



Transit Network Design and Service Tradeoffs Workshop

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May 15, 2019

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NYGAARD

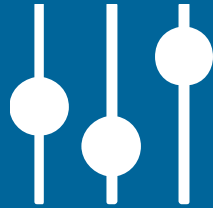
PRESENTATION OVERVIEW

The How and Why of Transit



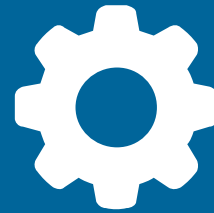
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Introduction

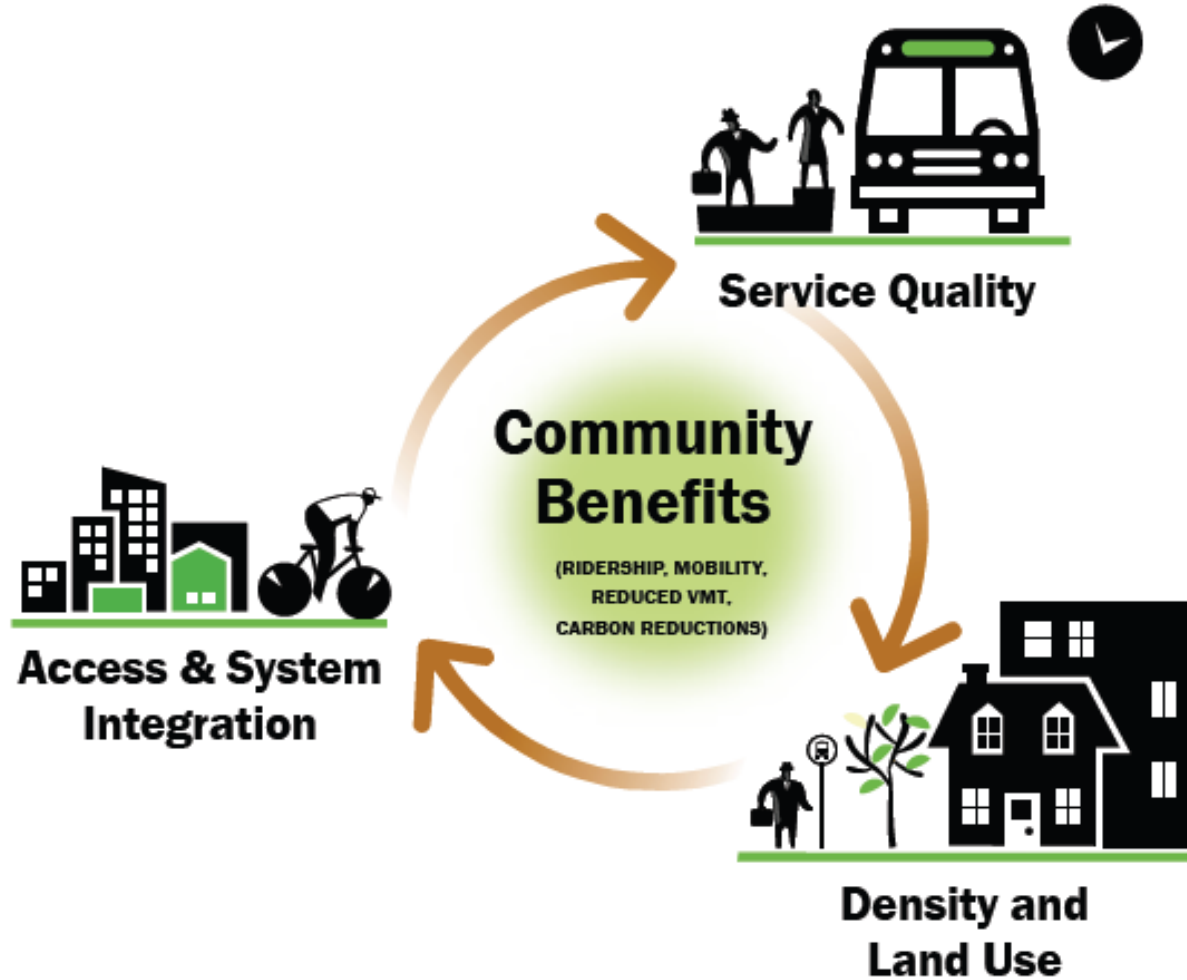
TRANSIT PLANNING CONSIDERATIONS

- What makes transit successful?
- How does service design relate to community goals and needs?
- What may constrain service design or level of service?









