The Future of Transportation:

Can You See Around the Corner?

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Transformation of Transportation

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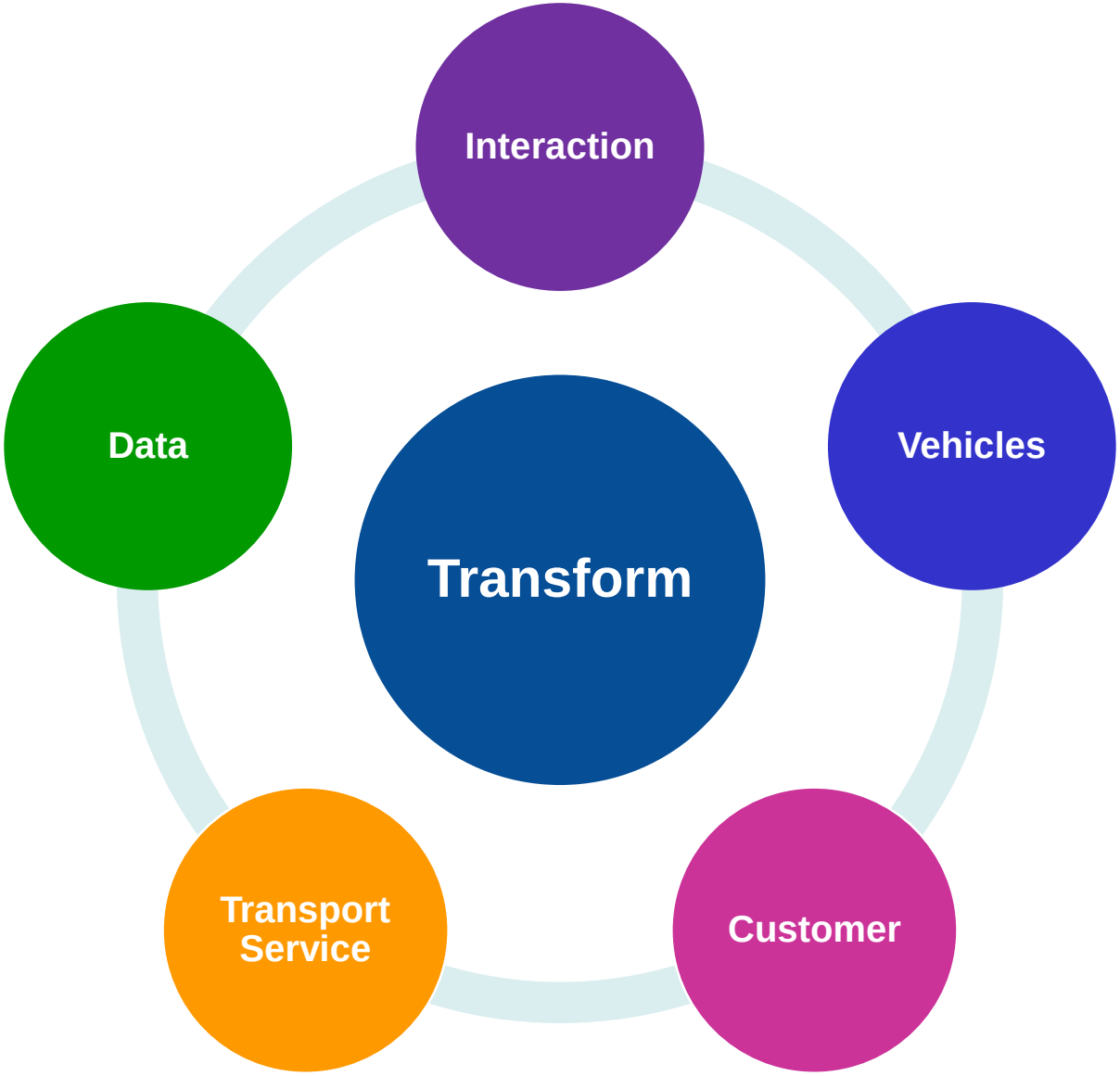


Customer

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

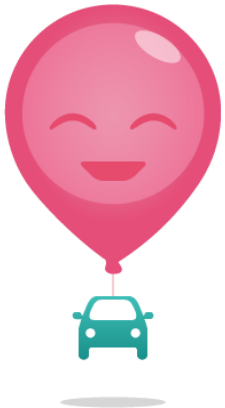
From driving to a service

"The **smartphone** is the carrier of multimodality."

