July, 2017

The Road to Optimization

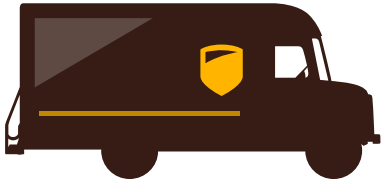
Jack Levis – Senior Director, Engineering

@jacklevis

WE ♡ LOGISTICS®

Basic Facts

Basic Facts



1 mile is worth $50M*

1 minute is worth $14.6M*

1 minute of idle time is worth $515K**

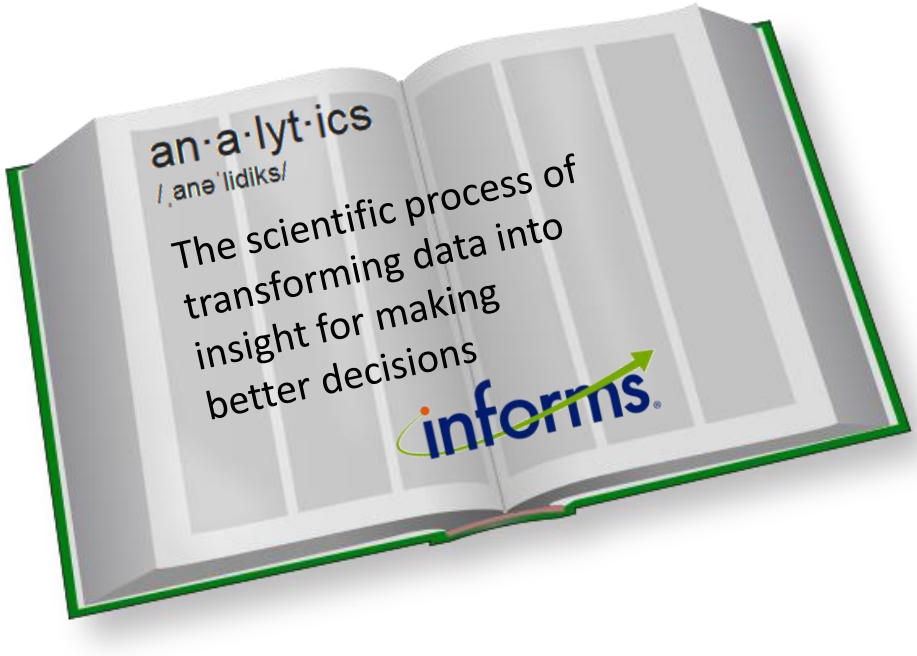
Big savings come from attention to detail

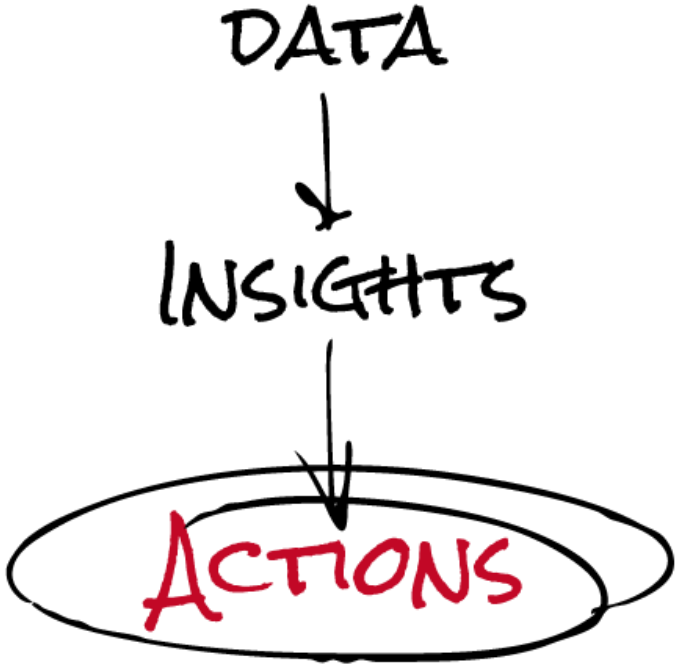
Note: Figures are per driver per day across the US for a year
* Small Package P/U and Delivery drivers
** Small Package P/U and Delivery, Freight and Tractor / Trailer drivers

