Beyond the Platform:
An Outcome-Driven Computer Vision Strategy

Connected Triangle + Summit
Nov 9, 2023

Inspiring, Forward Thinking, Regional Collaboration

Jim Mills
704-713-9978

Global Industries:
Computer Vision | Edge Verticals

DELL Technologies

intel

AGENDA

- Dell Advantage
- AI Landscape
- Computer Vision
- Collaboration
- Closing

Today's Goal

- What community project, facility or issue do you believe can be improved or addressed using "smart" technology — please be specific to your community and idea.

- What encouraged or inspired you to attend today's Summit?

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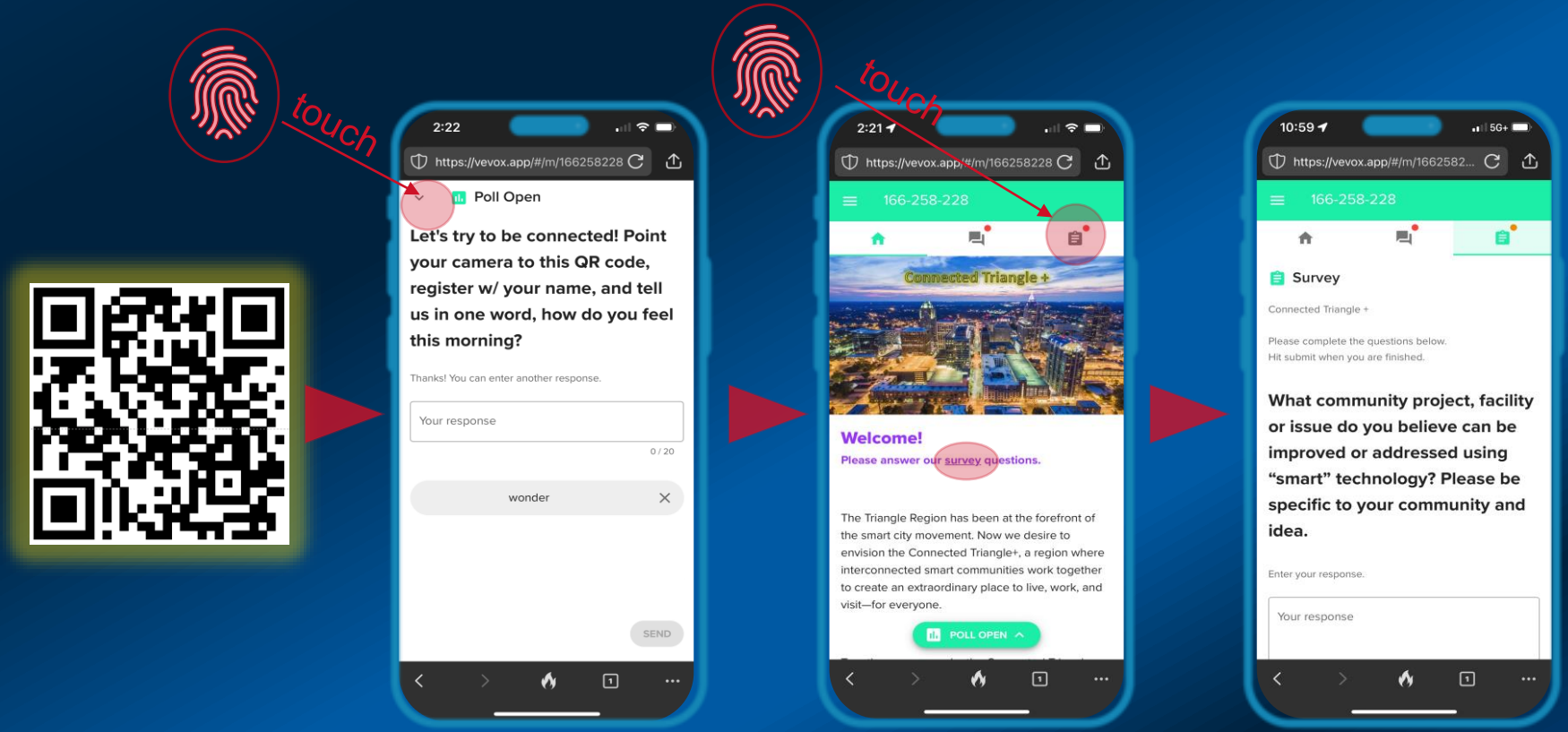
Click or hold down the spacebar to talk
Aa

Live Polling App + Navigation

Scan QR Or Type https://vevox.app/#/m/166258228



Live Polling Question #1

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We create technologies that drive human progress.

At Dell Technologies, we exist to help organizations and individuals build their digital future and transform how they work, live, and play. Our company provides customers with the industry's broadest and most innovative technology and services portfolio for the data era.

A trusted ally for State and Local Governments

Dell Technologies has a long history of delivering industry-leading government solutions for organizations of all sizes. With Dell Technologies, you have access to dedicated experts, direct from the industry, who provide strategic guidance and operational support to deliver solutions catered to your specific needs.

CITY GOVERNMENT

100

Largest U.S. cities use Dell Technologies IT Solutions[1]

STATE GOVERNMENT

50

States rely on Dell Technologies public sector IT Solutions[2]

COUNTY GOVERNMENT

20

Largest U.S. counties use Dell Technologies IT Solutions[3]

[1] Dell Technologies customers of Top 100 largest city governments by city population [↑]
[2] Dell Technologies government customers in U.S. [↑]
[3] Dell Technologies customers of top 20 Counties by revenue [↑]

Digital Transformation in State and Local Government

Driving innovation and community success through Digital Transformation

DIGITAL COMMUNITIES

- Intelligent Situational Awareness
- Analytics (AI/ML)
- Sensors and Sensor Management Software
- Edge Processing
- Connectivity and 5G

TRANSPORTATION

AIRPORT, ROADWAY, BUS, TRAIN, TRANSIT AUTHORITIES

- Passenger Experience
- Passenger Safety
- Operational Efficiencies
- Sustainability and Environmental Footprint
- New Revenue Streams

UTILITIES

WATER, WASTE WATER, GAS, ELECTRIC

- Worker Safety and Productivity
- Equipment Availability
- Real-time Data to Operators
- Reduce Unplanned Downtime
- Improve Product Quality

PUBLIC SAFETY

POLICE, FIRE, EMS, SHERIFF, CORRECTIONS, CYBER DEFENSE

- Integrated Operations Center
- Digital Forensics
- Situational Awareness and Multi-agency Response
- Predictive Approach to Preventing Crime and Security Situations
- Emergency Management

IT INFRASTRUCTURE

- Physical Infrastructure and Digital Technologies (AI, Edge-Cloud, IoT, 5G, Cyber Resiliency)
- Utilizing AI to Make Data-driven Decisions
- Next-gen Compute, Storage and Networking
- Data Integration and Management
- Software Defined Data Center and HCI
- Hybrid Cloud Infrastructure
- As-a-Service Infrastructure

SECURITY

- NIST Cybersecurity Framework
- Zero Trust
- Physical Facilities Security
- Managed Detection and Response
- User Awareness and End Point Security
- Data Governance and Security

The New Infrastructure

Physical Buildout + Digital Augments = Resulting Outcomes

Safety
Traffic-related fatalities in California were estimated at 1,709 in 2022, a 6% increase from the previous year.

