

The Future of Transportation:

Can You See Around
the Corner?



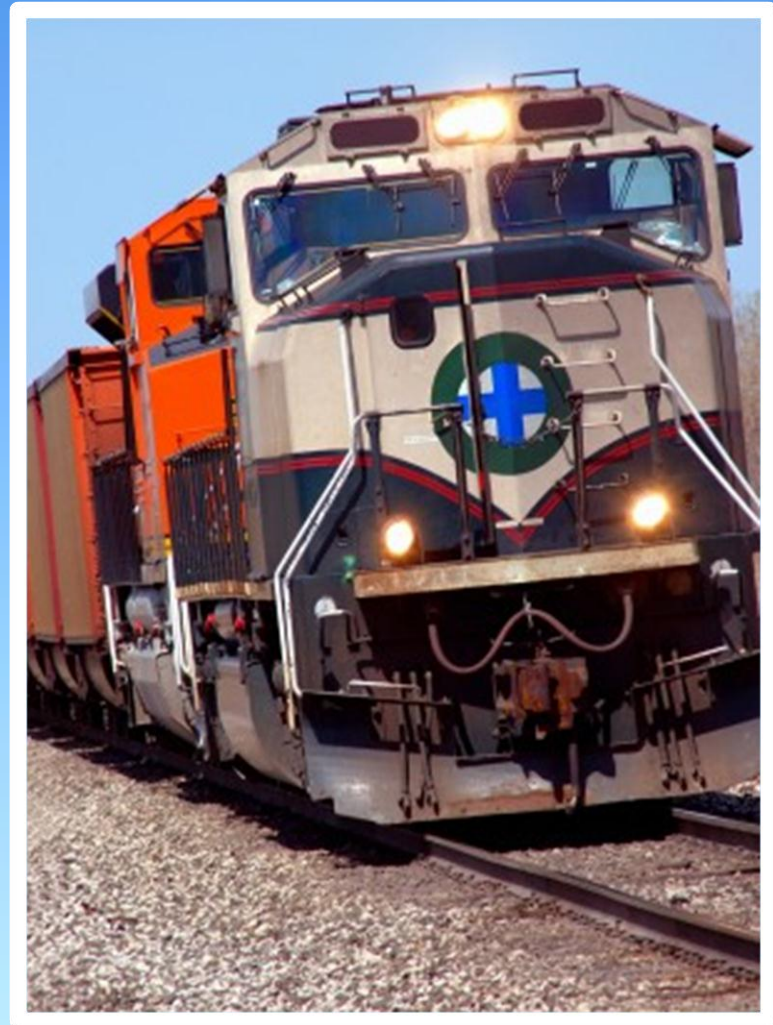
Shelley Row Associates LLC

www.shelleyrow.com

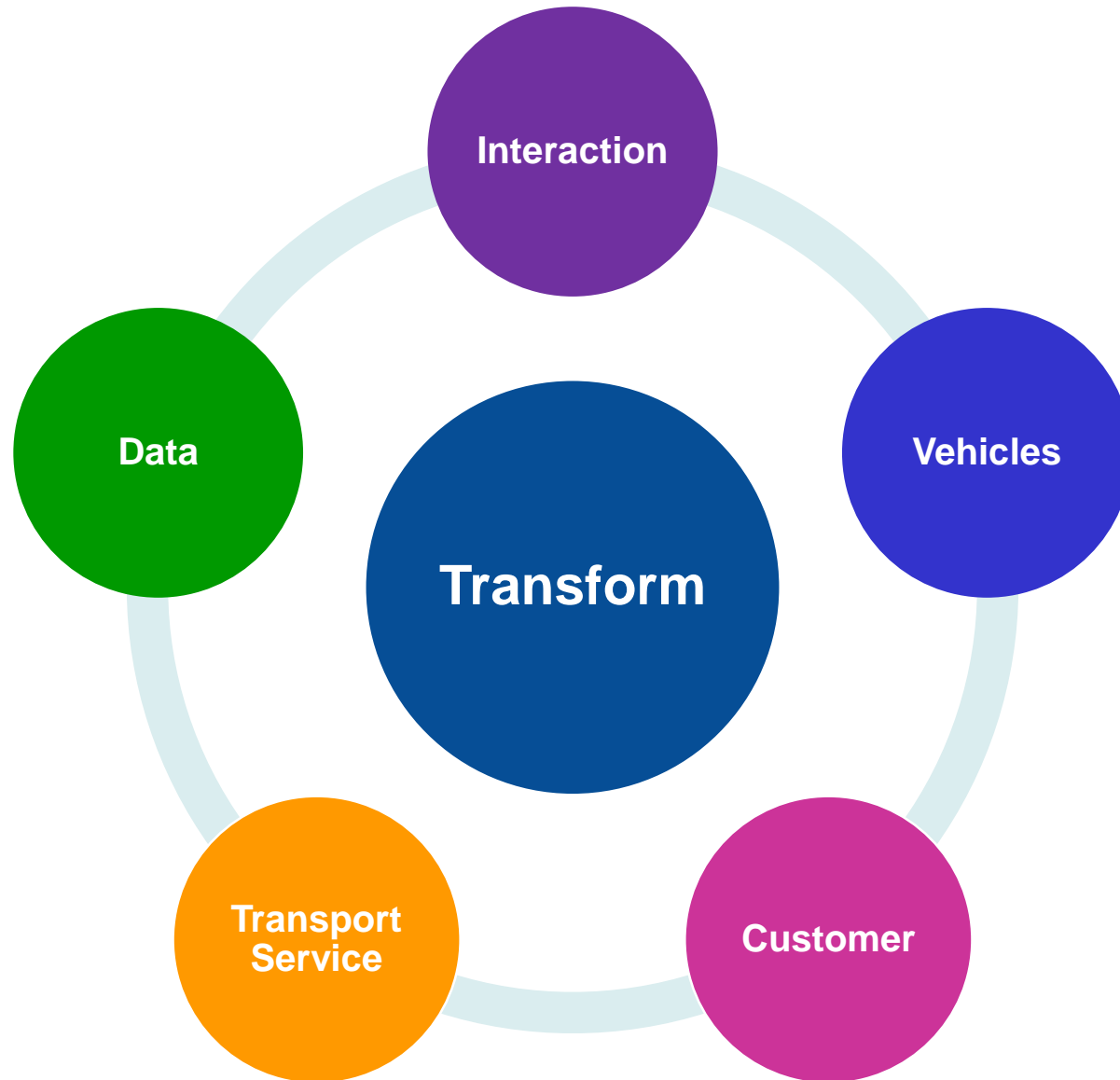
@shelleyrow

Shelley Row, P.E., PTOE

Transformation of Transportation



Transformation of Transportation



Customer

Customer

Who are you designing for?

Only 44% of teens obtain a driver's license within 12 months of coming of age



Labor force participation rate of 65-69 year-olds

21.8% in 2010

30.8% in 2012



Transport
Service

Transport Service

From driving to a service

“The **smartphone** is the carrier of multimodality.”

Magnus Kuschel



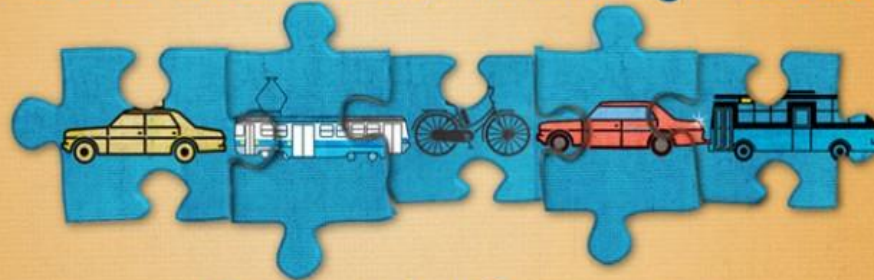
39% of young people say they can get around just fine without driving

Transport Service

From driving to a service

UbiGo

Alla resor i ett flexibelt abonnemang - alltid till hands



Se hur det fungerar ▶

- Bundled service
- Hertz, electric car, carpool, transit, bike, taxi
- 20% cheaper than ownership
- Subscription service

