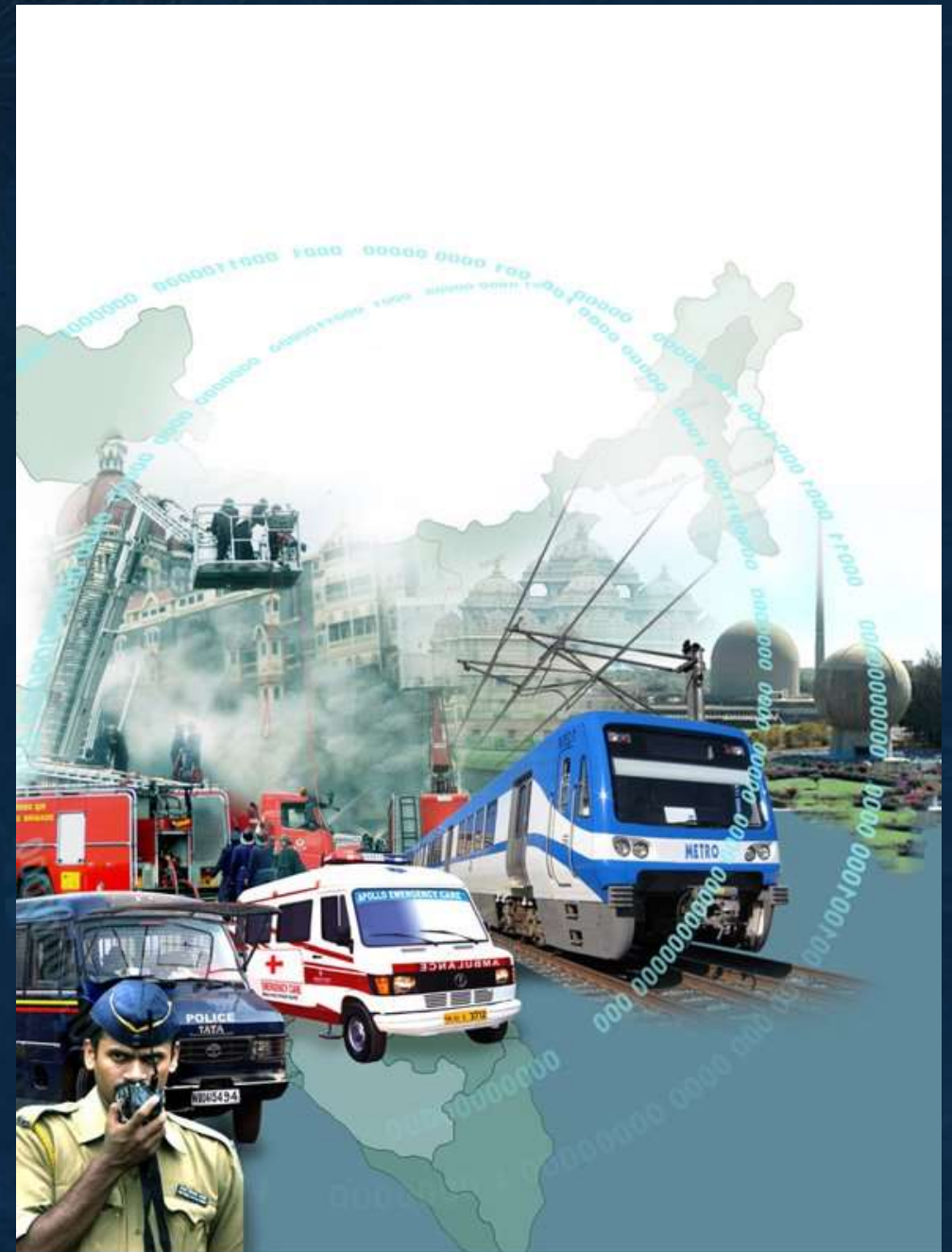


# Spatial Solutions for Crime Prevention & Disaster Mitigation

Krishna Rao TVB  
HEAD - Presales





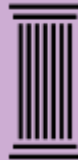
# 4 Pillars of ABI

ABI Pillar



Georeference  
To  
Discover

ABI Pillar




Data  
Neutrality

ABI Pillar



Integration  
Before  
Exploitation

ABI Pillar




Sequence  
Neutrality

## Enabling Technology


Geo-Enrichment




Real-Time Analytics



Big Data Analytics



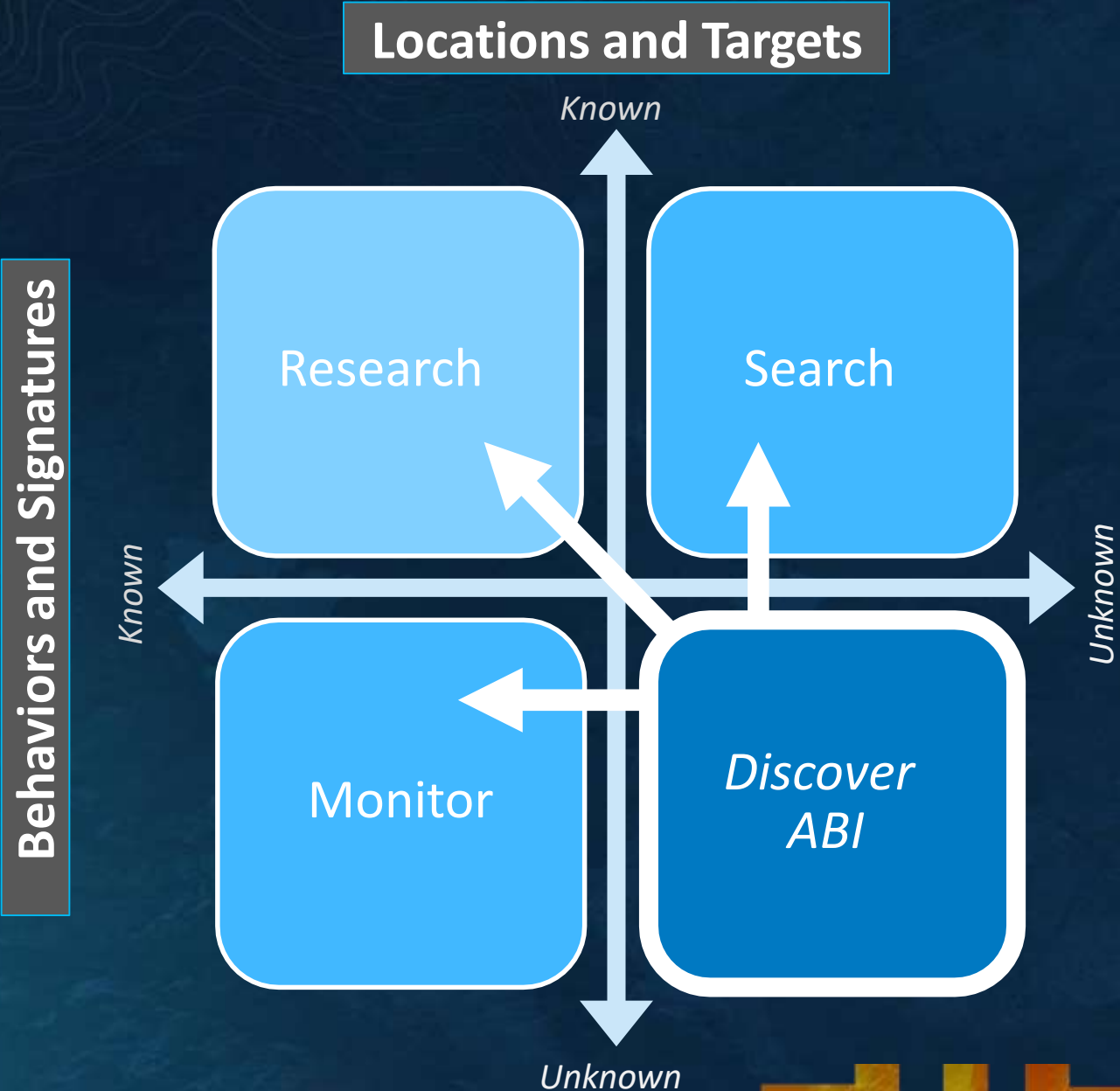