DELIVERING COMMUNITY BENEFITS

Coordinated Investment



MAKING THE CHOICE TO USE TRANSIT

How can service ...
... strive to reflect customer values?

	Coverage	Connectivity	Frequency & Span	Speed	Fares	Amenities & Cleanliness	Reliability
 Where I need to go	✓	✓					✓
 When I need to go		✓	✓				✓
 My time is valued		✓	✓	✓		✓	✓
 Value for my money					✓	✓	✓
 Getting there safely and comfortably						✓	✓
 With flexibility to change	✓		✓				✓

IMPORTANCE OF POLICY FRAMEWORK

- Service planning is about tradeoffs
- If service is expanded, what are the priorities for investing those resources?
- Where are the right places to invest, what are the right markets to serve, and what does equitable investment look like?
- Policy framework provides staff with direction on everyday network design decisions
 - Planning for the long-term outcome to inform short-term decisions
 - Consistency in how decisions are applied to each route or community



Tradeoffs in Transit Planning

WHAT ARE THE REGION'S VALUES?

FREQUENCY AND SPAN



Provide more frequent service for a shorter time



Provide less frequent service for a longer time

COVERAGE



Provide less frequent service to more areas



Provide more frequent service to fewer areas

DAYS OF SERVICE



Provide less weekday service and more weekend service



Provide more weekday service and less weekend service

TRANSFERS



Provide more routes with less frequent service but fewer transfers



Provide fewer routes with more frequent service but more transfers

DIRECTNESS



Provide slower and less direct service with shorter walks to stops



Provide faster, more direct service with longer walks to stops

STOP SPACING



Serve many stops that make service slower but reduce walking distance



Serve fewer stops to speed service up but increase walking distance

SERVICE TYPE



Improve the local bus network



Improve the commuter bus network

SERVICE DISTRIBUTION



Provide service in areas in proportion to funding



Provide service to areas with the most need

IMPORTANCE OF FREQUENCY

FREQUENCY AND SPAN



Provide more frequent service for a shorter time



Provide less frequent service for a longer time

- Wait less, travel conveniently
- Make connections **easily**
 - When the network is frequent, benefits are multiplied
- Trip security
 - Another bus is coming soon

Imagine if ...



You showed up for work, but the elevator only came every 60 minutes

IMPORTANCE OF SPAN OF SERVICE

FREQUENCY AND SPAN



Provide more frequent service for a shorter time



Provide less frequent service for a longer time

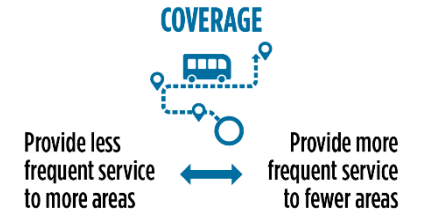
- Job market has expanded beyond standard 9 to 5 times
- Discretionary / non-work related trips are most often during non-peak times
- Longer span of service allows for more trip types to be served

Imagine if ...

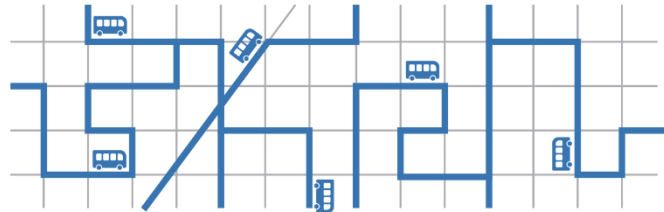


You showed up for work, but the elevator only operated between 6 to 9 a.m. and 3 to 6 p.m.

PRODUCTIVITY VS. COVERAGE TRADEOFF



COVERAGE

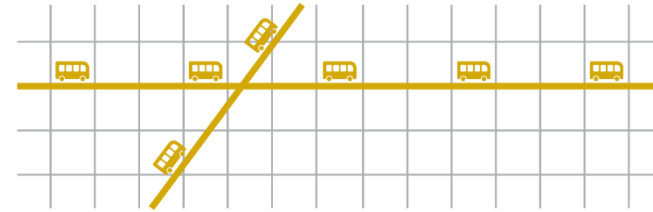


More people have **some** transit access

Ridership is **lower**...

