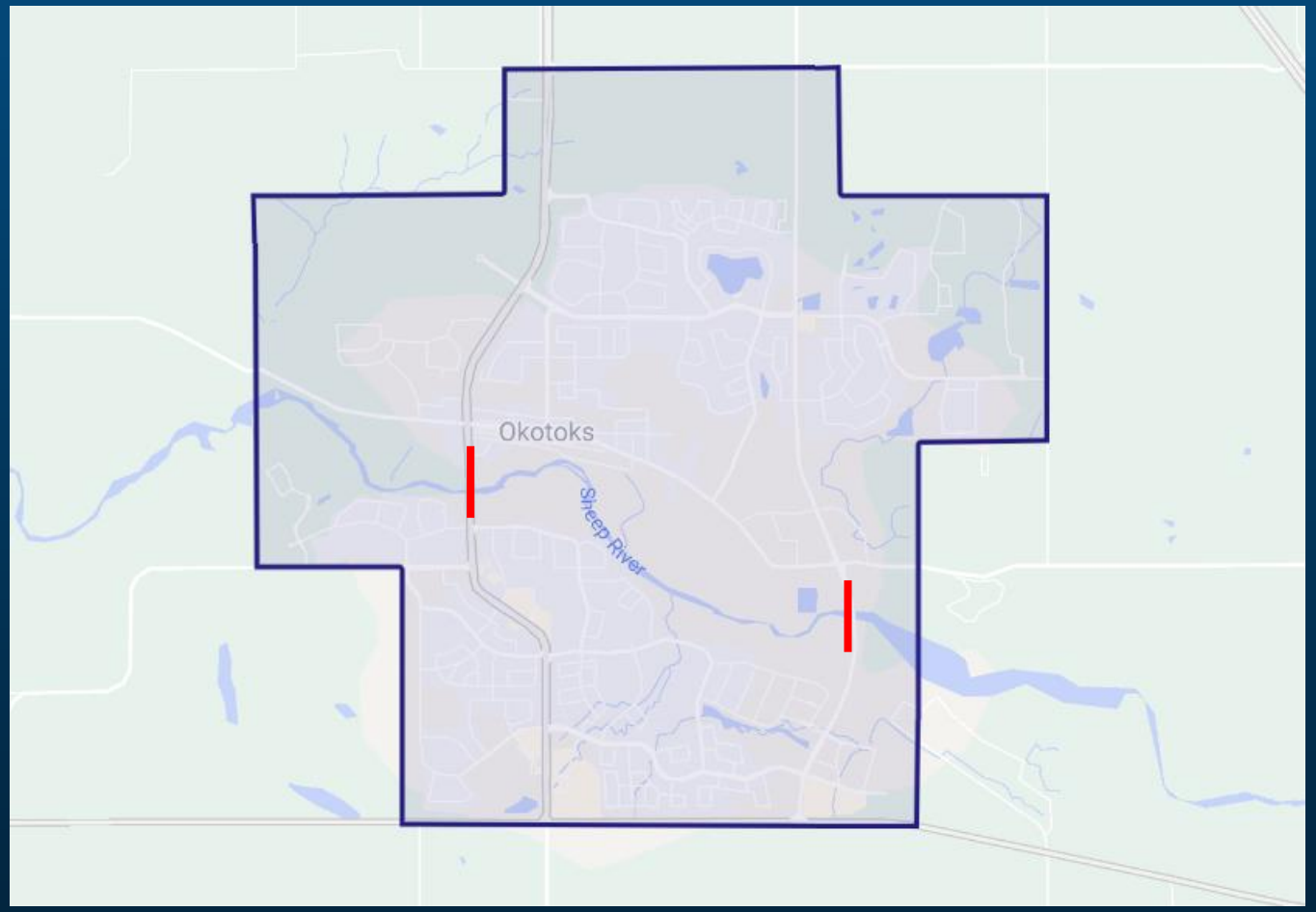
Many dead-end streets requiring U-turns/multi-point turn.

Isolated road networks. 1 way in, 1 way out. Backtracking required.

Consideration: Road Network

Natural Barriers

Impacts wait-times, on-board times, supportable ridership.