Equity
Project Connect in Austin, TX is aimed at improving transportation infrastructure in order to stimulate the economy & grow the middle class.

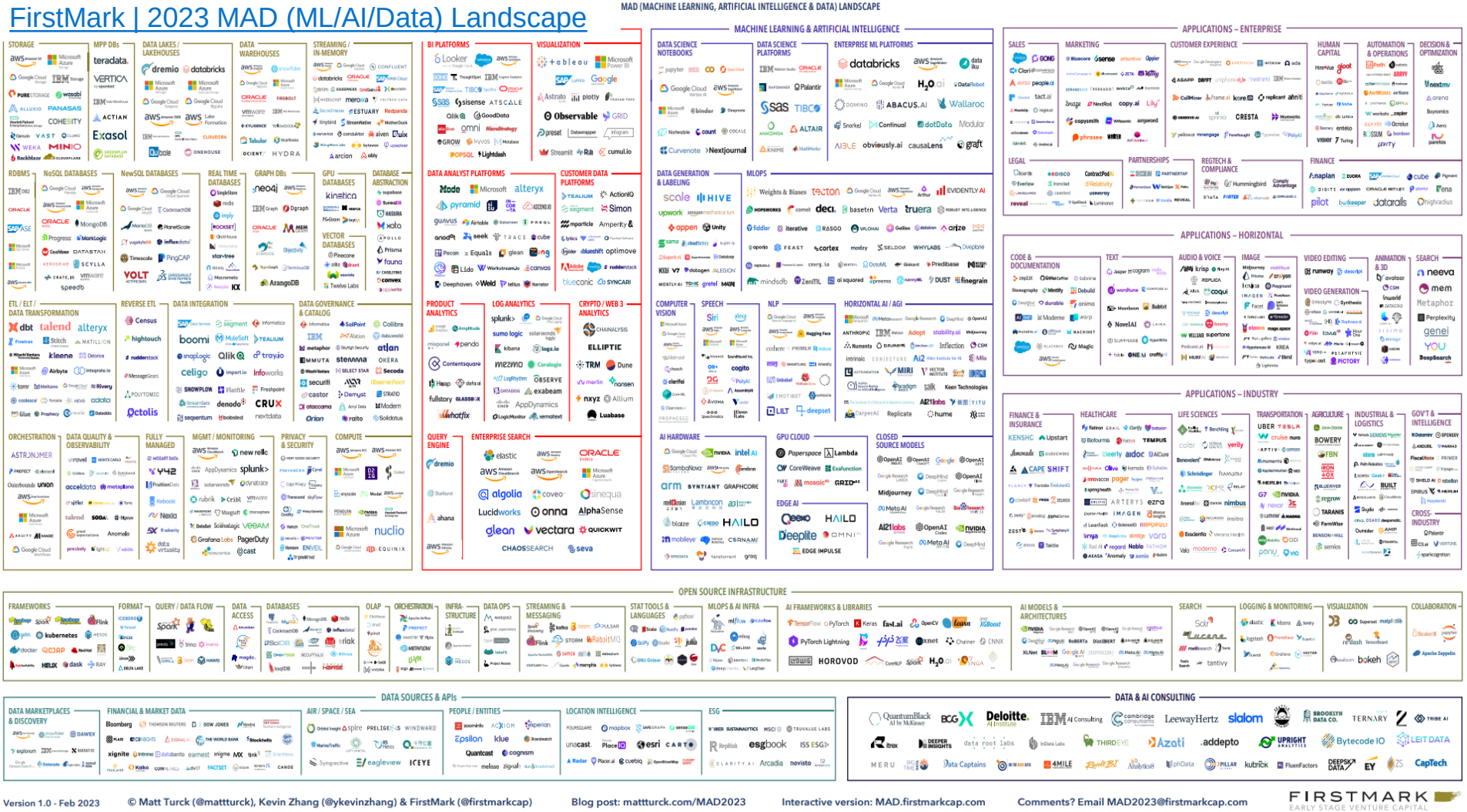
Climate
The U.S. transportation sector accounts for 29% of all greenhouse gas emissions, the greatest share of all sectors; electrifying transit can reduce related emissions by 67%.

Economy
U.S. cities using Intelligent transportation systems can save time and money, including more than $4.7B per year in lost productivity.

Physical Infrastructure
Public Transit
Airports and Sea Ports
EV Charging Station
Roads
Railways

