

The Future of SAP & Spatial

Why Should You Care?

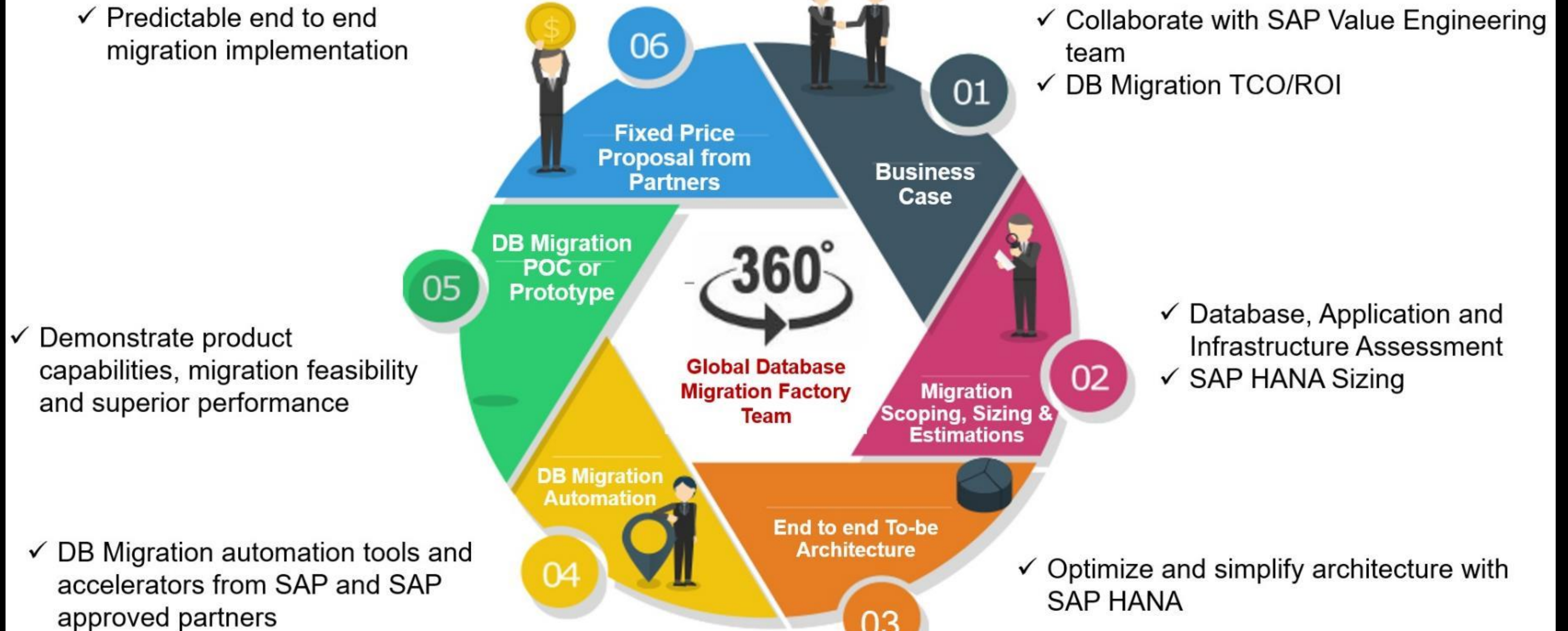
ZAG
LET OTHERS ZIG

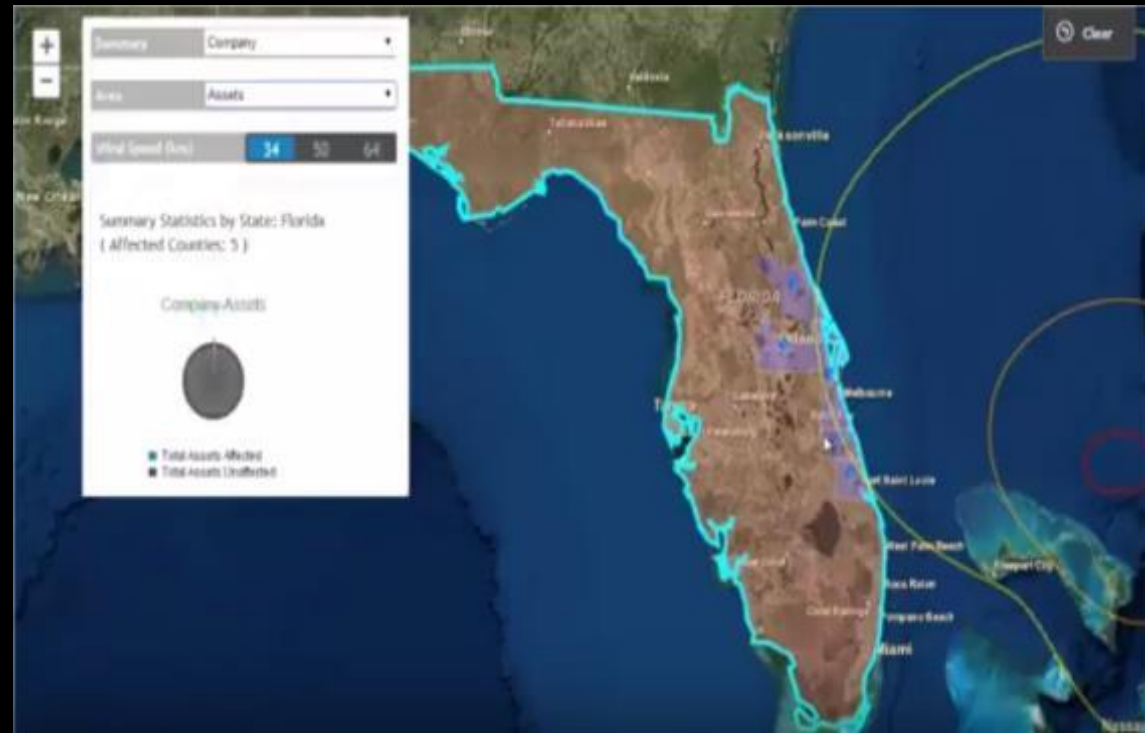
Agenda

- Introduction to Spatial
- SAP with Spatial & Roadmaps
- Geographical Enablement Framework (GEF)
- Other Stuff / Useful Links