Understanding **Where** and **When** travel will take place

Where: Demand Profile

Data Sources:

- Aggregate ridership of fixed routes in area
- Stop level ridership
- Ridership surveys

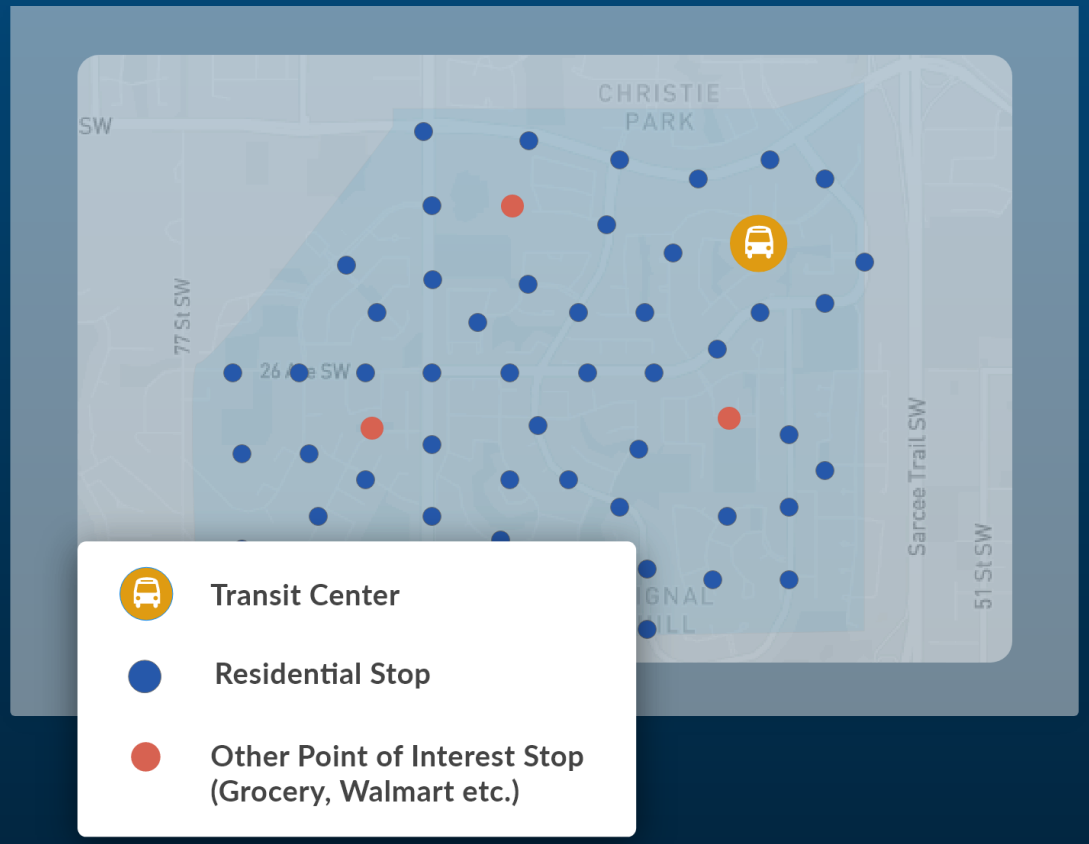
If Unknown:

- Assumptions
- Create a few scenarios
- Important to get buy-in in either case

Stop Level Ridership

Where: Travel Patterns

Sample stop network with main trip generators



Origin/Destination matrix for this zone

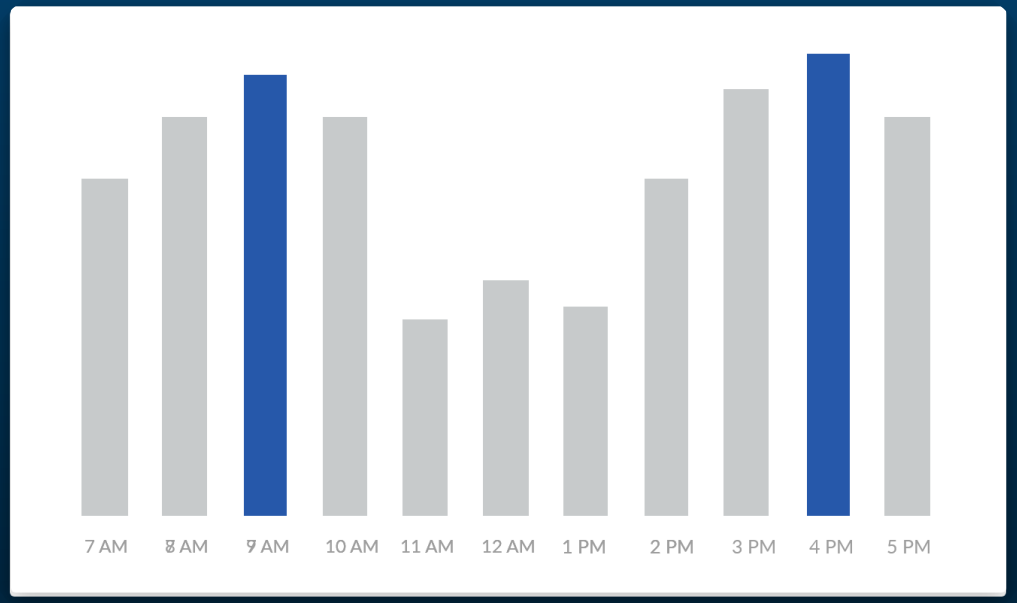
		Destination		
		Transit Center	POIs	Residential
Origin	Transit Center	0%	20%	80%
	POIs	13%	2%	85%
	Residential	80%	15%	5%