... but really **important** for those who use it

FREQUENCY



More **trips** on transit!

Ridership is **higher**...

... but **no service** in many places

IMPORTANCE OF OPERATING MORE DAYS OF THE WEEK



Seven Day Focus

■ Positives

- Growing service industry job types are served
- Ability to live without a car is enhanced
- Mobility for people who rely on transit improves

■ Drawbacks

- Weekend service carries fewer people

Weekday Focus

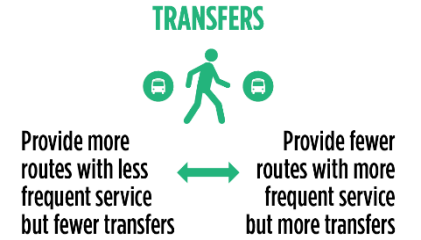
■ Positives

- Resources put where it carries the most passengers

■ Drawbacks

- Job access and overall mobility for unserved areas is diminished

IMPORTANCE OF TRANSFERS



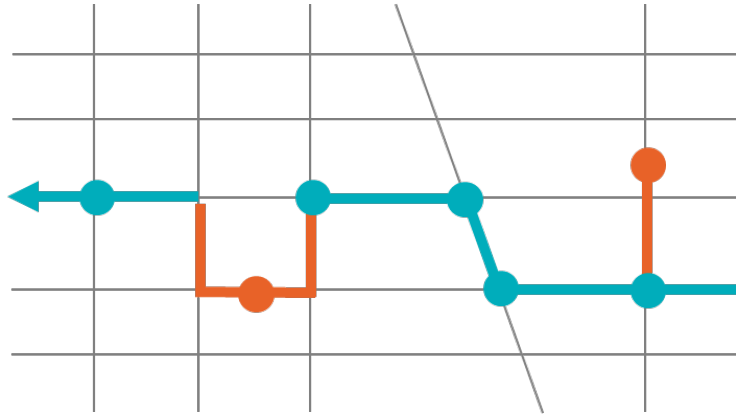
- Most trips within a metropolitan area cannot be served with a one seat ride
- Is it more important to try to serve trip patterns without transfers?
- **Considerations**
 - Customers tend to dislike transfers
 - Frequent service and good connections can reduce these perceptions
 - Greater emphasis on one-seat rides can lead to less frequent and lower utilized routes
 - Where is the balance?