Application Frameworks



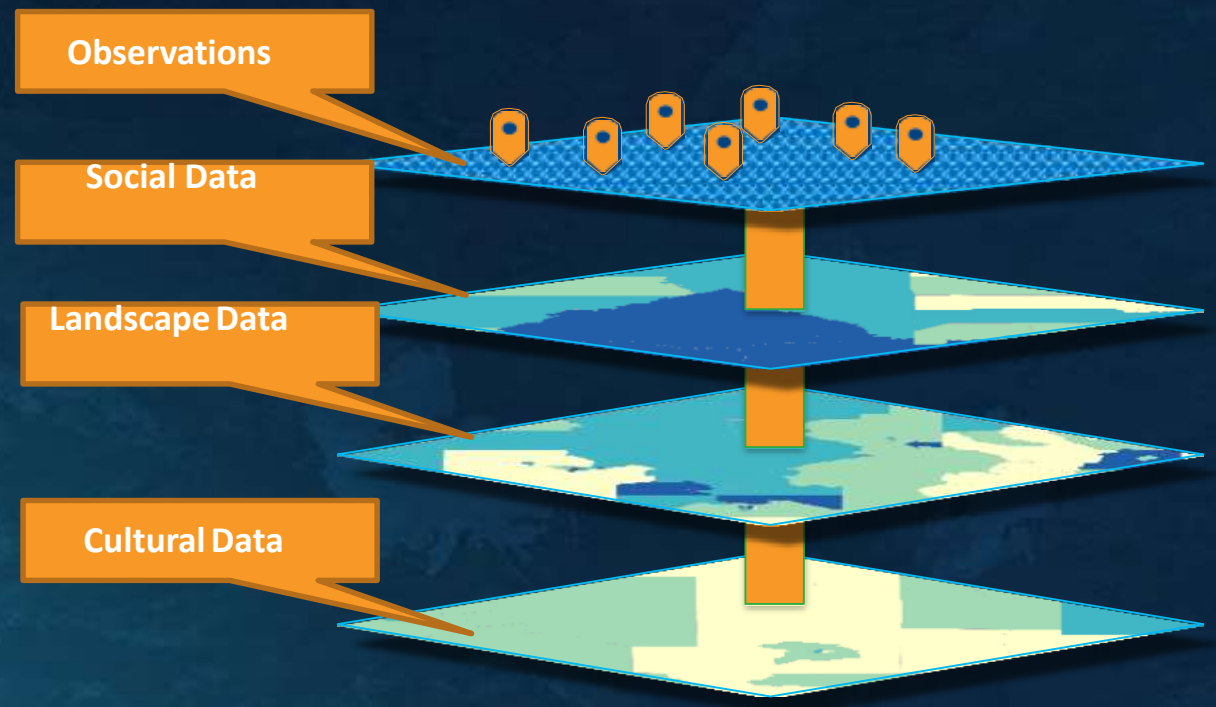
Intelligent Enterprise



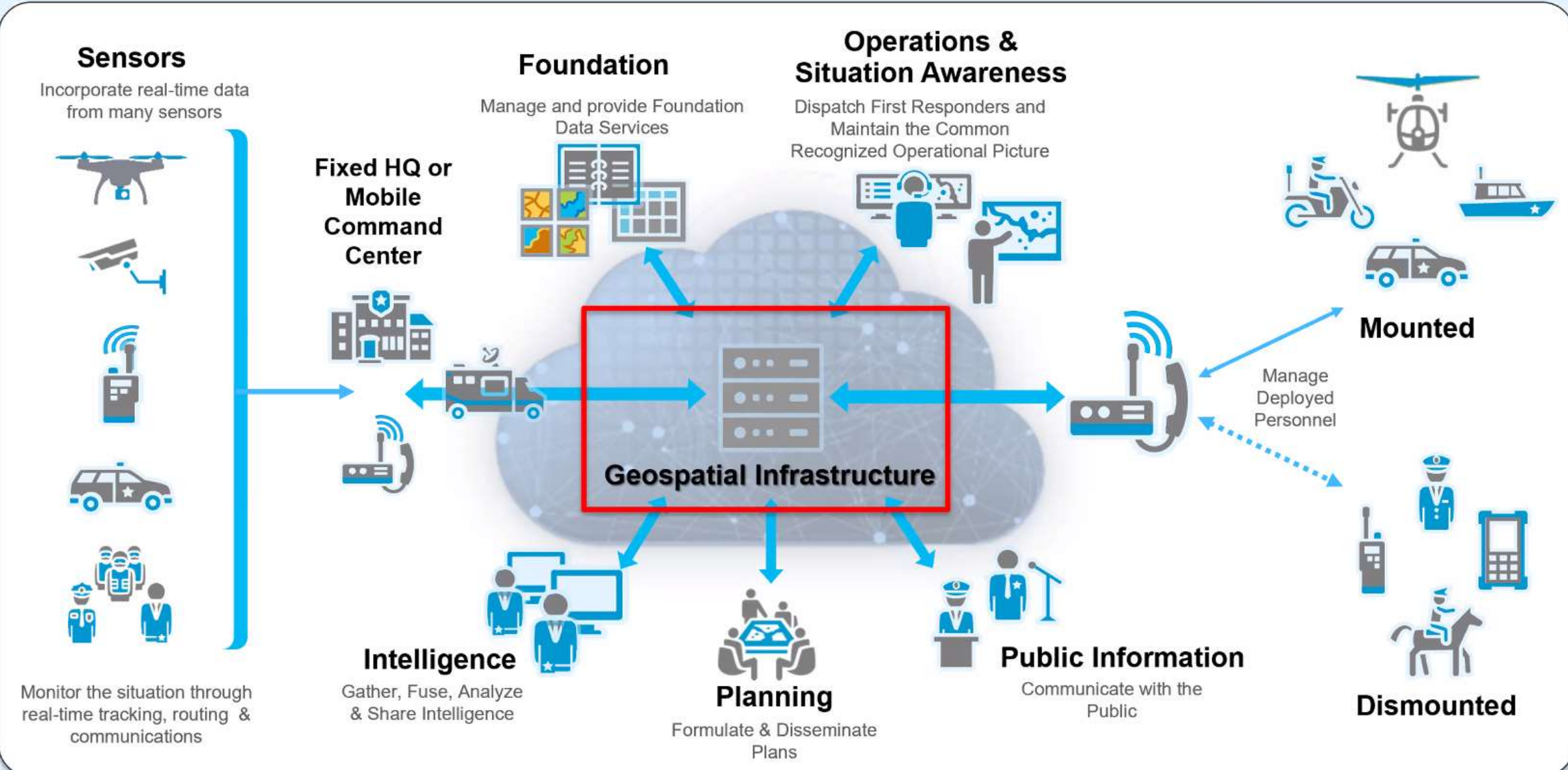
# Shift to Discovery



# GeoEnrichment of Observations



# Providing Central and Core Geospatial Services



# GIS is Directly Integrating All Types of Data

Making Them Available and Immediately Usable



# Geospatial Apps Are Becoming Pervasive

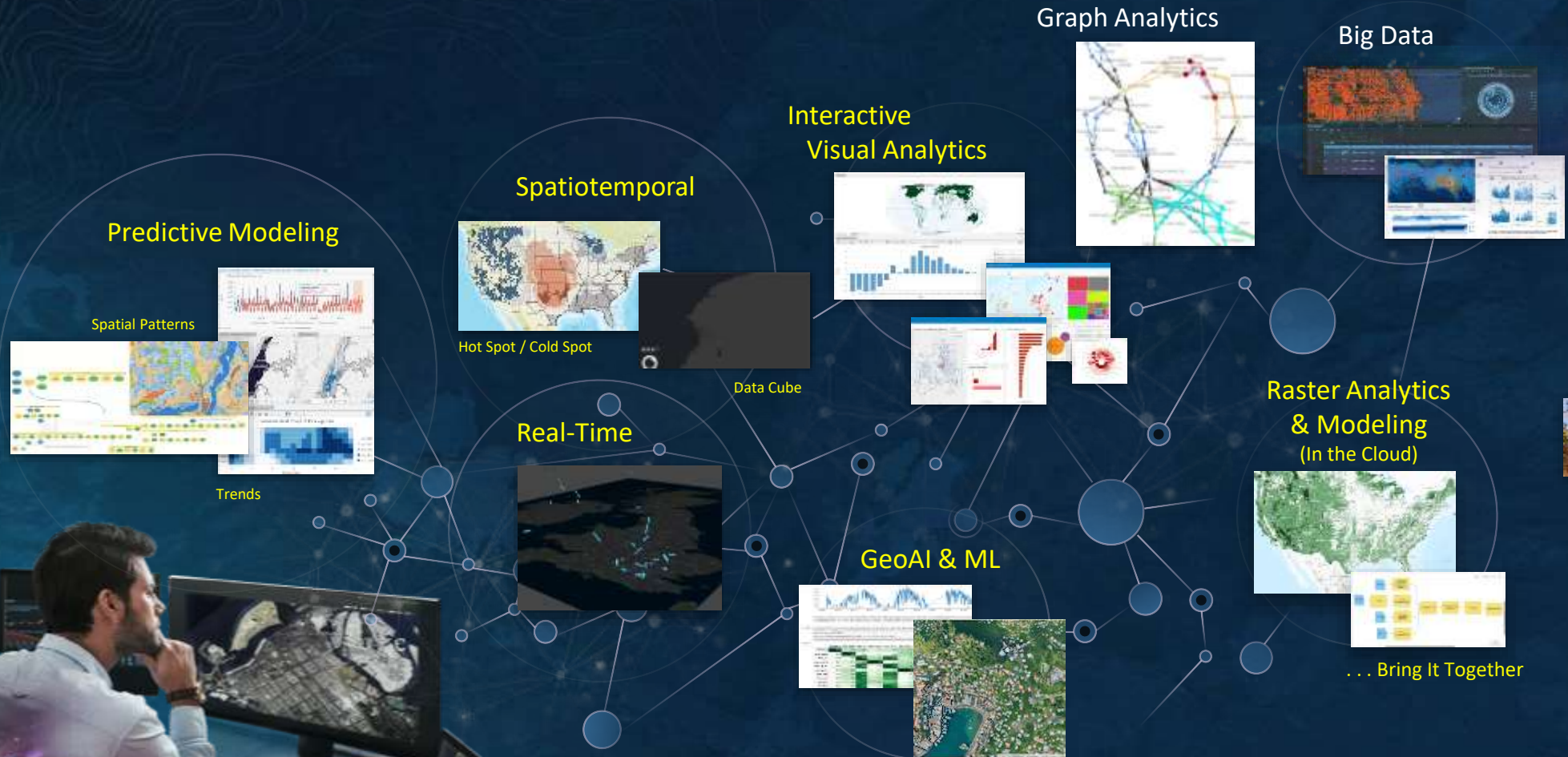
Supporting Many Types of Workflows and Engagements