Interaction

From connection to interaction

Every minute **208,300** photos are uploaded to FaceBook

Every minute **350,000** updates are sent to Twitter

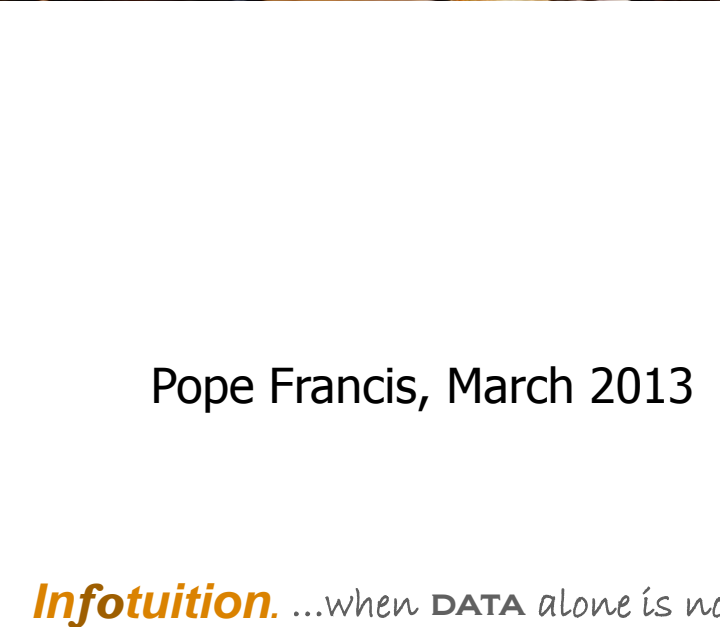
Airbnb has **650,000 rooms** globally

YouTube is **2nd** largest search engine





Pope John Paul II, April 2005



Pope Francis, March 2013



Interaction

Interaction

From connection to interaction

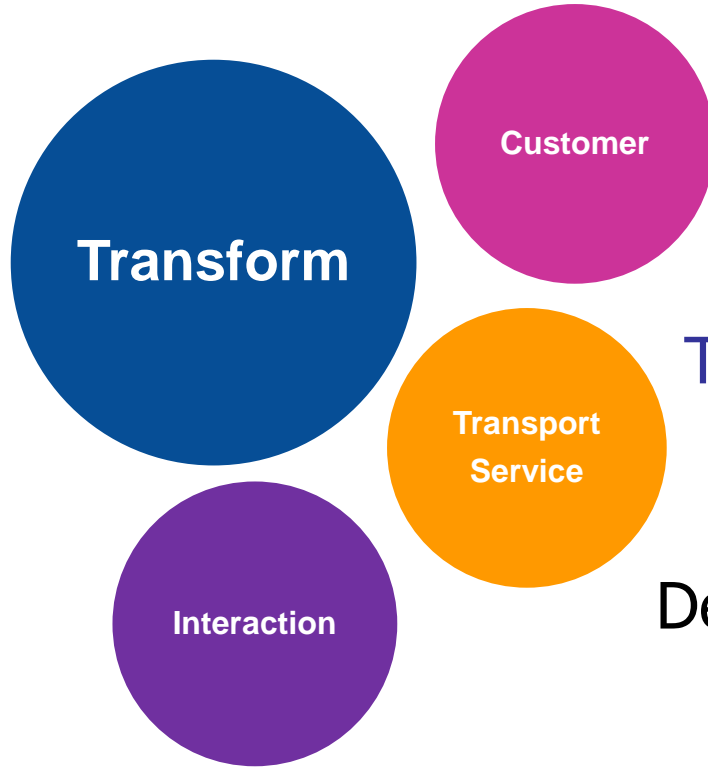
Assume everyone can **comment** on or **photograph** everything you do

62% used social media to report service issues

30% of customers expect a response within 1 hour



Transformation of Transportation



Connect the dots

Transport in a mobile, connected world

Design for **mobile platforms**

Social media for digital dialogs

Transportation as a part of service **eco-system**

Data

Data

Data to Information

Crowd-sourced information

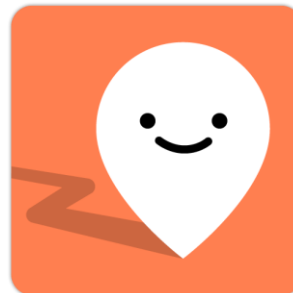
**Fun
Social**



Meteor
Counter



Waze



MOOVIT



SmileDrive



Infotuition. ...when DATA alone is not enough.

www.shelleyrow.com

Data

Data

Data to Information

Personalized information

For those 35 and younger,
80% want the car to understand their technology preference and predict their needs

amazon.com

Recommended for You

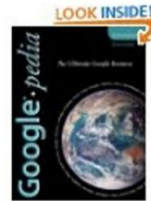
Amazon.com has new recommendations for you based on [items](#) you purchased or told us you own.