SAP Database Migration Factory Program

Service Offerings





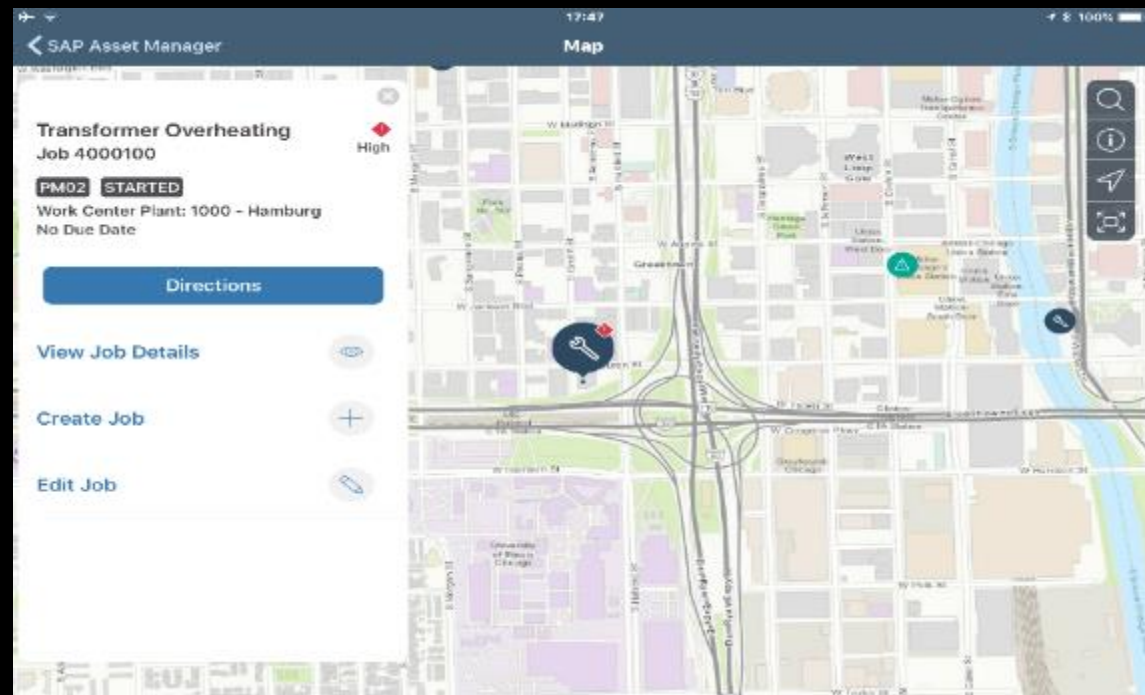
Correlate EVENTS



Prevent DISASTERS



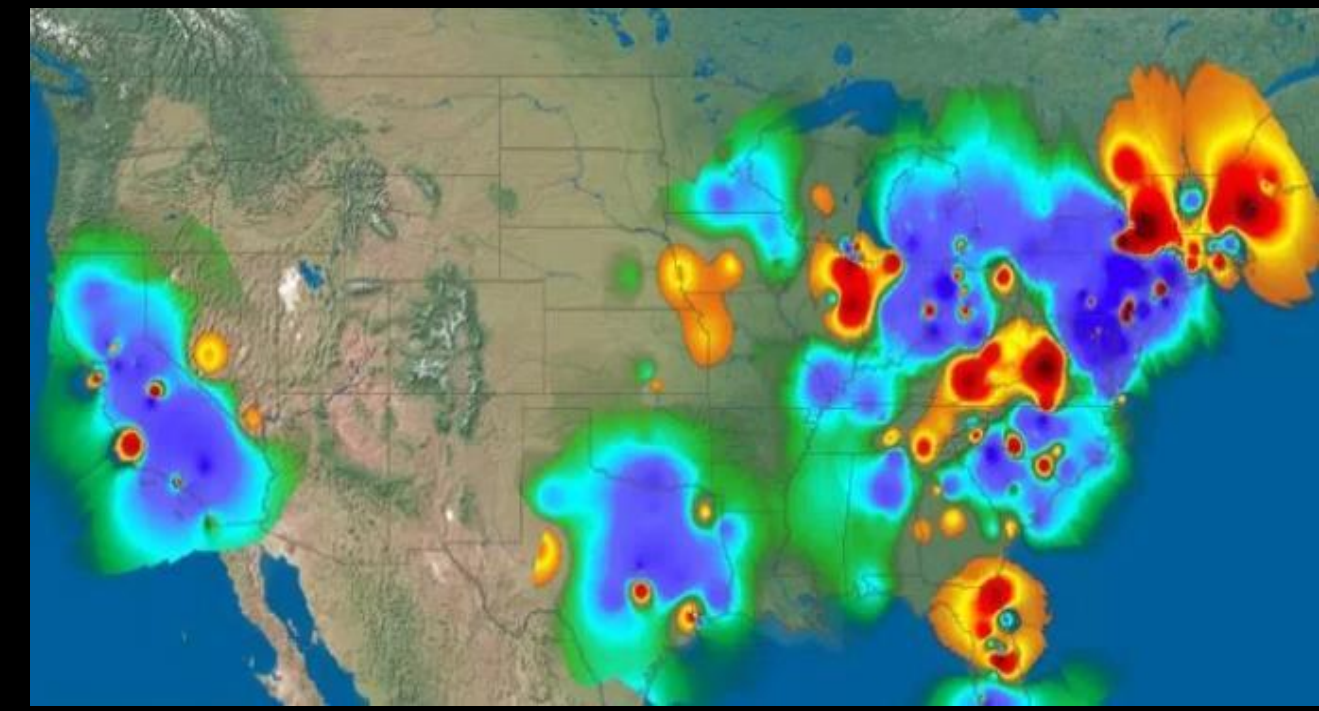
Detect PATTERNS



Act in the MOMENT



Process BIG DATA

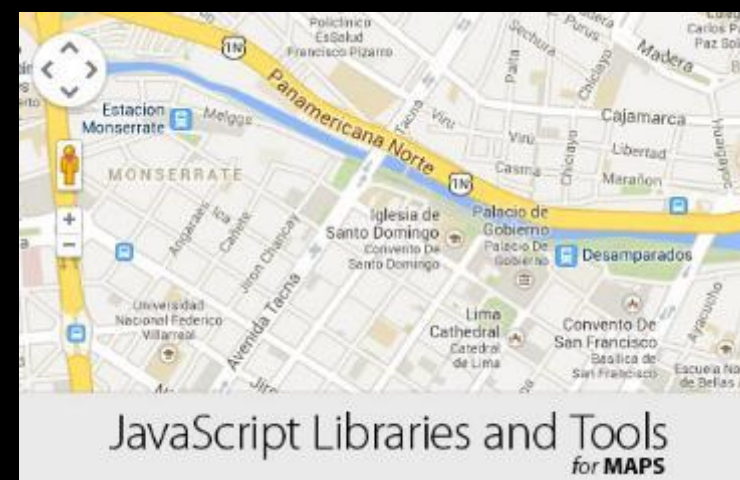
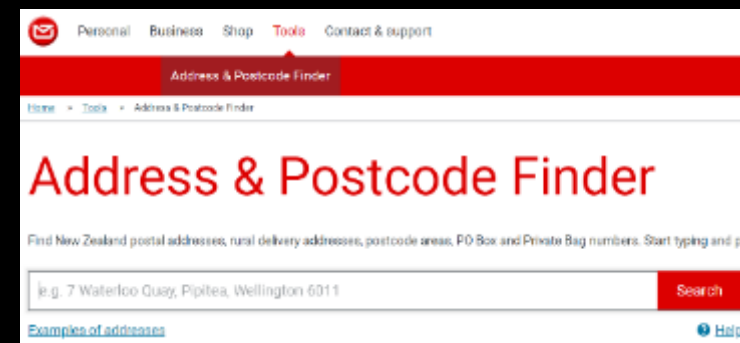
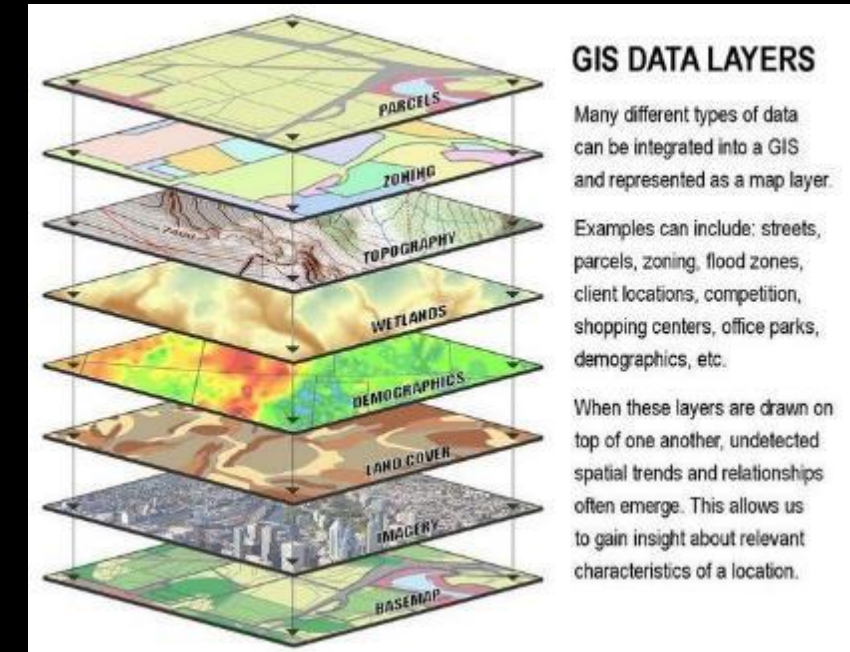


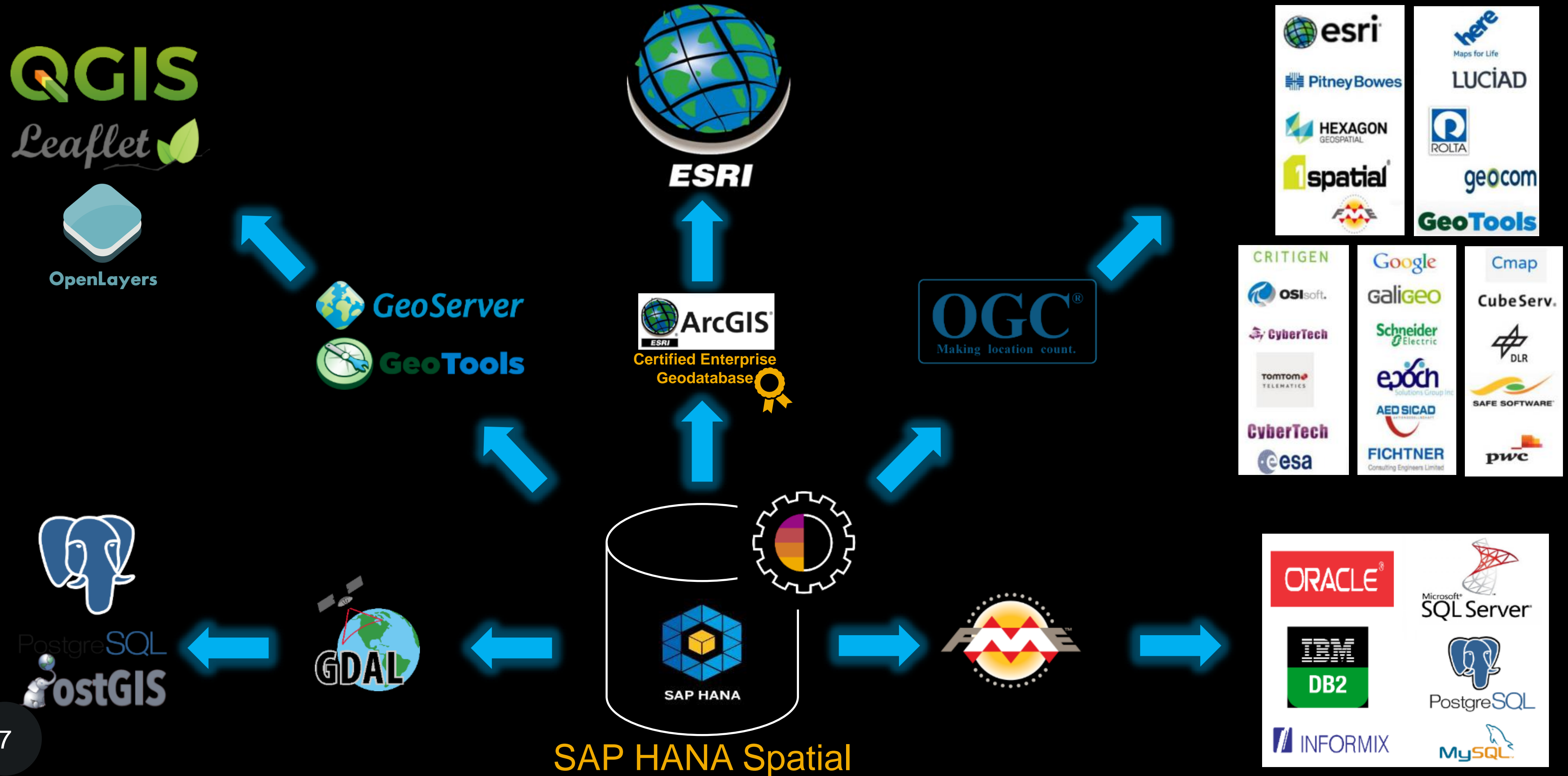
Engage CONSUMERS

- Trends & Insights
- Monitoring & Dashboards
- Targeted Apps
- Network Model & Routing
- Topology & Editing
- 3D/4D in Steroids
- Mixed Reality Enablement
- Advanced GIS



- SAP HANA Spatial Database.
 - as Esri GeoDB.
- SAP HANA Spatial Services.
 - and HSS app.
- SAP Directories.
 - per Country.
- GEF Viewer & Editor.
 - plus other modules.
- BUT NO MAP ENGINE !





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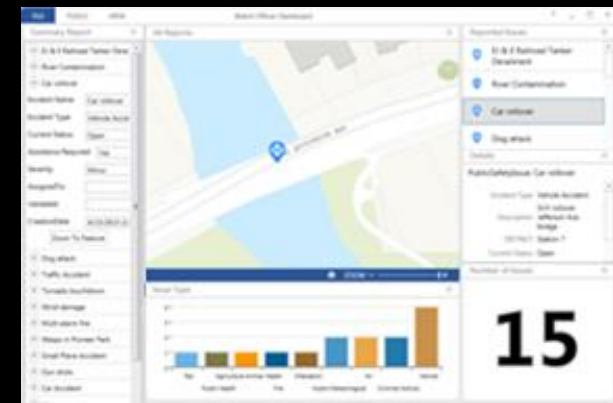
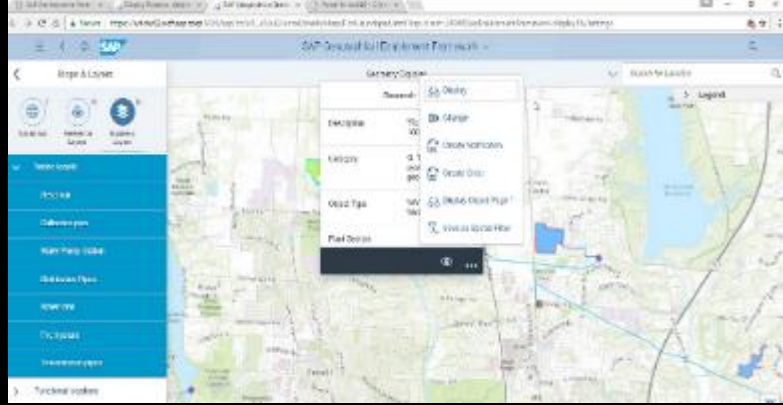


SAP + Esri – Better Together!