*Empowering Everyone . . .  
. . . In the Organization and Beyond*

# Spatial Analytics are Advancing

Creating New Insights and Understanding



*Leveraging Many Technical and Scientific Innovations*

# 3D Digital Twins and Immersive Experiences

Integrating All Types of Information

Reality Capture

3D System of Record

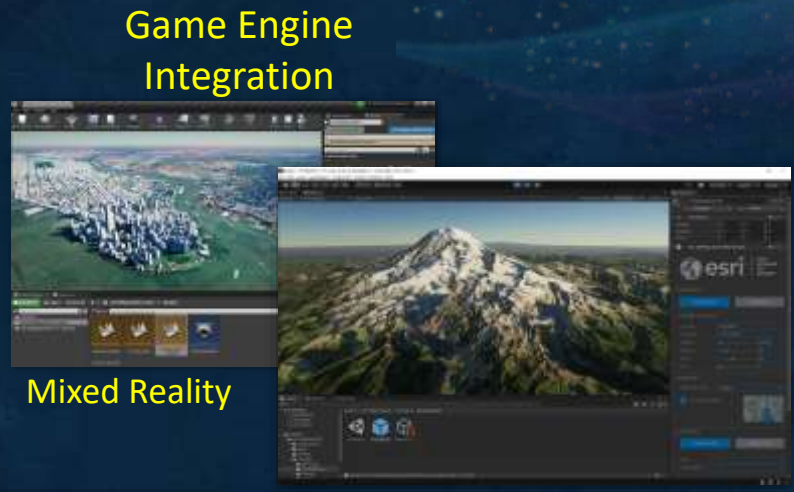
Real-Time Sensors



Digital Twin



Headsets



Game Engine Integration

Mixed Reality

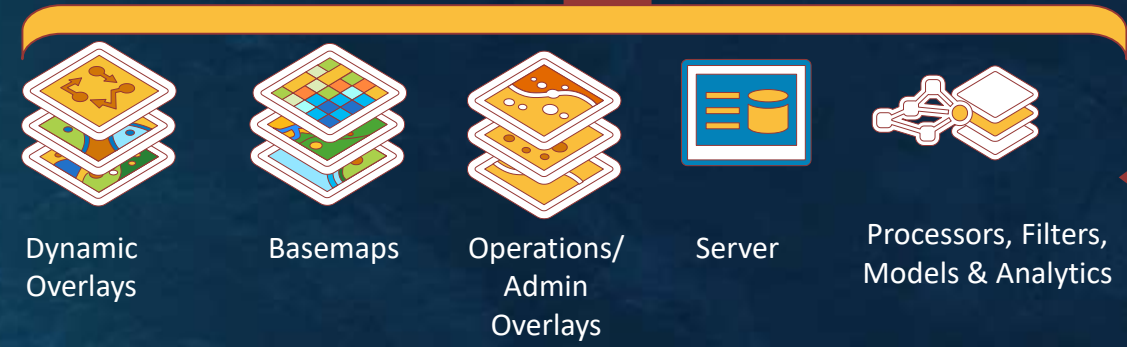
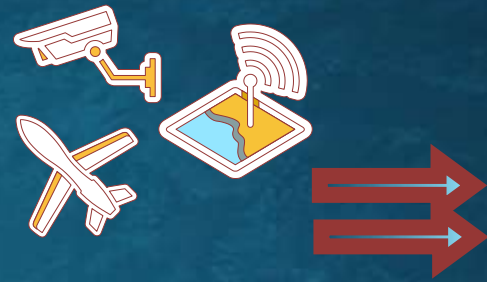
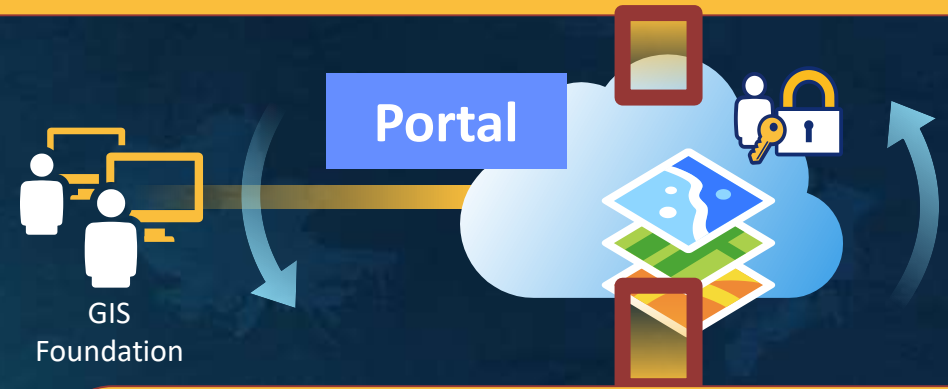