Digital Technologies
AI
Edge-Cloud
IoT
5G
Cyber Resiliency

FirstMark | 2023 MAD (ML/AI/Data) Landscape




FOCUS


OUTCOME

touch

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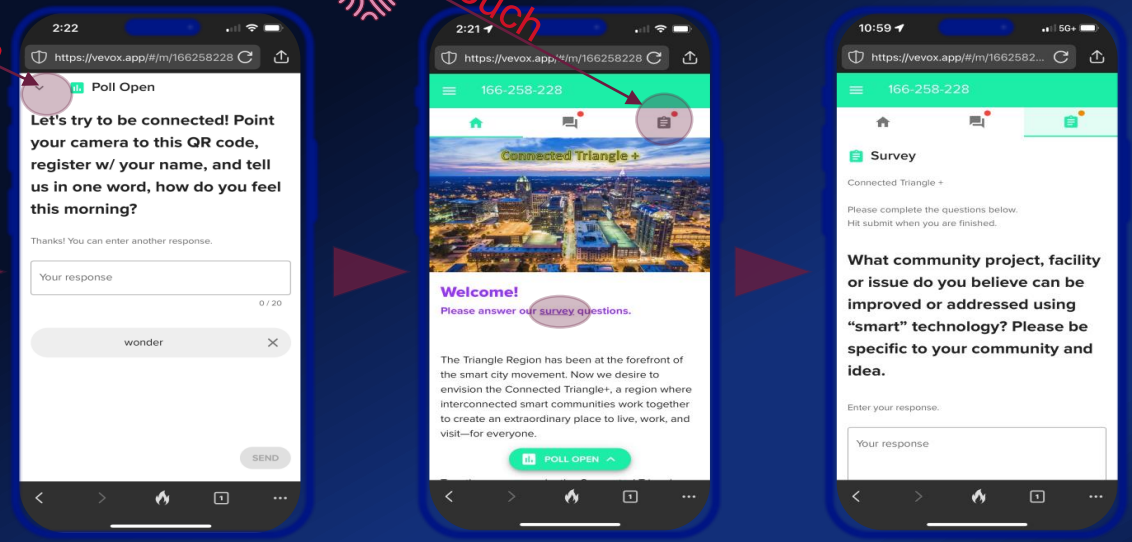

Live Polling Question #2

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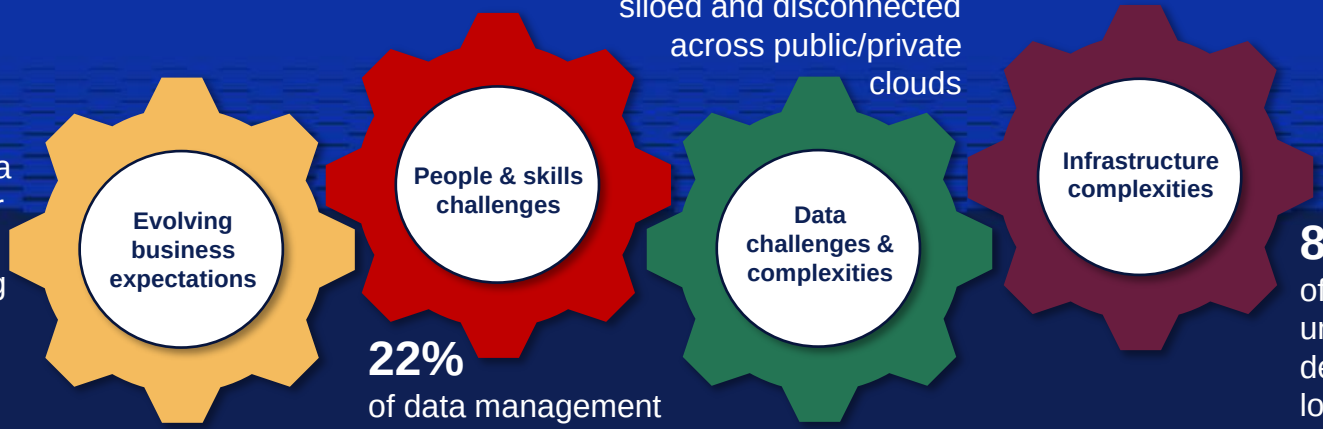
New Challenges Companies are Facing

73%
of company data goes unused for analytics and decision-making



70%
of data warehouses/lakes are siloed and disconnected across public/private clouds

22%
of data management resources' time is spent on data innovation and monetization

80%
of data created is unstructured and in decentralized locations

By 2025, **75%** of data will be created at the edge

Dell Technologies Global Industries

Validated Design Solution Process

STEP 1
UNDERSTAND
the outcomes you want to deliver.

STEP 2
DETERMINE
the workflows needed to deliver the desired outcome.

STEP 3
IDENTIFY
application technology partner components to deliver the outcome.

STEP 4
OPTIMIZE
the application for overall solution performance.

STEP 5
VALIDATE
using extensive lab validation of the end-to-end solution in real-world scenarios.

STEP 6
PILOT
proof-of-concept with your data.

STEP 7
DEPLOY
with an iterative process to eliminate risk.

Minimize Risk → **Accelerate Implementation** → **Improve Outcomes**

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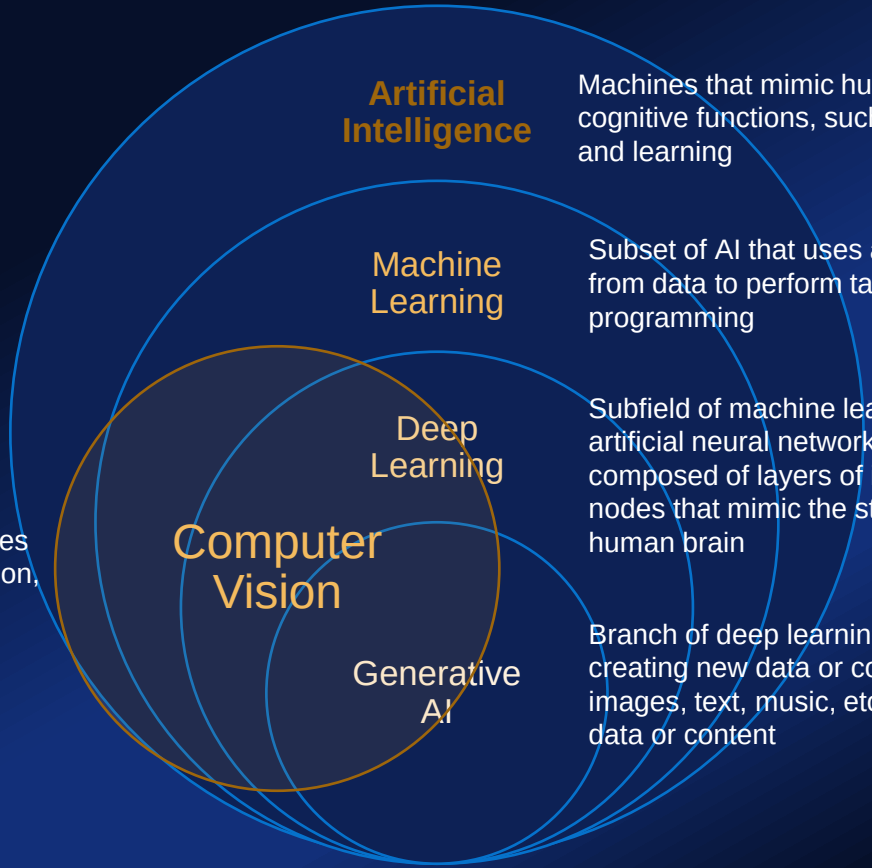
Artificial Intelligence Defined



Machines that mimic human intelligence and cognitive functions, such as problem-solving and learning

Subset of AI that uses algorithms that learn from data to perform tasks without explicit programming

Subfield of machine learning that uses artificial neural networks, which are composed of layers of interconnected nodes that mimic the structure of the human brain

Field of AI that deals with enabling machines to understand and process visual information, such as images and videos

Branch of deep learning that focuses on creating new data or content, such as images, text, music, etc., based on existing data or content

What is Computer Vision?