Magnus Kuschel

UBER

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



Transport Service

Transport Service

From driving to a service

UbiGo

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

Interaction

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

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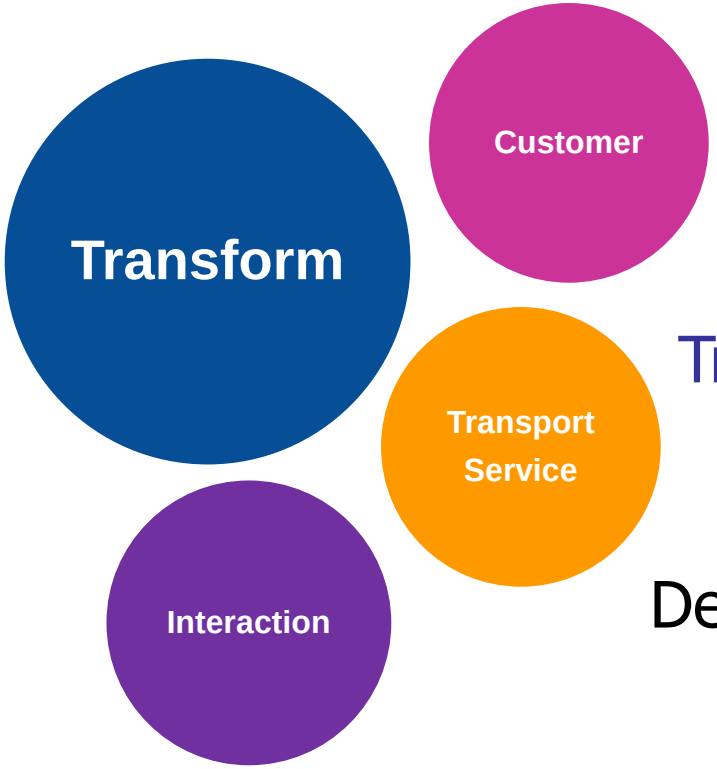