Tabletop AR

*Real-Time and Interactive . . .*

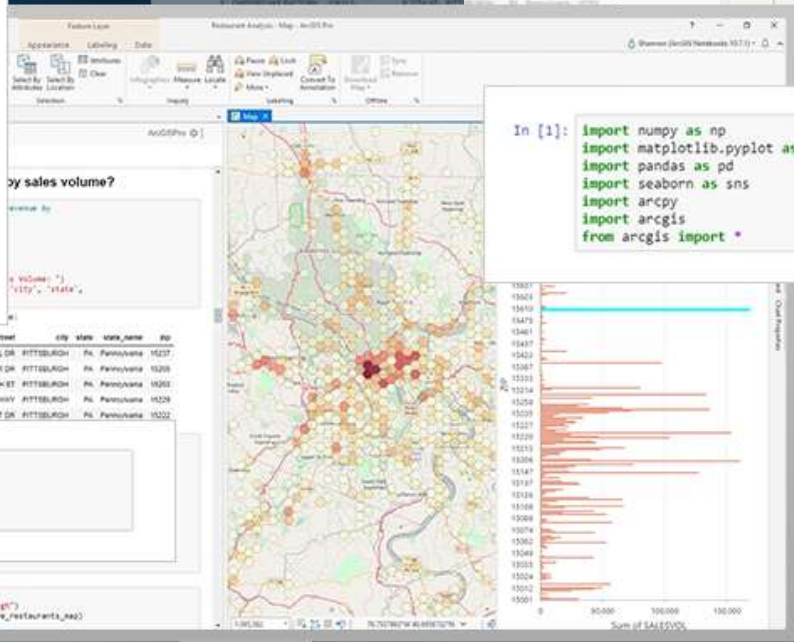
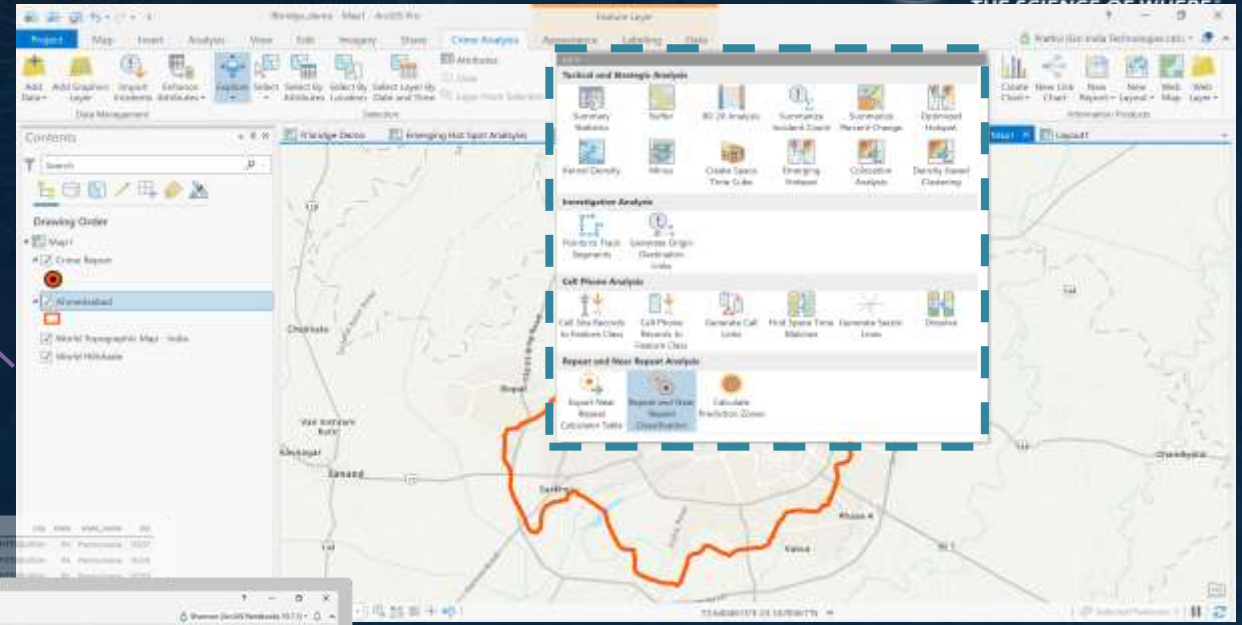
*. . . Transforming How We See, Understand and Act*

# Building the Initial Operating Capability



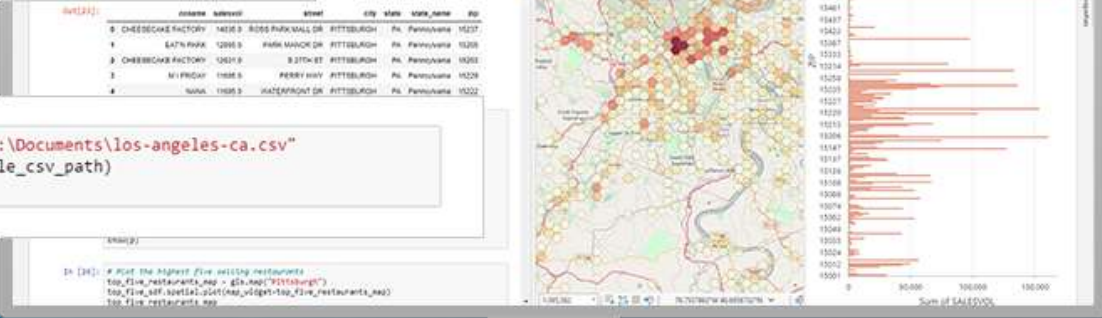
# Platform

ArcGIS Pro ( Crime Analysis )



```
In [1]: import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
import arcgpy
import arcgis
from arcgis import *
```

```
In [3]: table_csv_path = r"C:\Documents\los-angeles-ca.csv"
df = pd.read_csv(table_csv_path)
df.head()
```