AND

Operations Technology and Analytics has been key in turning OR → AND

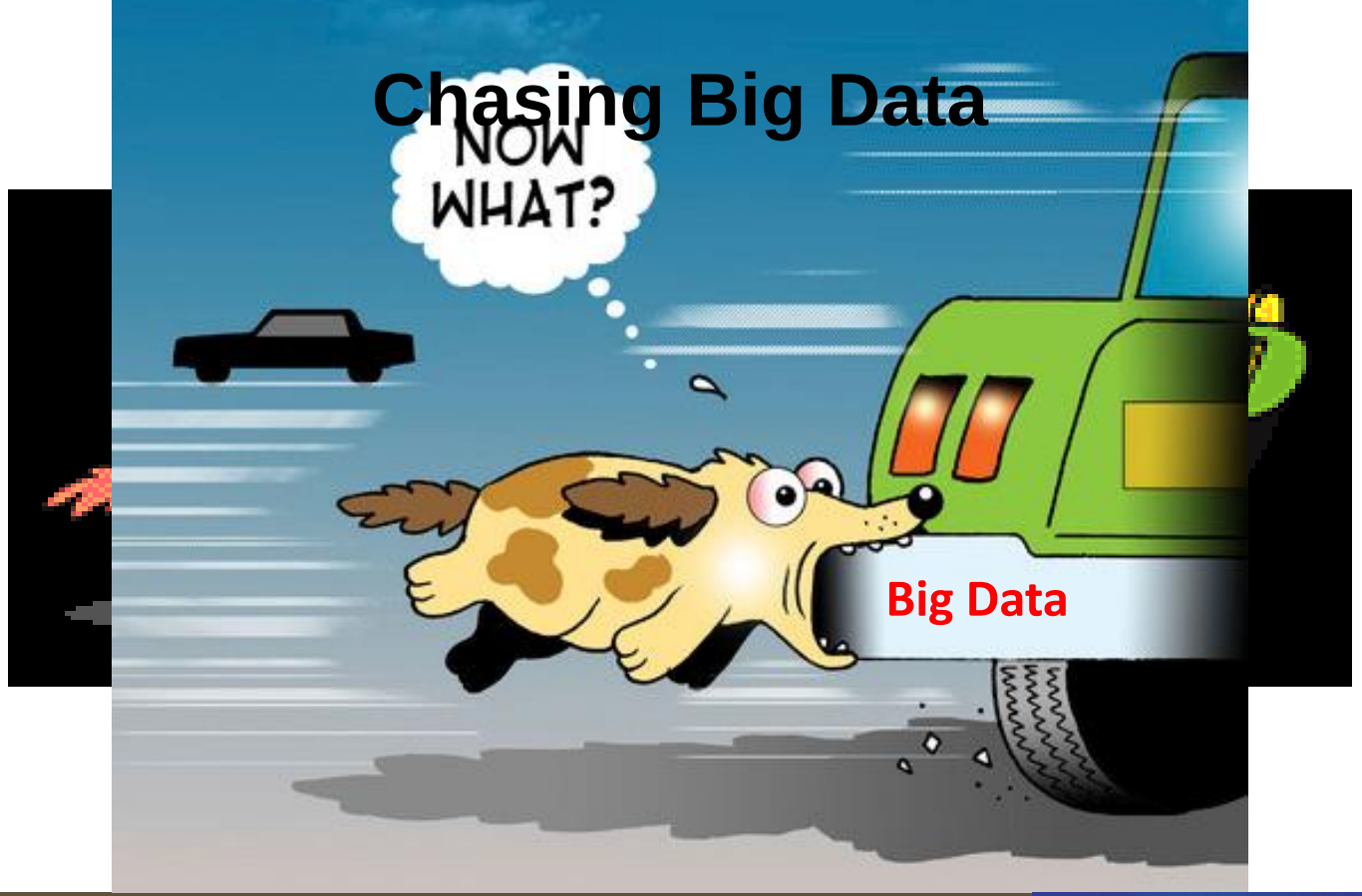
Analytics



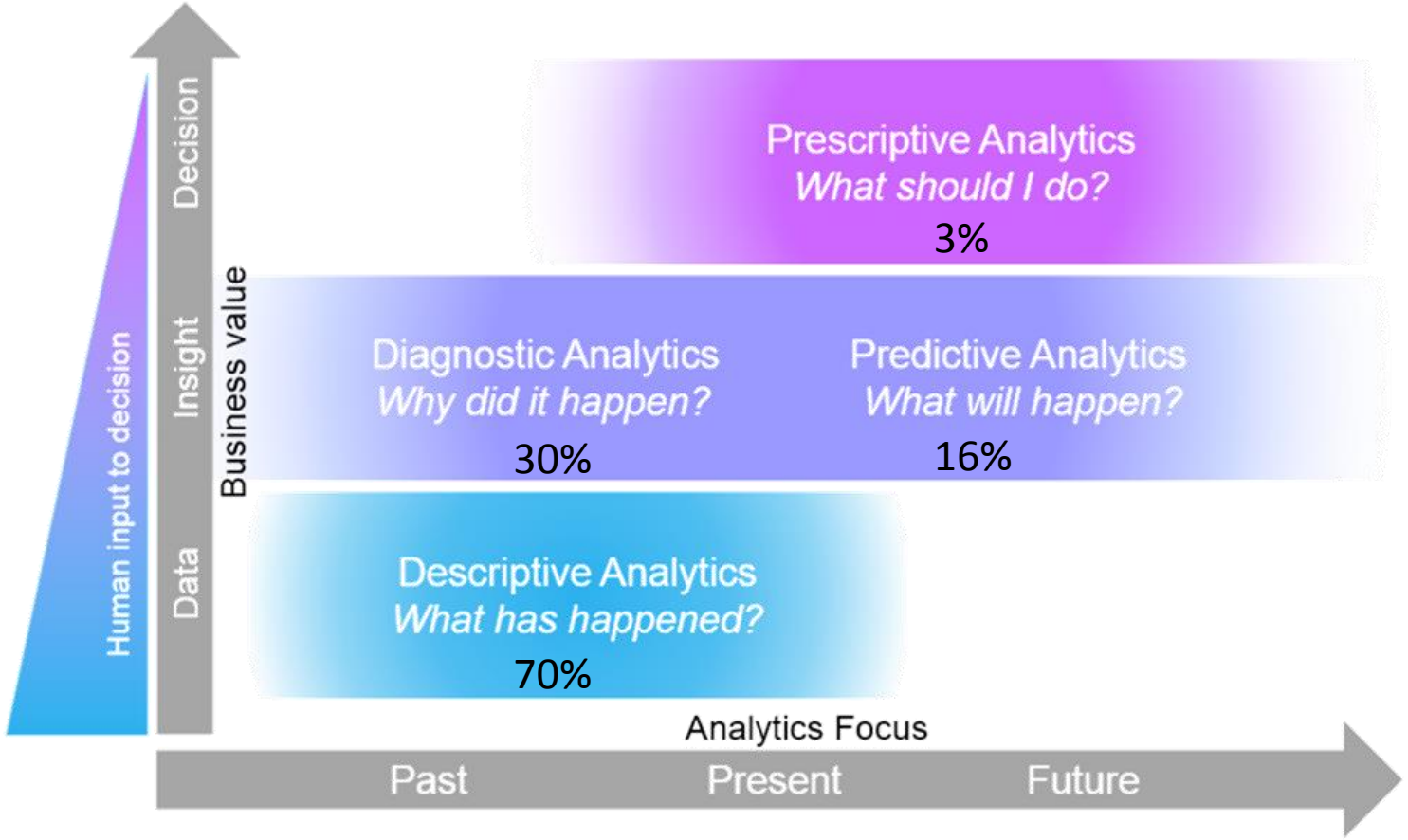


Insight that doesn't lead to a better decision is Trivia

Chasing Big Data

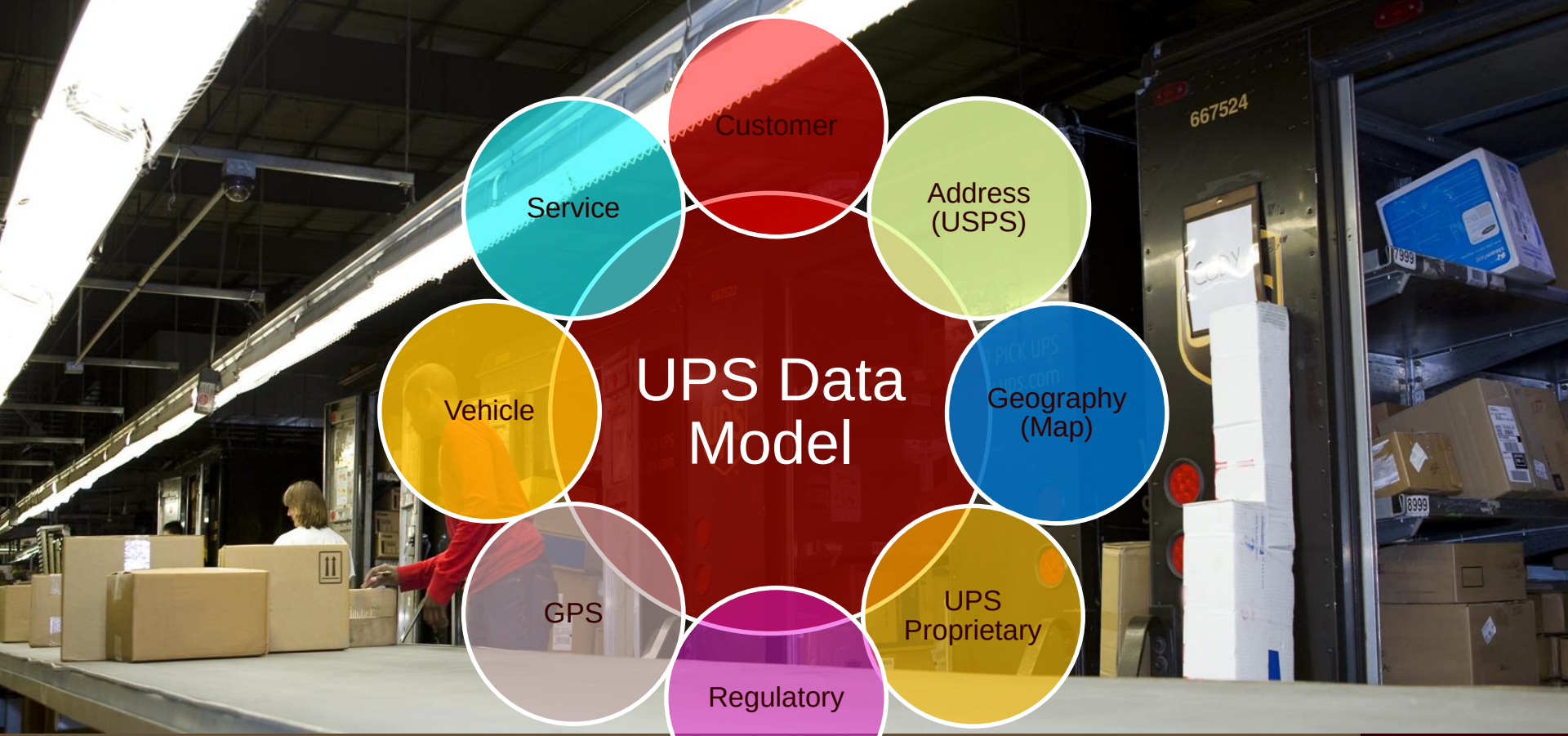


Big Data is a how… not a what…

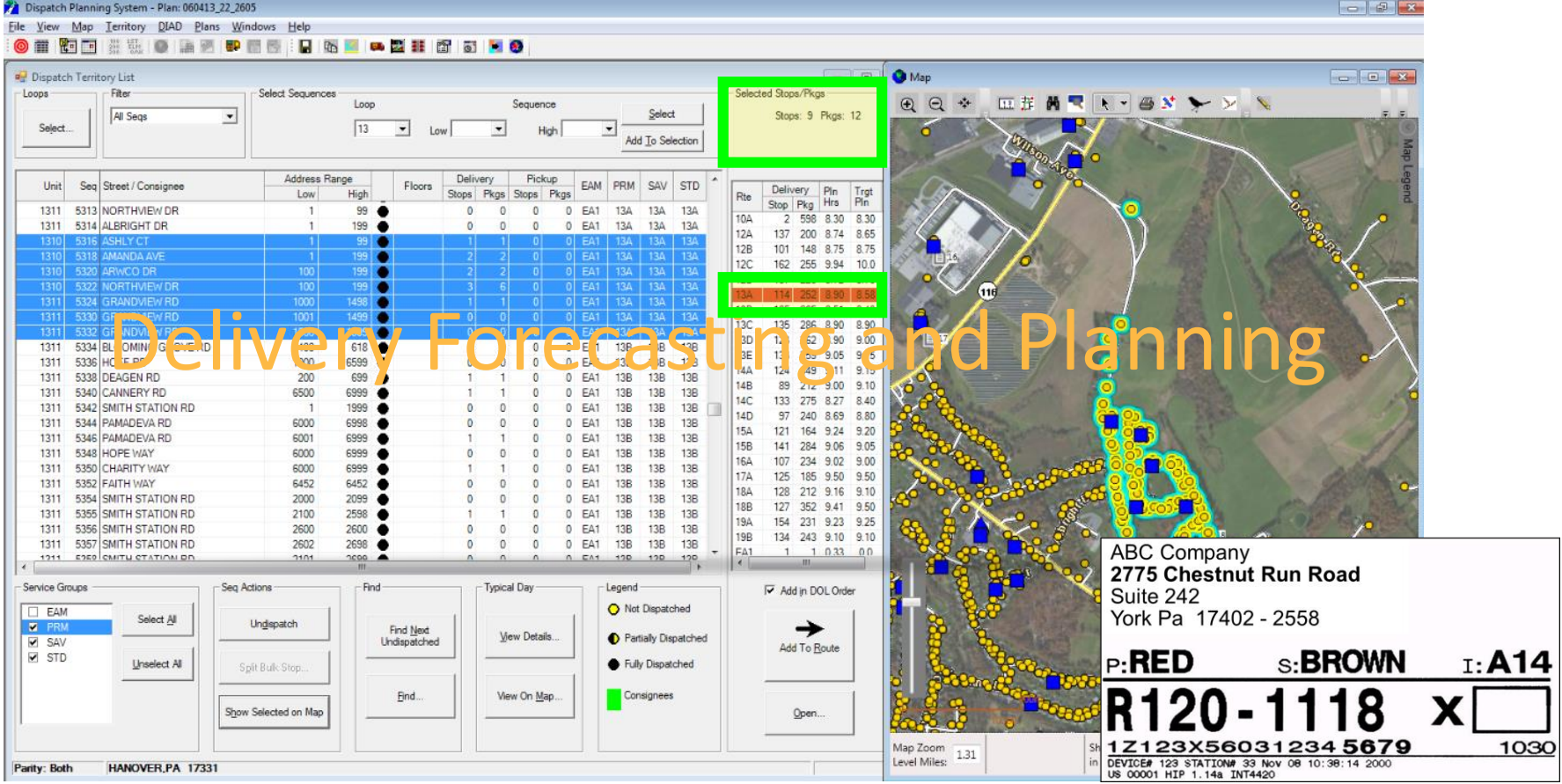


Research shows a hierarchy of impact through the use of analytics

Predictive Analytics

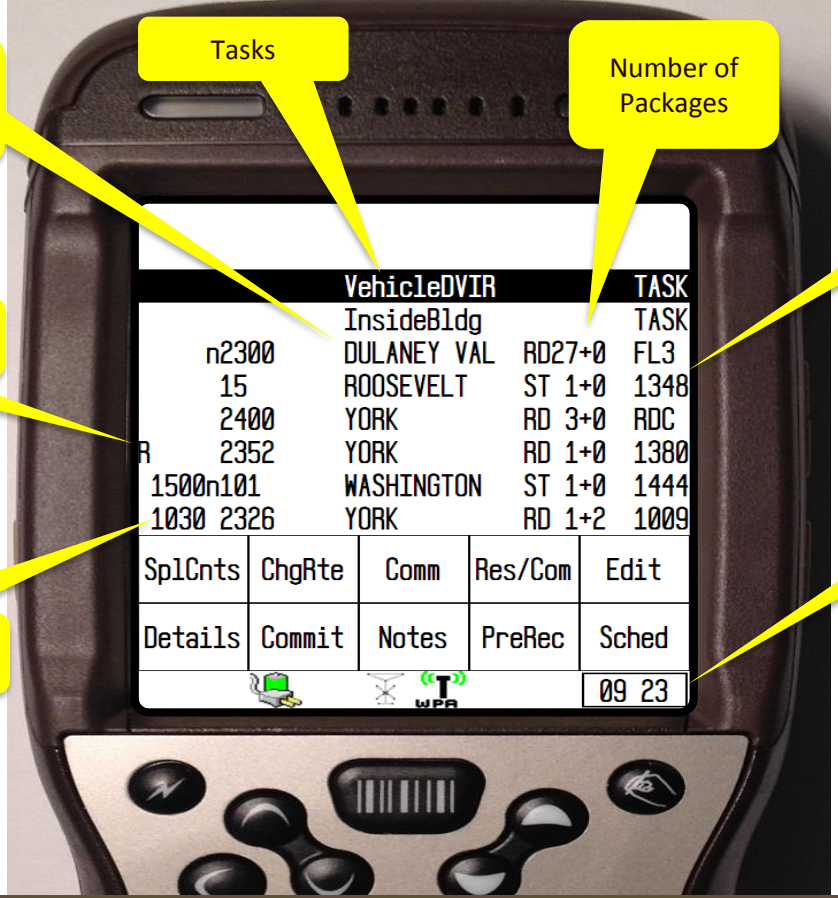


Virtual Network that describes UPS

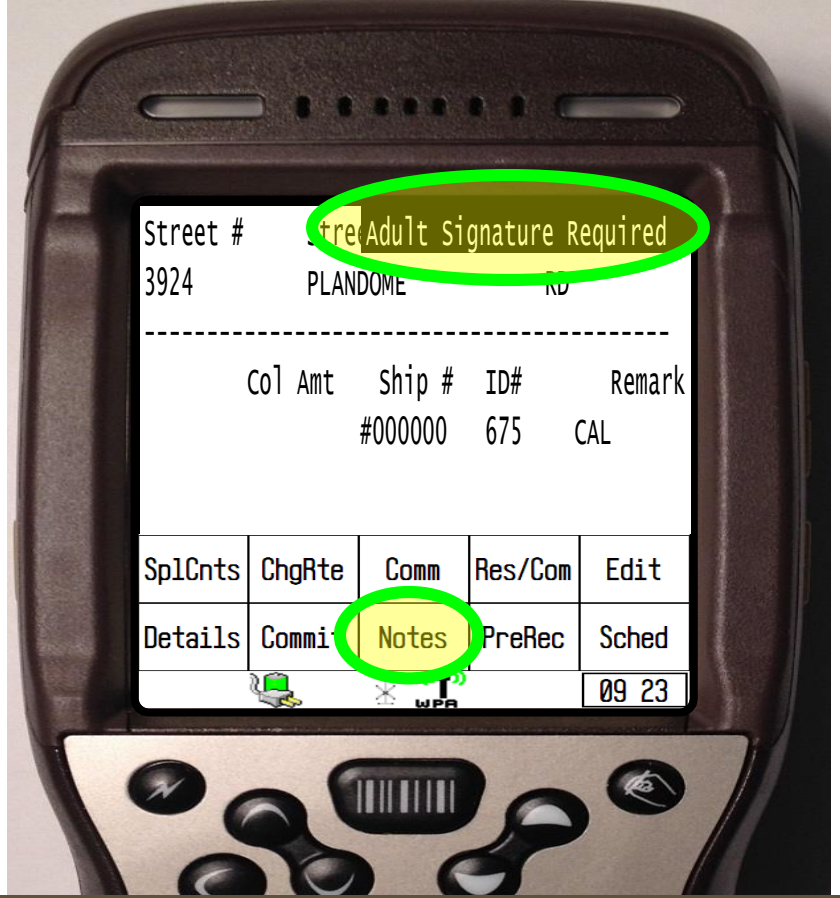


Delivery Forecasting and Planning

Each package planned on the right vehicle for the right day



Changing the DIAD from an Acquisition device to a driver Assistant for making better decisions