Connect the dots

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

20 households generate more internet traffic as the entire internet in 2008

Big data analytics market is expected to grow to

$17.1 billion by 2017*

*Marketsandmarkets.com 2013 report

Data

Data

Data to Information

Crowd-sourced information

Fun
Social

Meteor Counter

Waze

MOOVIT

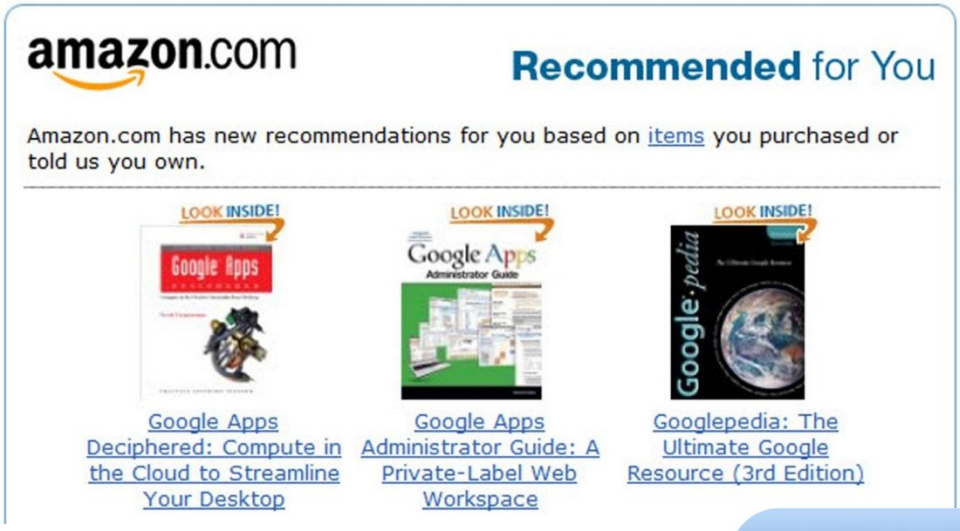
SmileDrive