ArcGIS API for Python

# Analysis

**Emerging Hot Spot**

*(R Bridge + ArcGIS Pro)*

**80/20 Analysis**

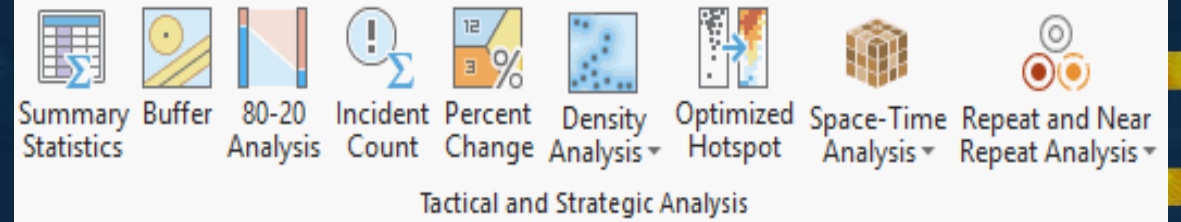
*(Python API)*

**Kernel Density**

*(Python API)*

**Summarize Incident Count**

**Repeat and Near Repeat  
Classification**



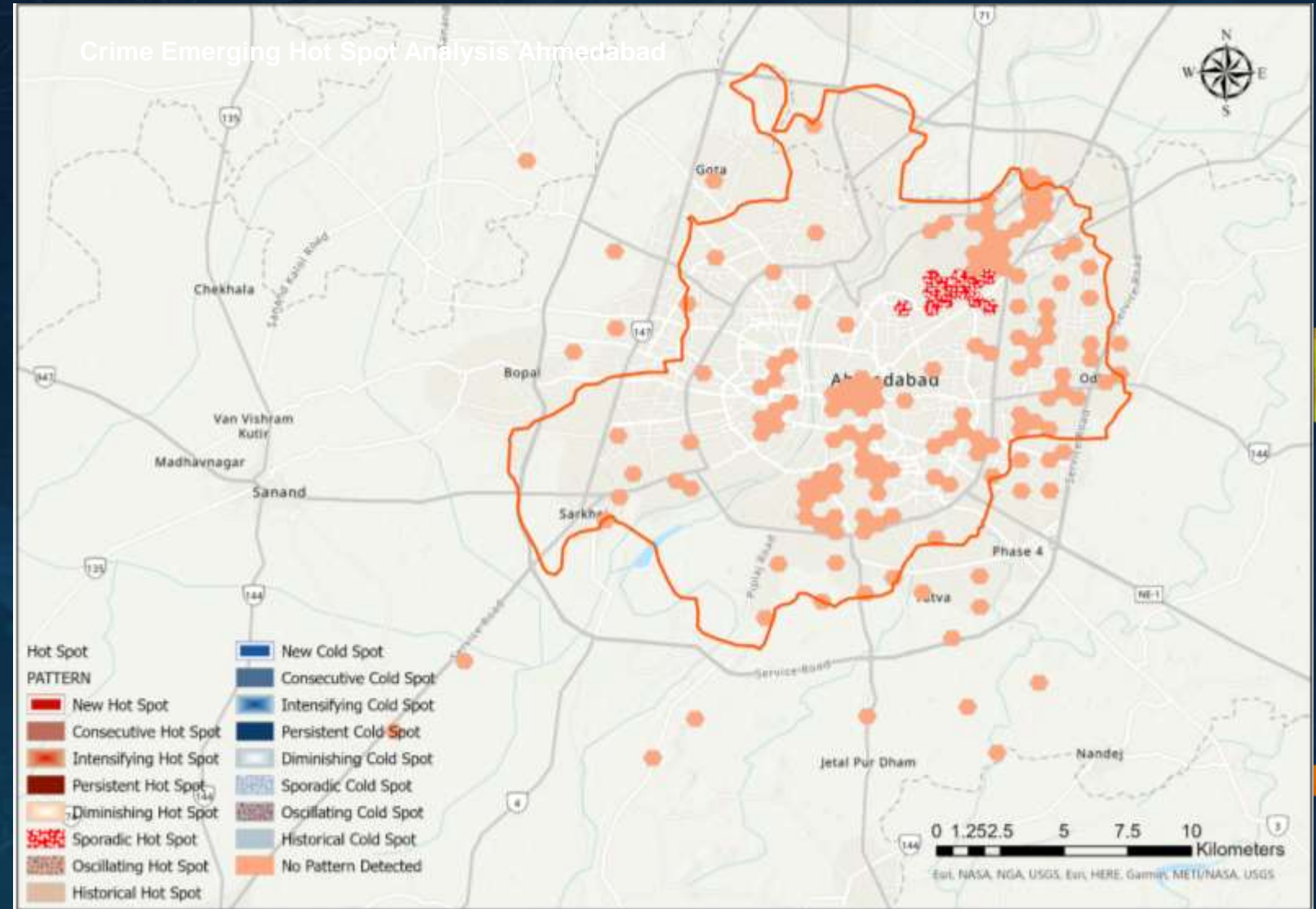
Tactical and Strategic Analysis

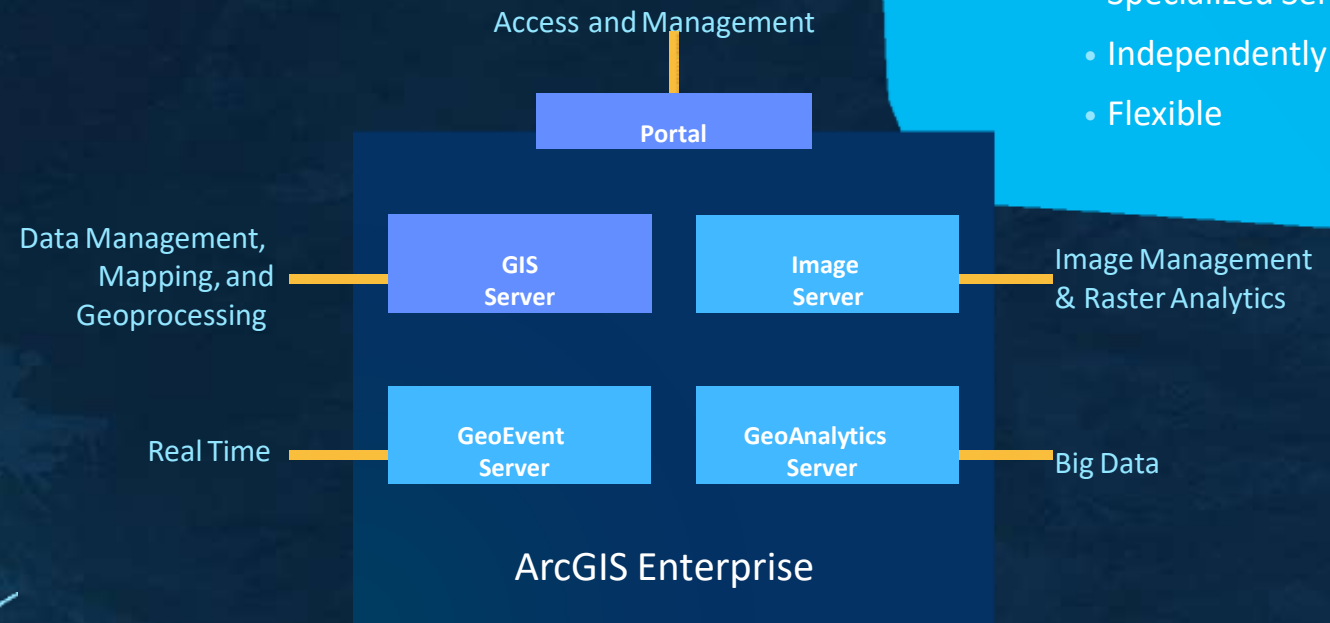
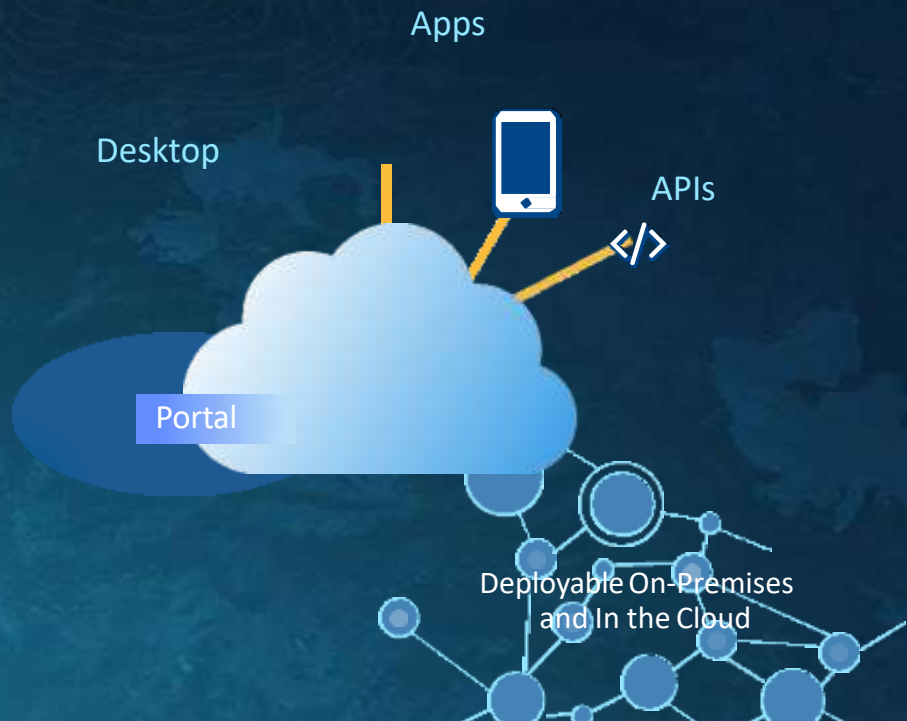
Summary Statistics | Buffer | 80-20 Analysis | Incident Count | Percent Change | Density Analysis | Optimized Hotspot | Space-Time Analysis | Repeat and Near Repeat Analysis

The toolbar contains icons for Summary Statistics (grid with sigma), Buffer (circle with lines), 80-20 Analysis (bar chart), Incident Count (exclamation mark with sigma), Percent Change (percentage sign), Density Analysis (point cloud), Optimized Hotspot (map with arrow), Space-Time Analysis (cube), and Repeat and Near Repeat Analysis (two circles).

# Results

- The output of the tool breaks down the results into 17 categories representing the temporal trends of hot and cold spots over time.
- Here, in this case, a sporadic hotspot was found.
- Big data can help to find more accurate results.