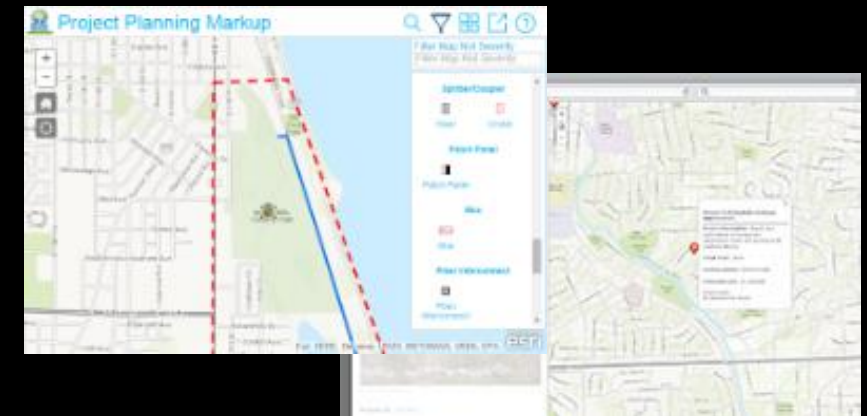
SAP Analytics Cloud



SAP Enterprise Asset Management



Health & Safety Reporting SAP Environment, Health & Safety management

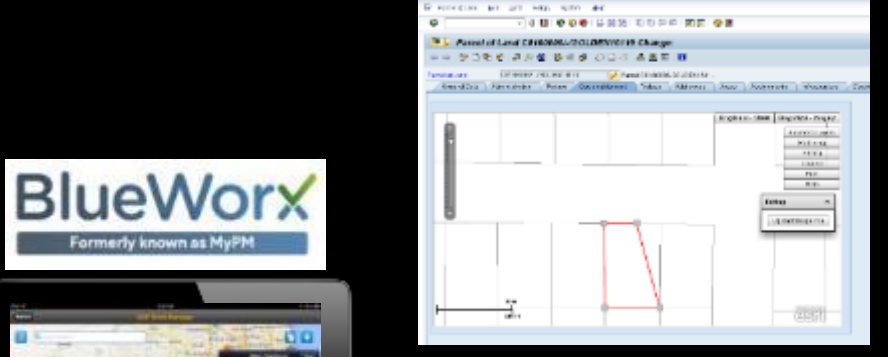


Capital Project Planning SAP Project System

HANA Apps



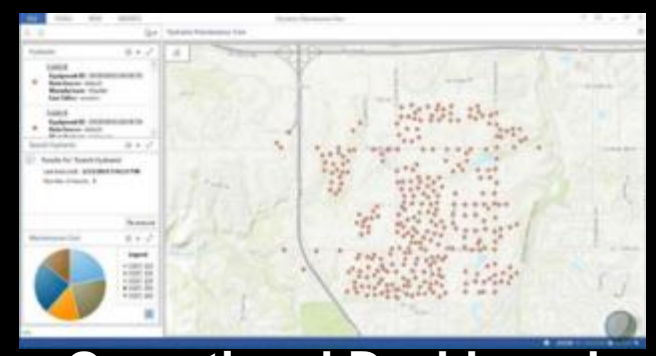
SAP Real Estate Management



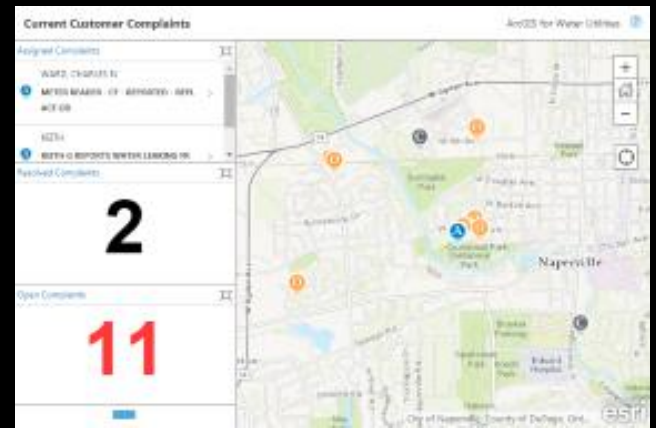
SAP Service Manager



SAP Multiresource Management



Operational Dashboard SAP Plant Maintenance

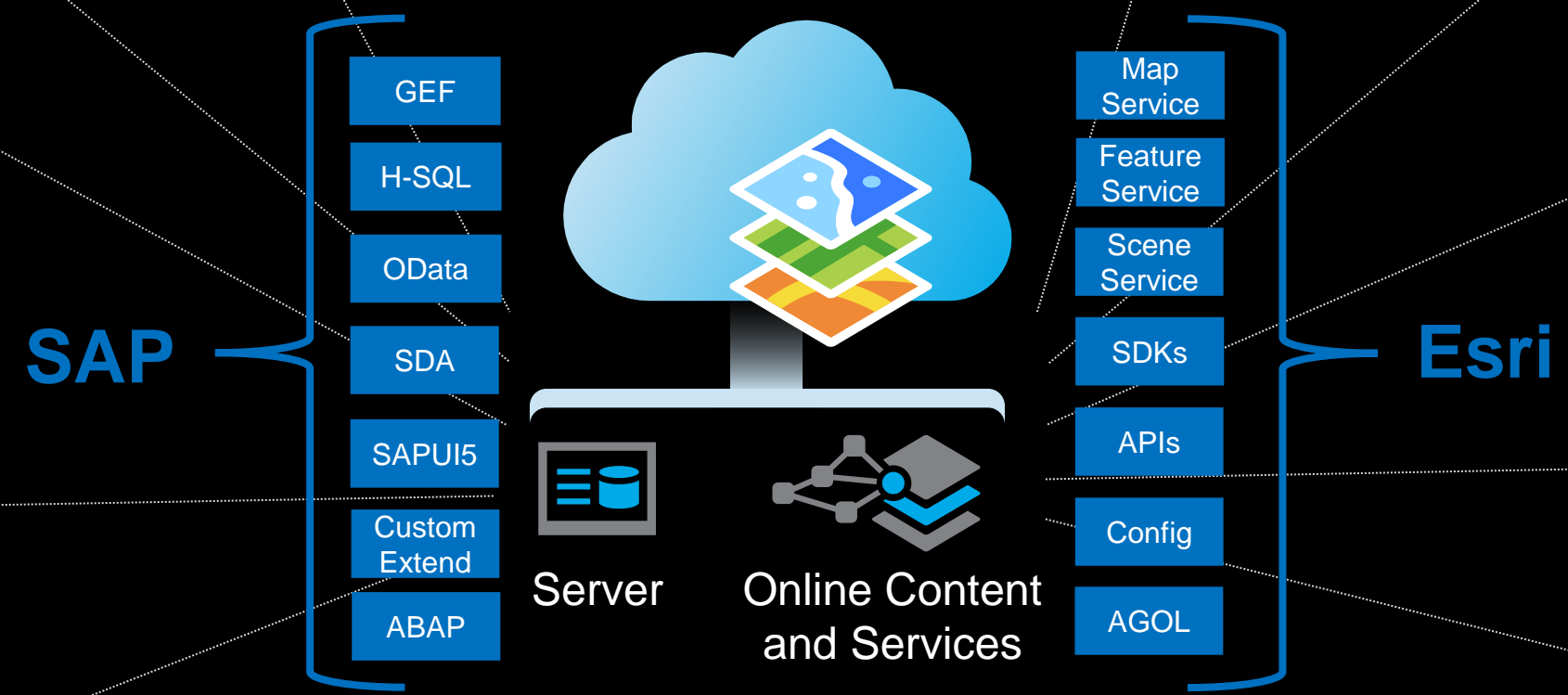


Customer Incidents SAP CRM

SAP Enterprise Asset Management

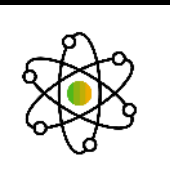


Leak Survey Collector SAP Enterprise Asset Management



SAP HANA