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

Vehicles

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

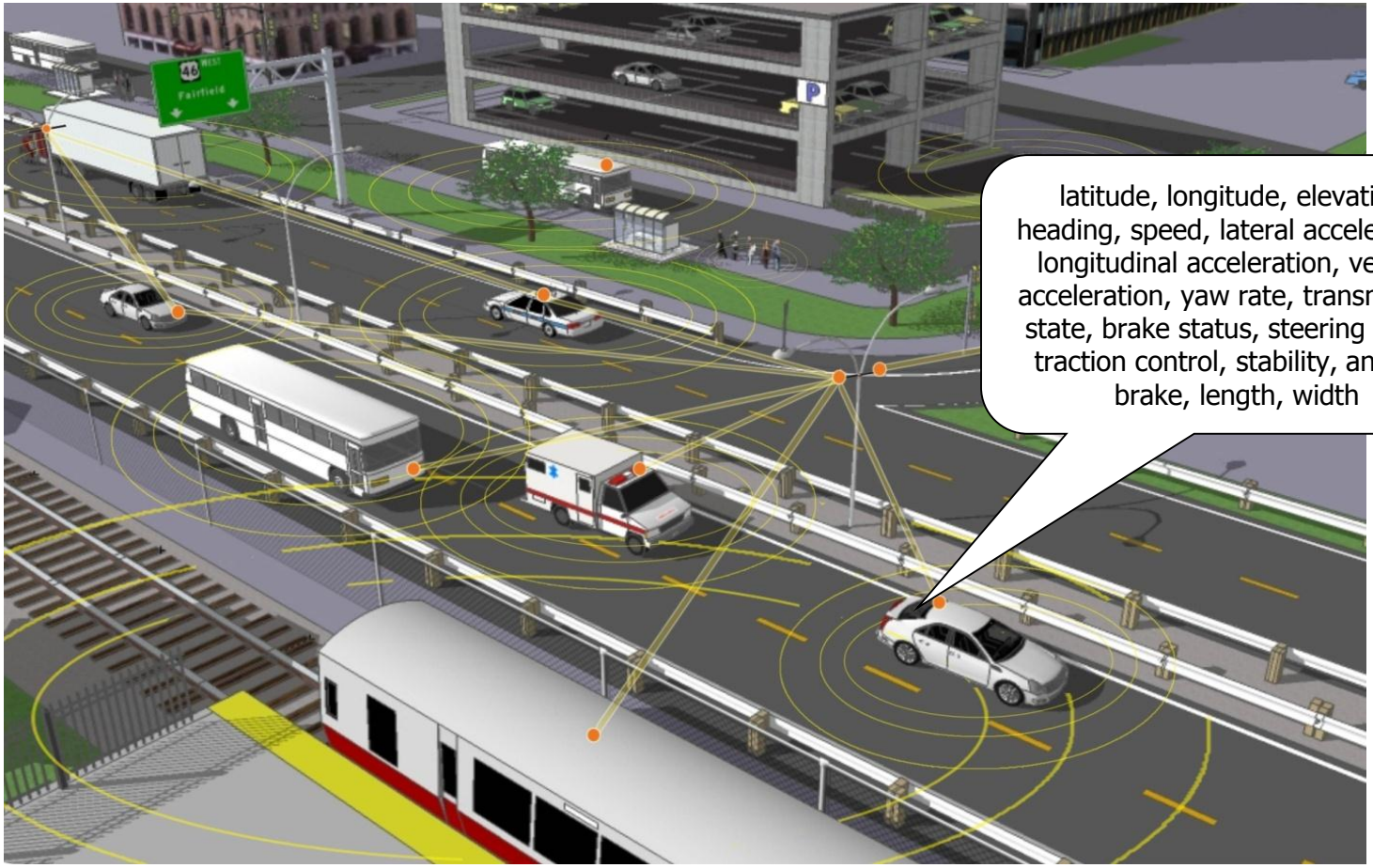
*Computerworld, 2015

Vehicles

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

Vehicles

Horsepower to Processing Power

DSRC Myths

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

Vehicles

Vehicles

Horsepower to Processing Power