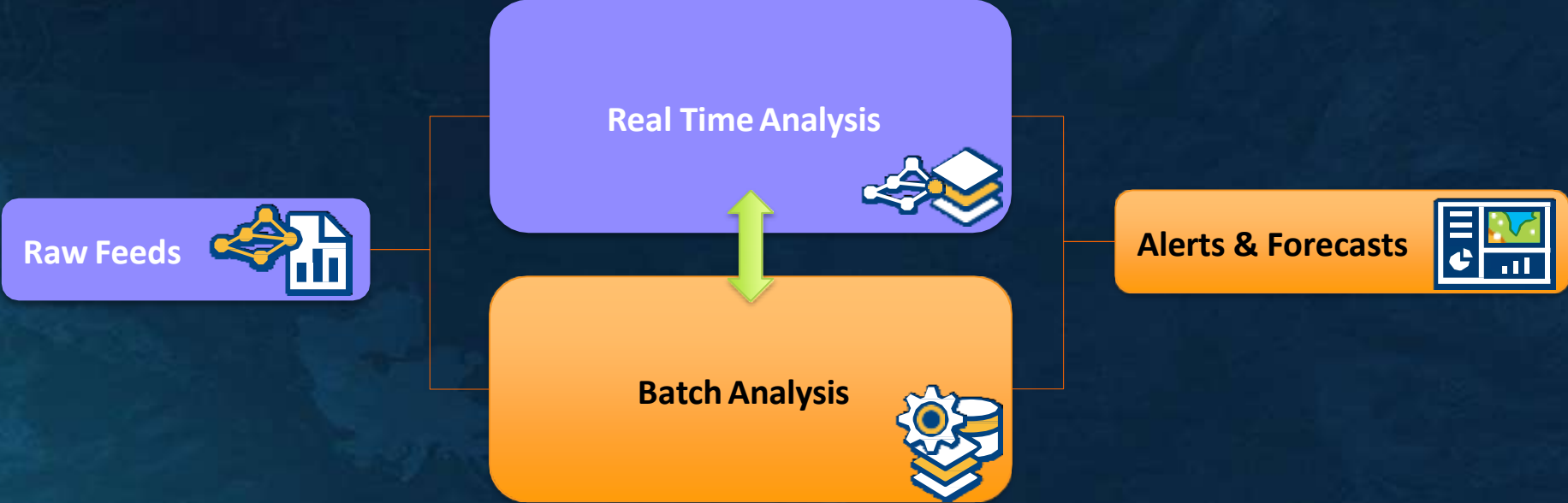
## Modular and Massively Scalable

- Specialized Servers
- Independently Scalable
- Flexible

Enterprise Data Management, Analysis, and Mapping

... Enabling Organizations to Take GIS to Scale

# New Analytic Workflow

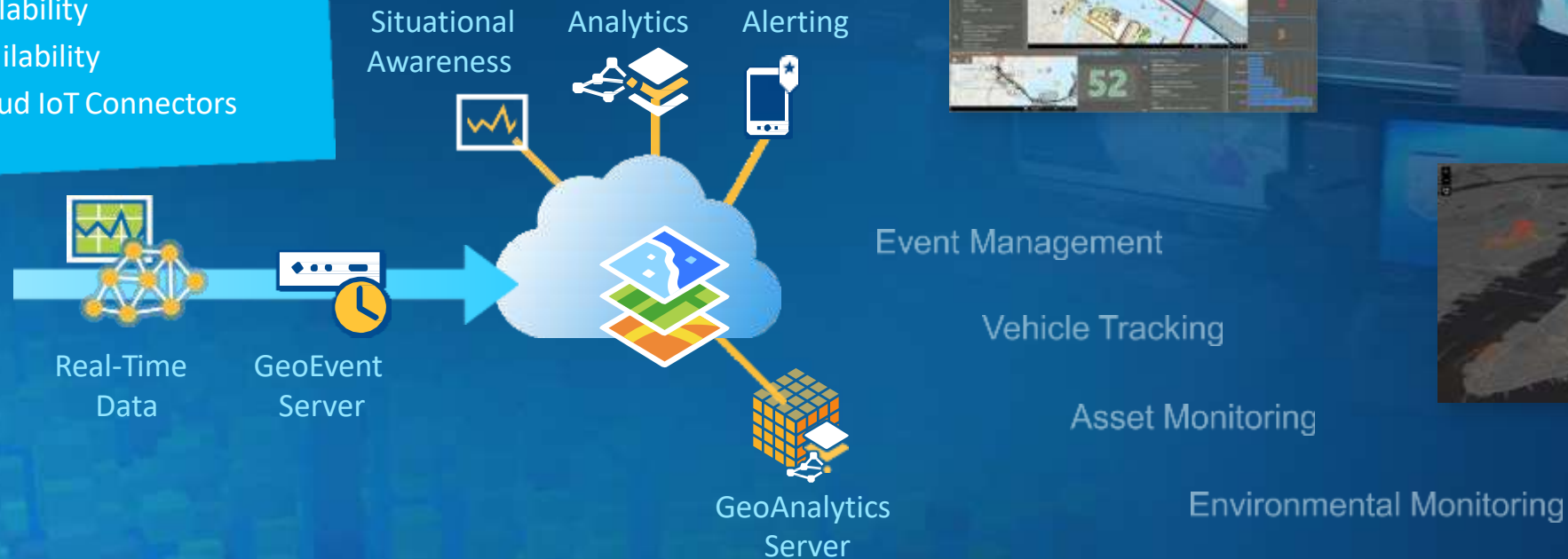


# Real-Time Analytics | Integrating Sensor Networks and the IoT

- High-Velocity Data Streams
- Monitoring and Alerting

## Improvements

- Scalability
- Availability
- Cloud IoT Connectors

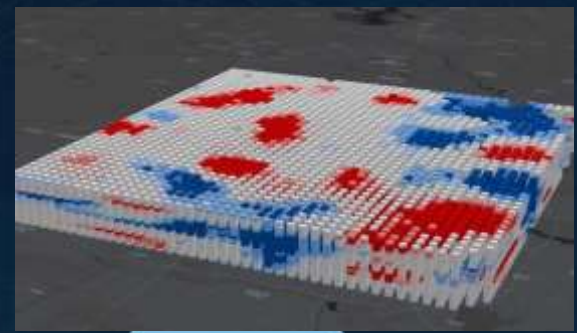


*Supporting Real-Time GIS Applications . . .*

# Big Data Spatial Analytics | Faster and Massively Scalable

## Feature Analytics

GeoAnalytics Server  
Large Observation Collections



Space-Time Cube



Riparian Areas

## Raster Analytics

Image Server  
Large Imagery Collection



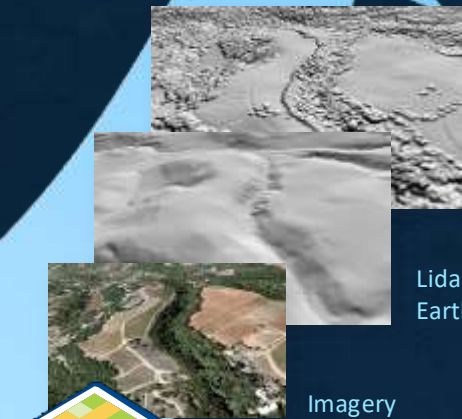
Power Outages (50+ Million)

Density

Hot Spots



Faster (10x+)



Imagery

Lidar: Bare Earth

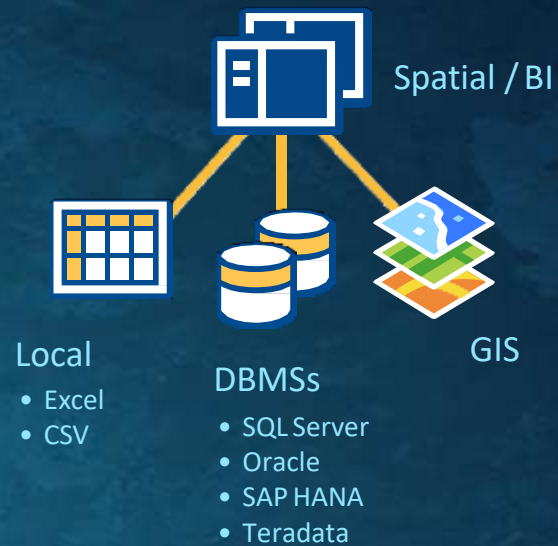
Lidar: First Return

Leveraging Distributed Computing and Parallel Processing

... Accessible from ArcGIS Pro and Python API

# Exploratory Data Analysis and Visualization

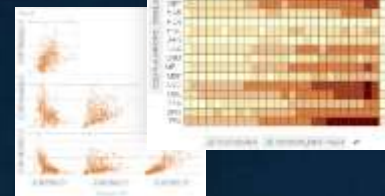
- Self-Service
- Visual, Intuitive, Responsive
- Access Data from Across Your Organization