[Google Apps Deciphered: Compute in the Cloud to Streamline Your Desktop](#)



[Google Apps Administrator Guide: A Private-Label Web Workspace](#)



[Googlepedia: The Ultimate Google Resource \(3rd Edition\)](#)



Vehicles

Horsepower to Processing Power

Americans drive 1.5 trillion miles/year
which is **250 hours/vehicle/year**

Global vehicle telematics market is expected to be
\$40 billion by 2016**

75% of cars will be connected to the
Internet by **2020***

GM: 4G LTE on all **2015** models

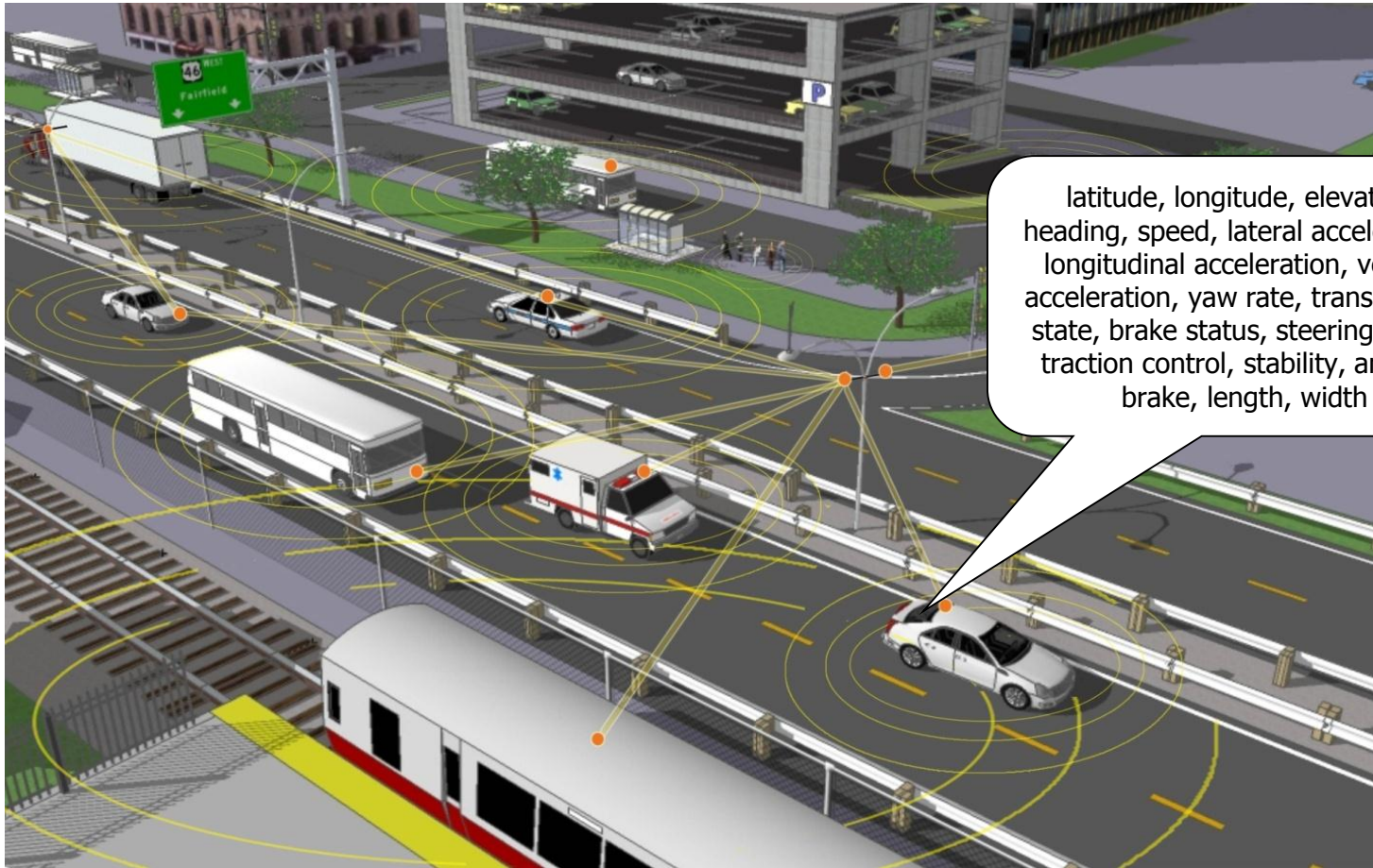
**Statista.com

*Computerworld, 2015 www.shelleyrow.com



Vehicles

Horsepower to Processing Power How DSRC Works



Vehicles

Vehicles

Horsepower to Processing Power
DSRC – V2V

NHTSA announced its intent to pursue **regulation** for DSRC connected vehicles

Proposed rule in **2016**

Requirement by **2020**



NHTSA estimates **37 years** for full fleet penetration

Vehicles

Horsepower to Processing Power

DSRC Myths

- **Massive infrastructure** is required
- DOTs will have access to **many new services**
- **V2I** is required