When: Peak Periods

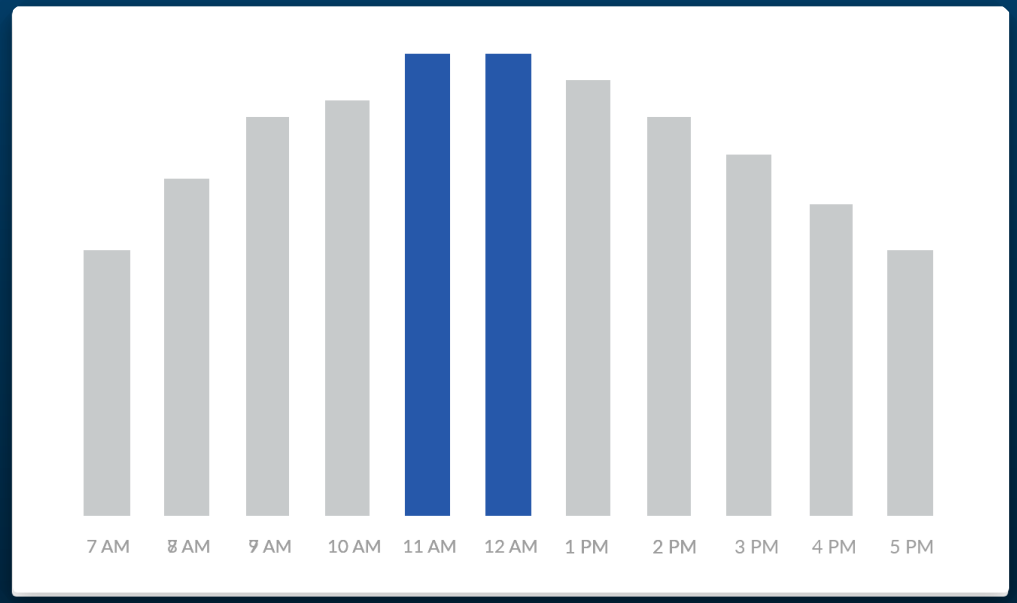
How many vehicles required at peak?

Considerations: desired service levels, budget, the road network, traffic patterns, shift rules, breaks etc…

Typical Weekday Peak



Typical Weekend Peak



Setting and Measuring Objectives

Coverage

Objective/Service Target	KPI/Metric	Considerations
Service Window	Days and Times that the service is available	• Microtransit for Off-peak or outside service hours (E.g. Guelph)
Projected Demand	Trips/day	• Local Geography (Density, Street Network) • Existing transit service • Demographics
Zone Size and Extent	Total Area Population/Employment Major trip generators	• Local trip patterns • Inclusion of both trip generators and attractors • Geographic constraints/road network

Setting and Measuring Objectives

Convenience

Objective/Service Target	KPI/Metric	Considerations
Wait Time	Average duration between time of ride request and time of pick-up	• Improvement on existing headways • Improvement on existing travel times • Travel time ratio to a direct driving trip • These targets have impacts on other objectives
On-Board Time	Average ride duration (from pick-up to drop-off)	
Walk Distance	Average walk distance to a stop or stop density (stops/area)	• Climate conditions, • Quality of pedestrian infrastructure • Abilities of riders. • Road network • Existing stop network and infrastructure • Accessibility and safety
Failed Searches	% of searches that return a failure message % of users that experience a failure message	• Important for reliability • Trip Types • Rider Expectations/Trust in the system • Transfers to fixed route/other services
On-time Performance	% of rides that arrive beyond the committed arrival time	