New Charts



Link Analysis



Visual Models



Charts and Maps



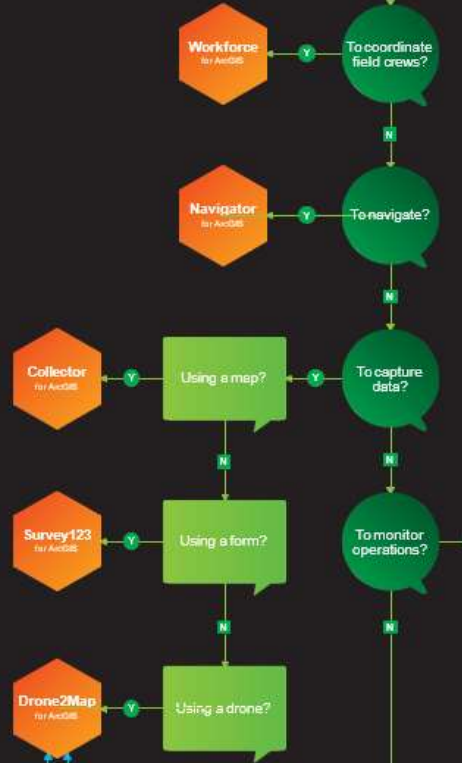
Spatial and Tabular Analysis



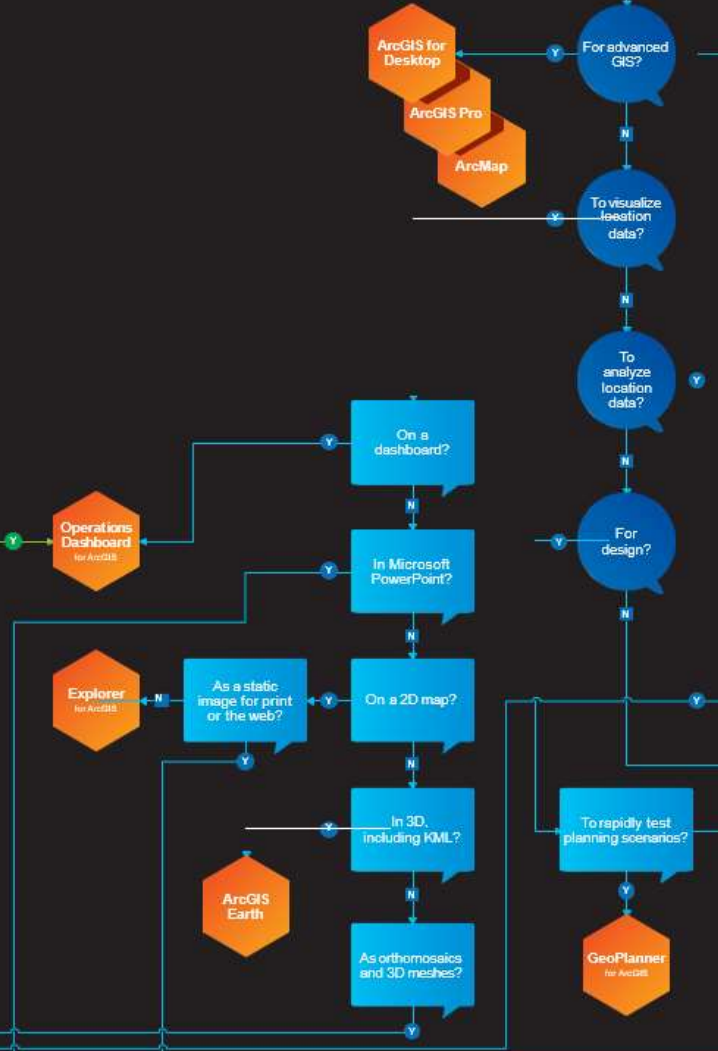
Available with ArcGIS Online & Enterprise

I want to use  
**ArcGIS Apps**  
 for

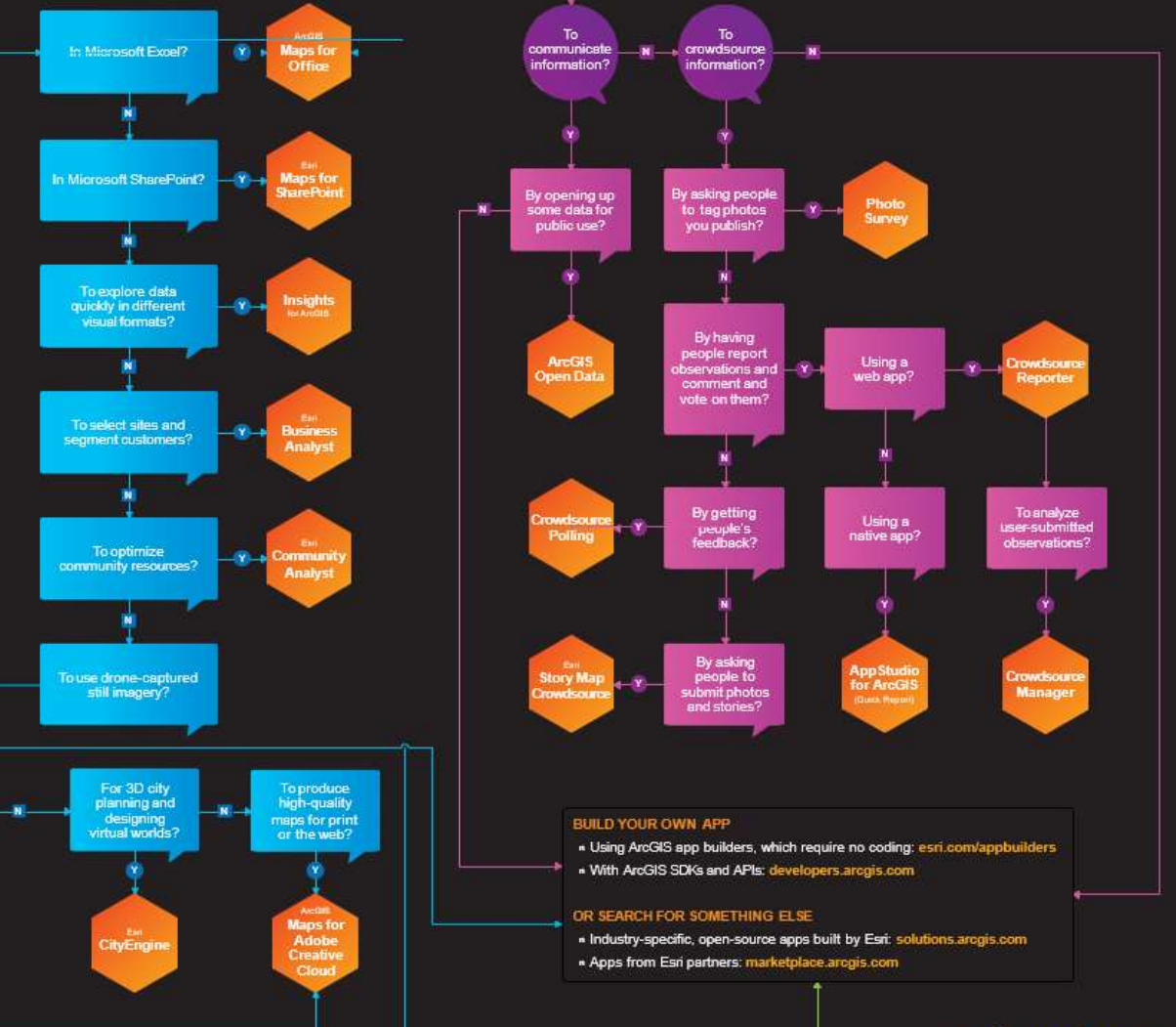
**THE FIELD**



**THE OFFICE**



**THE COMMUNITY**



**BUILD YOUR OWN APP**

- Using ArcGIS app builders, which require no coding: [esri.com/appbuilders](http://esri.com/appbuilders)
- With ArcGIS SDKs and APIs: [developers.arcgis.com](http://developers.arcgis.com)

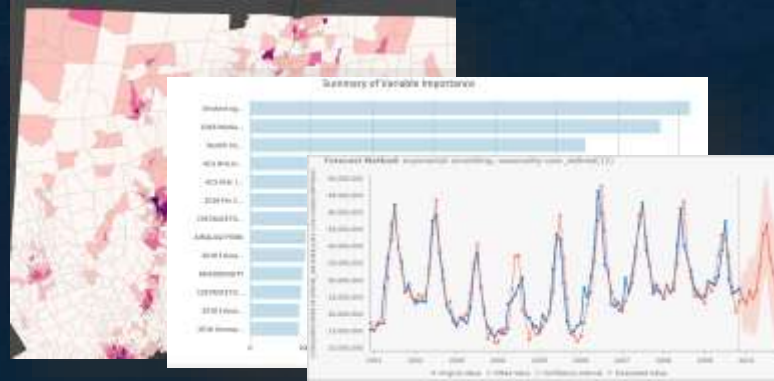
**OR SEARCH FOR SOMETHING ELSE**

- Industry-specific, open-source apps built by Esri: [solutions.arcgis.com](http://solutions.arcgis.com)
- Apps from Esri partners: [marketplace.arcgis.com](http://marketplace.arcgis.com)

# What Can Machine Learning Do?



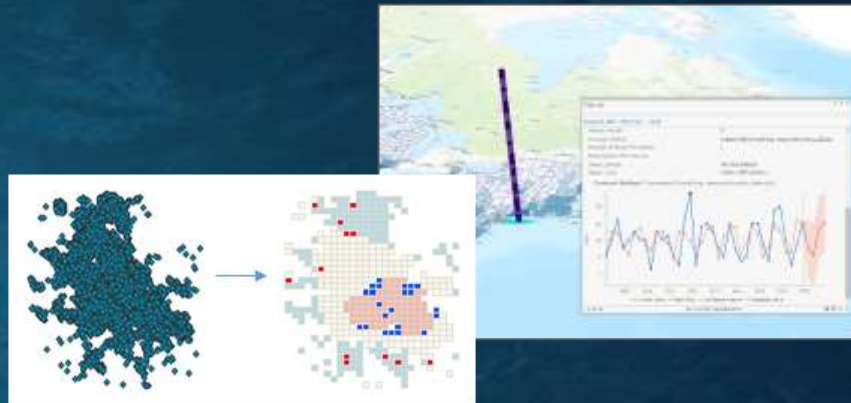
Extract features



Make predictions



Find patterns & clusters



Detect anomalies



Address Crime Crime\_datetime C-e Reporting\_officer C-r Weapon  
Reported\_date Reported\_time  
A Radcliffe Drive resident said three men - at least two of whom were carrying handguns - entered her apartment early this morning. They ordered her to give them the combination to a safe which they took from her home. She was not injured. Detectives believe this was a targeted armed robbery. Released 08/07/2016 at 11:17 AM by PIO Joel Despain.