IMPORTANCE OF ROUTE DIRECTNESS

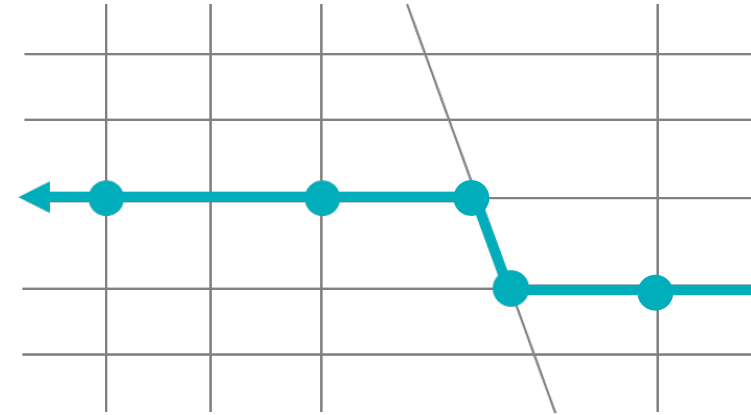


Provide slower and less direct service with shorter walks to stops

Provide faster, more direct service with longer walks to stops



OR



■ Positives

- Shorter walks for percentage of riders

■ Drawbacks

- Slower travel times for most riders
- Higher operating costs

■ Positives

- Faster travel times for most riders
- Lower cost

■ Drawbacks

- Some people have to walk farther

IMPACT OF STOP SPACING ON SPEED

STOP SPACING



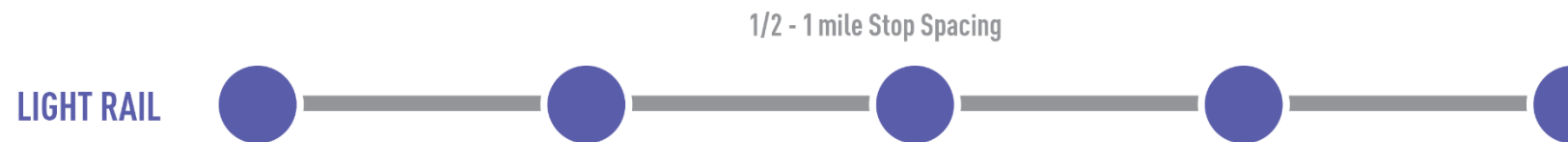
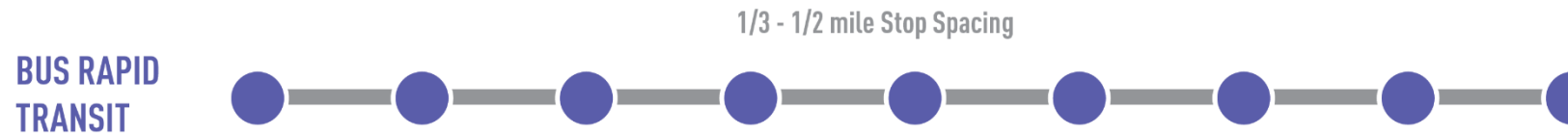
Serve many stops that make service slower but reduce walking distance



Serve fewer stops to speed service up but increase walking distance



FREQUENT TRANSIT NETWORK



FASTER SERVICE BUT SOME LONGER WALKS?