Setting and Measuring Objectives

Cost

Objective/Service Target	KPI/Metric	Considerations
Capital and Operating Costs	Operating Cost per Passenger Trip	• Budget • Right Sizing • EVs • Threshold of Microtransit • Use of existing drivers/vehicles or contracting • Replacement service, additional service, new service
Productivity	Passengers/veh/hr (PVH)	- Service Model - Flexibility of other obecjtives (on-time performance, on-board times)

Simulation and Iteration

1. Simulation Engine
2. Simulation Process
3. Operating Levers

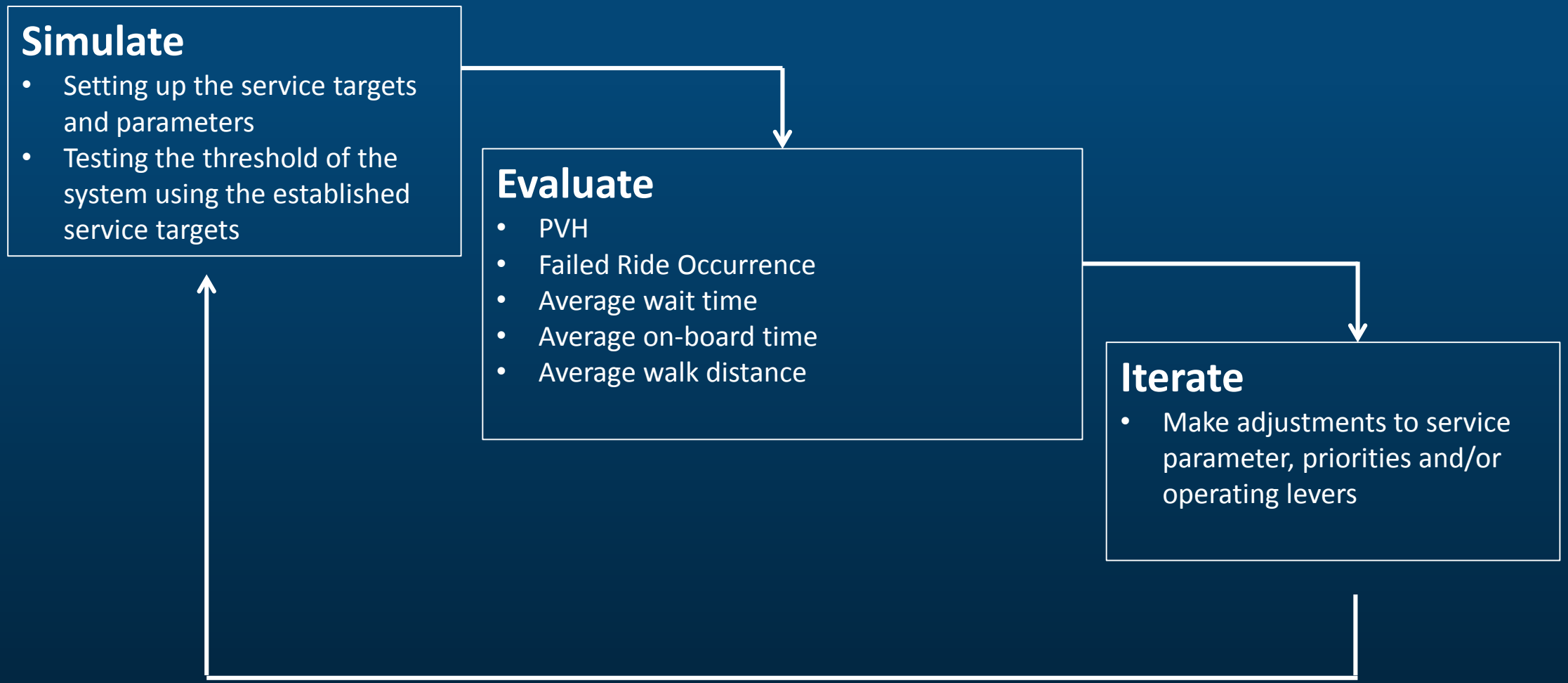
Product Spotlight

RideCo's Simulation Engine

Simulates entire service (all pick-ups and drop-offs) in real time, accounting for vehicle speeds, boarding/alighting times, service parameters, real-time traffic and routing