Vehicles

Horsepower to Processing Power

Start **Now!** – It's all about the data

- Know the data you **need**;
- Know the data you **get** from DSRC

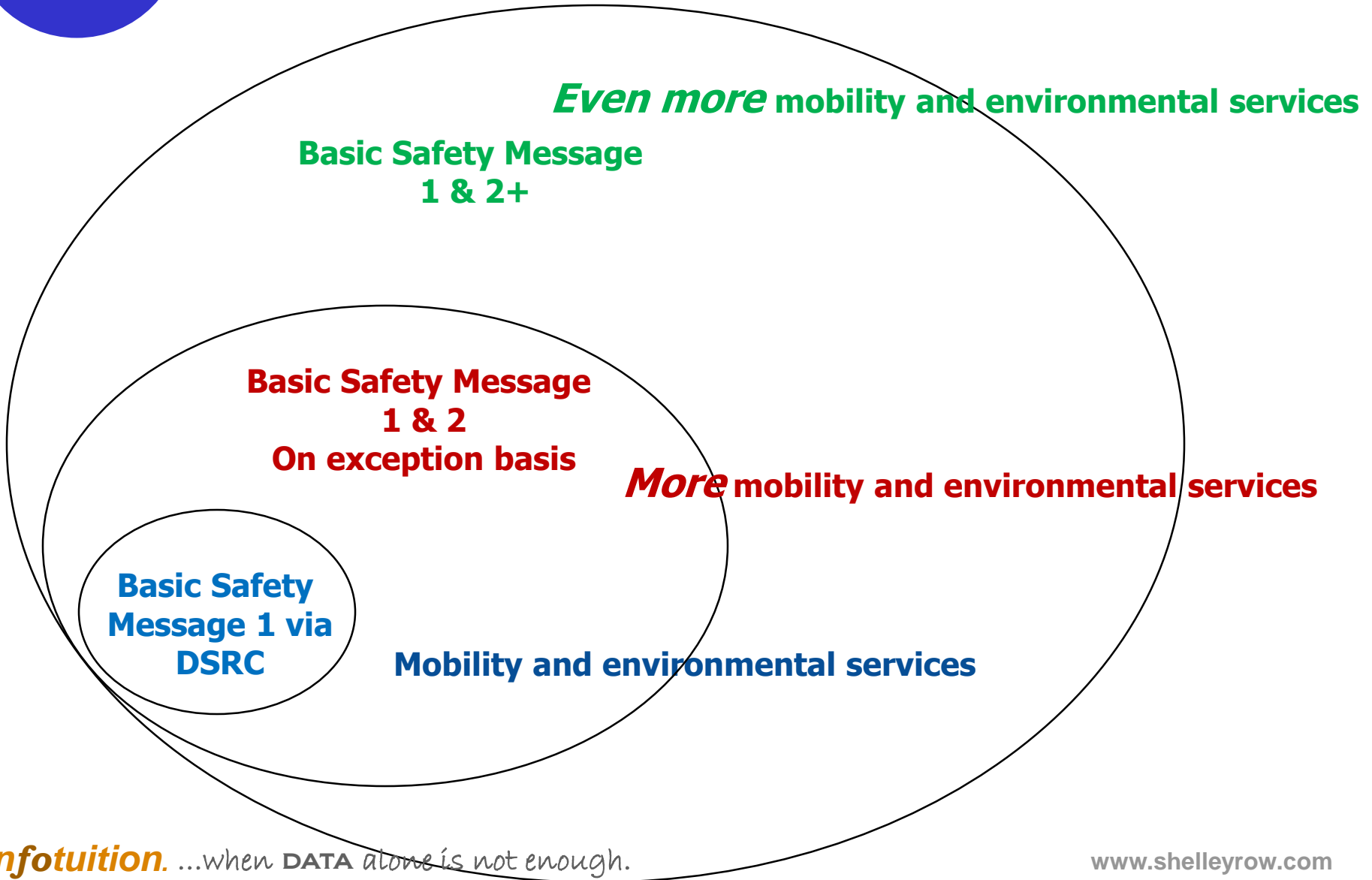


Will the BSM meet your needs for DOT apps



Vehicles

Connected Vehicles Create Data



Vehicles

Connected Vehicles

Horsepower to Processing Power

Start **Now!**

DSRC planning

- High-crash intersections
- Planned signal system upgrades
- Unexpected curves or alignment changes
- Corridors with intense data needs
- Connected vehicle pilots
- See AASHTO Infrastructure Footprint Analysis



Connected Vehicles

Horsepower to Processing Power

Enable Others

Share data to enable app developers

- Transit data
- signal, phase & timing (SPaT) data
- Work zone data
- Other data

Considerations

- Does it further your public agency goals
- Data standards



Connected Vehicles

What Does it Mean to Me?

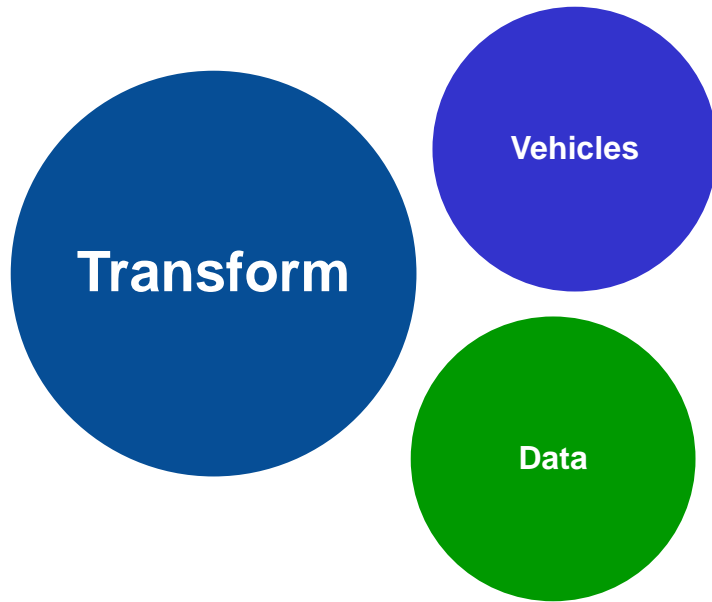
Be a smart investor; **ask questions**

Assess **DSRC** and **Cellular** options

- Footprint analysis provides good assessment of DSRC
- There is no assessment of cellular design options or costs



Transformation of Transportation



Connect the dots

Plan for connected vehicles now

Share your data

Analyze **data** and data needs

Study if **DSRC data** meets your needs

Study possible DSRC **implementations**

Vehicles

Horsepower to Processing Power

Automated Vehicles



**NHTSA DEFINES
VEHICLE AUTOMATION
AS HAVING FIVE
LEVELS**

LEVEL 0

No automation
Driver is in complete and sole control of brakes, steering, throttle, and motive power at all times.

LEVEL 1

Function-specific automation
Automation of one or more functions: electronic stability control or pre-charged brakes.

LEVEL 2

Combined function automation
Automation of at least two functions, for example adaptive cruise control and lane centering steering.