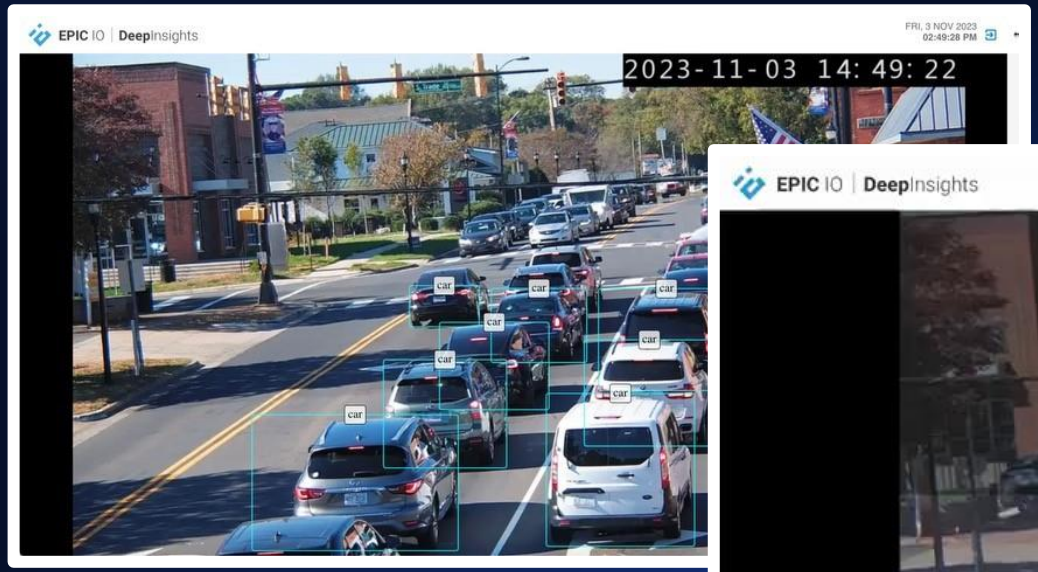
Computer vision is a field of artificial intelligence (AI) that enables computers and systems to derive meaningful information from digital images, videos and other visual inputs — and take actions or make recommendations based on that information.

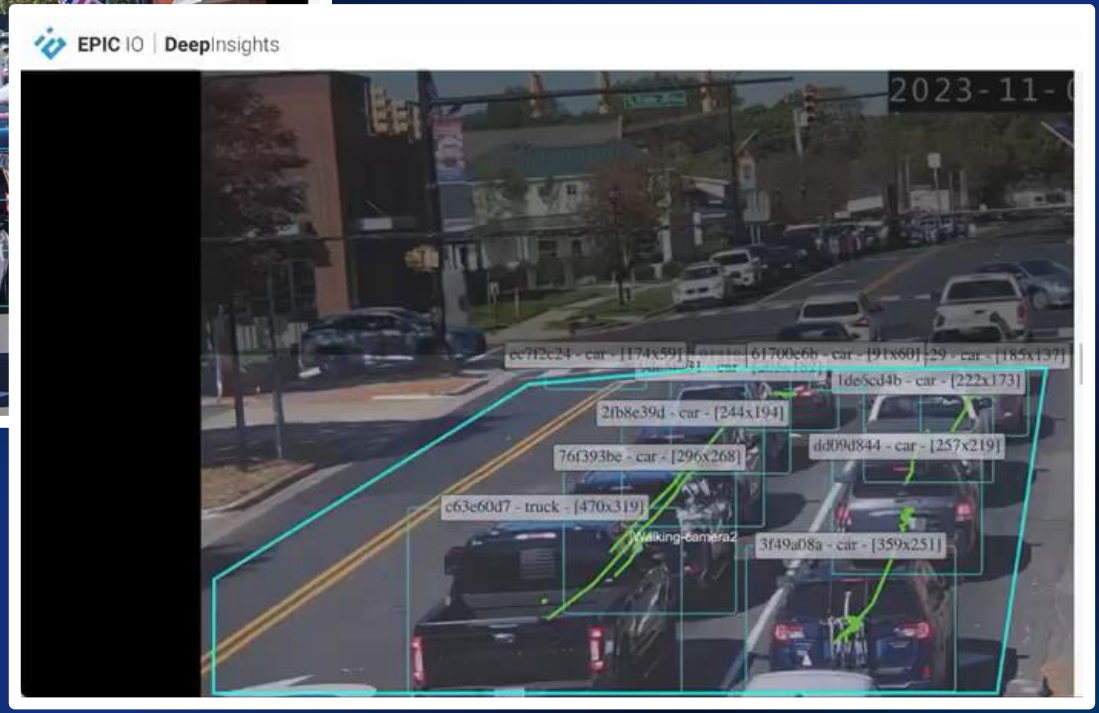
IF **AI enables computers to think**, Computer Vision **(CV) enables them to see, observe and understand**.

Examples of Computer Vision tasks:

- Image Classification
- Object Detection
- Object Tracking
- Content-based Image Retrieval

Computer Vision - Classification





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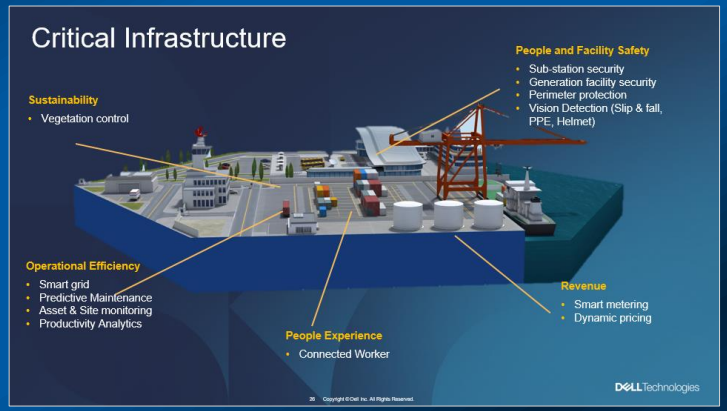
Smart Communities Use Cases