Extract insights from text

# Extract Insights from Unstructured Text

Extract Entities, Classify Text, Translate StoryMaps, and More

## Extracting entities and relationships from text reports

Address Crime Crime\_datetime C-c Reporting\_officer C-r Weapon

Reported\_date Reported\_time

A Radcliffe Drive resident said three men - at least two of whom were carrying handguns - entered her apartment early this morning. They ordered her to give them the combination to a safe which they took from her home. She was not injured. Detectives believe this was a targeted armed robbery. Released 08/07/2018 at 11:17 AM by PIO Joel Despain



## Classifying country of incomplete addresses

Address	Country
40, Rue Eugene Delacroix, Seloncourt, 25230	FR
736, E AMOROSO PL, 90291	US
15127, CALLE EDGAR ALÁN POE, CHIHUAHUA, Chihuahua, Chihuahua	MX
25376, COSTEAU ST, LAGUNA HILLS, CA	US
1-6, 一栗寺町 / 内町	JP
3701-1, 飯香浦町	JP
30, CL GARMEN AMAYA, 39011	ES
NW21-17-23W	CA
8140, avenue Belges	CA
80, WURUNDJERI BOULEVARD, BERWICK, VIC, 3806	AU

## Translate StoryMaps

translacion High-Injury Roadway Akasre actualizado Preguntas

The "Wabbot" base

The Preliminary Engineering Report for a new bridge will advance into the design phase of project. and construction of the new bridge will depend.

As part of the community conversation to develop improvements were also identified. A final report will be released in December 2019.

Healthy



## Correct and normalize mistyped street addresses

MISTYPED NON-STANDARD ADDRESS	NORMALIZED ADDRESS
940, NORTH PENNSYLVANIA AVNEUE, MASON ICTY, IOWA 50401	940, N PENNSYLVANIA AVE, MASON CITY, IA 50401
220, SOYTH RHODEISLAND AVENUE, MASON CITY, IOWA 50401	220, S RHODE ISLAND AVE, MASON CITY, IA 50401

# With ArcGIS Knowledge Organizations can...

Visualize and Explore Connected Data

- In maps and link charts

Explore and Analyze connected data

- Using queries, free-text search, histograms, graph algorithms that identify important or influential entities

Manage Data in the Knowledge Graph

- With flexible schema, load external data, add & modify graph data

Reference Documents

- To preview their contents and extract text

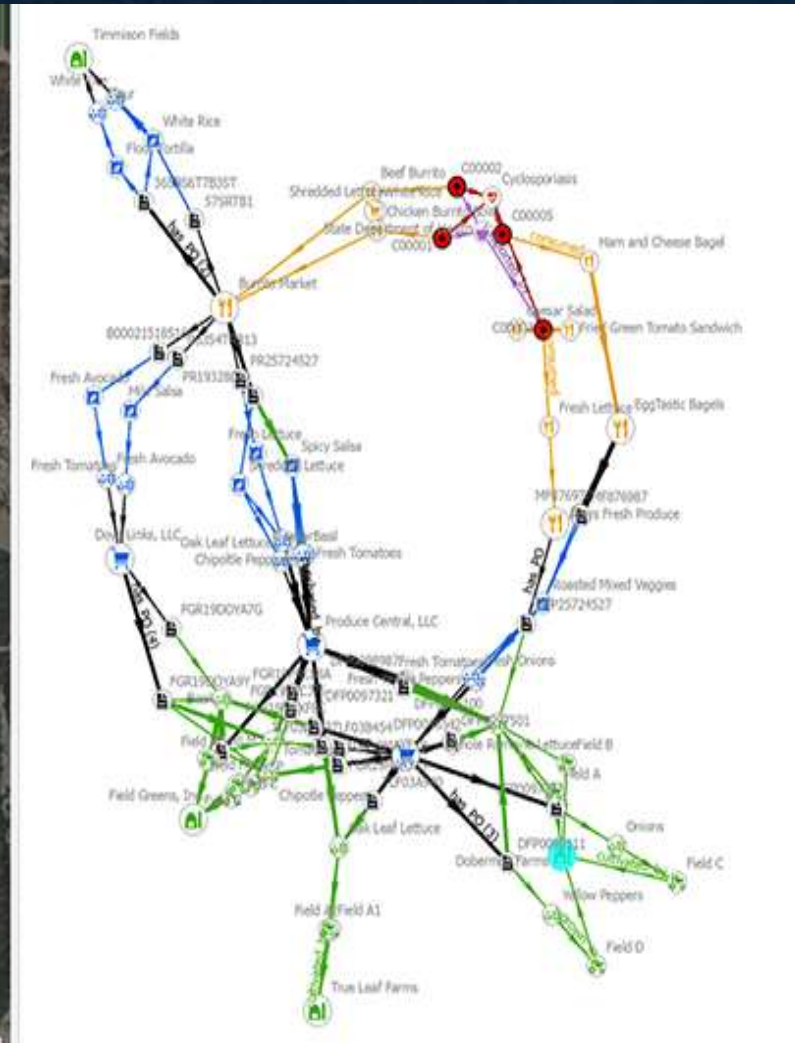
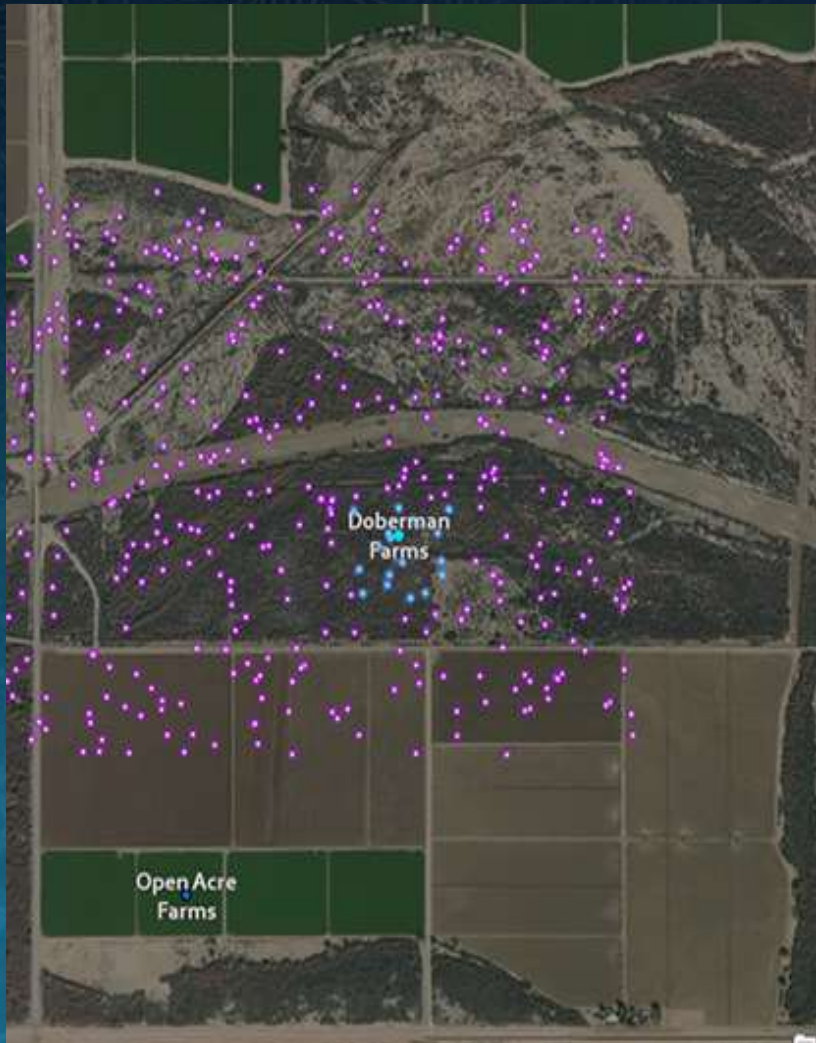
Collaborate Across Enterprise

- Share Knowledge Graphs to build on existing analysis

# ArcGIS Knowledge excels at bringing wide range of data

- Supply chains, invoices, shipping manifests
- Watchlists or block lists
- Customer loyalty information
- Case data, investigations, dossiers
- Call data records
- Property ownership records
- Dependency trees (IT assets)
- Financial transactions
- Social media posts
- Personnel files
- Movement/location data
- Vehicle tracks
- Warranty claims
- Reports, news articles, internal documents

# Graph Analysis - Knowledge graphs



Makes it possible to perform analytics on the data to quickly understand the significance of complex sets of relationships across multiple datasets.

*Collaboration in the New Normal  
Building resilience for individuals,  
communities, and nations.*

Thank you for your  
attention

Any questions,  
comments