Cloud, Multi-Cloud, On-Premise, Hybrid

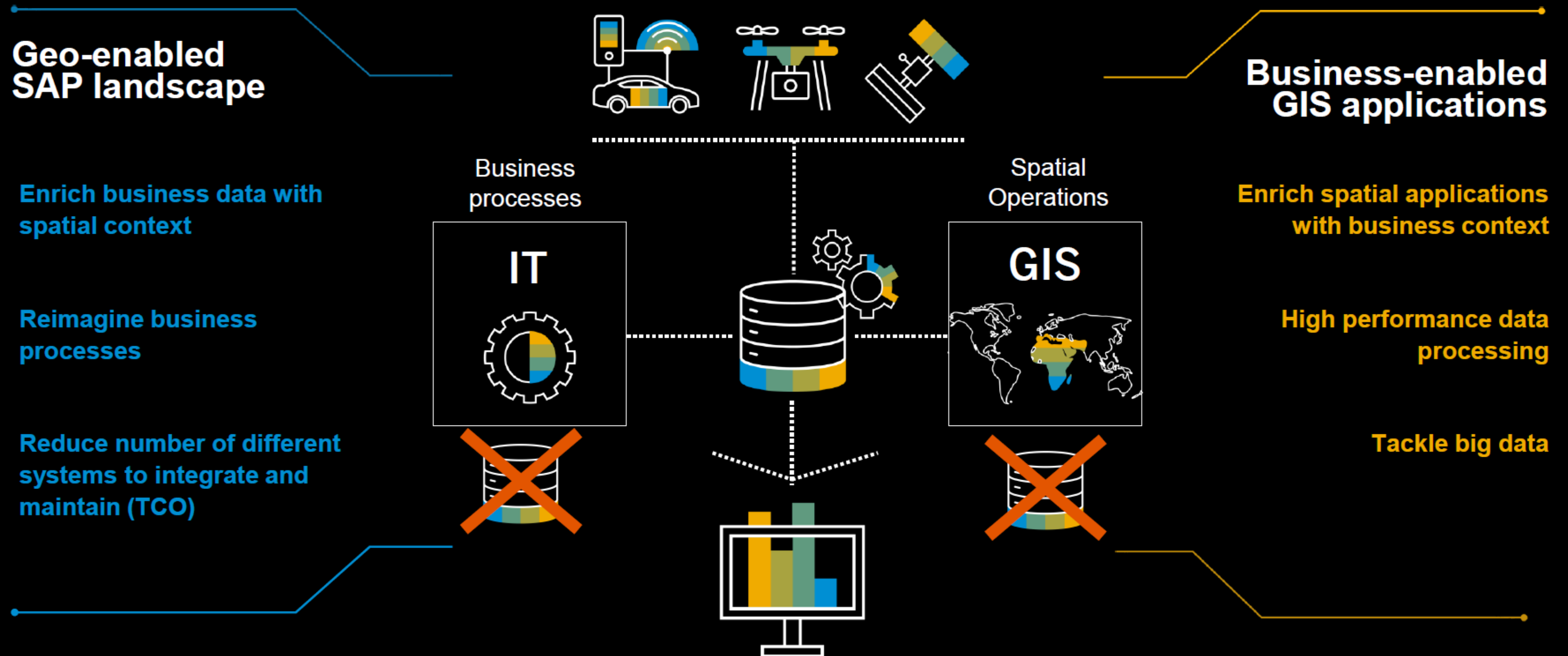


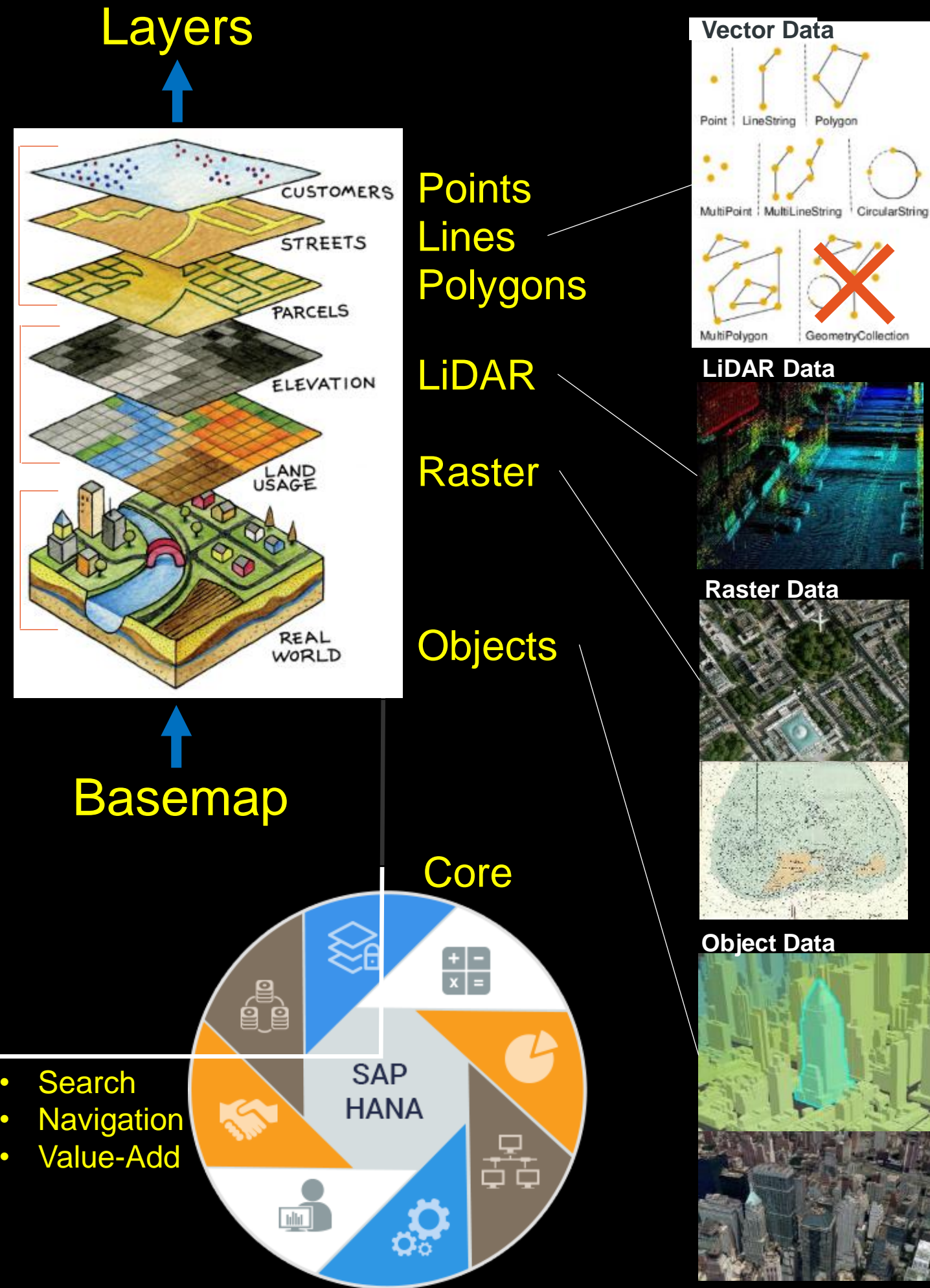
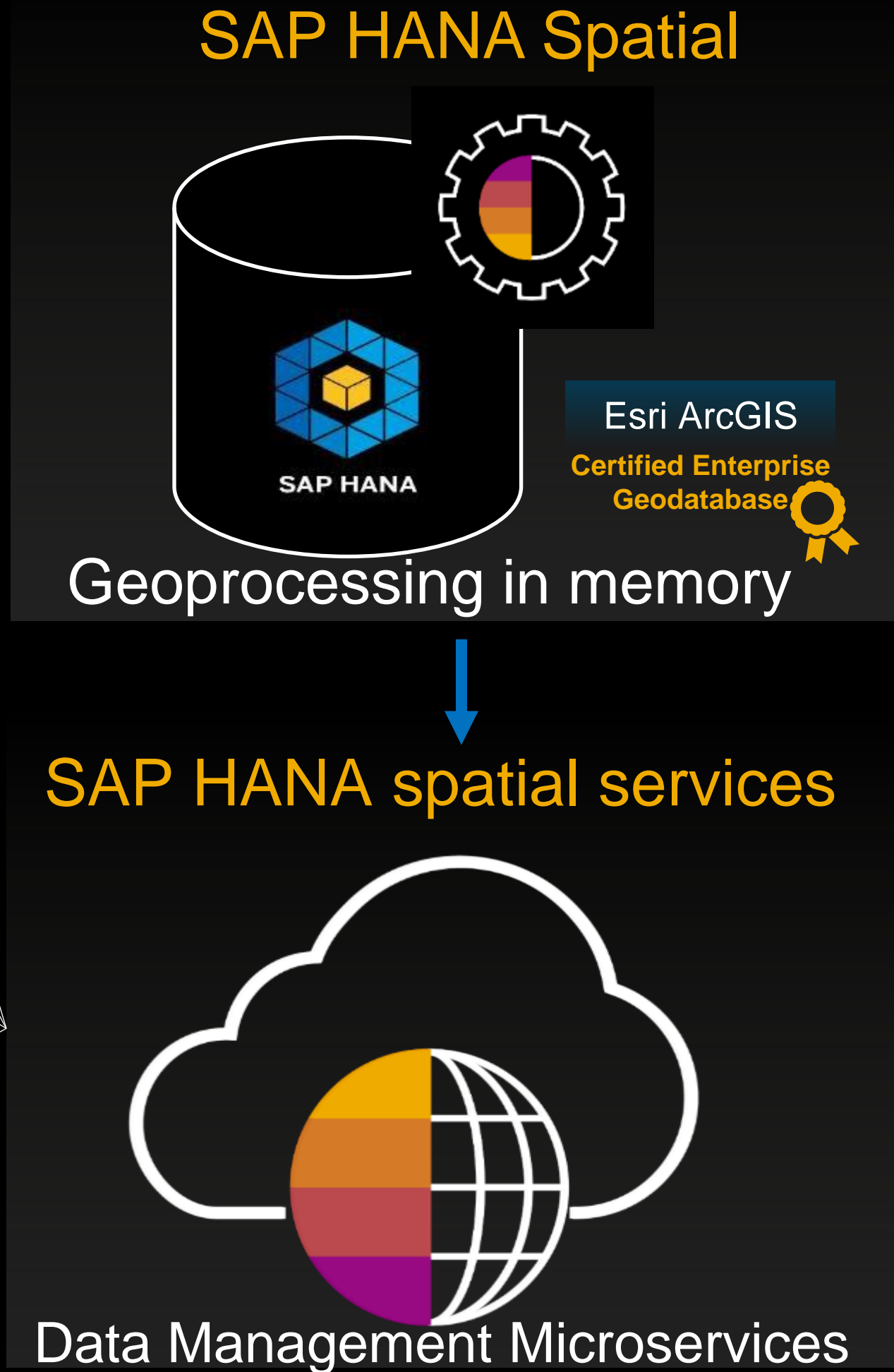
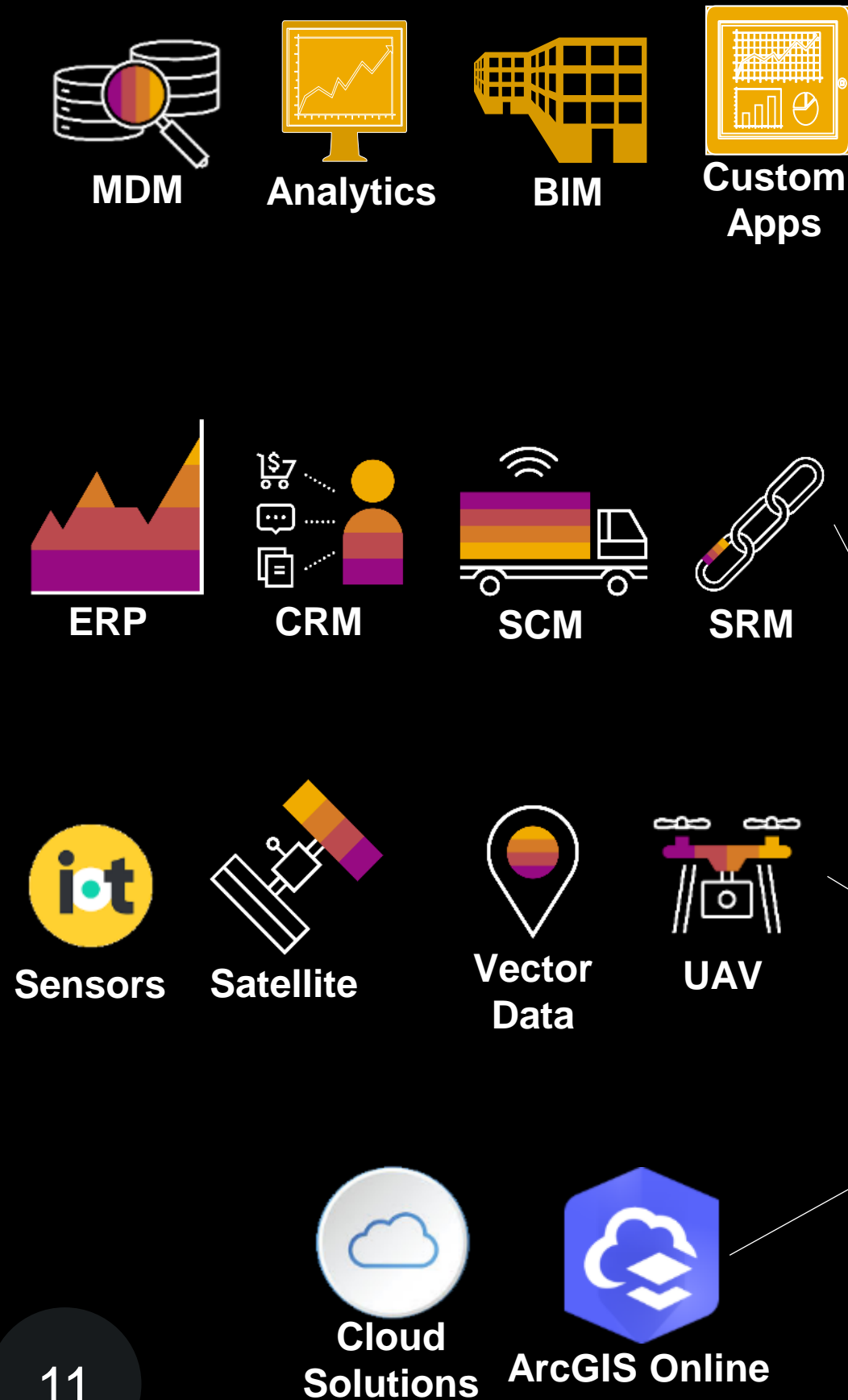
Advanced Analytics Engines



Esri ArcGIS geodatabase

SAP's commitment : Unifying two worlds







Business User



SAP HANA Spatial Services

Consume...

... spatial services & data inside business applications with spatial use cases

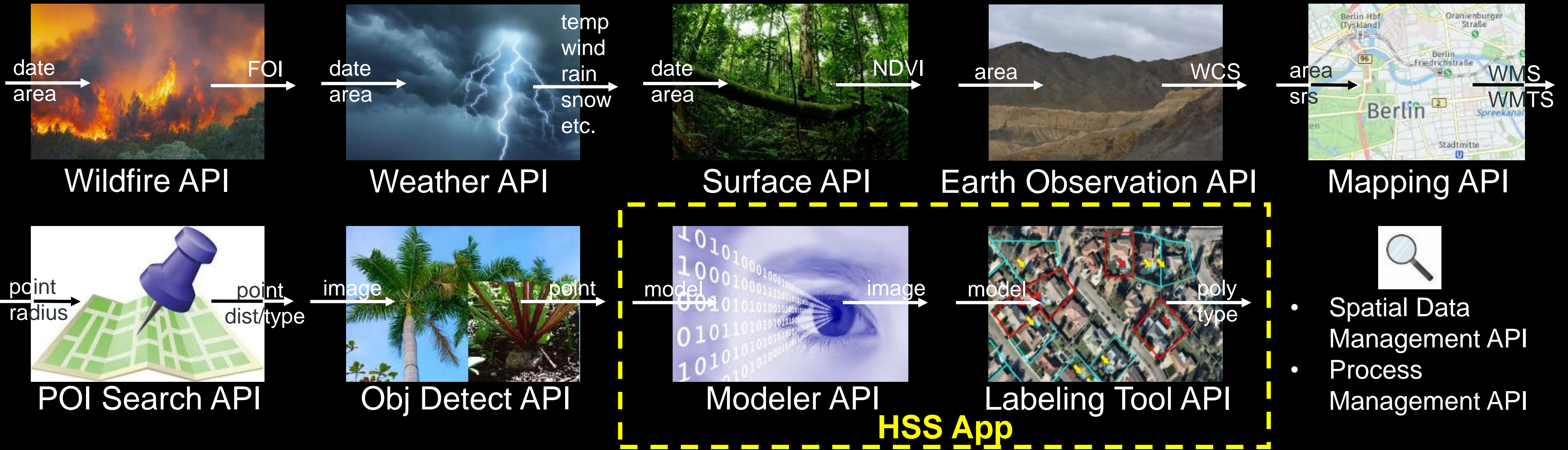
Process & Prepare...

... spatial services for delivery and consumption

Collect...

...geo data from multiple sources (e.g. satellite imagery from ESA, wheather forecast data, drone data, SAP systems)