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Smart Community

Click on a bullet to access that use case, or click on here to access the *Global Industries Interactive App*
Clicking on the Dell logo will return you to this slide

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Public Transit

People and Facility Safety

- Abandoned object
- Loitering and vandalism / intrusion detection
- Platform safety / Yellow line intrusion
- Crowd density management

Revenue

- Smart Parking solutions
- Retail space optimization
- Fare evasion detection

Operational Efficiency

- Traffic flow analysis
- Rolling stock predictive maintenance
- Smart infrastructure maintenance

People Experience

- Disabled Passenger identification
- Taxi / Rideshare Flow management
- Passenger wayfinding

Sustainability

- Traffic flow optimization
- Dynamic traffic routing
- Parking occupancy

Airport

Revenue

- Dynamic pricing
- Taxi flow management
- Retail space optimization

People Experience

- Baggage tracking
- Wayfinding
- Curb-to-gate experience

Sustainability

- Waste management
- Di-icing optimization
- Predictive maintenance

People and Facility Safety

- Security lane monitoring
- Abandoned object detection
- Intrusion detection

Operational Efficiency

- Incident & asset management
- Ramp operation improvements
- Dynamic staffing

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Critical Infrastructure

People and Facility Safety

- Sub-station security
- Generation facility security
- Perimeter protection
- Vision Detection (Slip & fall, PPE, Helmet)

Sustainability

- Vegetation control

Operational Efficiency

- Smart grid
- Predictive Maintenance
- Asset & Site monitoring
- Productivity Analytics

People Experience

- Connected Worker

Revenue

- Smart metering
- Dynamic pricing

Smart Transportation - Vision Zero Strategy

Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. First implemented in Sweden in the 1990s, Vision Zero has proved successful across Europe — and now it's gaining momentum in major American cities.

Vision Zero

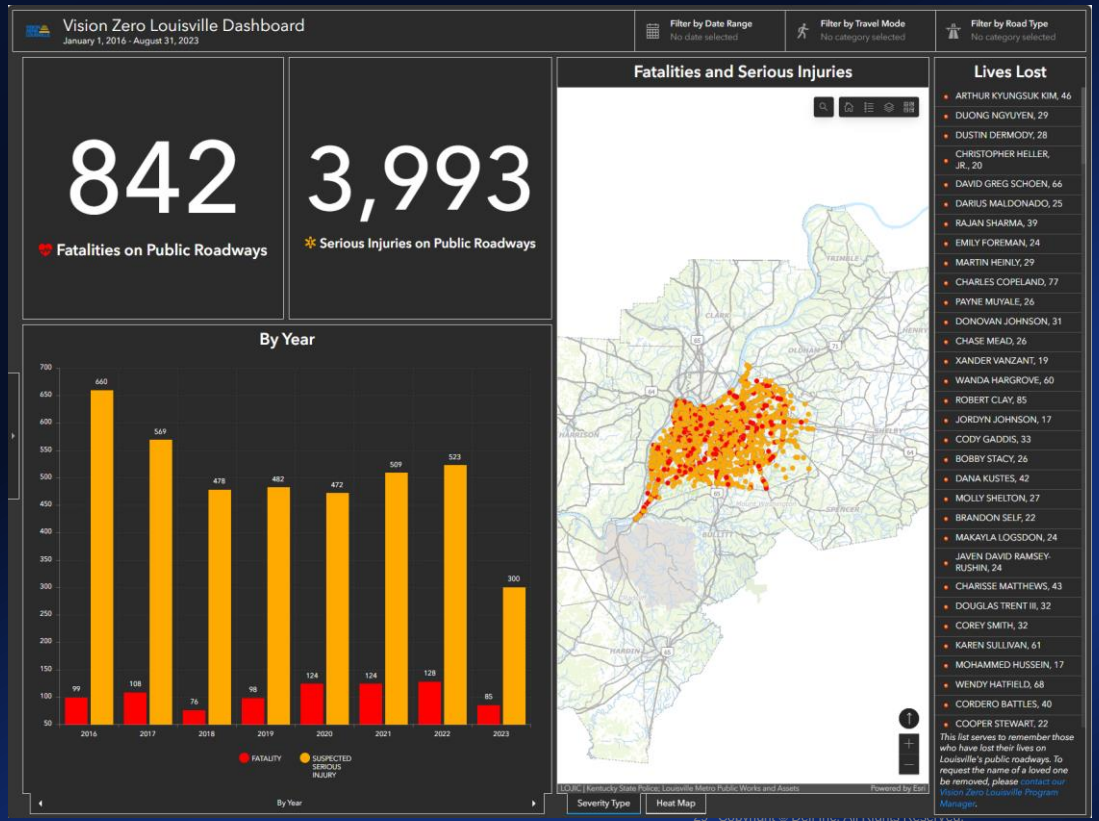
Federal Statistics show that traffic fatalities in the US hit a 16-year high in 2021, with 42,915 deaths

- Daytime fatalities up 11 percent
- Fatal motorcycle accidents were up 9 percent
- Bicyclists were up 5%
- Speeding Deaths up 5%

- Speed is major factor in pedestrian deaths
- Fatality rate by car traveling 20 mph account for 5% of pedestrians
- Fatality rate jumps to 45% with 30 mph and 95% with speeds 40 mph SUV's and Pickup trucks account for more deaths at speed

Tracking & Sharing Vision Zero Progress

1) Develop and share an annual report or public dashboard



Tracking & Sharing Vision Zero Progress

- 2) Engage with community while tracking and reporting in ongoing ways
- 3) Develop a framework to assess strategies' effectiveness
- 4) Measure and share equity related priorities
- 5) Update the Plan to reflect emerging priorities, learnings

Vision Zero Success

Seattle DOT – 4 Mile Corridor Insights

BEFORE	AFTER	
On average, 1 crash per day	50th % speeds	16%
11 people killed during 10-year period	Total crashes	40%
1,700 people injured during 10-year period	Injury crashes	30%
	Bike/ped crashes	15%

NY City – Traffic/Bicycle Lane Insights

BEFORE	AFTER	
300+ crashes each year	Pedestrian injuries	49%
65+ crashes with injuries each year	Bicyclist injuries	42%
	Injury crashes	4%