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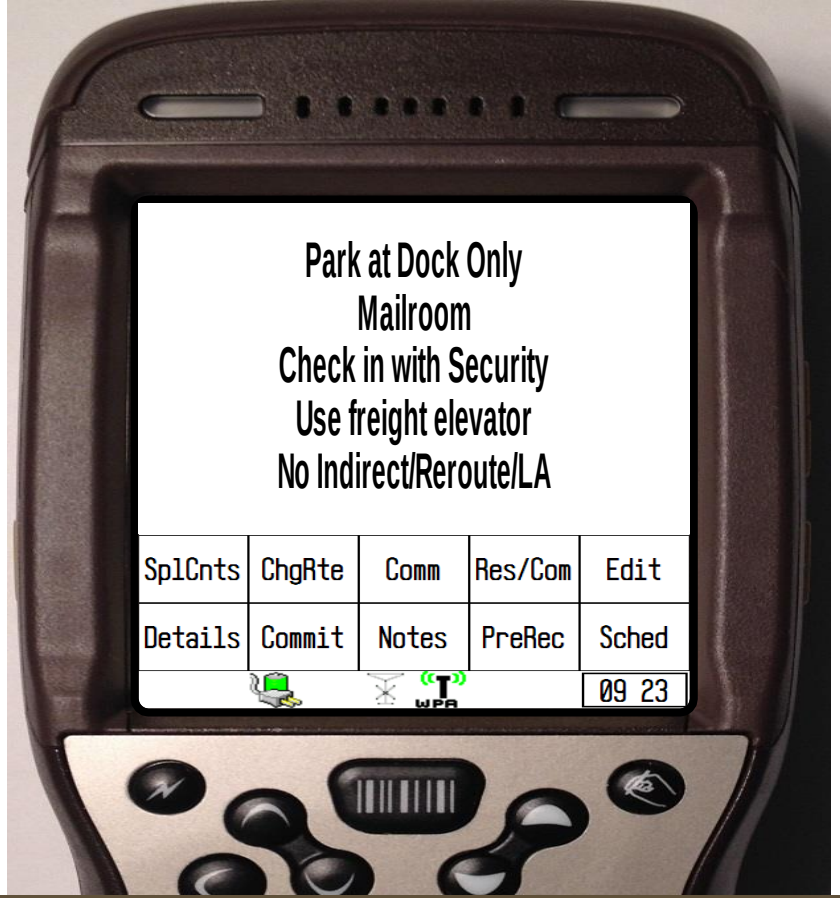

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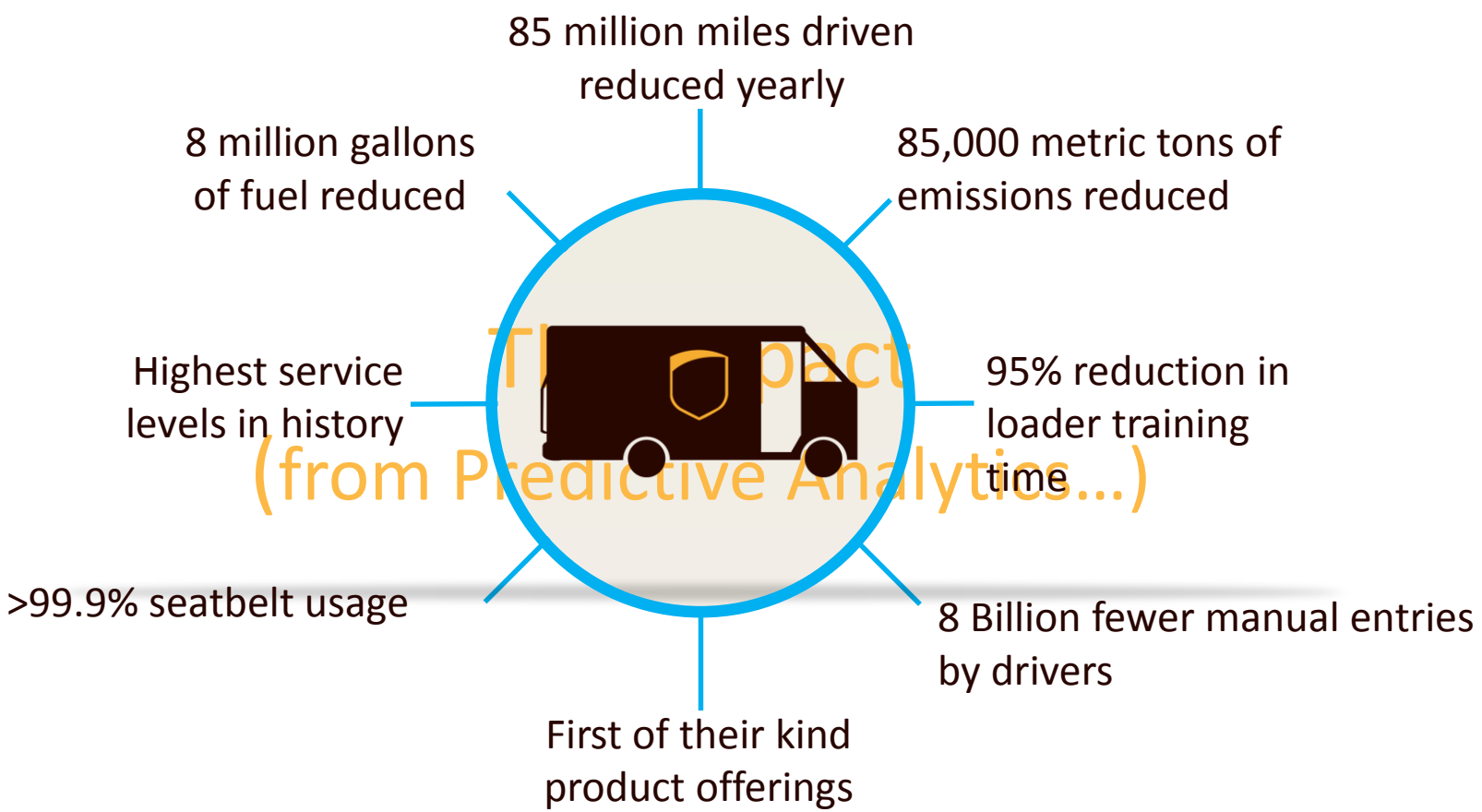


Real world results

E + I < E

OR AND

ABC Company
2775 Chestnut Run Road
Suite 242
York Pa 17402 - 2558

P:**RED** S:**BROWN** I:**A14**

R120-1118 X

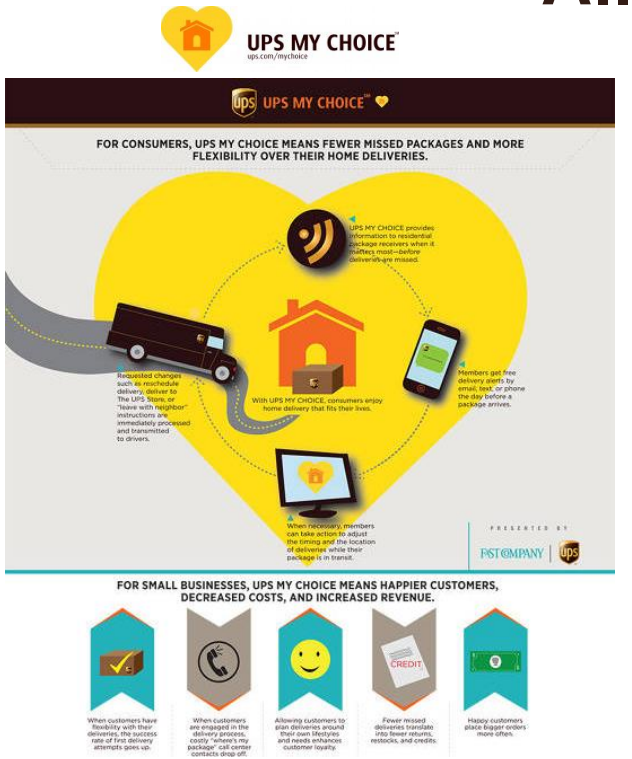
1Z123X56031 **5679** 1030

DEVICE# 123 STATION# 33 Nov 08 10:38:14 2000
US 00001 HIP 1.14a INT4420

Each scan provides a customer connection

OR AND

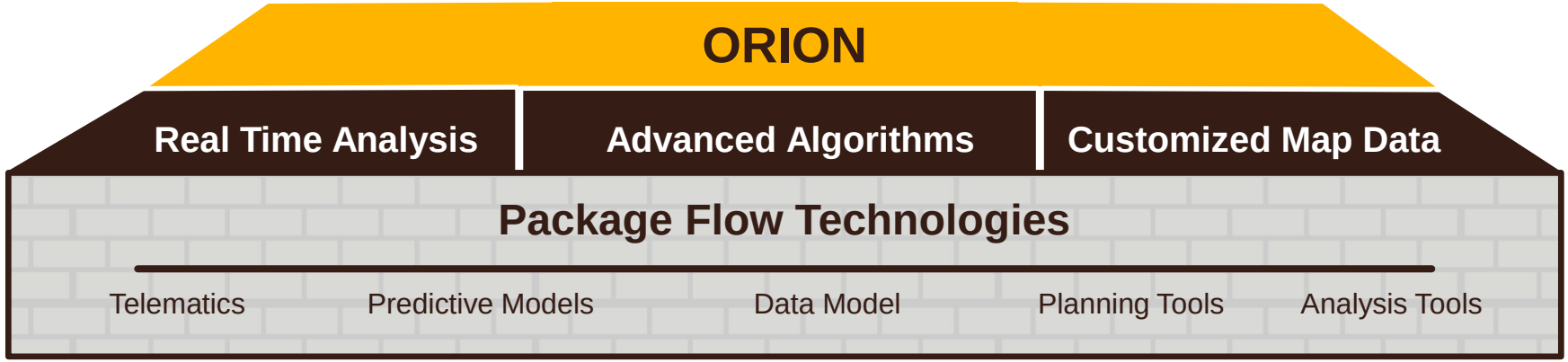
Virtual and Physical Network Linkage Allows New Products