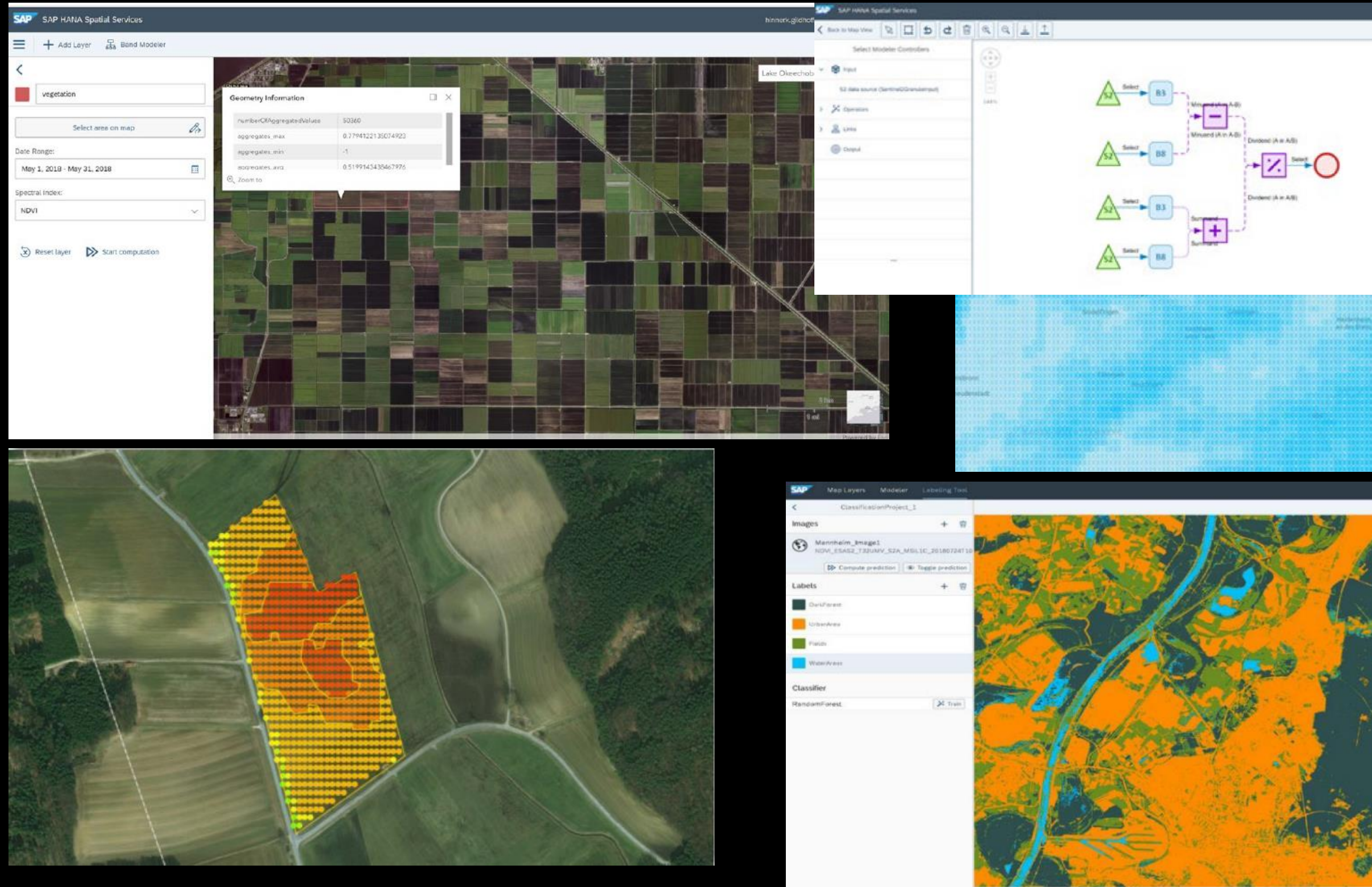


- Address Directories
- Geocoding Directories
- SDQM Location Microservices

- Type-Ahead
- Validation
- Certification
- Geocoding
- Reverse Geocoding

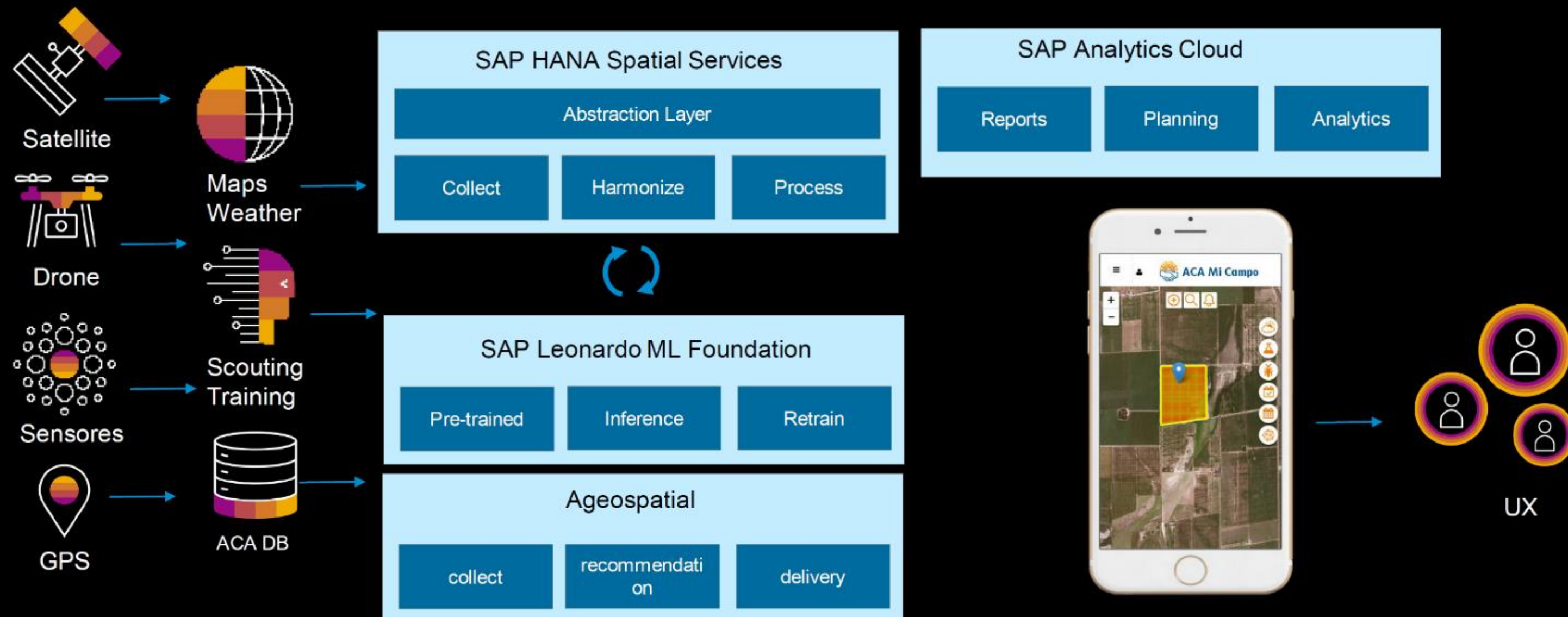
Spatial Viewer, Labeling Tool and Modeler to build, test and validate your models.

- Create on-demand custom services and models.
- Remove complexities of processing complex data (e.g. imagery).
- Easily integrate these services into business applications.
- Cost/scale management with cloud-based spatial services.
- Increased profits through better user experience (easy tools & visual UI).



Leverage location/satellite data feeds to provide predictive decision support for sustainable and efficient agriculture.

- Extract intelligent data from satellite/drone imagery, weather information, sensors.
- Monitor crops & determine anomalous areas to inspect for feasible pests and diseases.
- Provide intelligent crop management proposals to customers.
- Utilise Leonardo ML capabilities to receive automatic recommendations





HANA Spatial - Roadmap

Released

Linear Referencing

- ST_LocateAlong, ST_LocateBetween(), ..

Features

- ST_Rotate(), ST_Translate(), ST_Scale(), ..
- ST_Snap(), ST_MergeLine(), ...

Clustering

- Hexagon Clustering

TCO reduction

- Reduce memory footprint by factor 2

Native Storage Extension

- Spatial Storage Extension

Quality & Performance

- Round earth improvements

Open Source Support

- HANA driver & plugins

DataHub Integration

- Spatial functionality

2019/2020 – Taking HSS to the next level

Usability

- Correctness, tolerance, full round earth support
- Built-in Reference Systems

TCO reduction & Performance

- Spatial indices (e.g. R-tree, SFC)
- Spatial optimizer, cost function and histograms
- Execution engine optimization (streaming, code compilation, memory footprint reduction ...)

Features

- ST-function gap close

Integration

- Esri focus (performance, quality, improved HANA Spatial methods in Esri Software e.g. Toolbox)
- Improve Open Source Tooling Integration
- SDA, SDI, ABAP DDIC support

Innovation

- Non-volatile memory
- Simplifier
- Voronoi

2020/2021 – Product direction

Full 3D Engine

- ST_Intersects3D(), ST_Within3D(), ...

Features

- ST_MakeValid()

Innovation

- Trust & Precision
- Grid generator

Data Types

- Trajectories
- Point Clouds

Optimizations

- GPU processing

Integration

- Esri focus (performance, quality, innovation)
- Multi-Model Analytics (Graph, Text, DocStore)
- SAP business processes, ABAP, ...

Research

- Temporal, Media-Store, BIM, ...



HANA Spatial Services (HSS) - Roadmap

Released

HSS Tooling

- API viewer, Modeler, and Labeling Tool
- Open Geospatial Consortium (OGC) standard support/integration: Web Map Service (WMS), Web Map Tile Service (WMTS), Web Coverage Service (WCS)

Labeling

- Semi-automatic ground truth generator
- Area detection (random forest)

Modeler

- Modeler and Modeler UI
- API for custom models

Spatial Services

- Surface API (NDVI, NBR, NDWI, GNDVI, NDRE)
- Weather Forecast API (ICON, COSMO-DE, NOAA)
- Wildfire API (Geo-ML model)
- Object Detection API (palm trees, sugar beets)
- Spatial Data Management API (UAV data)
- Process Management API (batch processing)
- Earth Observation API (WCS)
- Point of Interest Search API

2019/2020 – Taking HSS to the next level

Partner Ecosystem

- Partner Integration Framework
- Integration of partner services & platforms
- [Integration into SAP Analytics Cloud \(SAC\)](#)

Labeling

- Labeling Tool API
- [Area detection](#)
- Labeling on drone data
- [Object detection](#) (Convolutional Neural Networks, CNN)

Modeler

- Full Sentinel 2-band support for custom surface indices
- Additional operators, e.g. filter
- Additional sources, e.g. weather

Spatial Services

- Support core functions: Details, Time Series, Aggregate, Clustering

Business

- Pay-per-Use / SAP Cloud Platform Enterprise Agreement (CPEA)
- Trial System

2020/2021 – Product direction

Partner Ecosystem

- [Integration with SAP business systems](#) (e.g. SAP Analytics Cloud, SAP Enterprise Asset Management, S/4HANA, Ariba, SuccessFactors)
- Integration of further partner services & platforms

Modeler

- Industry and customer models (also with partners)
- Additional sources (e.g. ESA Sentinel-X)
- Correlation with partner and business data

Professional Spatial Services

- [Geo-ML](#) (yield prediction, landslide risk prediction, land cover/usage classification, elevation, anomaly/drought detection, flood, rain)
- [Object Change Detection](#)
- [Indoor Positioning](#)

Climate Service

- EO Fencing and Alerting
- Vector Data Push Service

Standard Spatial Services

- Admin Boundary Service, Timezone Service
- Geo-Fencing, OpenStreetMap API, Routing Service, Traffic Service
- Integration of SAP (reverse) geocoder

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SAP Business Suite
SAP S/4HANA

- SAP Geo Framework for SAP EAM
- SAP Geo Framework for SAP S/4HANA Asset Management

Custom developed spatially enabled SAP applications

SAP Geographical Enablement Framework

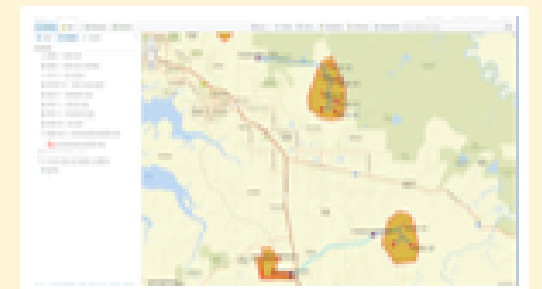
SAP Geographical Enablement Framework for SAP S/4HANA



SAP HANA***

GIS Platform

(e.g. Esri ArcGIS)