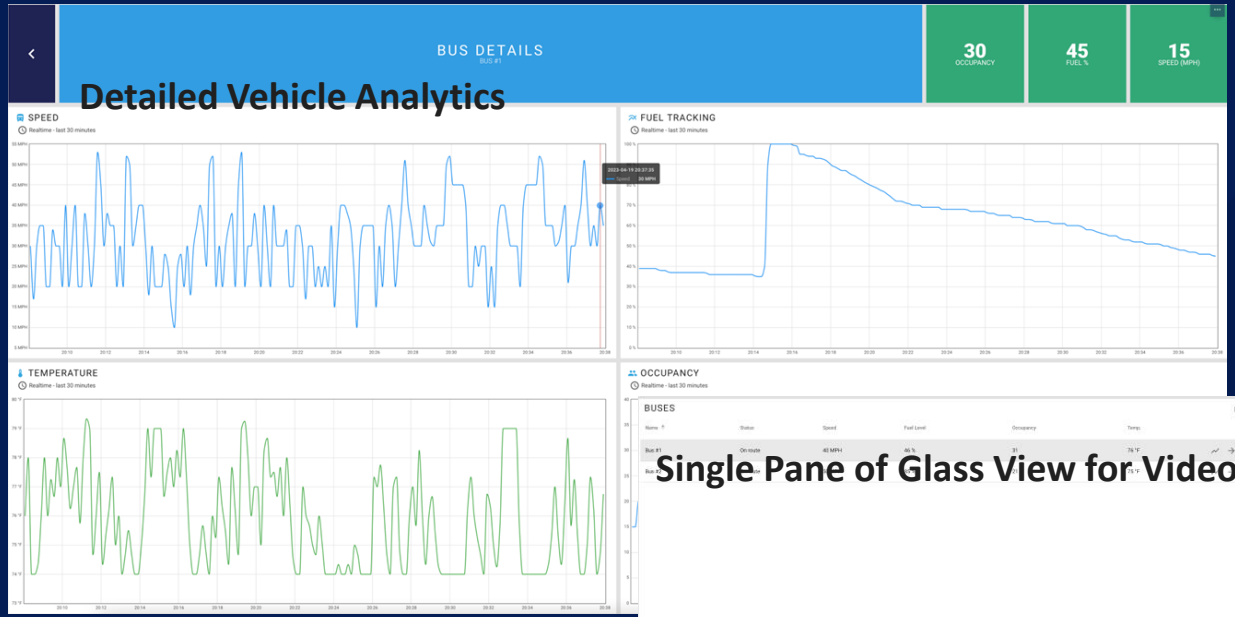
November 19, 2023, Raleigh NC

WORLD DAY OF REMEMBRANCE

FOR ROAD TRAFFIC VICTIMS IN THE U.S.

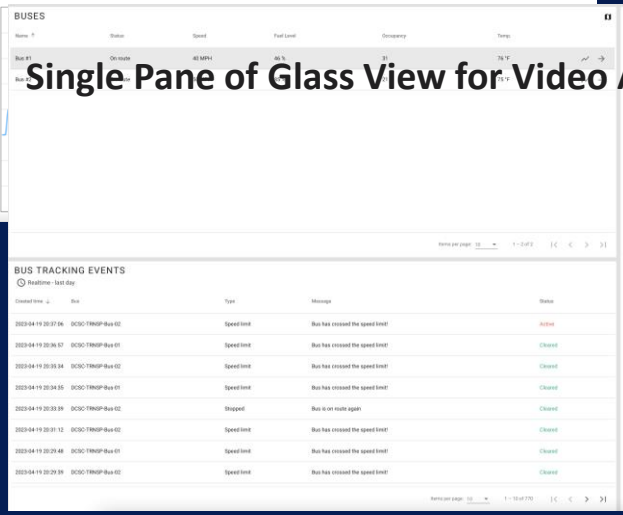
The WDoR Memorial features pairs of shoes which represent the 1,784 people killed on North Carolina roads in 2022 (Source: NCDOT Crash Facts)