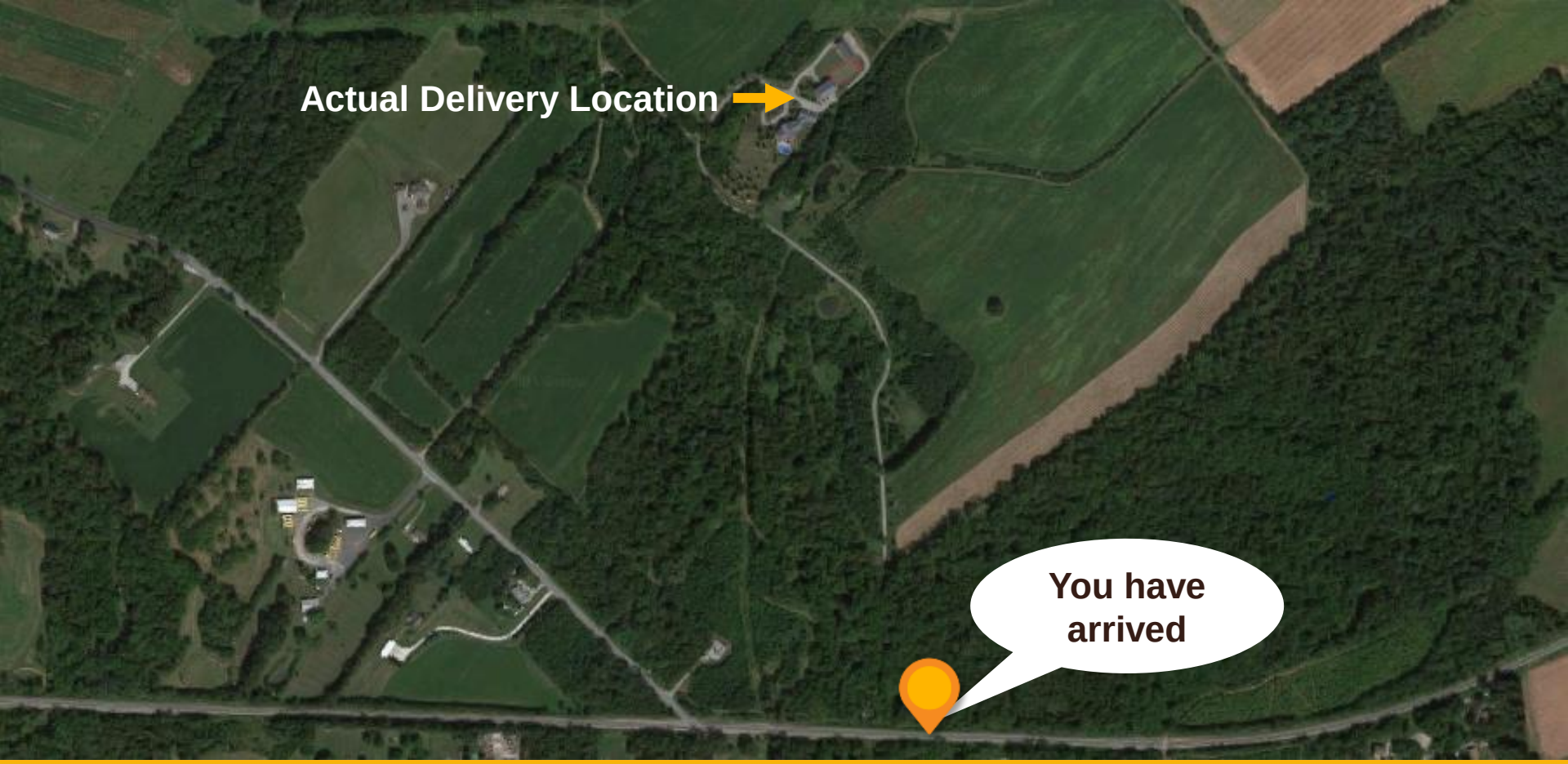
- Delivery Alerts
- Delivery Planner
- Reschedule Delivery
- Hold for Will Call
- Authorize Shipment Release
- "Leave at" Instructions *(Driver Instructions)*
- Leave with Neighbor
- Deliver to a UPS Store®
- Deliver to Another Address
- Approx. delivery time
- Confirmed Delivery Window *(2-hour)*

Prescriptive Analytics
ORION

ORION builds upon UPS's rich technology foundation

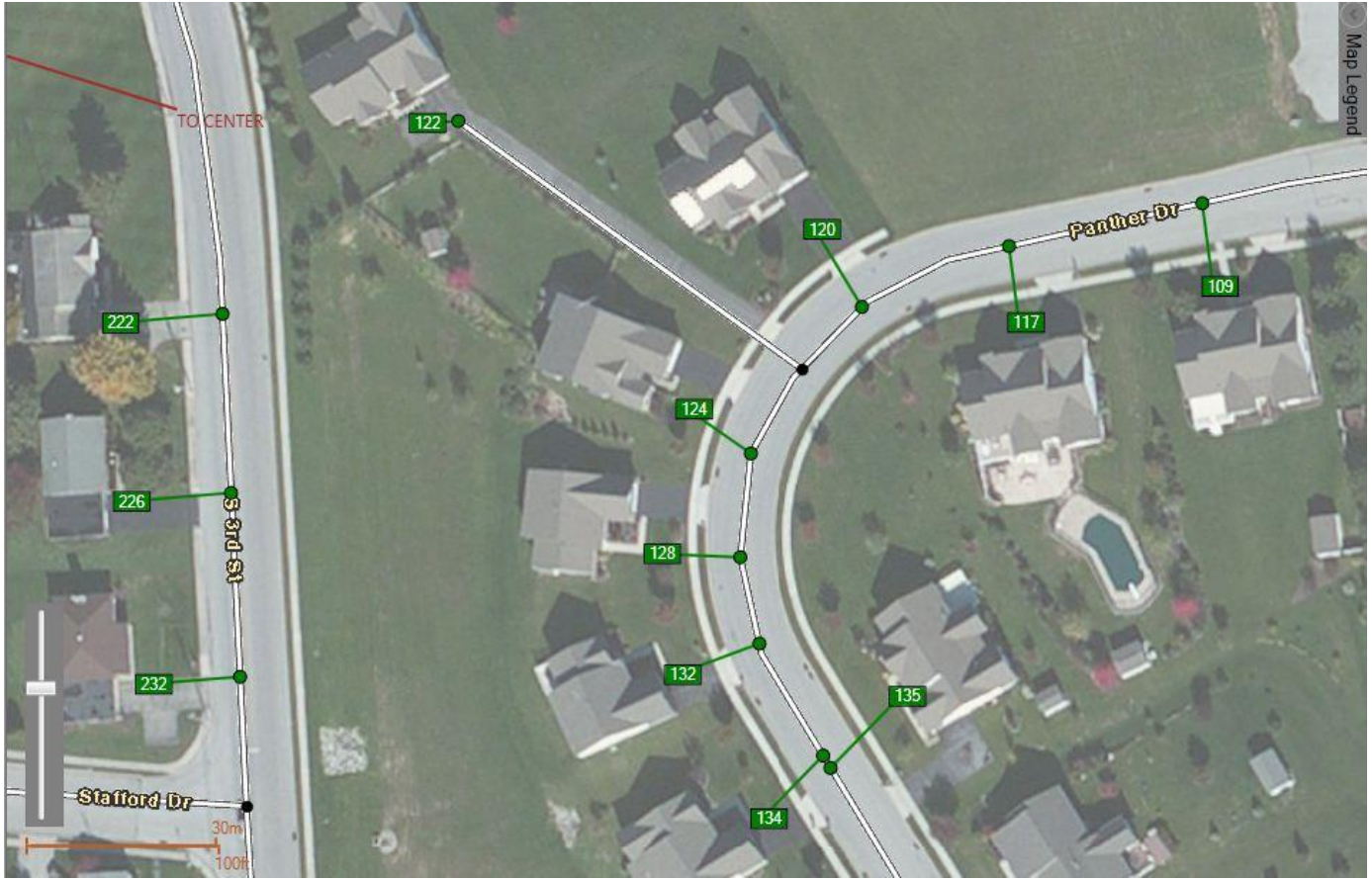


Map Information
is a Corporate Asset



1.2 mile round trip difference

Proprietary Geographic Algorithm



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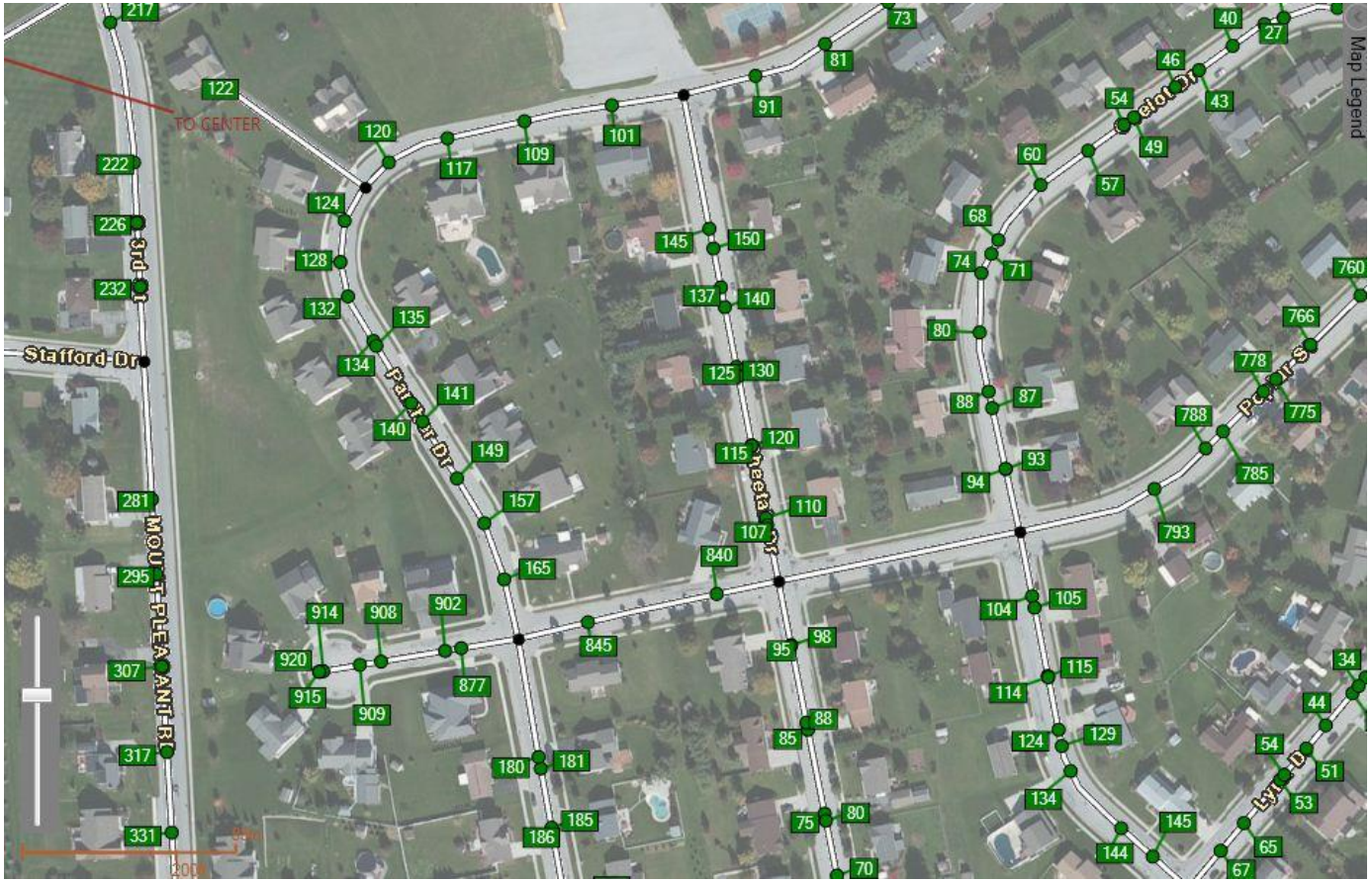