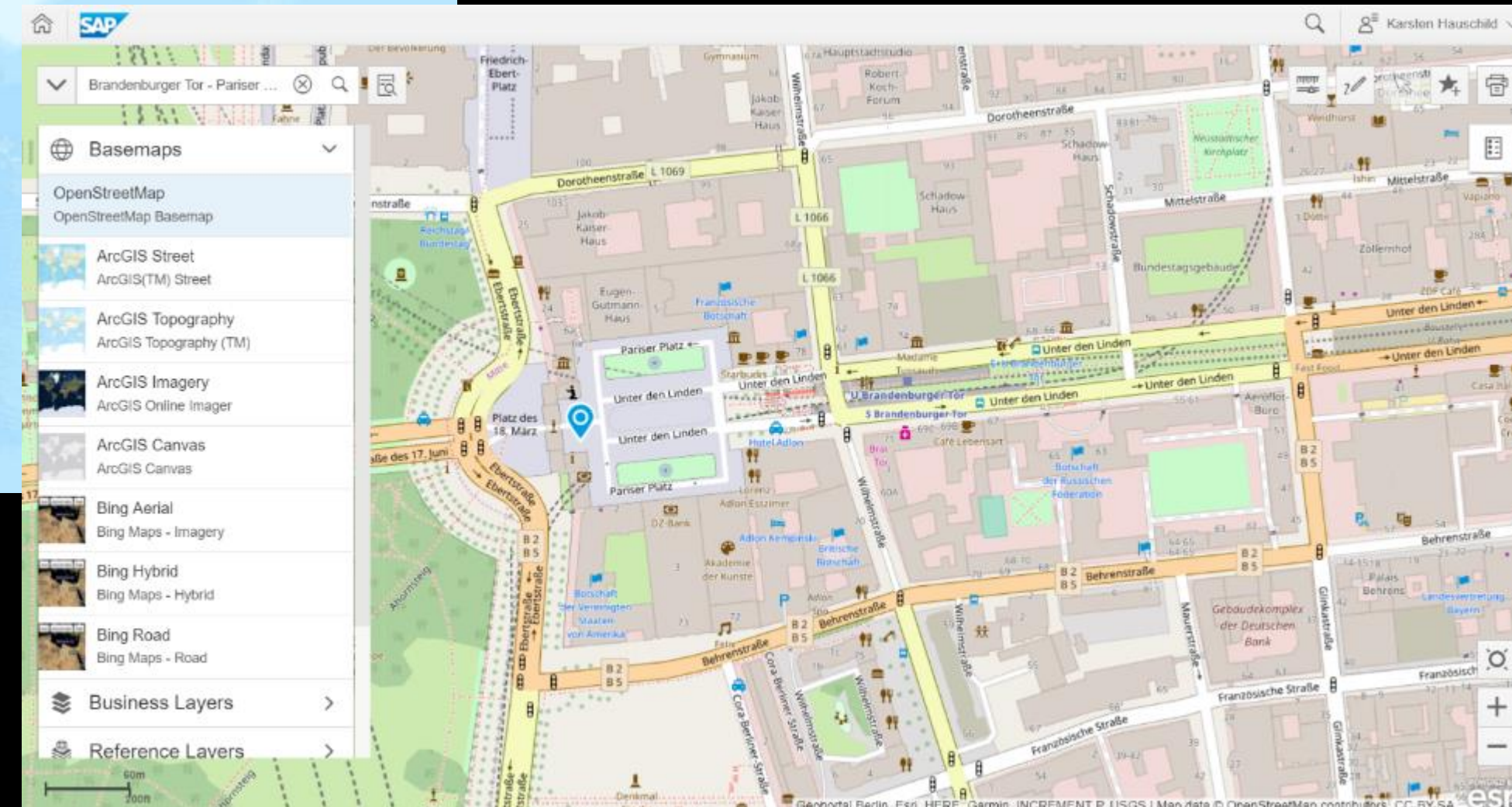
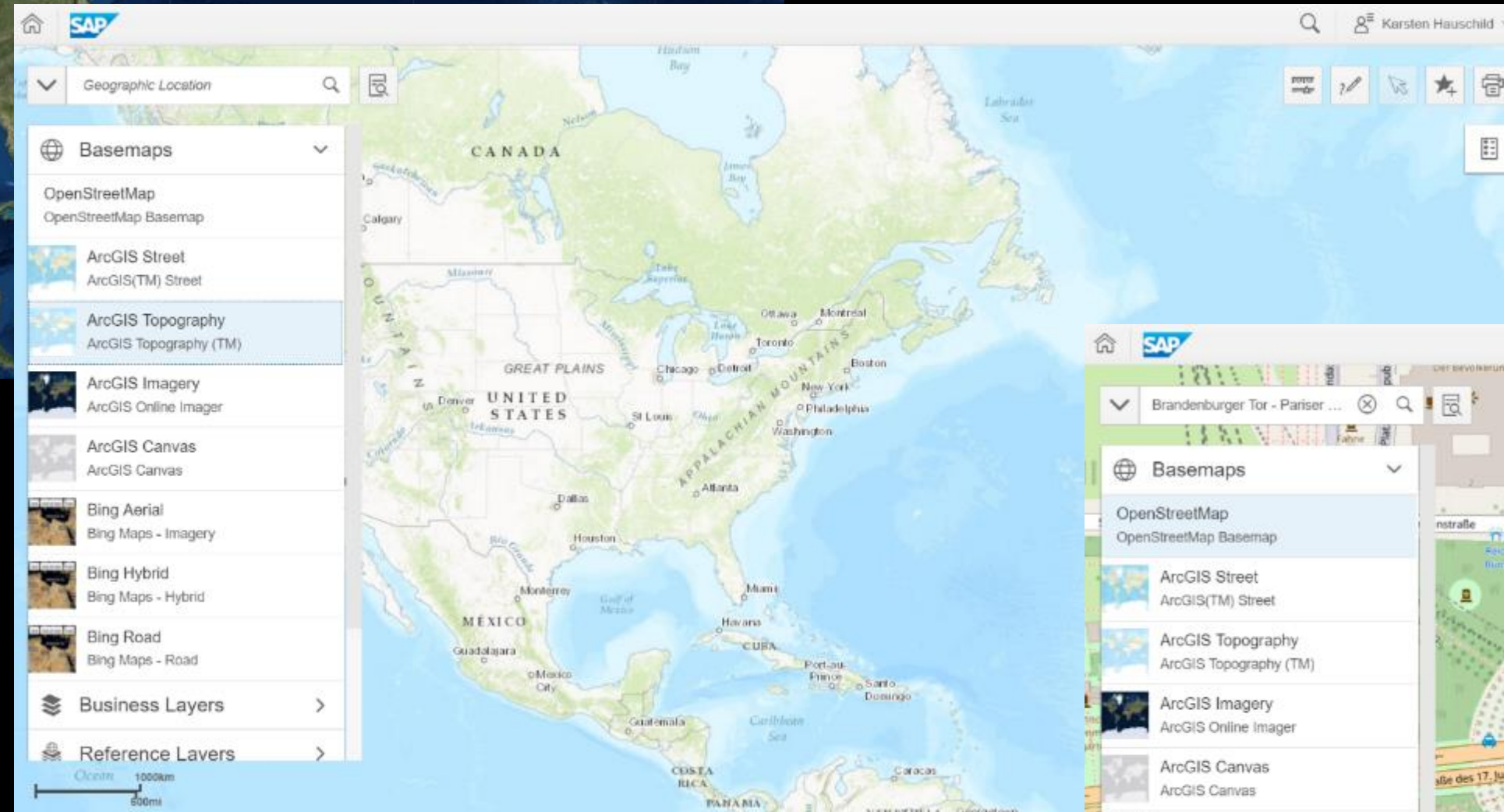
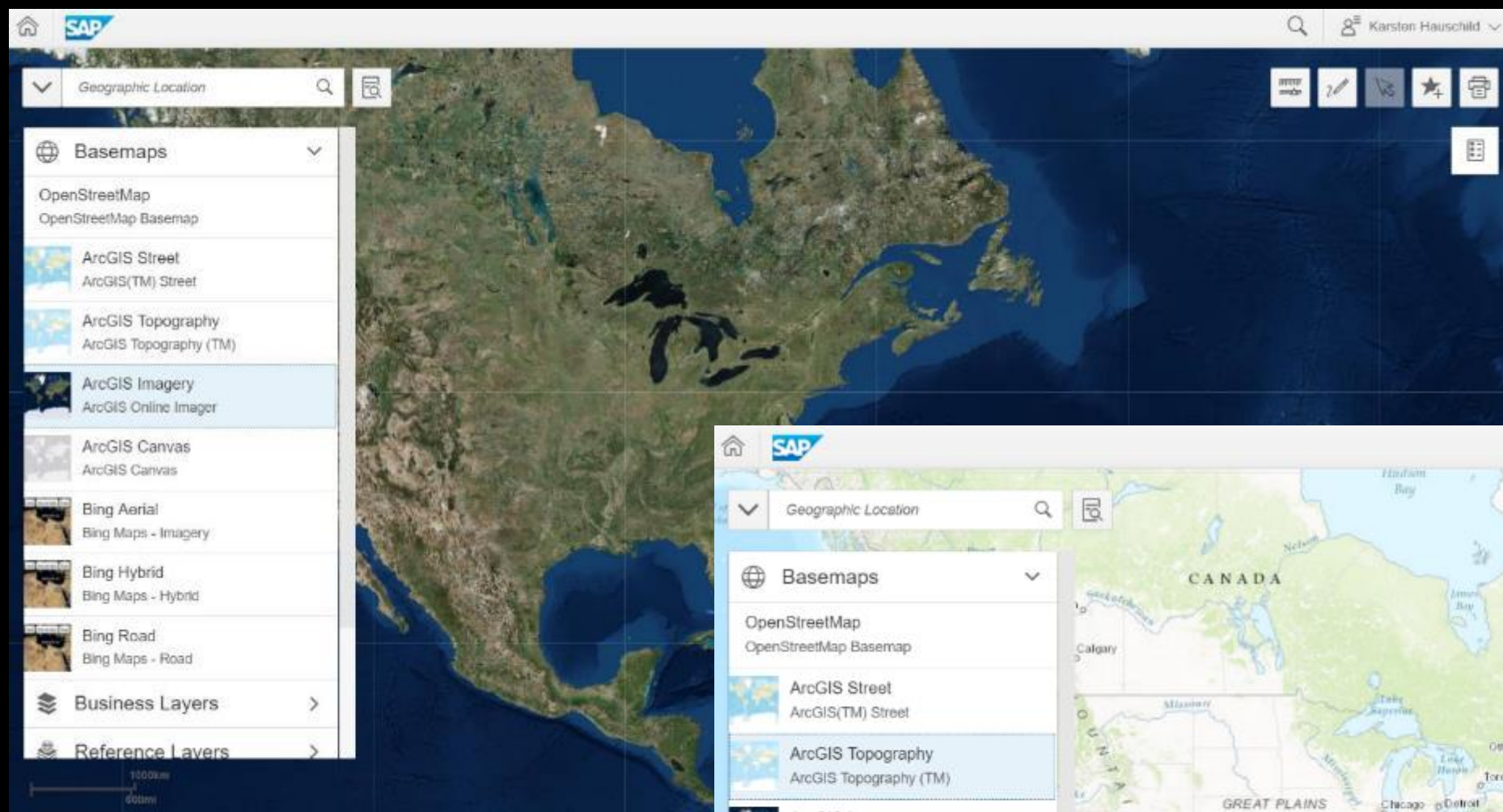
GIS Map UI

Default: Esri REST services

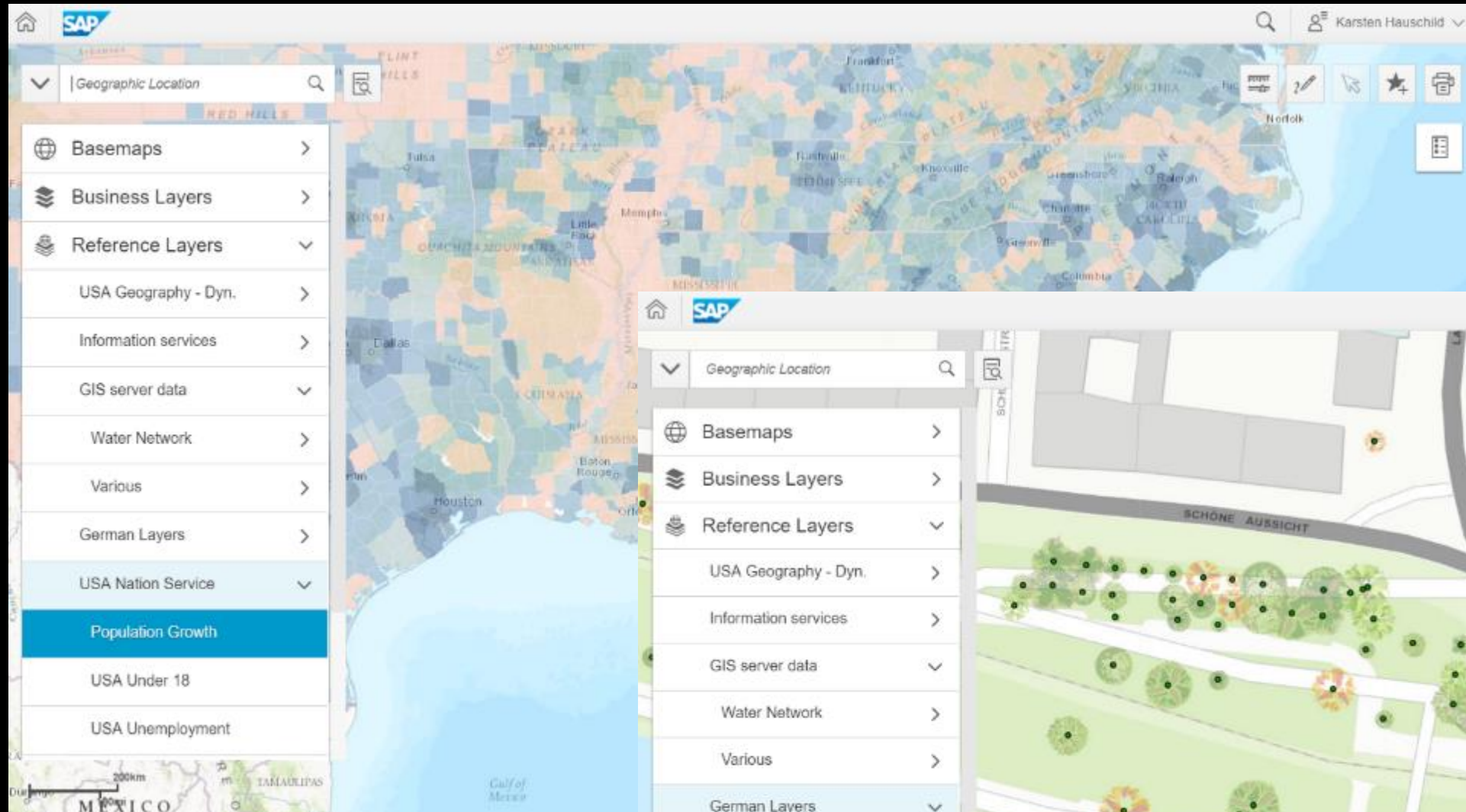
GIS Server

Access to

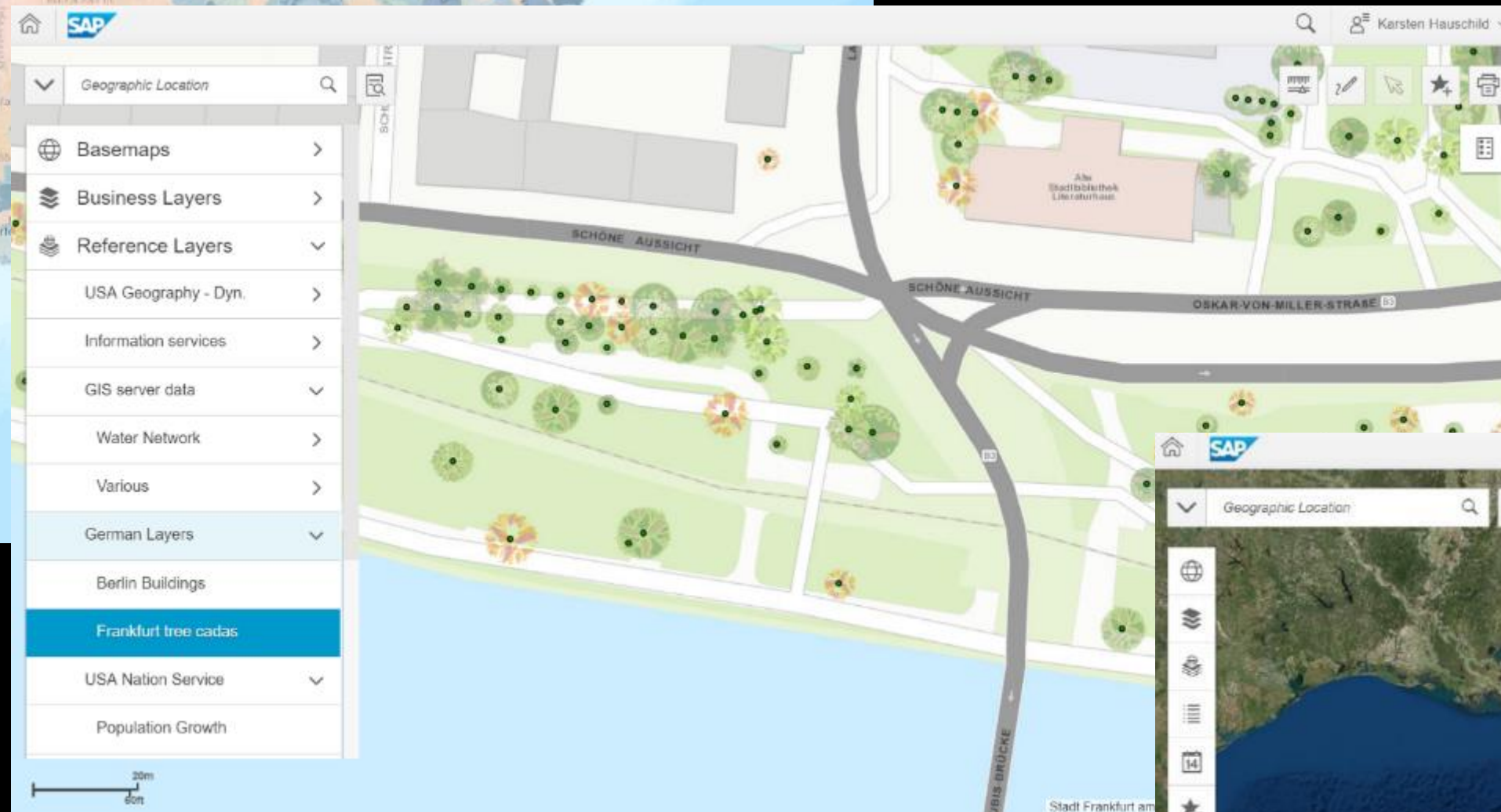
- OpenStreetMap.
- Esri public base maps.
- Enterprise GIS base maps as licensed by the customer.