DEEPINSIGHTS: Smart Transportation

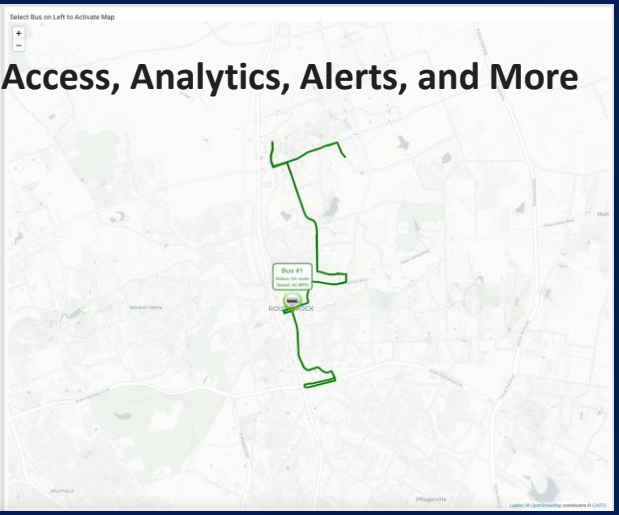


Detailed Vehicle Analytics

Other Use Cases



Single Pane of Glass View for Video Access, Analytics, Alerts, and More



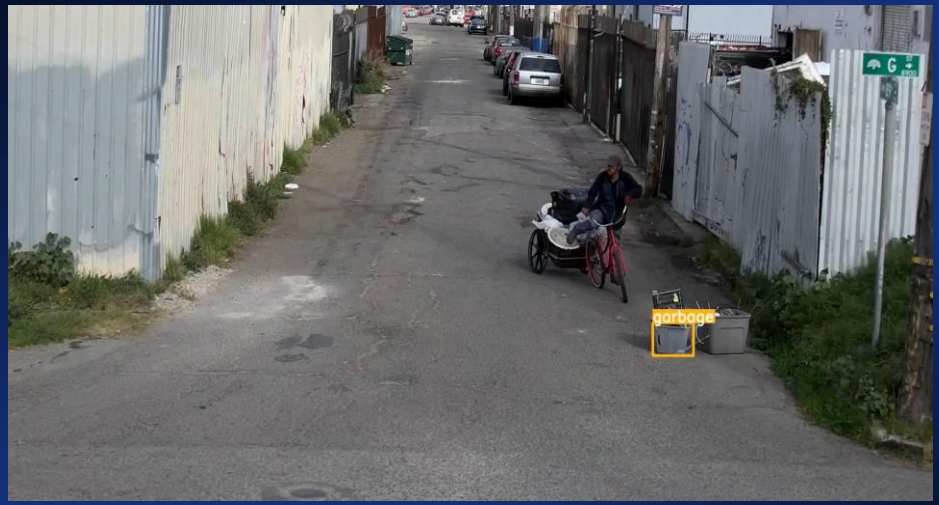
Smart Infrastructure Use Cases

Parking Enforcement

Smart Infrastructure Use Cases

Drones

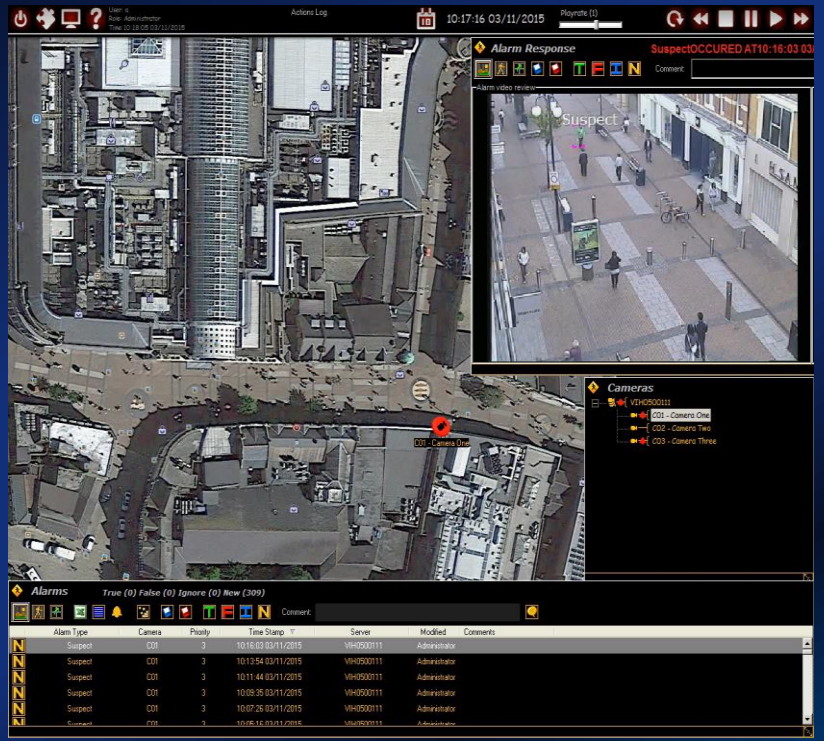
Illegal Dumping



Smart Infrastructure Use Cases

Homeless Camps and Fires

GIS Mapping Coordinates



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Computer Vision vs. LiDAR

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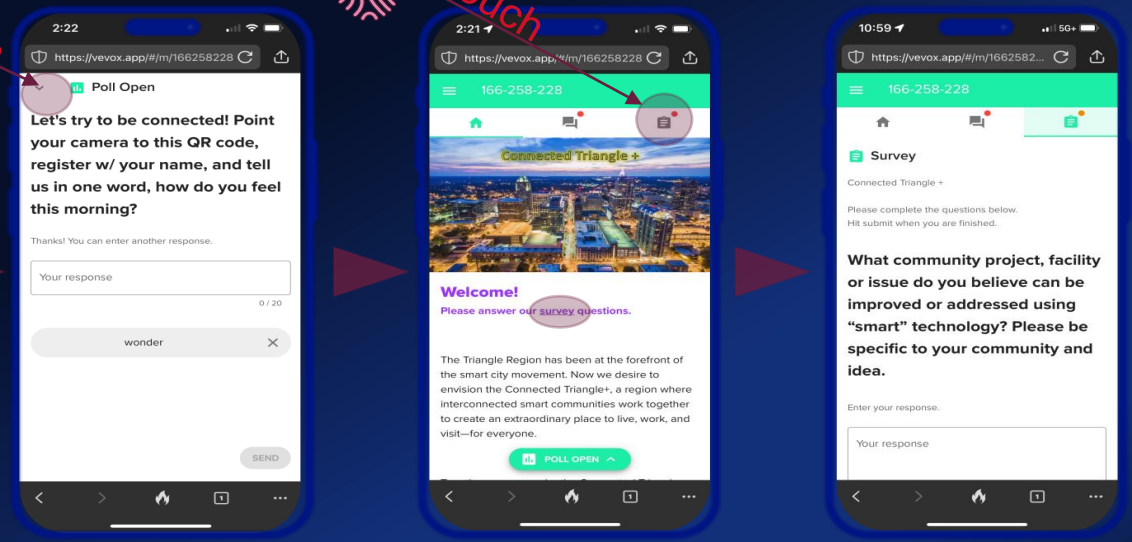
touch



Live Polling Question #3

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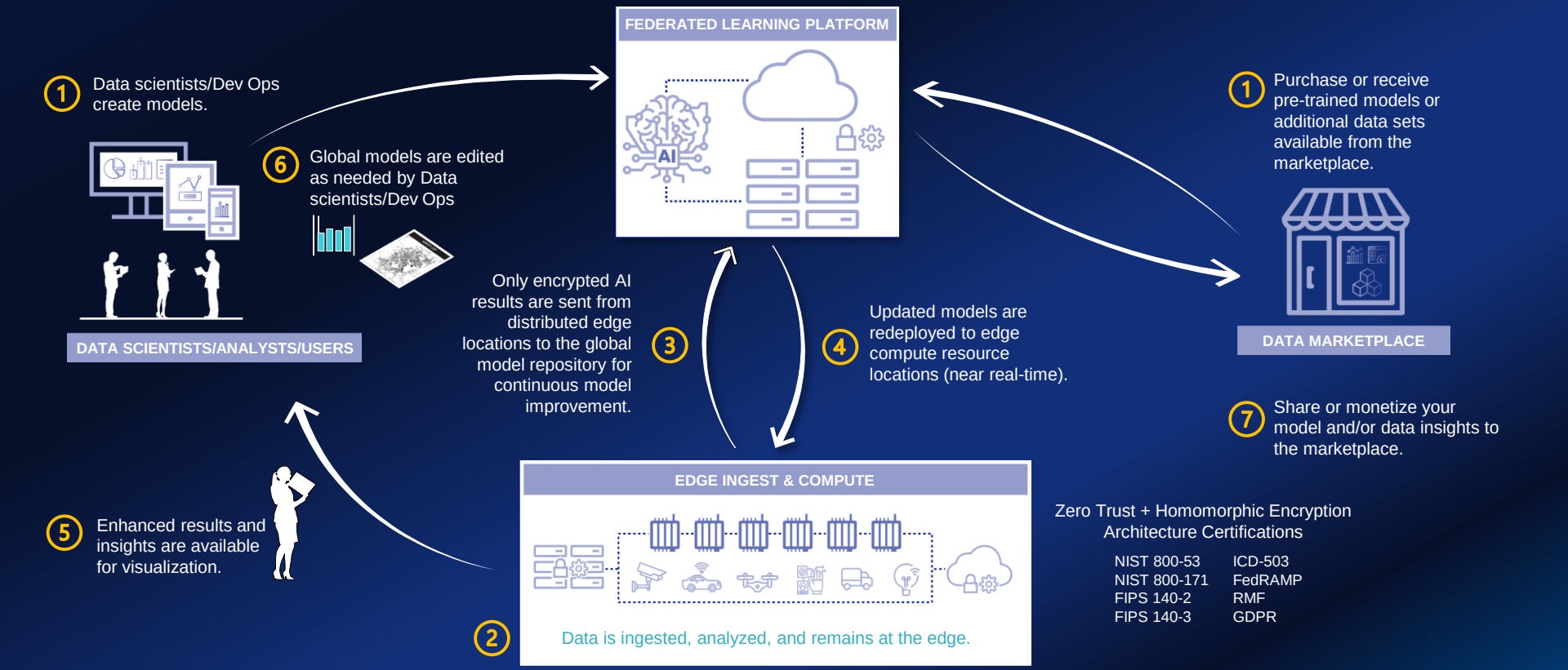
Collaboration