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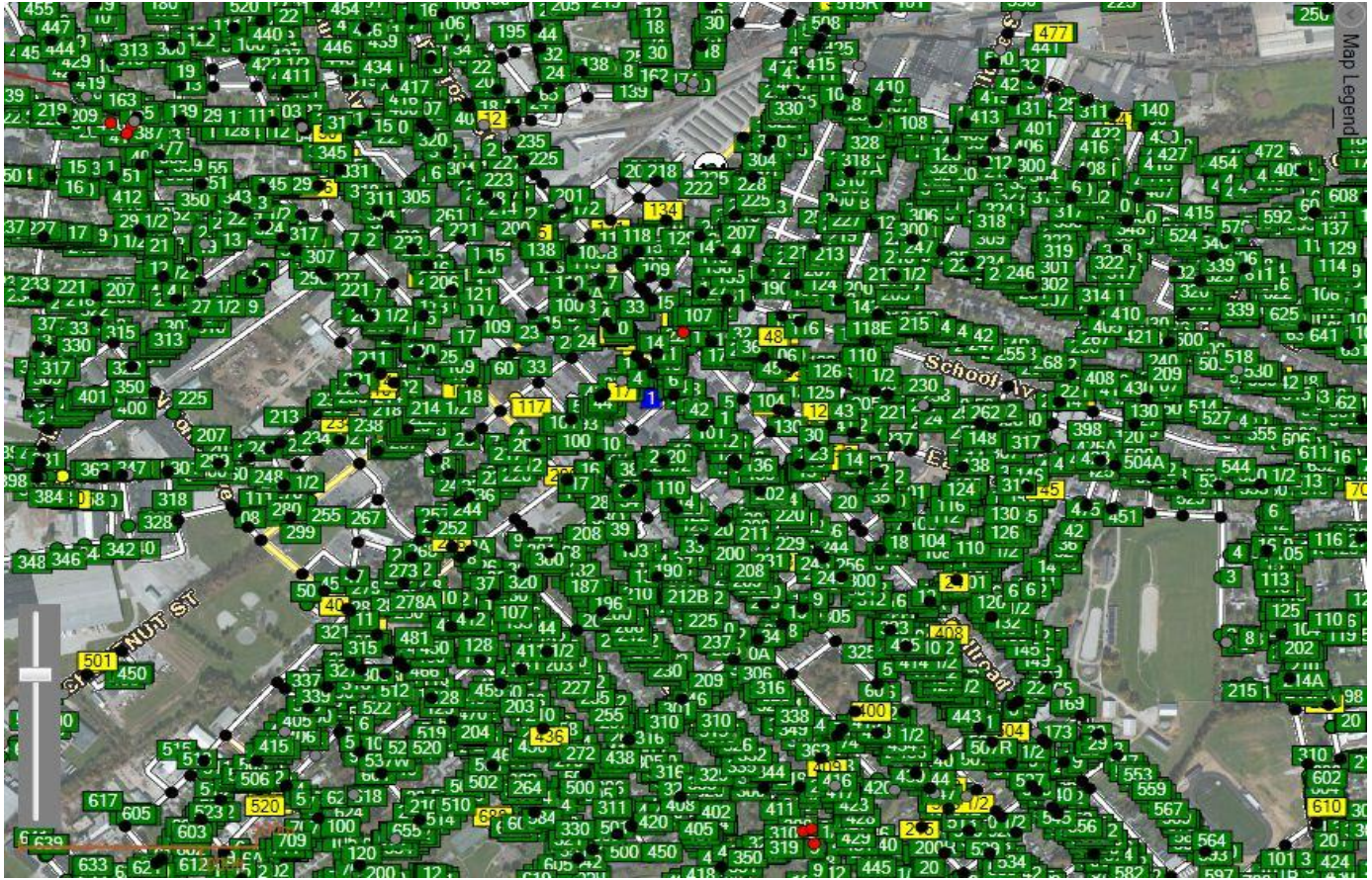
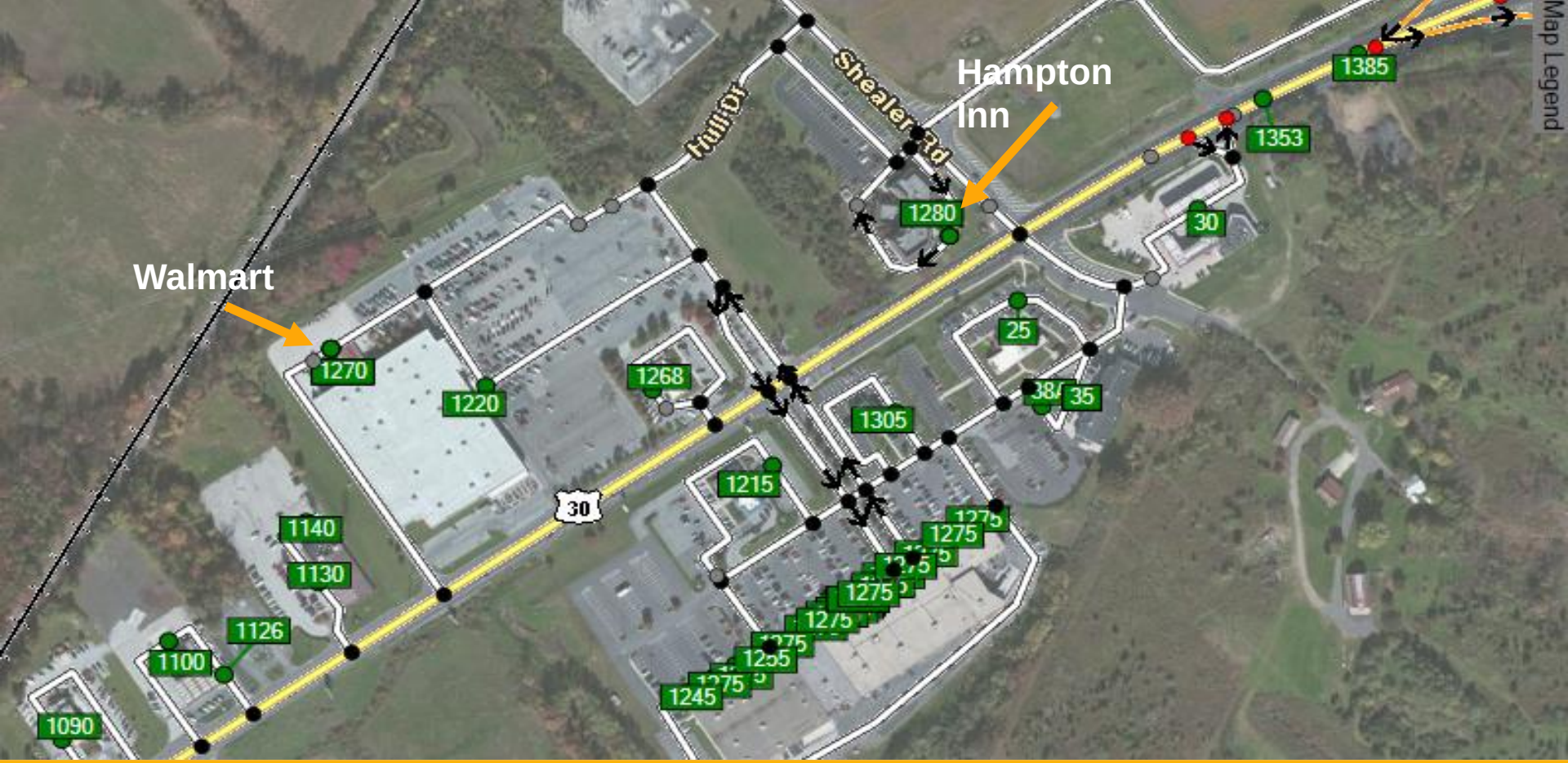


250 Million Global Data Points

Map data greatly impacts optimizations

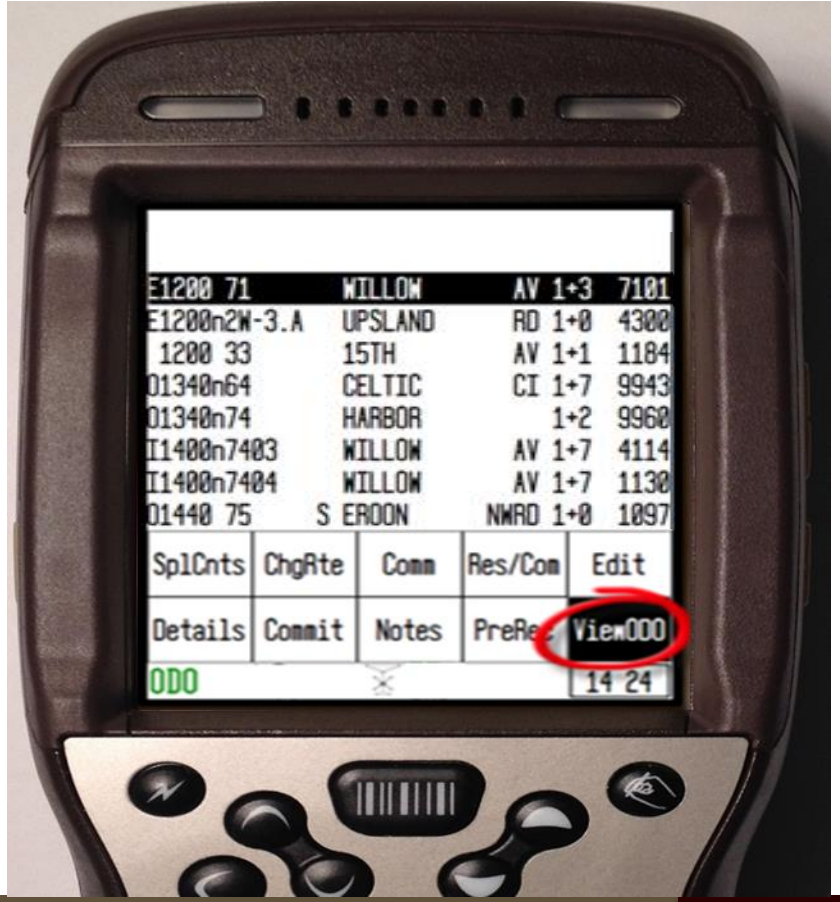
Map data greatly impacts optimizations



Map data greatly impacts optimizations

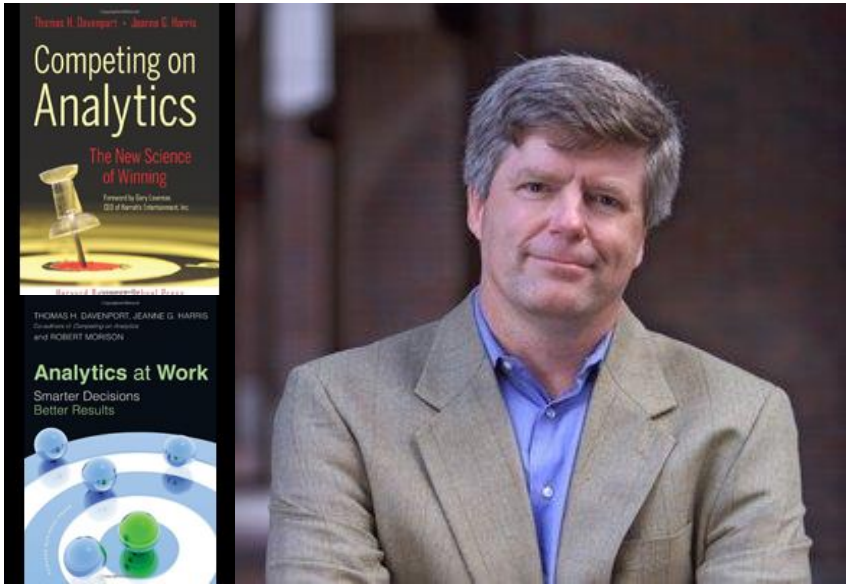
Map data greatly impacts optimizations

- 30 seconds from map edit to a driver's hands
- ORION optimizes delivery / pickup order accounting for:
  - Service commitments
  - Individual customer needs
  - Business rules
- Implementable cost based decisions balances all rules and constraints



ORION "sorts the list" from a General order to a Specific order for the day's specific conditions

ORION



"This initiative, called ORION
(On-Road Integrated Optimization and Navigation)
is arguably the world's largest operations research project."