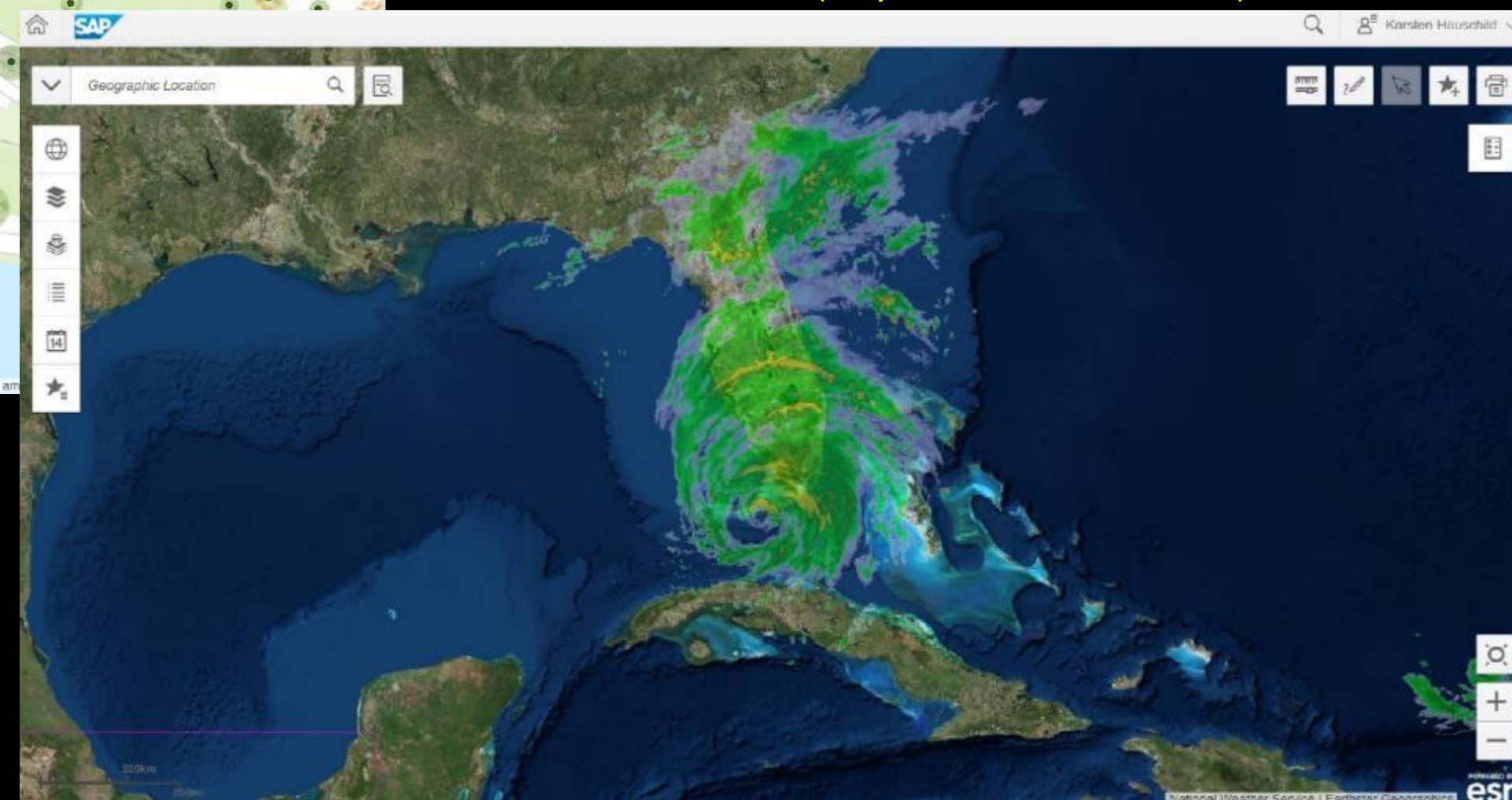
Select individual or group(s) of reference layers - which represent spatial data from GIS source. Adjust the transparency of reference layers.



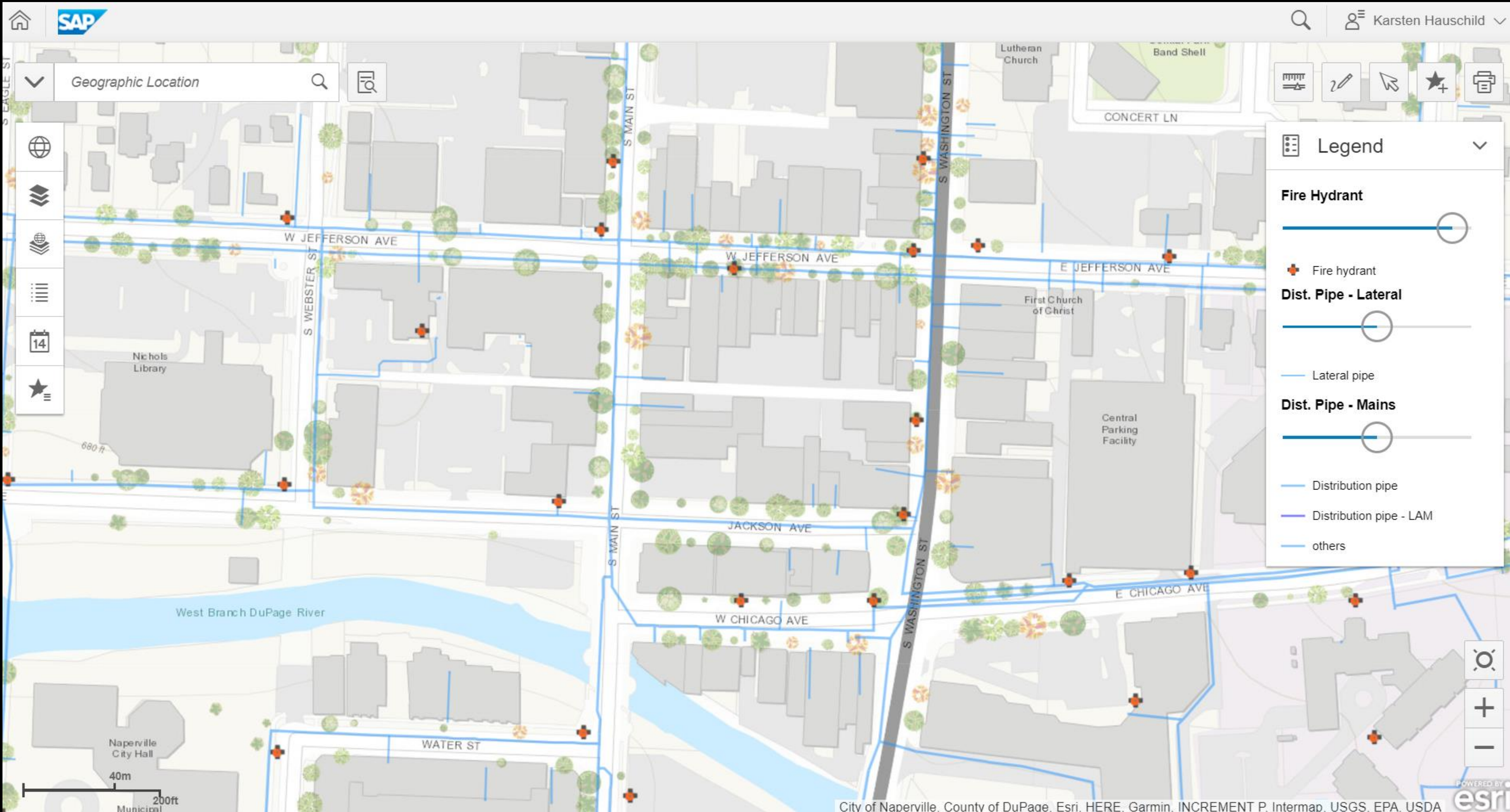
Population growth in US



Tree cadastre in Frankfurt/Germany

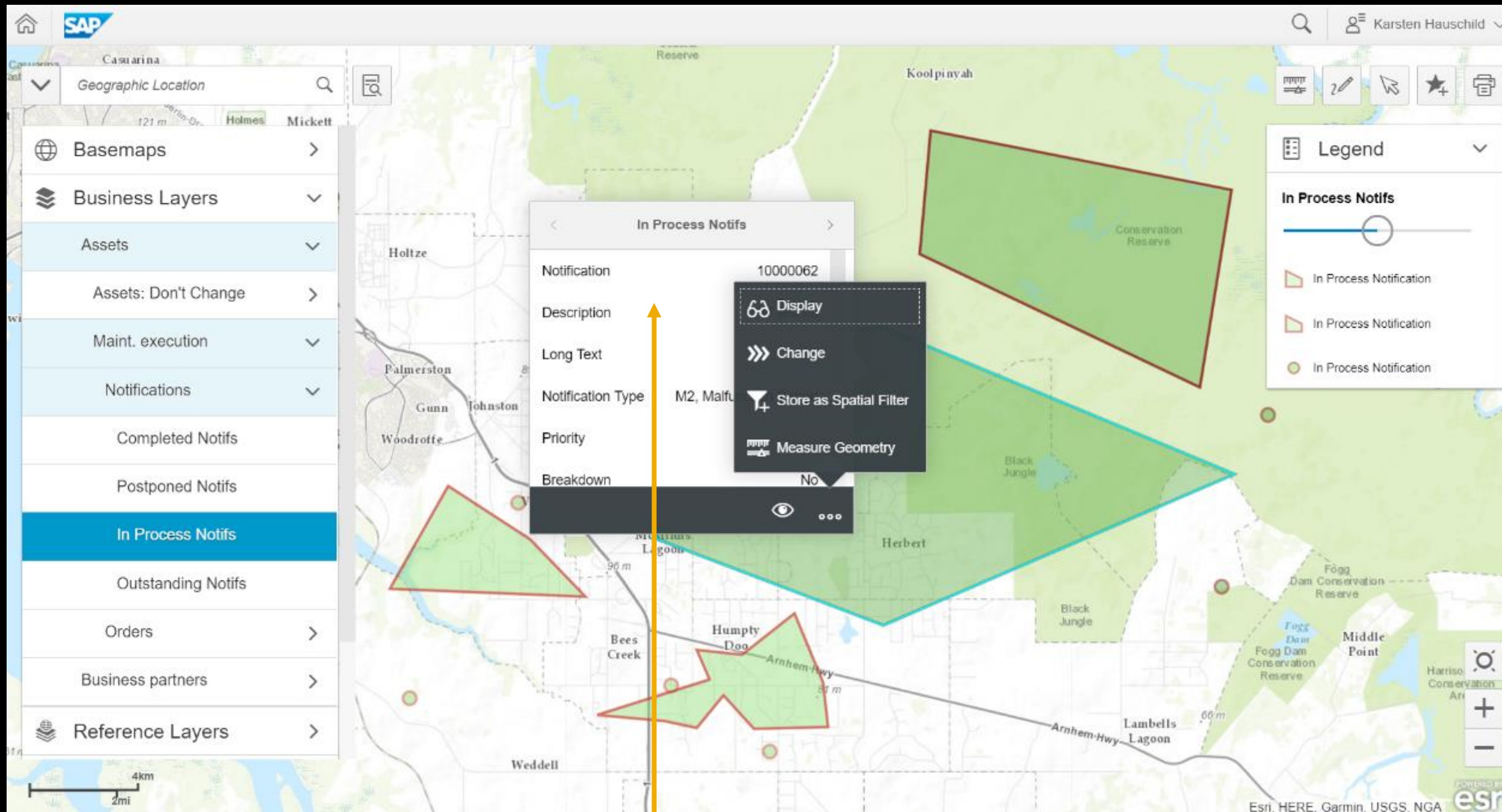


Hurricane Irma (September 10th, 2017)