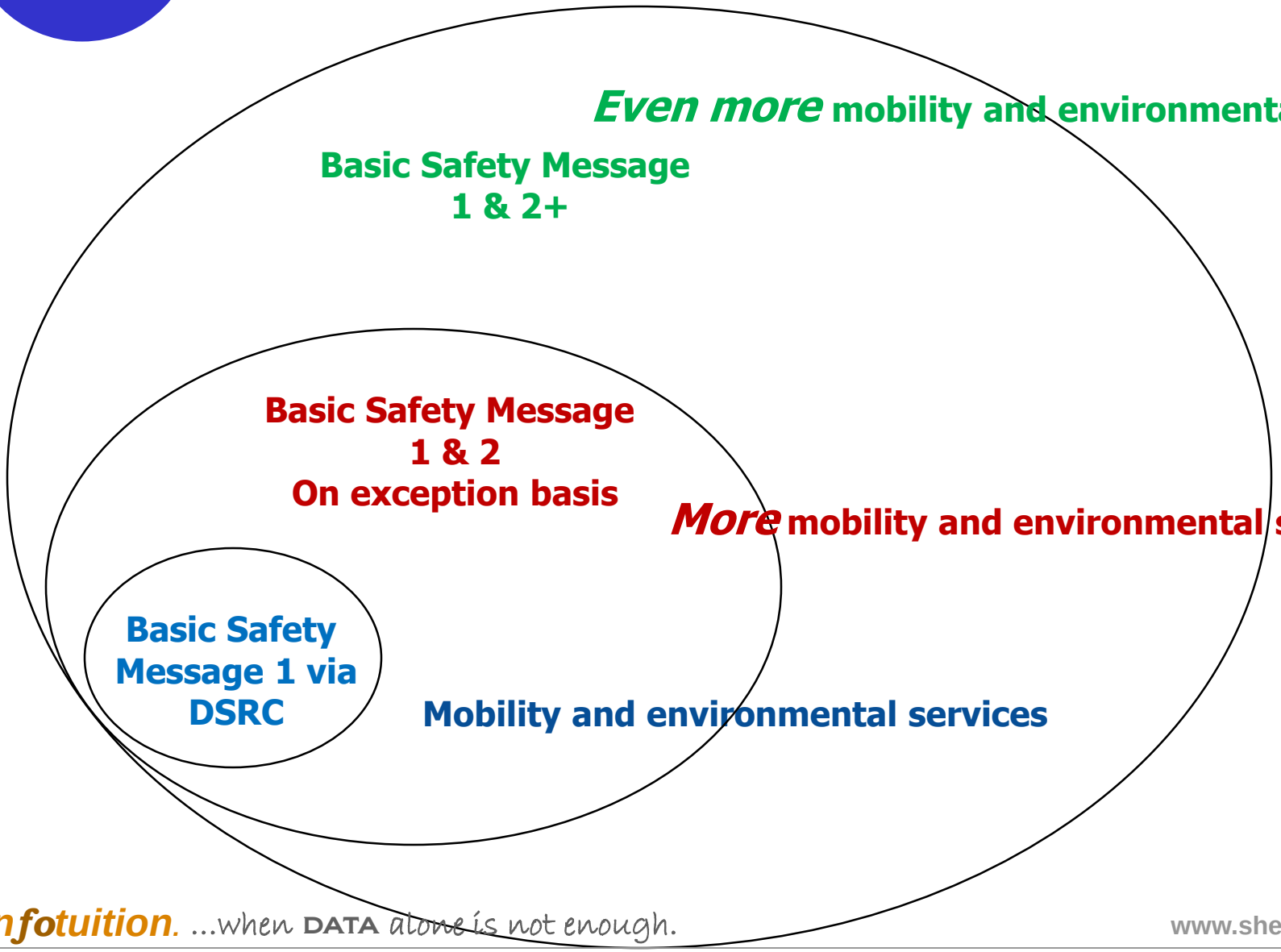
Start Now! – It's all about the data

- 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

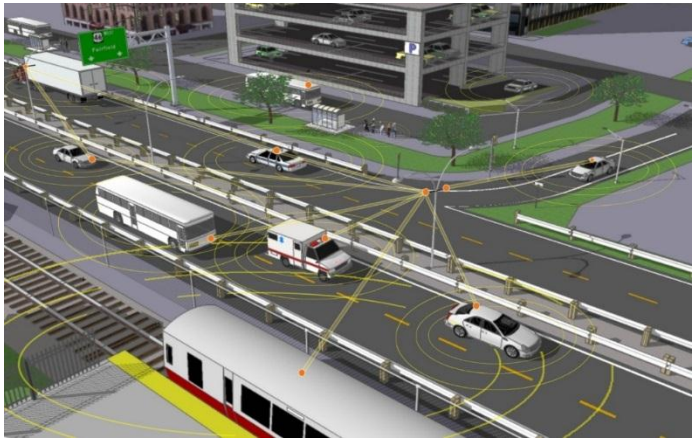
Connected Vehicles

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



Vehicles

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

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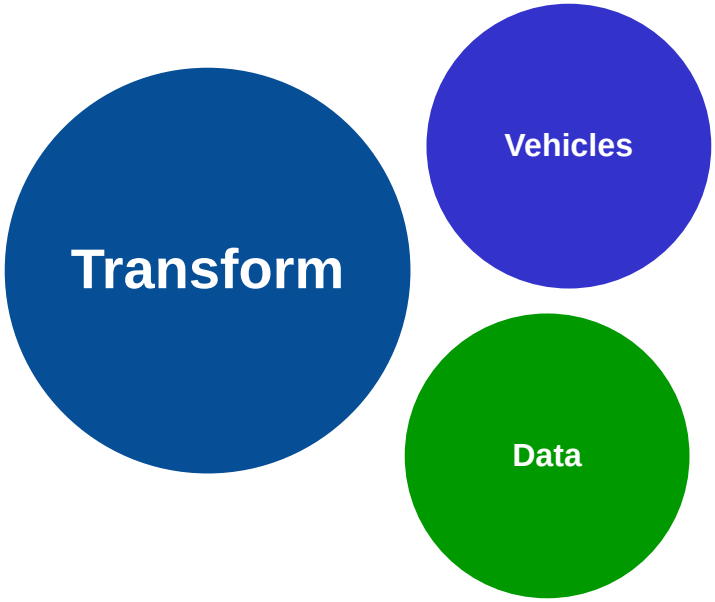