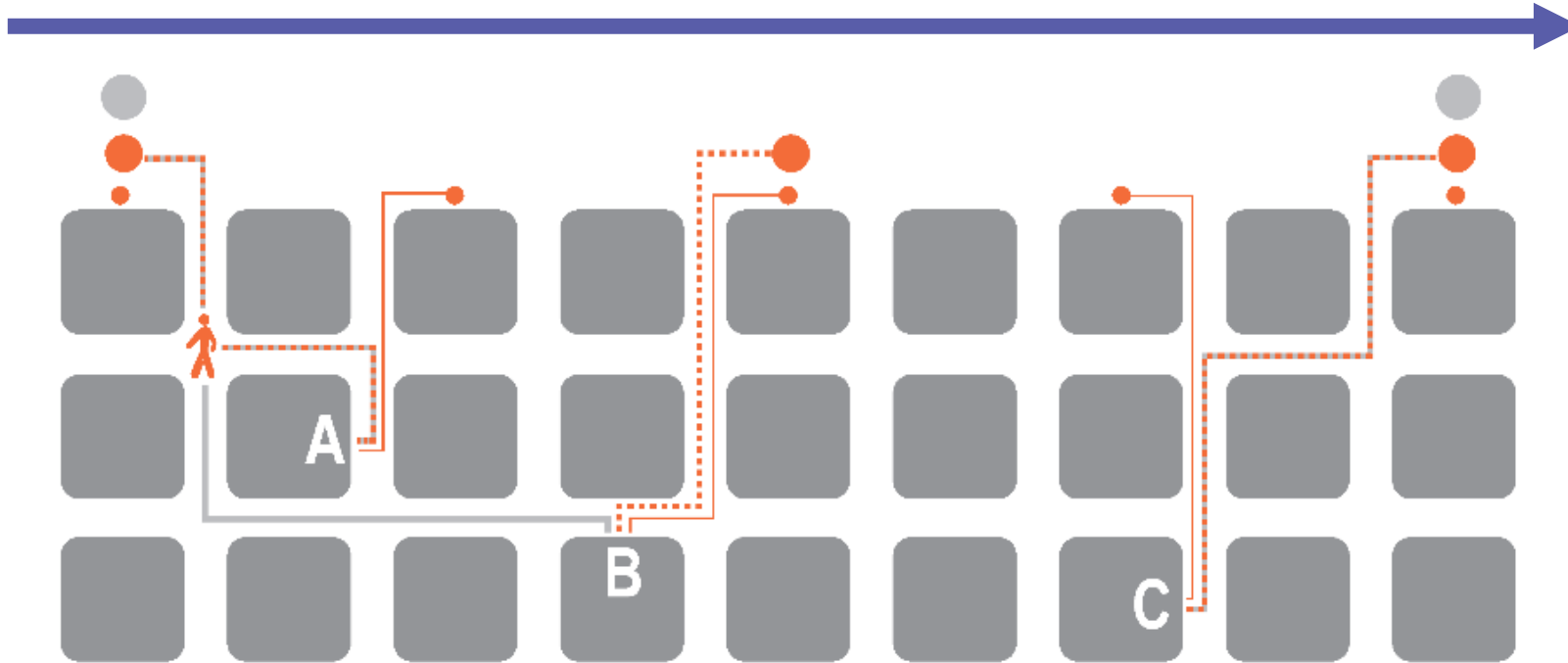
STOP SPACING



Serve many stops
that make service
slower but reduce
walking distance



Serve fewer stops
to speed service
up but increase
walking distance



Blocks Traveled by Service Provided

	1/8 mi. Service	BRT 1/4 mi.	BRT 1/2 mi.
Household A	2 blocks	3 blocks	3 blocks
Household B	3 blocks	3 blocks	5 blocks
Household C	3 blocks	3 blocks	4 blocks

Walking Travel Path to Transit Stop

- BRT Stop (1/2 mile stop spacing) and Path
- BRT Stop (1/4 mile stop spacing) and Path
- 1/8 mi. Service Stop and Path

IMPORTANCE OF SERVICE TYPES

SERVICE TYPE



Improve the local bus network

Improve the commuter bus network



Local Services

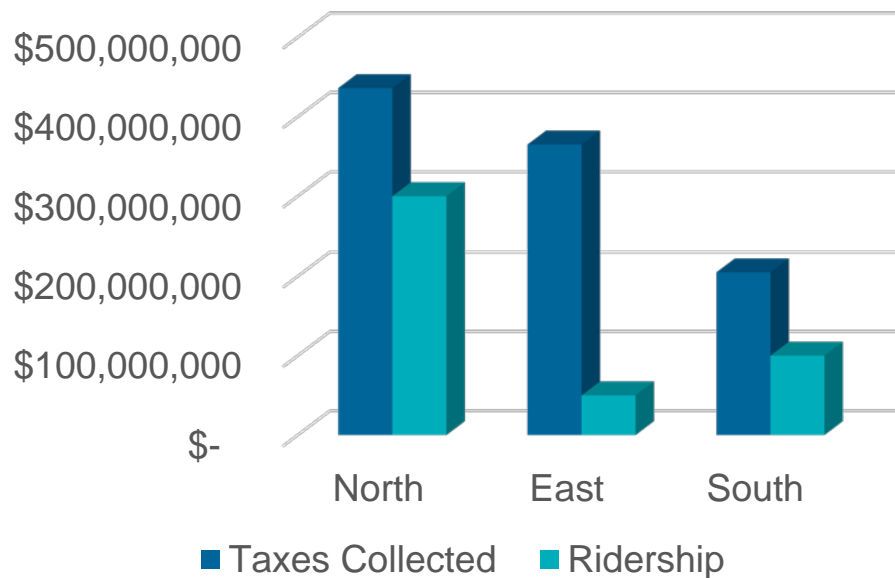
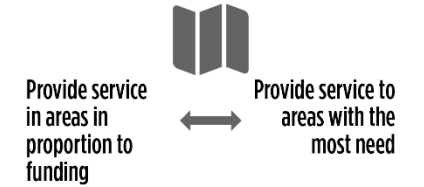
- Serves all-day market with many trip purposes
- Higher ridership
- Lower operating and capital costs

Commuter Services

- Takes people off the road at most congested times
- Attracts downtown employee market
- High operating cost
- High capital cost due to need for park-and-rides

SERVICE DISTRIBUTION HYPOTHETICAL EXAMPLE

SERVICE DISTRIBUTION



East King County

Population: 579,000
Taxes Collected: \$365M
Annual Ridership: 50M

North King County

Population: 782,000
Taxes Collected: \$436M
Annual Ridership: 300M

South King County

Population: 511,000
Taxes Collected: \$205M
Annual Ridership: 100M

Population & sales tax = 2017, ridership is fictional – i.e. for illustrative purposes only