Thomas H. Davenport
Big Data in Big Companies

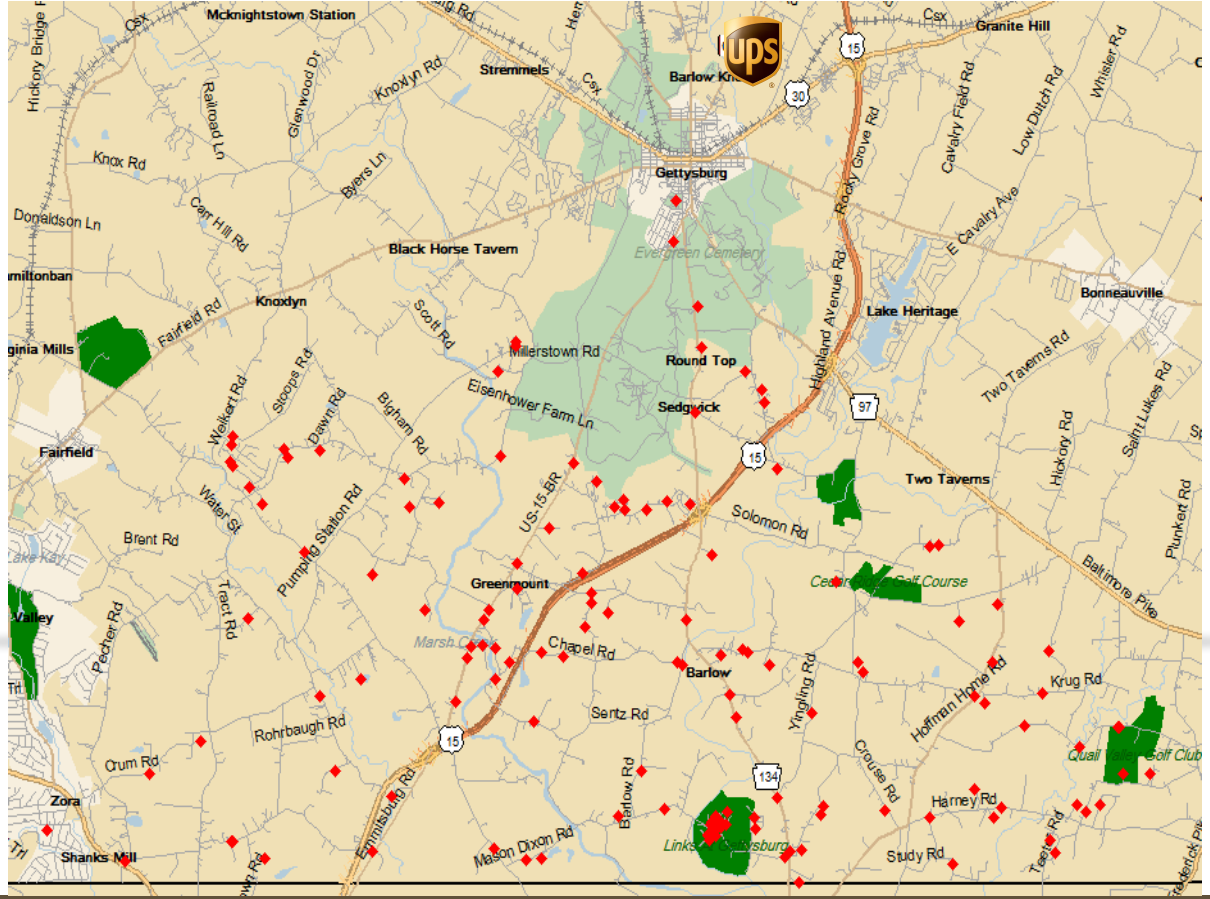
Recognized Technology Innovation

Approximate age of the Earth (in Seconds):

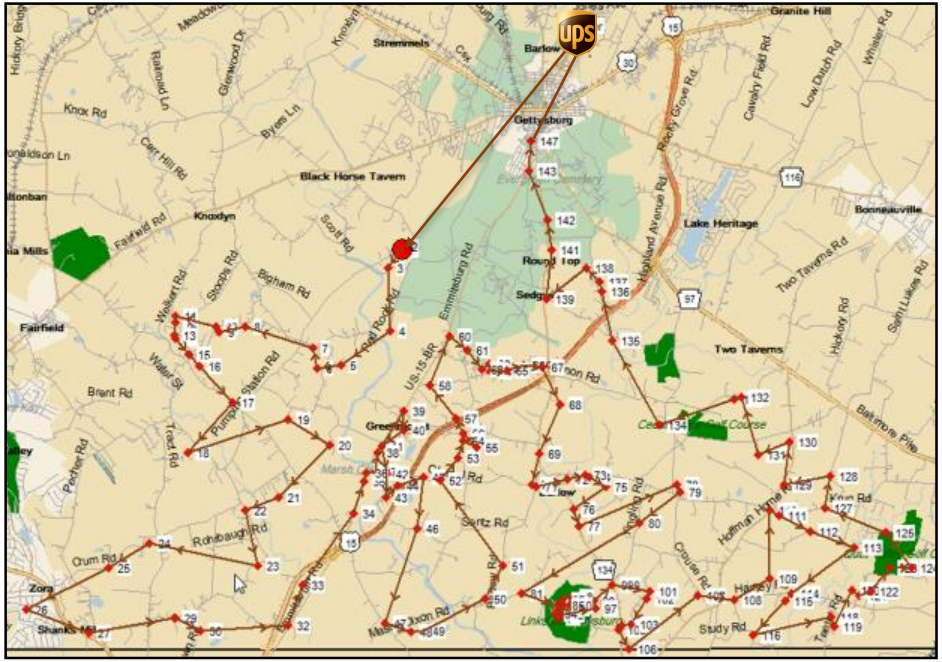
145,065,600,000,000,000

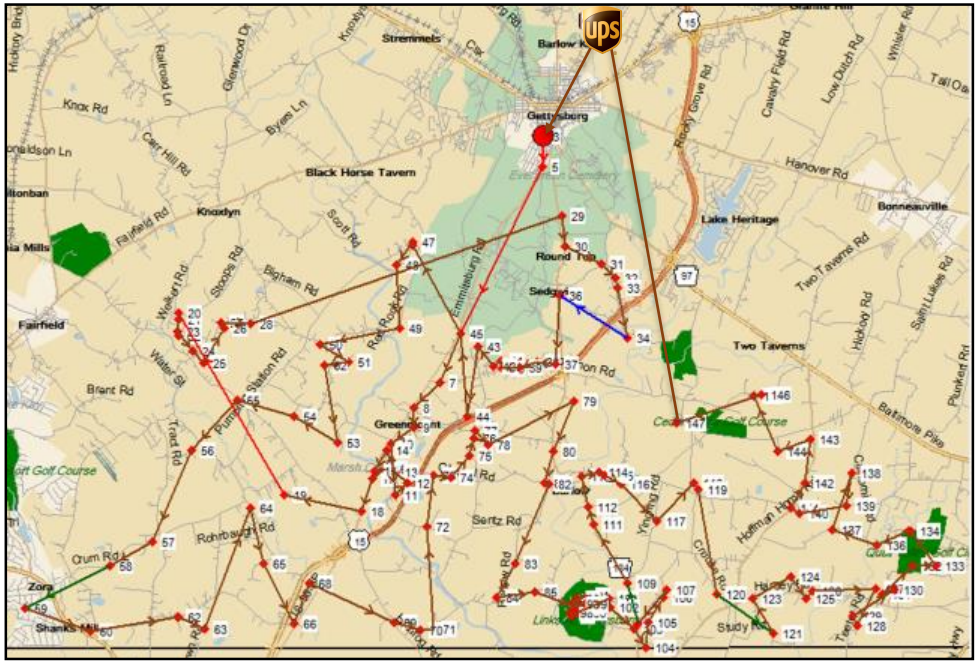
Number of ways to deliver 120 stops:

6,689,502,913,449,135,000,000,000

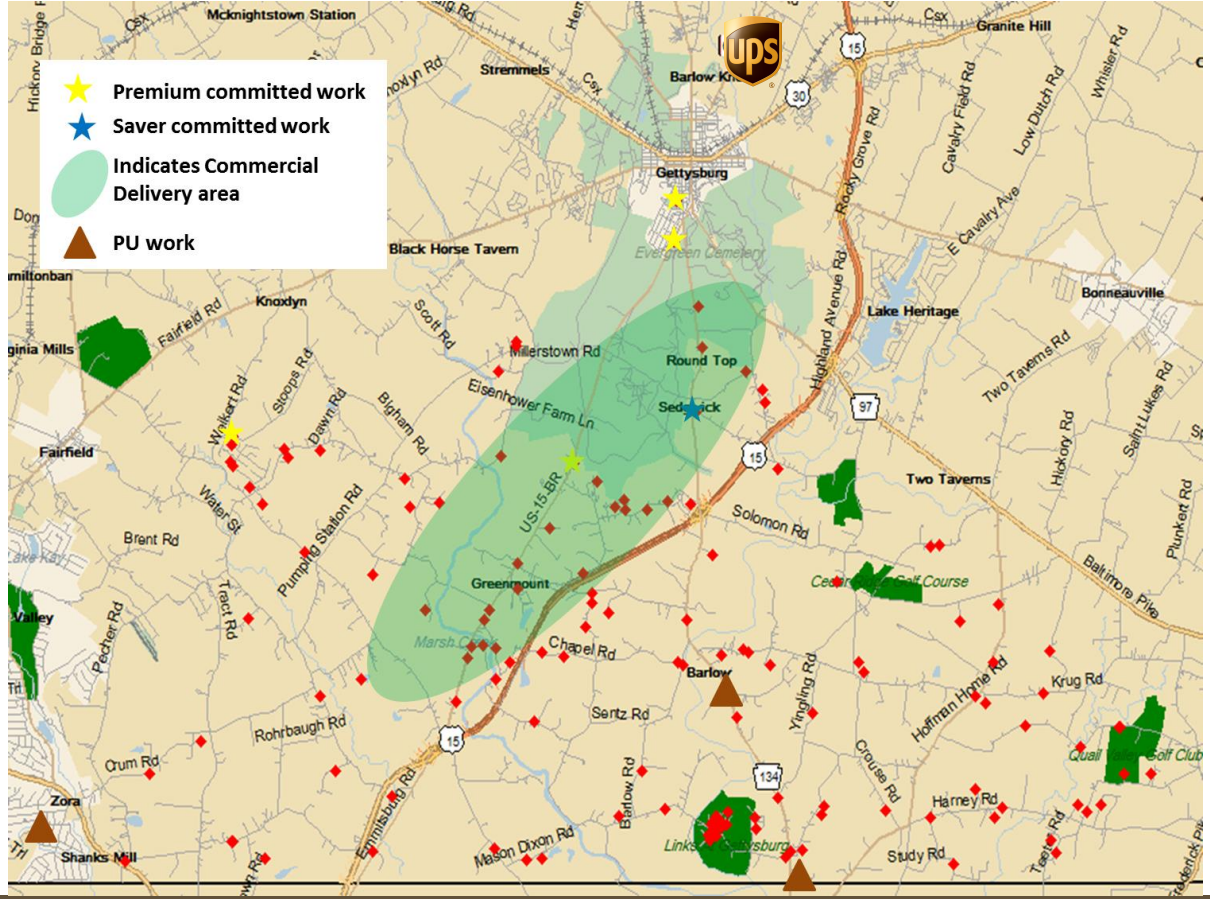


What is the most cost effective way to serve these customers?