Outputs a long list of KPIs, service statistics

Simulation Process



Operating Levers that Impact Performance

The system has dozens of variables that are commonly adjusted. Here are a few:

Lever	Explanation
Route Deviation	How far a vehicle will deviate from the most direct route
Trip assignment based on Vehicle Operating Cost	If the fleet has different vehicle types, the system can optimize for cost efficiency. E.g. Only send the smaller vehicles to the peripheral areas
On Board Time	On-board time relative to the direct trip (driving) travel time.
Boarding/Alighting Delays	Understanding the average boarding/alighting time, including the diversity of accessibility needs of the passengers in a zone
No-show Threshold	Number of seconds the system will ask the driver to wait at a pick-up location for a passenger to show up
Trip Negotiation Window	If the system can not accommodate a specific ride request, it will offer alternative trips at different times. This lever tells the system how far to look into the future or the past from the requested time
Shift end Policy	Flexibility on shift end location and time
Booking Policy	Priorities between passenger groups

The algorithm can be tuned to the specific context.

Building a Case for Microtransit

1. Communicating Benefits at a Societal Level

2. Communicating Benefits at a Personal level

Communicating Benefits at a Societal Level

Business Case Metrics

Policy Alignment

- Equity
- Sustainability
- Accessibility
- Safety
- Economic Development
- Tourism

Economic/Environmental

- GHGs Reduction
- VKT/VMT Reduction
- Travel Time Savings
- Access to jobs

Deliverability/Operations

- Risk
- Scalability
- Implementability

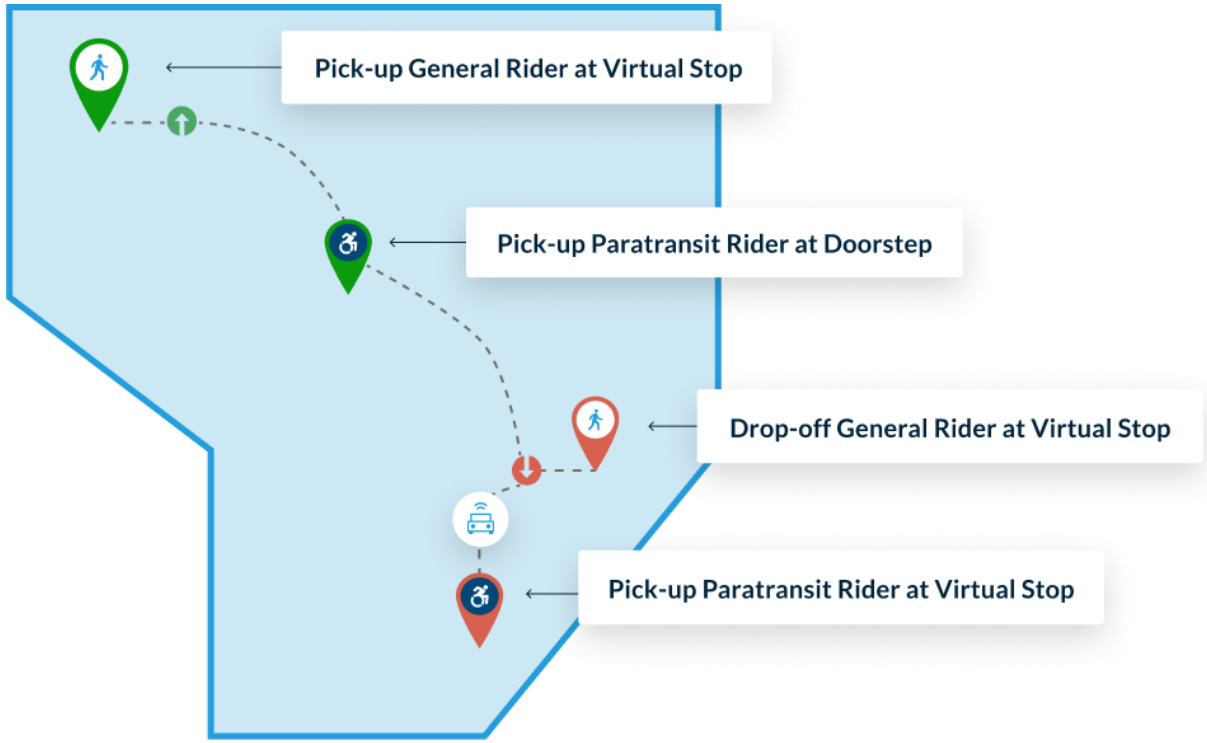
Financial

- Reduced OPEX
- Reduced CAPEX
- Increased Ridership

Commingling

With a single vehicle fleet, we will carry both microtransit and paratransit riders. We will pick up and drop off microtransit riders at virtual stops and paratransit riders at doorsteps.