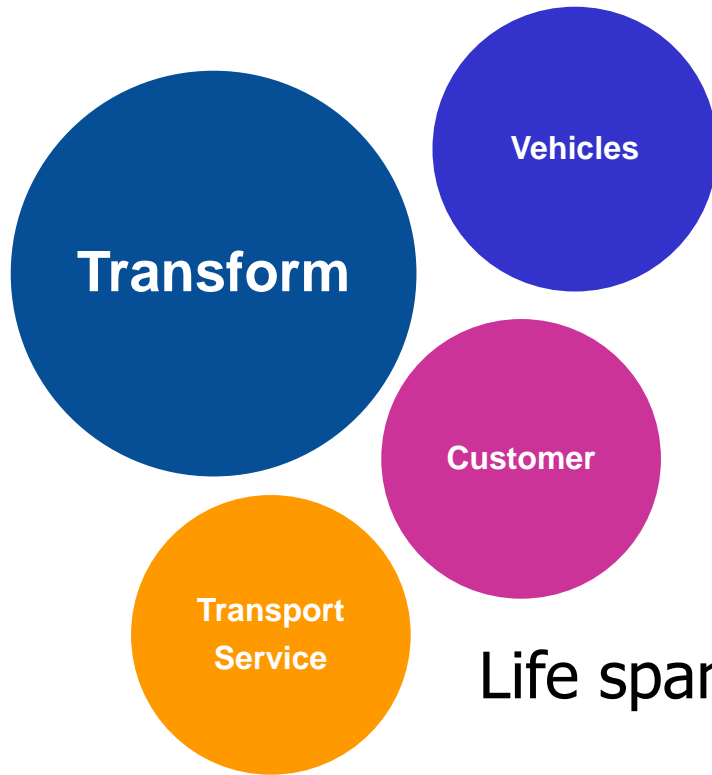
LEVEL 3

Limited self-driving automation
Automation that takes over all safety-critical functions under certain traffic conditions. Driver is available for occasional control.

LEVEL 4

Full self-driving automation
Vehicle can perform all safety-critical driving functions for an entire trip. Driver is not expected to be available for control any time during the trip.