Considerations in Transit Planning

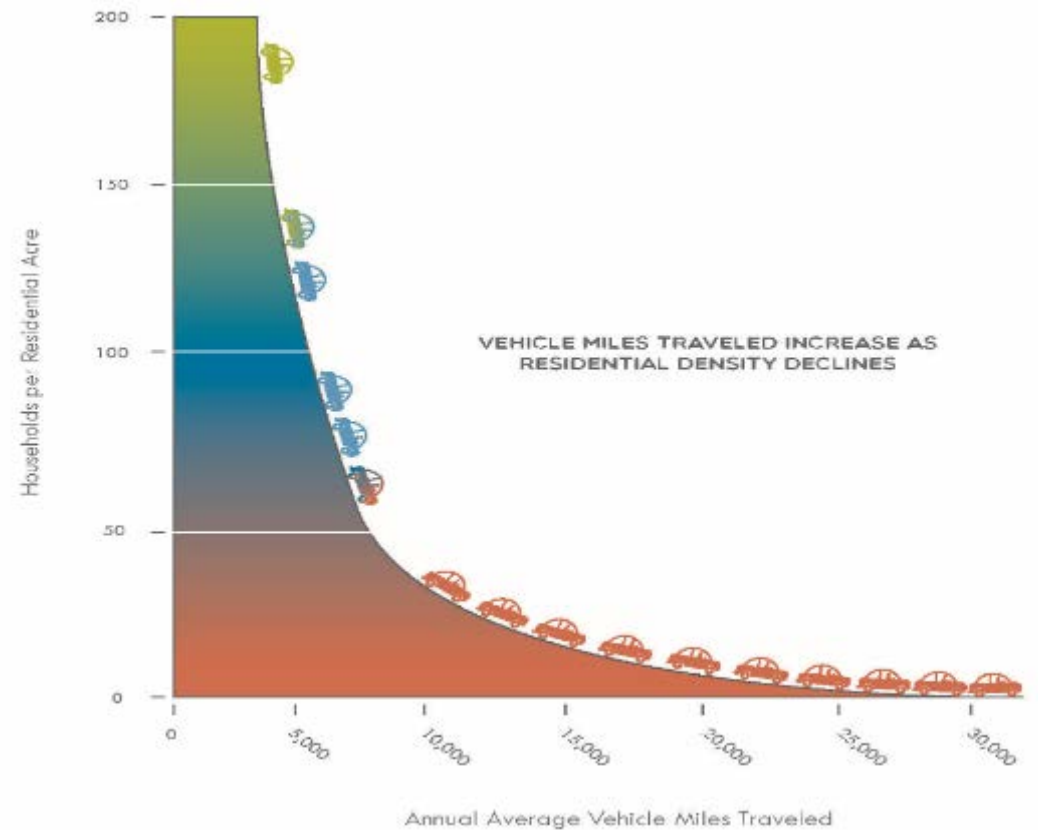
COORDINATING LAND USE AND TRANSPORTATION

- Classic “chicken-and-egg” problem:
 - Transit quality is a key criterion for land use development
 - Yet land use is also a key criterion for transit service performance
- Ideally, quality transit will be available when land use and street design use good transit-oriented forms
- Tools:
 - Frequent Transit Networks/Lines
 - Community based services to feed frequent network
 - Transit priority in the roadway

DESIGN, DIVERSITY, AND DENSITY



The design of downtown Bend encourages biking and walking – both providing access to transit



Studies show that households in higher density areas make 25% less auto trips on average