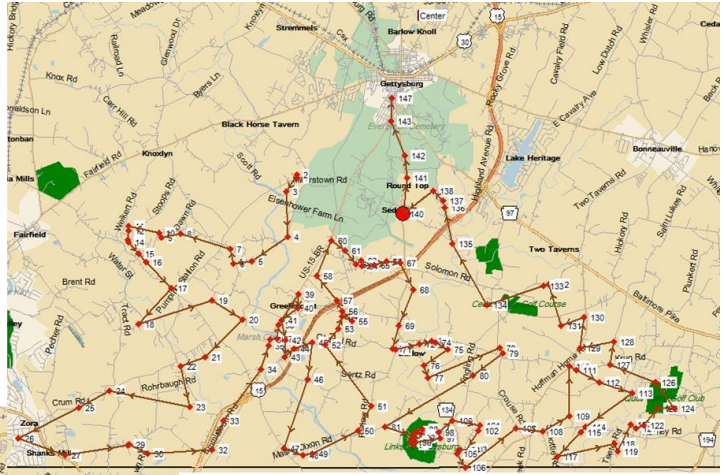
Which route has fewer miles?

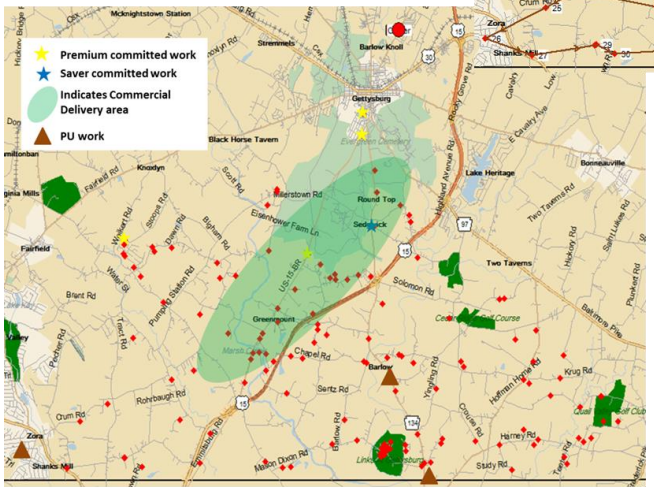


Customer needs add additional complexity

OR AND

David's Route Evaluation

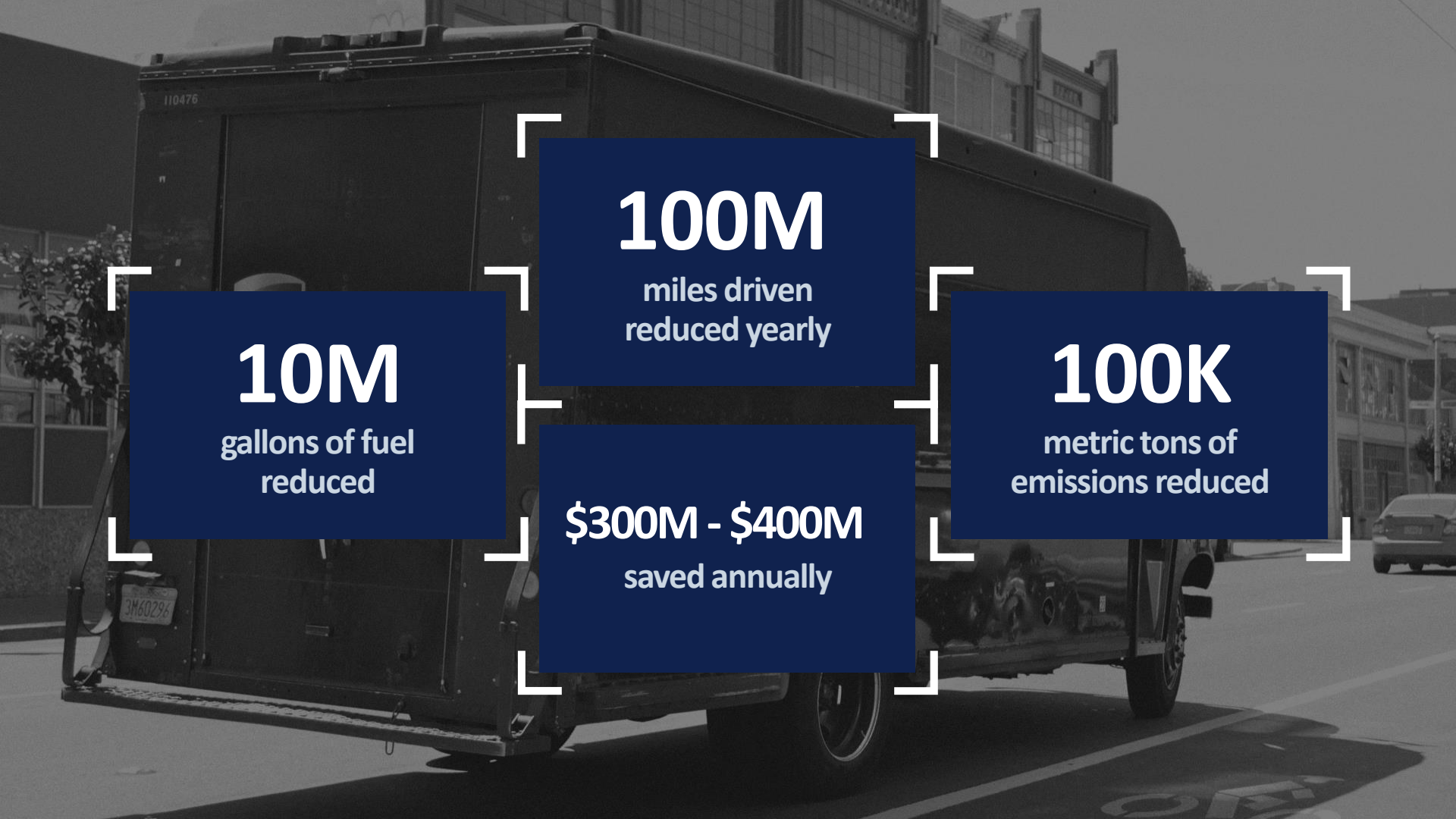




- ✓ Delivered four out of five premium packages late
- ✓ Arrived at six businesses after they closed
- ✓ Delivered two Businesses later than Customer's need
- ✓ Two PU's were made outside the planned PU window
- ✓ Ten miles over plan

ORION reduces cost while satisfying all customer and business needs

~~OR~~ AND


100M
miles driven
reduced yearly
10M
gallons of fuel
reduced
100K
metric tons of
emissions reduced
$300M - $400M
saved annually

Best Practices

~~Best Practices~~

Imperatives

- Understand the different types of Analytics and what each can and cannot do
- Understand and mitigate data limitations
- Build analytics into the process
- Do not wait for the perfect system

- Embrace change management
  - Change Conversations
- Learn from others / Network

ORION Bala

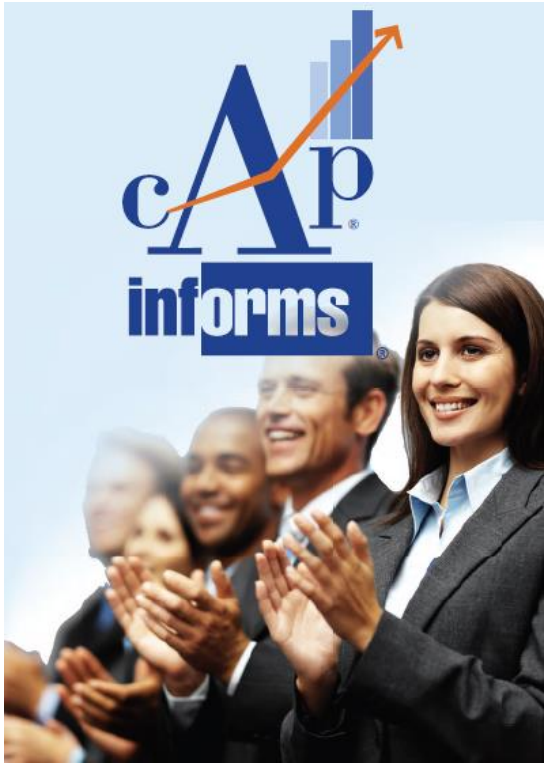
Leading indic

- Data maint
- Plan qualit
- Overrides
- Solution ac

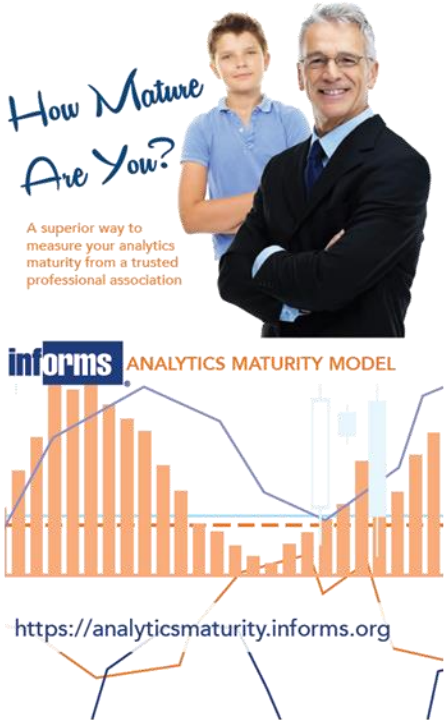
/26	w/e 10/3	w/e 10/10	w/e 10/17	w/e 10/24	w/e 10/31
.0	100.0	94.9	95.0	100.0	98.6
.2	77.8	79.9	93.6	94.4	96.3
.3	85.5	98.0	97.8	97.0	94.1
.0	99.5	99.6	80.6	97.0	91.5
.0	89.9	90.0	100.0	98.0	90.0
.5	81.0	89.8	90.4	92.7	89.9
.2	83.0	82.4	75.9	92.1	89.2
.9	80.3	82.7	81.9	82.6	86.9
.1	86.2	72.8	77.4	84.2	86.6
.9	83.7	93.9	87.9	90.6	86.6
.5	86.6	88.8	89.1	91.5	85.7
.1	82.2	87.0	92.6	94.8	84.8
.8	83.2	75.3	85.9	92.2	82.8
.9	77.1	81.1	79.0	81.3	80.3
.0	100.0	89.8	88.4	84.0	80.1
.2	80.0	81.0	79.1	80.4	80.0
.0	75.2	64.6	55.0	86.9	76.8
.2	83.0	85.1	89.5	88.6	70.8
.4	86.4	90.0	86.0	76.6	70.8
.4	80.7	82.4	80.6	72.8	69.6
.5	80.2	82.7	70.6	56.5	68.3

Learn from others / Network

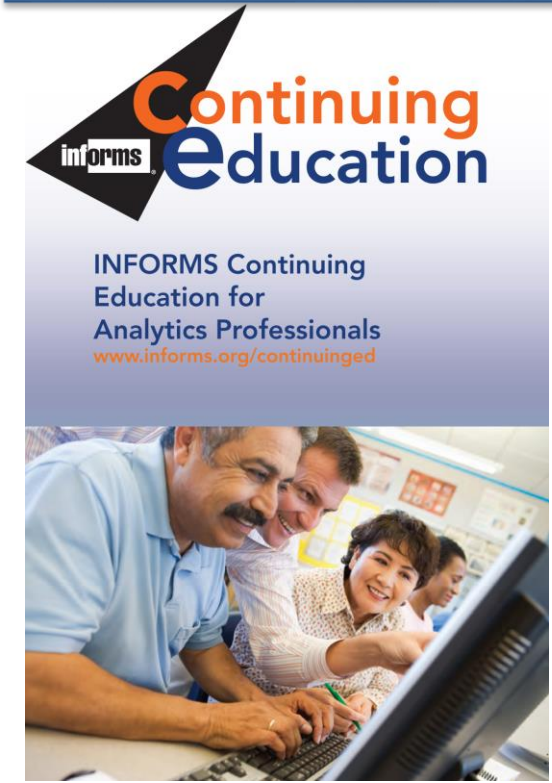
Analytics Certification



Analytics Maturity Model



Continuing Education



Learn from others / Network

Join the Analytics Society of INFORMS!!!