Connect the dots

Plan for connected vehicles now

Share your data

Analyze **data** and data needs

Study if **DSRC data** meets your needs

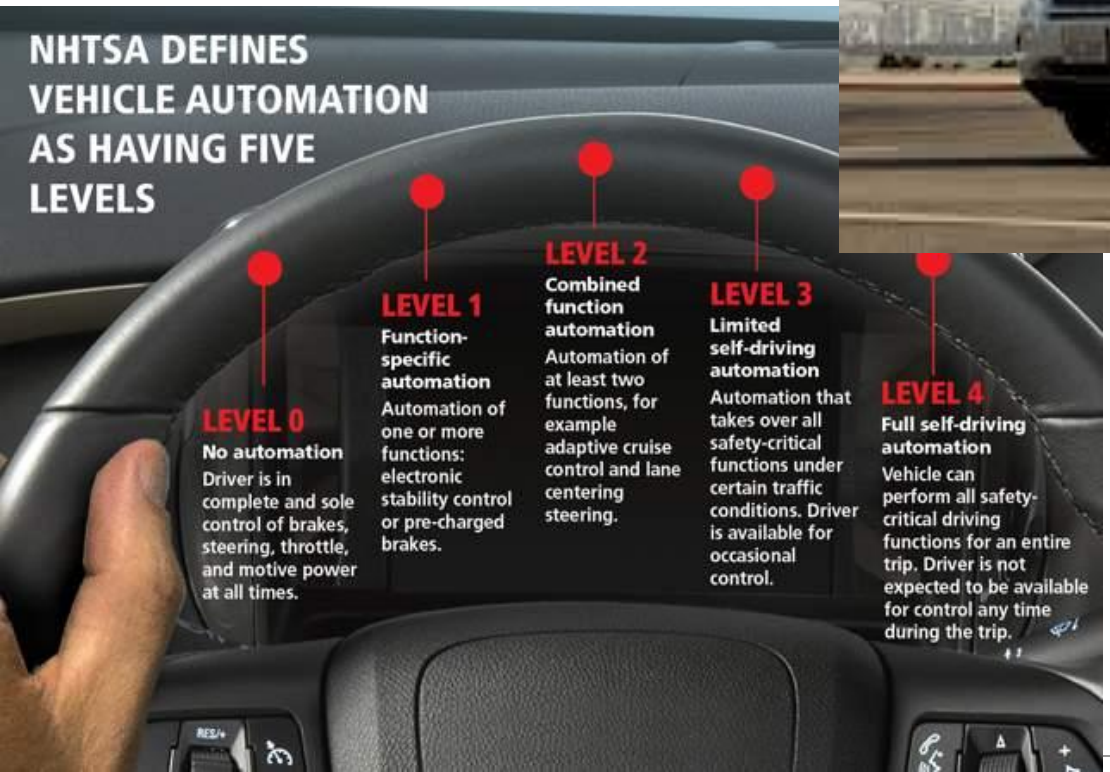
Study possible DSRC **implementations**

Vehicles

Vehicles

Horsepower to Processing Power

Automated Vehicles



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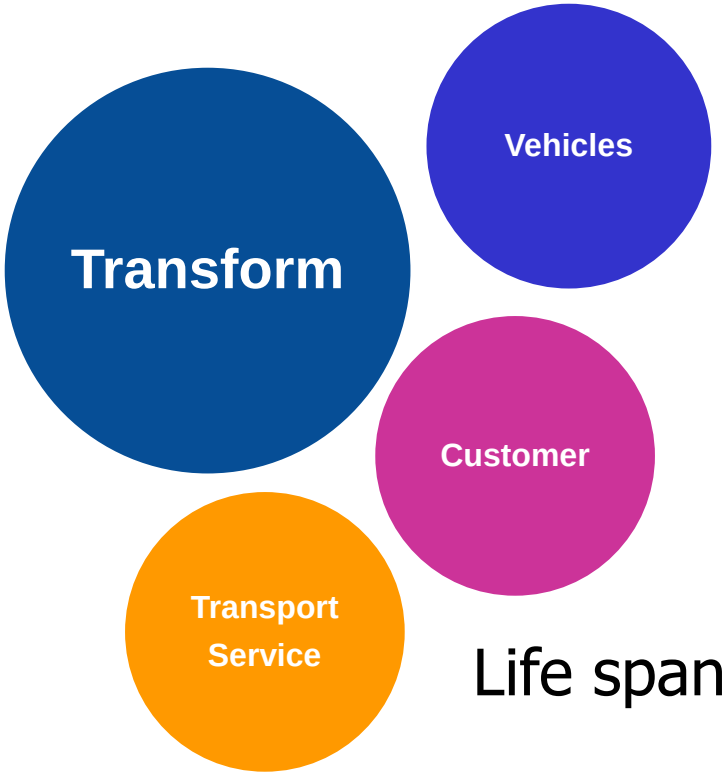