- Single Vehicle Fleet
- Doorstep Service (Paratransit Passengers)
- Stop-to-stop Service (General Passengers)
- Varying Trip Windows
- Optimized Seating Configuration
- Varying fares, payment types and funding sources



Improved Passenger Experience

Booking Convenience

Passengers can book through the app themselves are call in to book

Improved Ride Tracking

Passengers can track their own rides through the passenger app as well get messages to their phones with ride updates

Standing Orders

Riders with repeat appointments (e.g. dialysis) get guaranteed bookings for their trips before other users can book

Accessible Applications

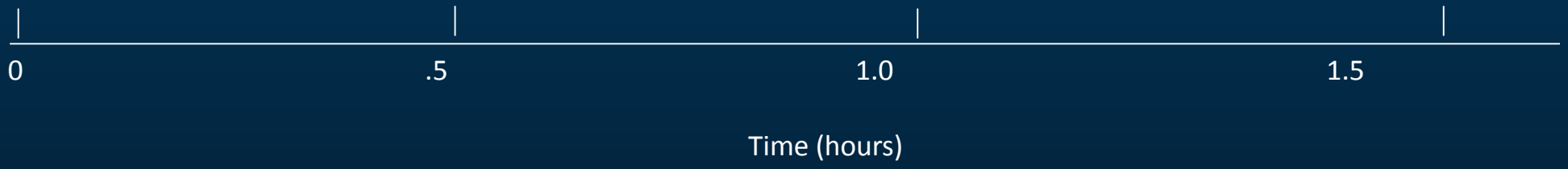
The RideCo platform is WCAG 2.0 AA compliant so all users can access the application and use it as required

Communicating Benefits at a Personal Level

Equity. Giving time back to **people** that need it.

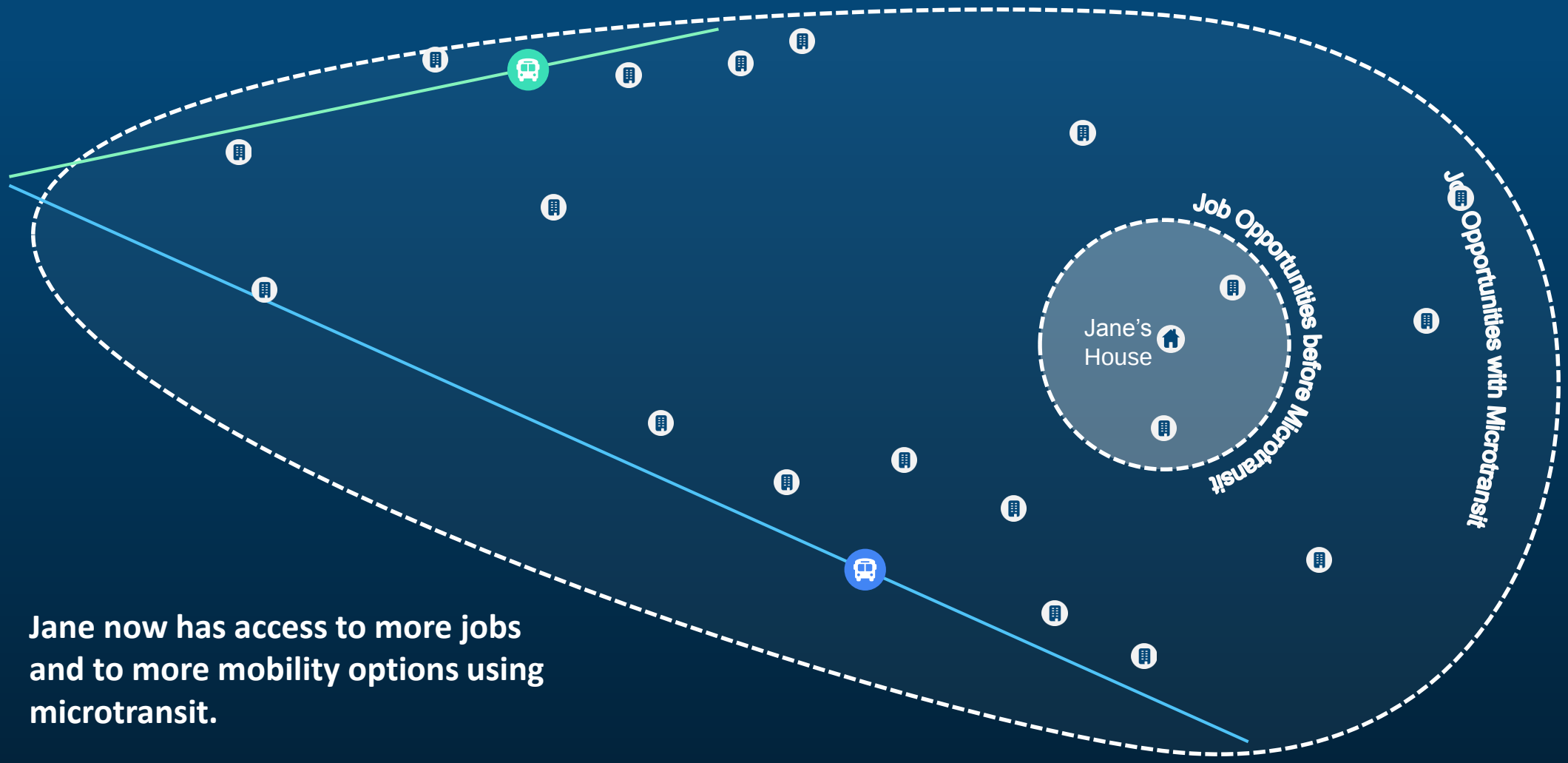
Jo spent 3 hours/day getting to and from work.