TRANSIT MARKETS

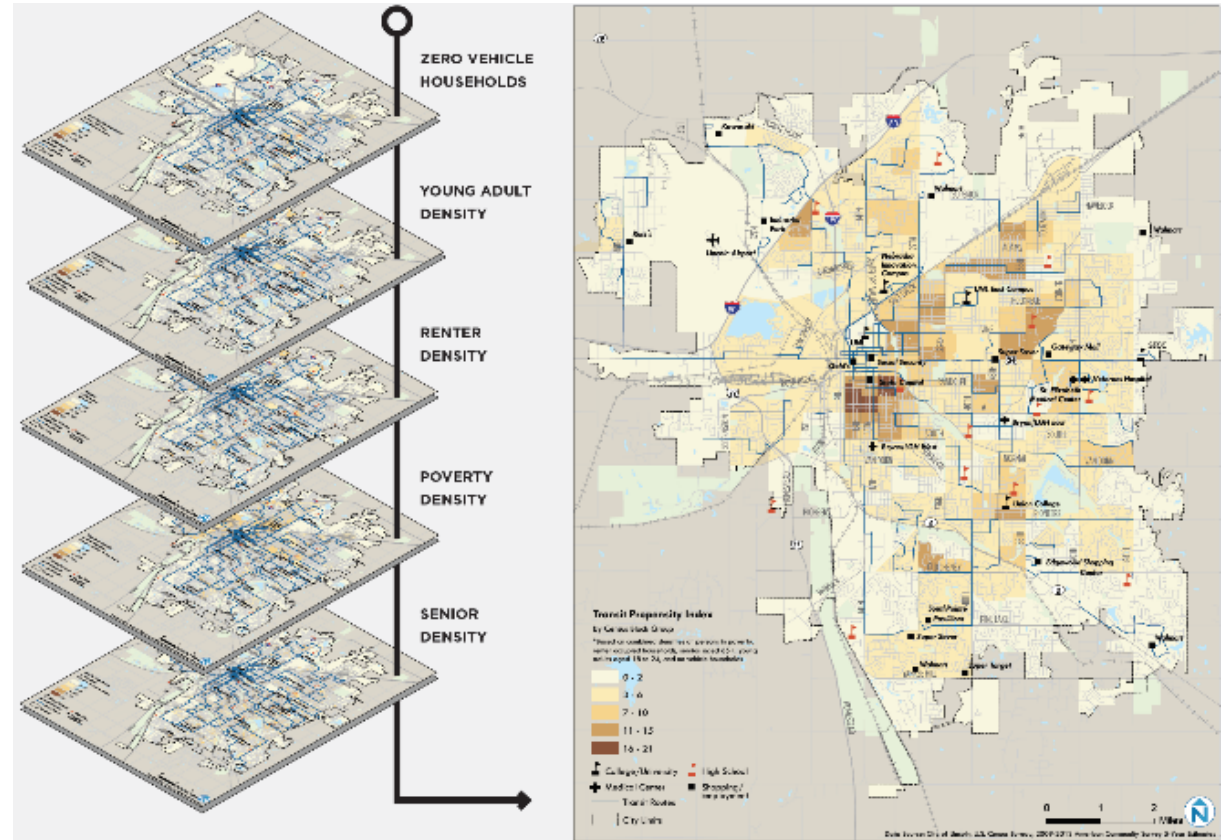
■ Riders with Options

- Options are increasing
- Paying for location efficiency
- Transit is one choice among an increasing number

■ People who Rely on Transit

- Options are not increasing
- New options are expensive
- Mobility choice spreads demand and can threaten existing services