INFORMS® ANALYTICS SOCIETY

Analytics Society reviews 2016 and shares plans for 2017

The Analytics Society of INFORMS enjoyed a successful year in 2016, when it not only received society status within INFORMS, but it also again grew in membership and expanded its scope of activities, all of which were reviewed at a lively reception and business meeting at the 2016 Annual Conference in Nashville, Tenn. We are now 1,248 members strong, with 2,046 engaged with our LinkedIn Community. Especially encouraging is the growth of student members by more than 80 percent compared to 2015.

At the meeting, we transitioned leadership of the Society to Stefan Karisch of Boeing (president), Jack Levis of UPS (vice president/president-elect), Subrat Sahu of Caterpillar (secretary) and Aaron Burciaga of Accenture (treasurer). Many thanks to retiring President Jim Williams (FICO), Secretary Polly Mitchell-Guthrie (SAS) and Treasurer Erick Wikum (Tata Consultancy Services) for their service.

Stefan Karisch

Attendance at the business meeting was, as in the past, excellent. We discussed

ups
Worldwide Services
ups
ups

ENCORE?

what's
next
?

What's Next

- Build out ORION
  - Dynamic, Navigation, Dispatch

- Optimize the Network

  Final Mile (ORION)
  + City to City Transportation (NPT)
  + On Property / Sortation (EDGE)
  + Automation

  = Global Smart Logistics Network

Operations Technology and Analytics Has Been Key in Meeting Challenges

THE WALL STREET JOURNAL.

TECHNOLOGY

At UPS, the

Turn right, turn left, t

By STEVEN ROSE

Feb. 16, 2015 8:28 p

FORTUNE

The 13 hottest real estate markets in America

NEWS POPULAR VIDEOS RANKINGS

The shortest distance between two points? At UPS, it's complicated

The shortest distance between

Forget Drones: This Is the Future of Delivery

Scoop.

From www.businessweek.com - February 20, 1:09 AM

" Dec. 10 (Bloomberg) -- Ten years in the making, a UPS system called Orion crunches data so that drivers can save a fraction of a mile. It's expected to save the world's biggest package delivery company millions of dollars a year in gas. Bloomberg goes inside the making of the mathematical model"

Forbes 'Avengers: Age Of

TECH 11/01/2013 @ 1:27PM | 16,660 views

Alex Konrad

Forbes Staff

FOLLOW

Meet ORION, Software That Will Save UPS Millions By Improving Drivers' Routes

+ Comment Now + Follow Comments

MERRILL EDGE

Sign In

ms to

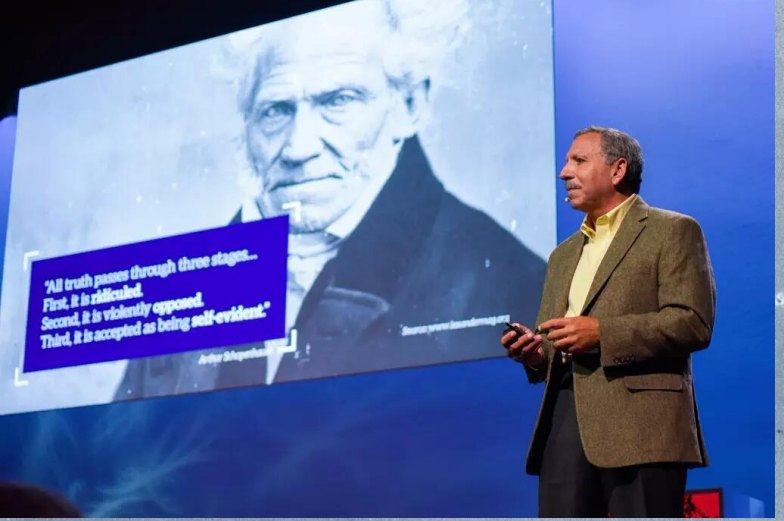
cut delivery time and save fuel

Share

A

7

ups

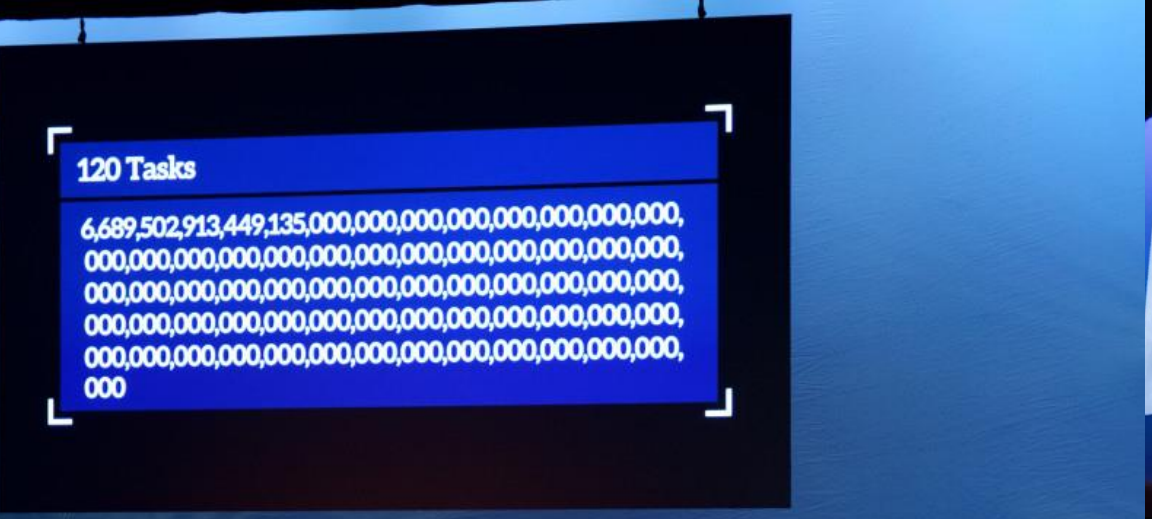


"All truth passes through three stages...
First, it is **ridiculed**.
Second, it is violently **opposed**.
Third, it is accepted as being **self-evident**."

Arthur Schopenhauer

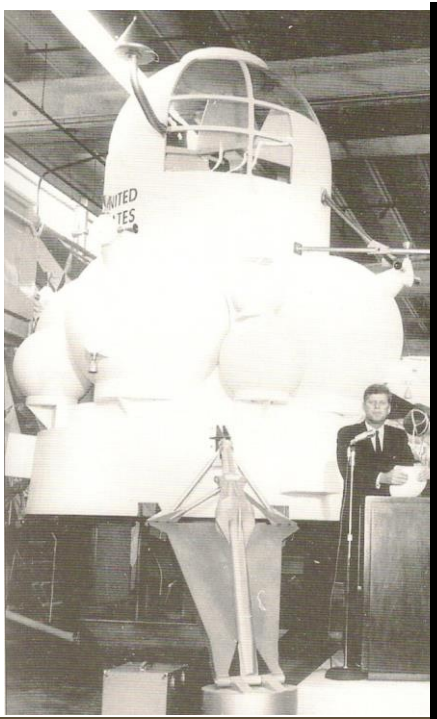
120 Tasks
6,689,502,913,449,135,000,000,000

ups


120 Tasks
6,689,502,913,449,135,000,000,000

Creating Vision is Hard

Executing Vision is Harder



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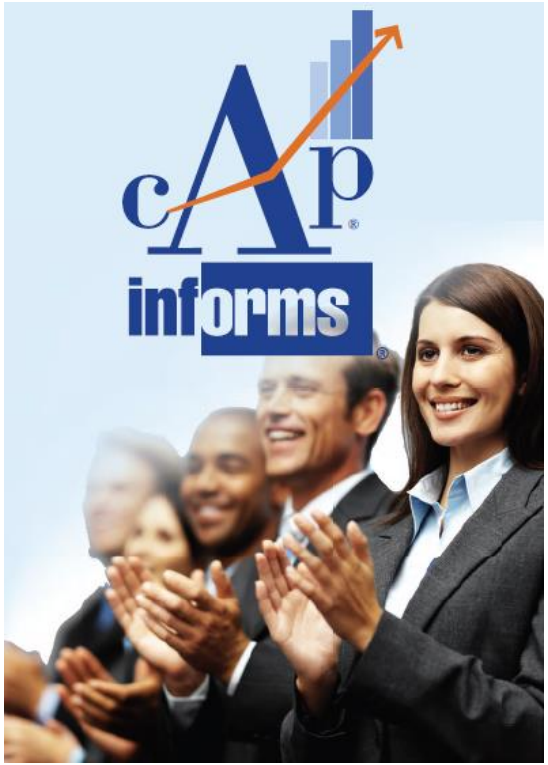

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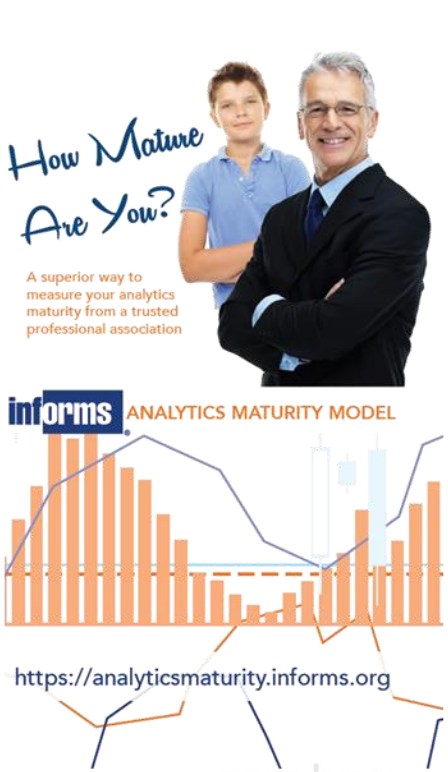
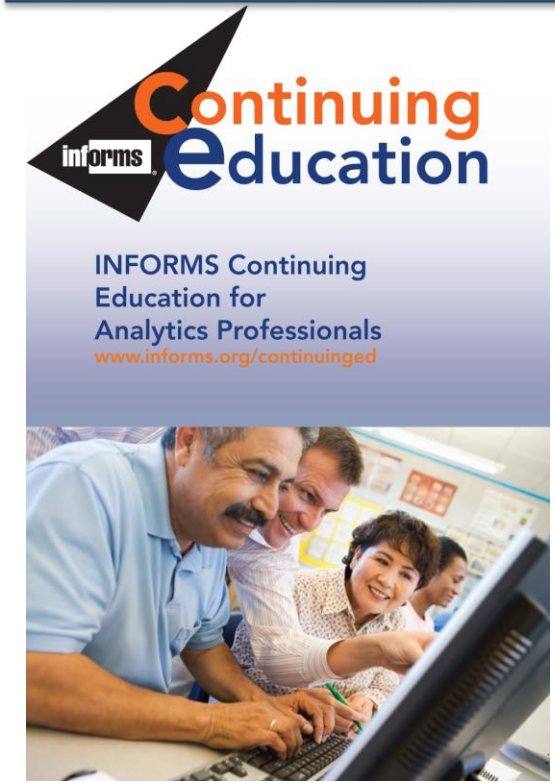


Continuing Education



analyze ▪ organize ▪ optimize

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