Now they spend 1 hour/day using microtransit.



Equity. Connecting **people** to more opportunities.

Jane couldn't apply to the jobs she wanted to because she didn't have a way to get there.

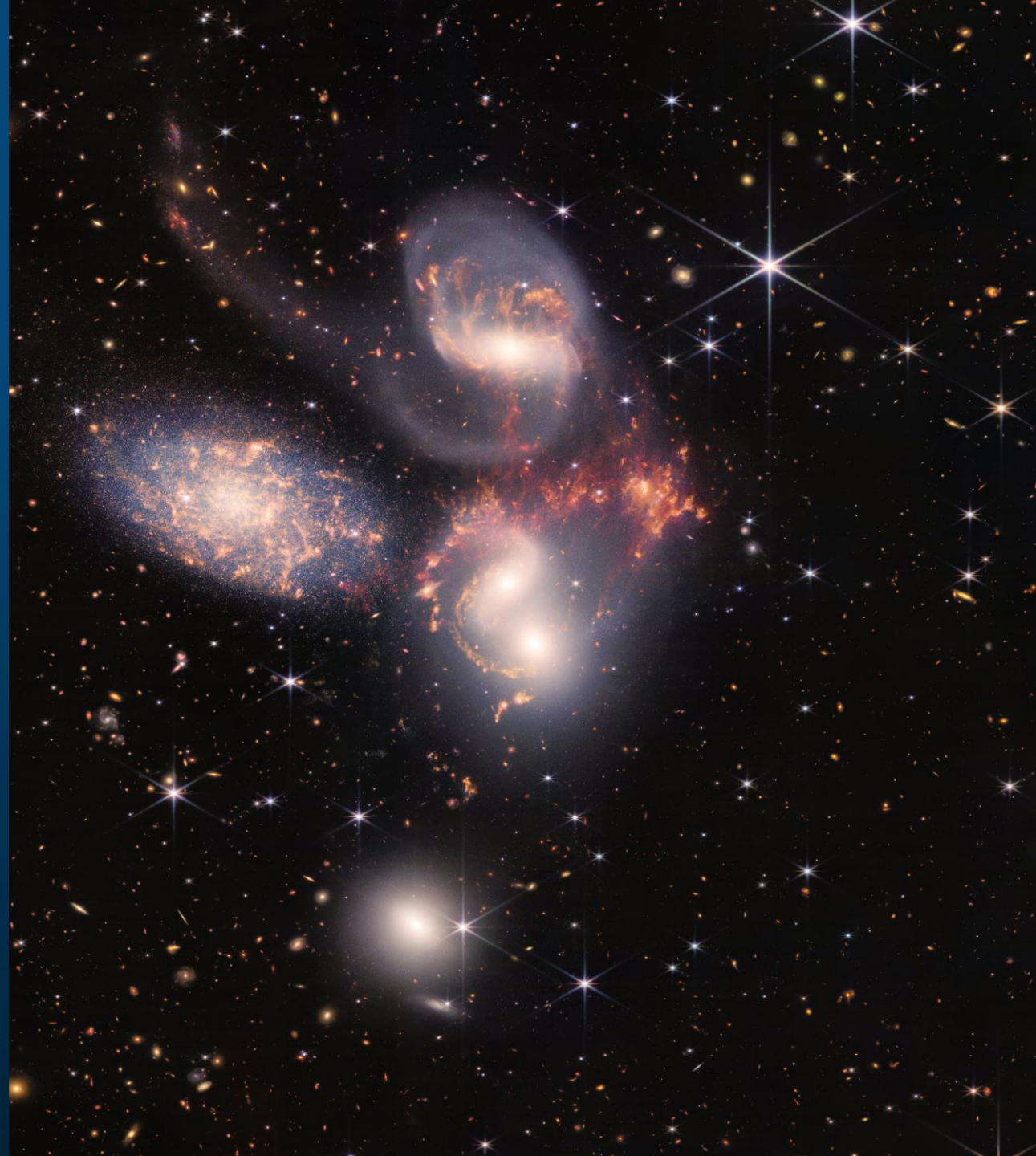


Jane now has access to more jobs and to more mobility options using microtransit.

The Here-Future of Microtransit