Groups More Likely to Rely on Public Transportation

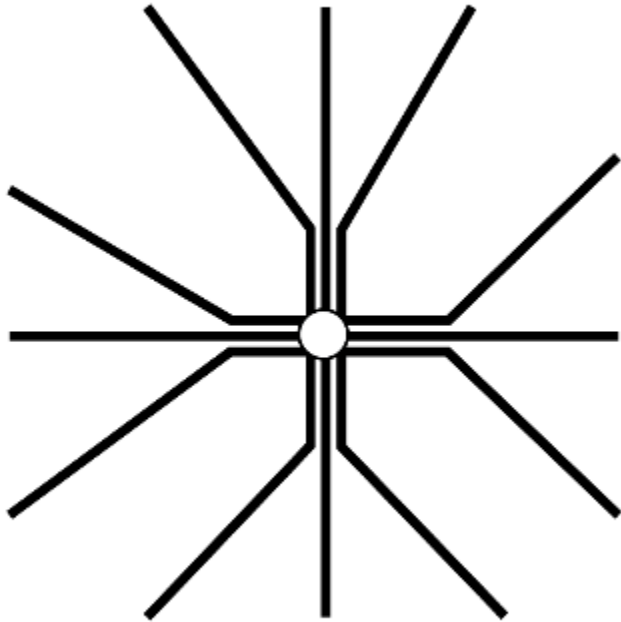


GUIDELINES FOR SERVICE



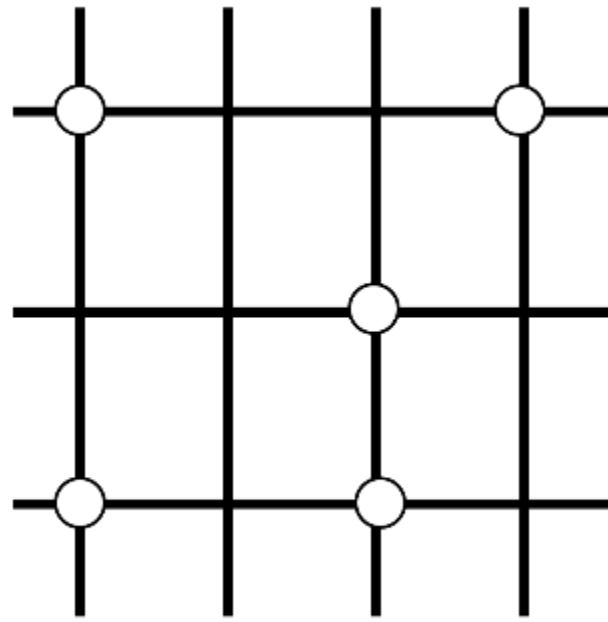
ARRANGING THE PIECES: NETWORKS

Radial (Hub and Spoke)



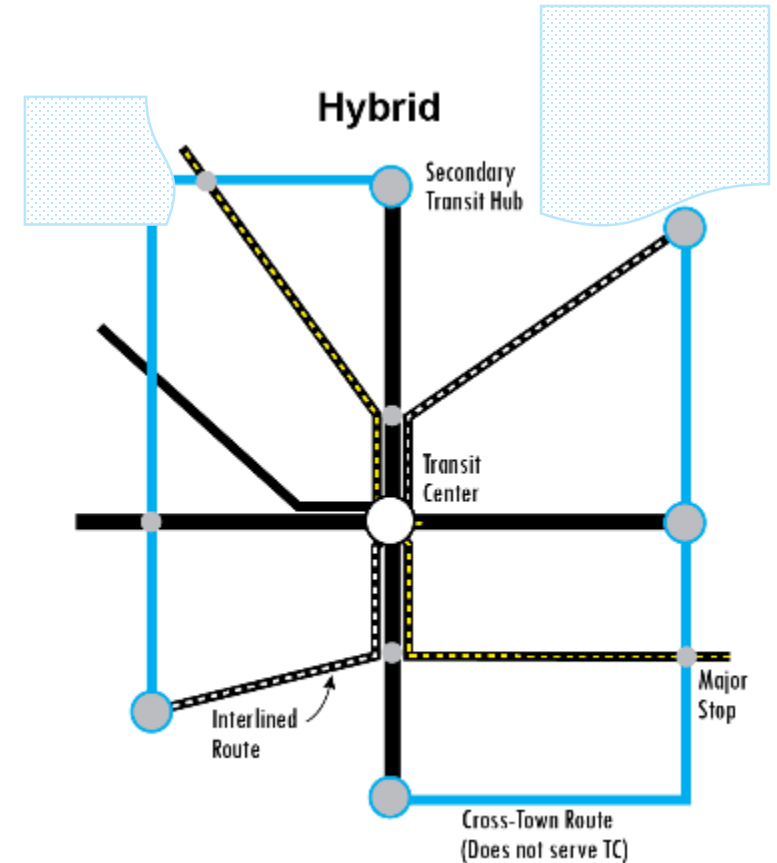
Commuter Oriented
Cost Effective

Grid



All Trip Types Served
Most Ridership
Highest Cost

Hybrid



Service Types Fitted to Market
Balance Cost and Productivity

EMERGING MOBILITY

**Transportation
Network
Companies (Uber,
Lyft, etc.)**



Microtransit



**Autonomous
Shuttles**





Defining Success

VISION FOR SUCCESS

- Assume additional funding for transit in the Metro area
- Fast forward 6 years from now
- Newspaper has just released a headline about Metro
- What is your vision that is expressed in the headline?
- Spend 2 minutes thinking about this
- Share the vision





ENT PLAZA

GREEN LINE

T METRO

metrotransit.org

249B

249B

MetroTransit

A service of the Metropolitan Council
Transit Improvement

Next Steps

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INTERACTIVE WORKSHOP PLANNING EXERCISE

- **Challenge:** Redesign a hypothetical service to maximize public benefit
- **Process:** Discuss routes as a group, draw them, check cost, and go back to drawing board as necessary



WORKSHOP PROCESS

Participants will have to make difficult decisions:

- Who gets service?
- What kind, and how much?
- Who gets a “one-seat ride,” and who has to transfer?



THANK YOU!



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