Connect the dots

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

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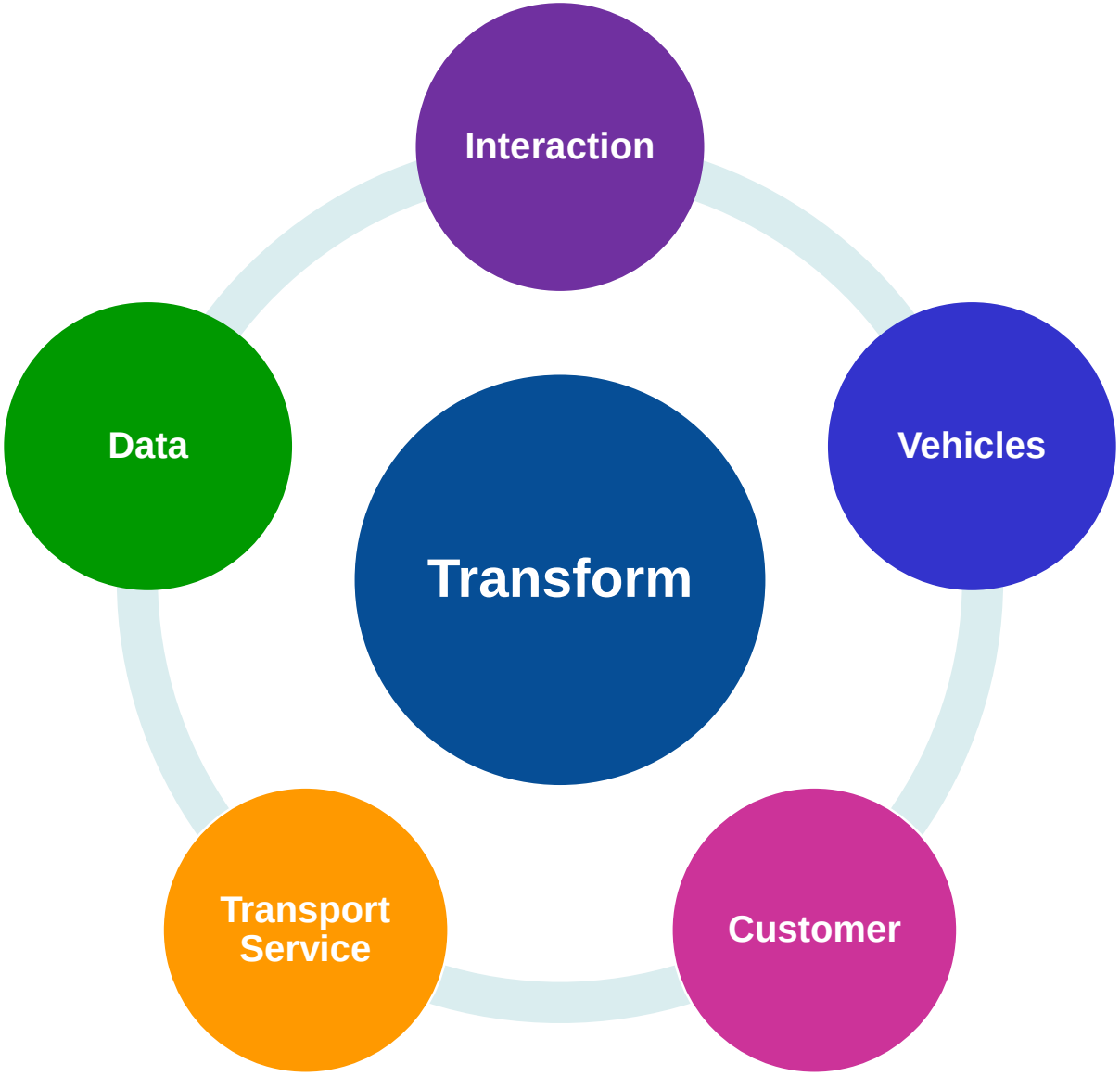

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Prepare now for what' around the corner

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