1. Seamless Multimodal
2. Battery Electric Vehicles
3. Autonomous Vehicles

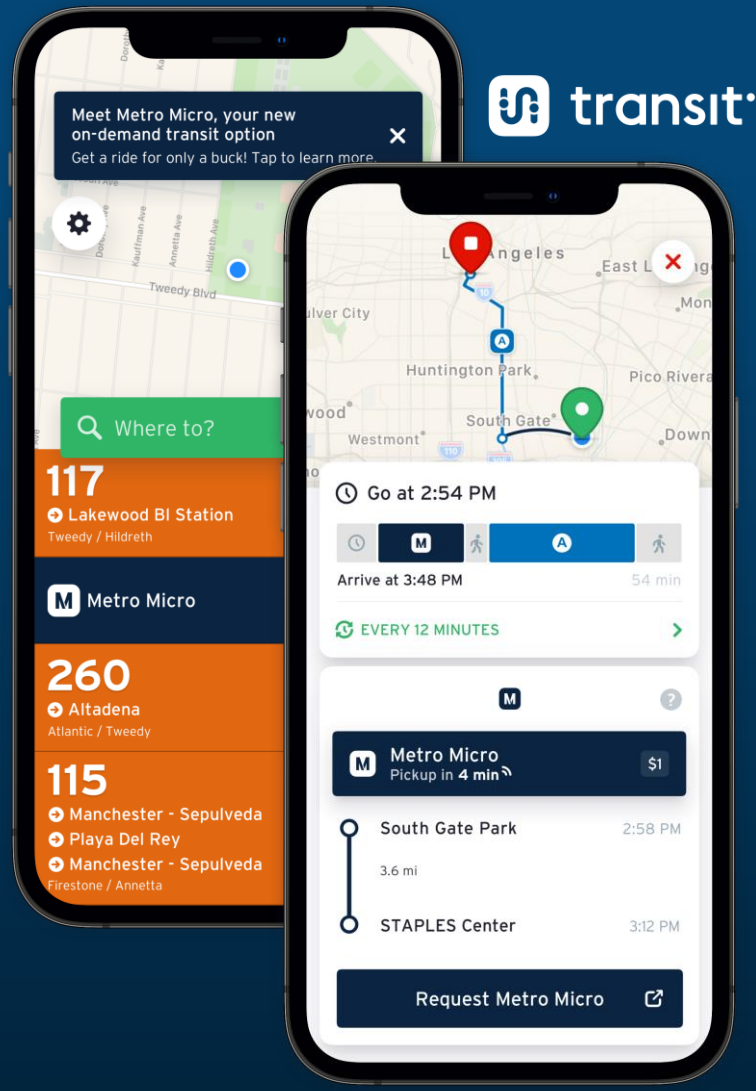
“We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten”
– Bill Gates



The Here-Future of Microtransit

Seamless Multimodal

- The vision is being realized
- Considerable advancement in past couple years
- GOFS working group



Thank You