Data collaboration is the process of gathering and sharing data from various sources. This process typically involves combining data sets from internal teams such as sales, marketing, and customer service and empowering domain experts to contribute their unique perspectives to inform insights. Data collaboration also takes the form of data-sharing partnerships or supplementing existing data with third-party data sets.

Enterprise Federated Analytics & Learning Framework

Faster time to better quality insights



Zero Trust + Homomorphic Encryption Architecture Certifications

NIST 800-53	ICD-503
NIST 800-171	FedRAMP
FIPS 140-2	RMF
FIPS 140-3	GDPR

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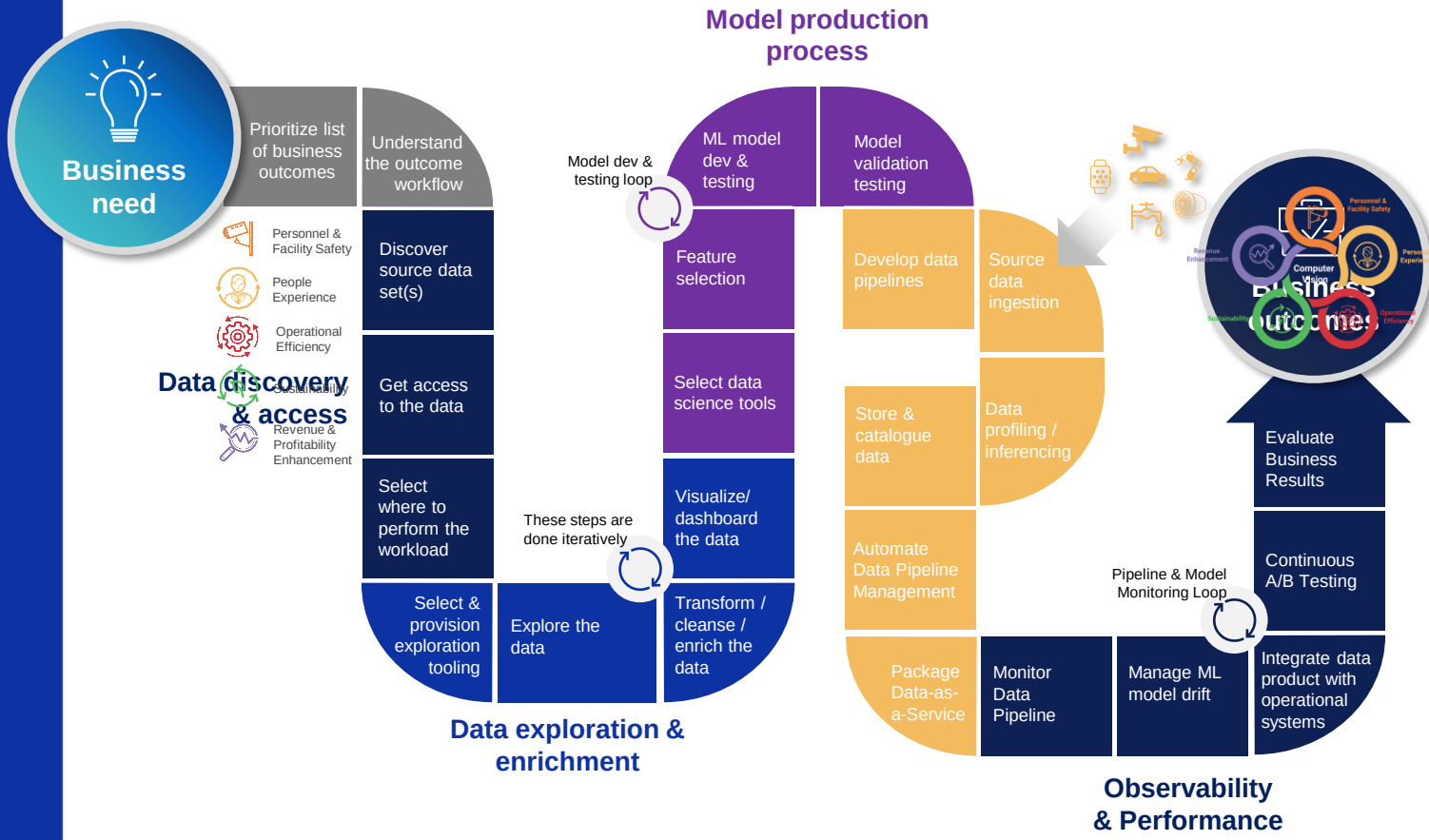
Computer Vision data engineering journey map

Accelerate an organization's value-driven data science & engineering journey from **Business Need** to **Business Outcome**

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Dell Digital Human Demonstration – 3:30 to 4:00 PM

CLARA

Take the next step in your Computer Vision journey

Making the art of the possible the art of the practical©

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