Transformation of Transportation



Connect the dots

Plan for flexibility

Automated vehicles in 10-20 years

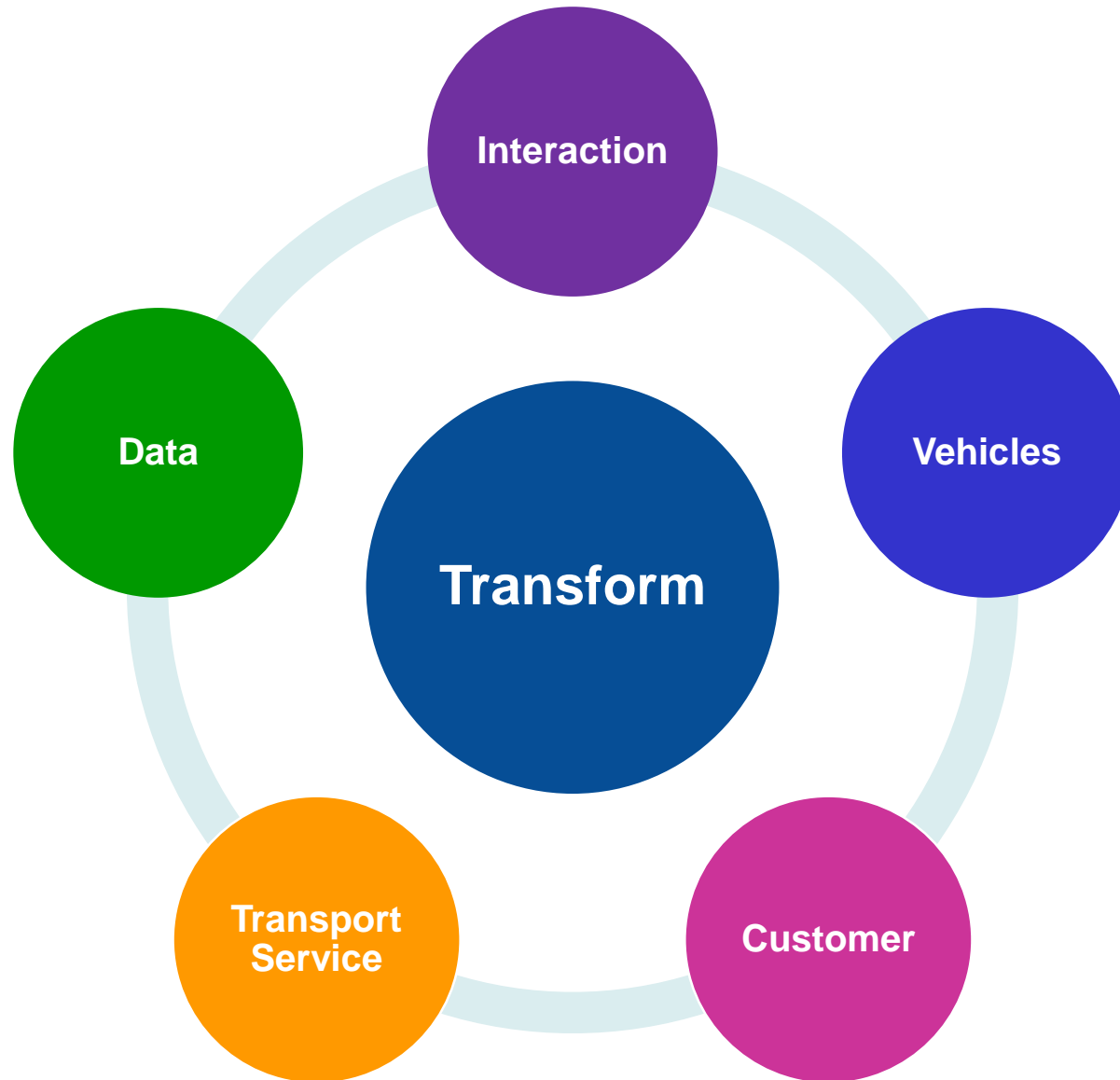
Connected vehicles in 20-30 years

Life span of new roadway or bridge 20-40 years

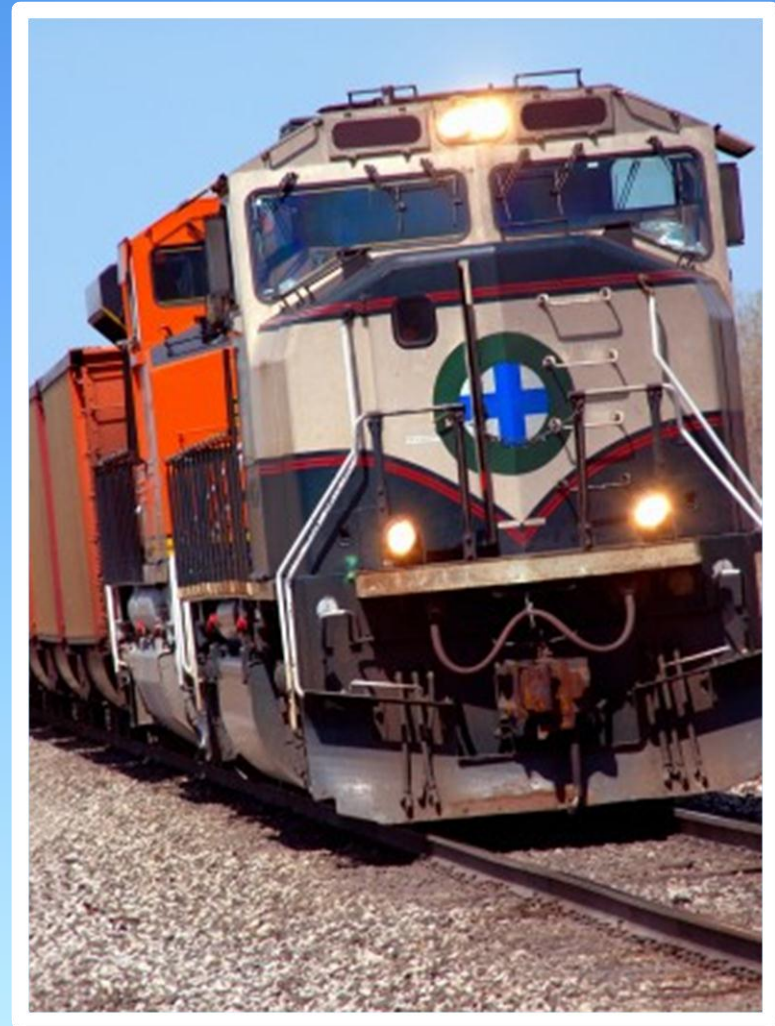
Build in **off ramps** in the planning and design process for large investments

Assess **options** for technology investments

Transformation of Transportation



Transformation of Transportation





The Future of Transportation

Prepare **now** for what
around the corner

Shelley Row Associates LLC

www.shelleyrow.com

@shelleyrow