Supported EAM business objects

- Equipment
- Functional location
- Maintenance order
- Maintenance notification



Example: Drill-down into SAP EAM backend system directly from the map

Map Data

Refresh Geometry Exists for EAM Go to Map

SAP Display Notification: 10000062

Edit Refresh Set User Status Set System Status Additional Functions You can also

Notification 10000062 Notification type M2, Malfunction Report Technical Object ROBI FL1 System Status NOPR 0 Document(s)

General Data Location Data Organizational Data Malfunction Data Task Data Activities Documents

Address

Name 1:

Postal Code:

Street:

Region:

Fax No.:

Technical Object Address

Name 1:

Postal Code:

Street:

Region:

Fax No.:

Location Data

Production Work Center:

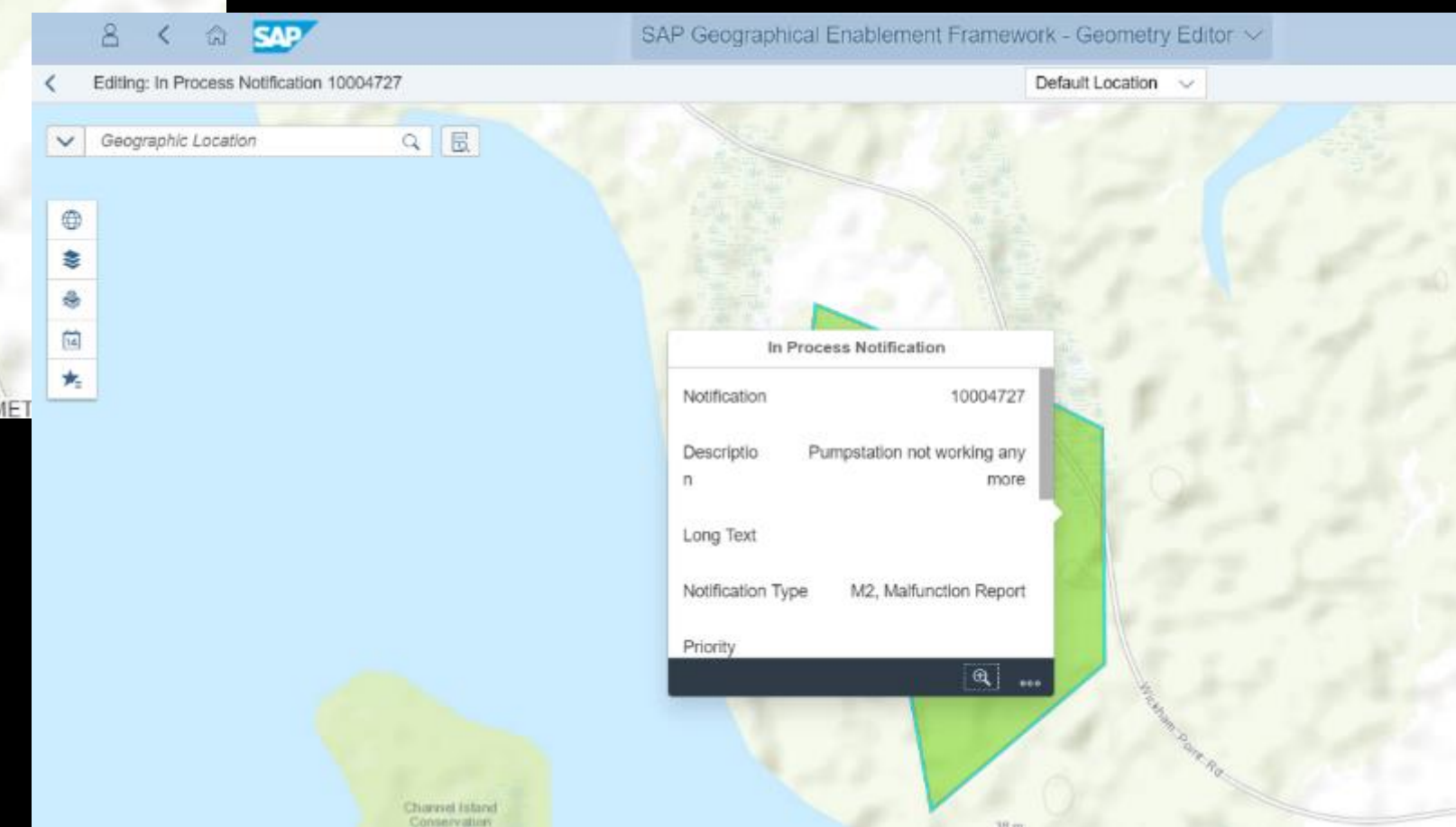
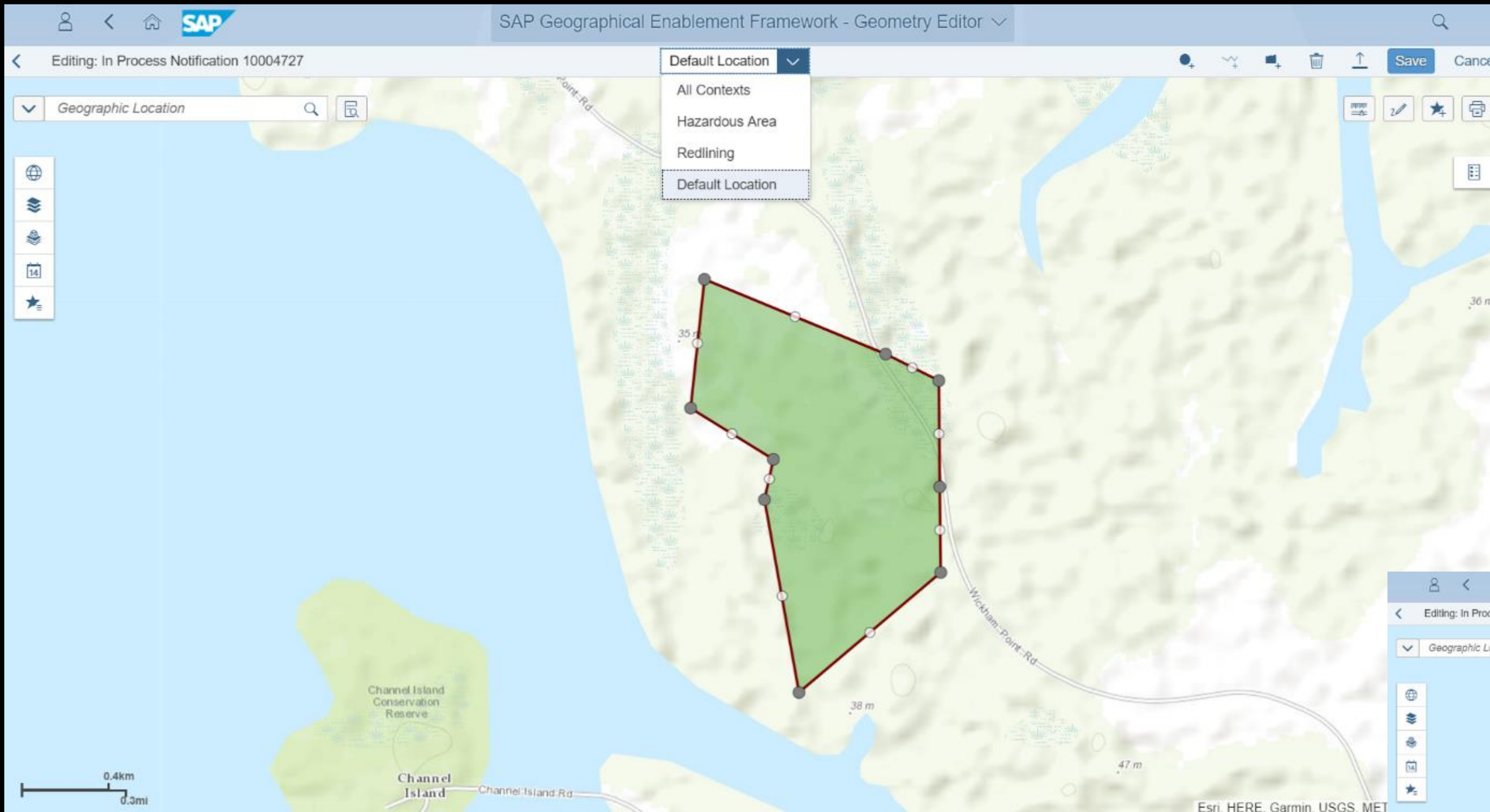
Location: 1 EAMS Location

Plant Section: 010 Frau X 123

Map Data

Refresh Geometry Exists for EAM Go to Map

Create, modify, or remove geospatial information (point, line, polygon) for integrated SAP business objects right on the map via the Geo Editor



Example: create/change geospatial information for a maintenance notification

- Add-on 'EAM extension for GEF' to ge-enable functional location, equipment, notification and work order of SAP EAM.
- RE4GEF - for SAP Real Estate and Land Management, replaced GEO.eRE.
- Sync4GEF - synchronizing data from the Enterprise GIS to SAP Geo Framework and vice versa, replaced GEO.eSync.
- LRS4GEF - supporting SAP LAM in order to calculate geometry for line assets, notifications and work orders based on start- and end-points and visualization of linear data characteristics, replaced GEO.eLRS.
- PPM4GEF - for SAP Portfolio and Project Management.
- ISU4GEF - for SAP IS-U objects (Utilities industry solution).

Create Maintenance Order : Location Data

Order: PM01 000000000001 check segment 552 to 553

Sys.Status: CRTD MANC NTUP

Linear Data			
Start Point	552.000	End Point	553.000
Length	1.000	Unit of Measure	M
St.Marker		End Marker	
Dist.St.M.		Dist End Marker	

Map View: GEO.e Orig screen

Map Layers: Business Layers (SAP objects), Reference Layers (external GIS), Map Bookmarks, Editing, Sketch, Print

Editing toolbar: [Tools]

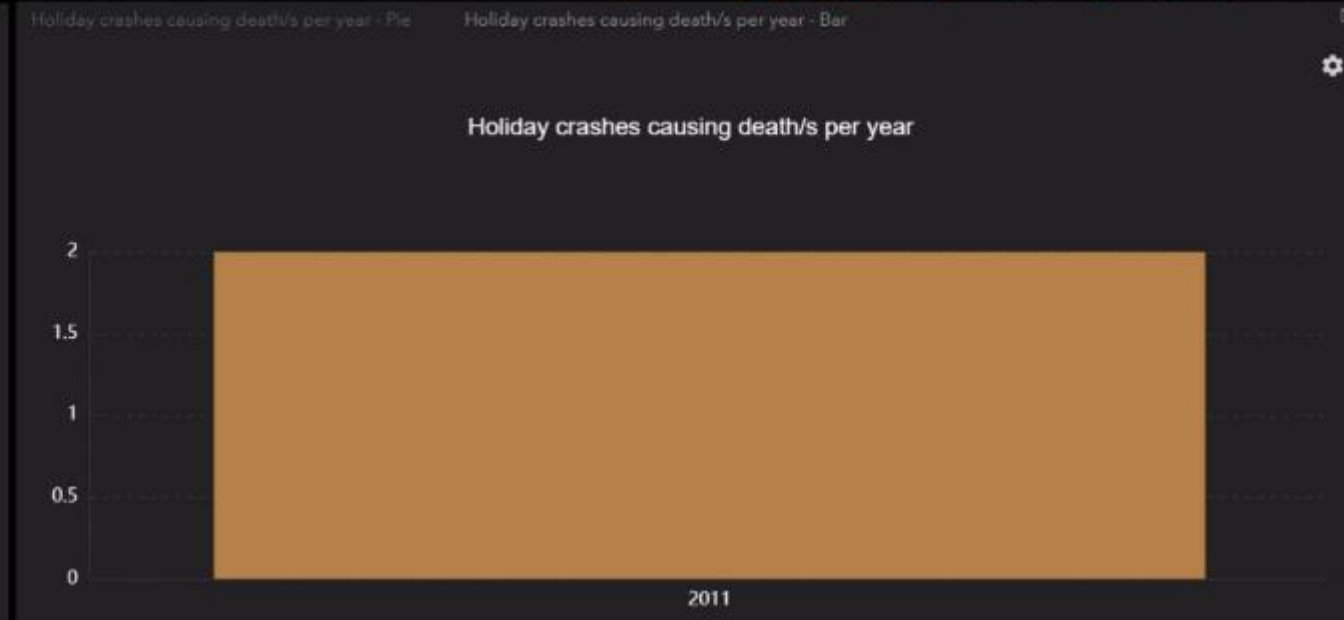
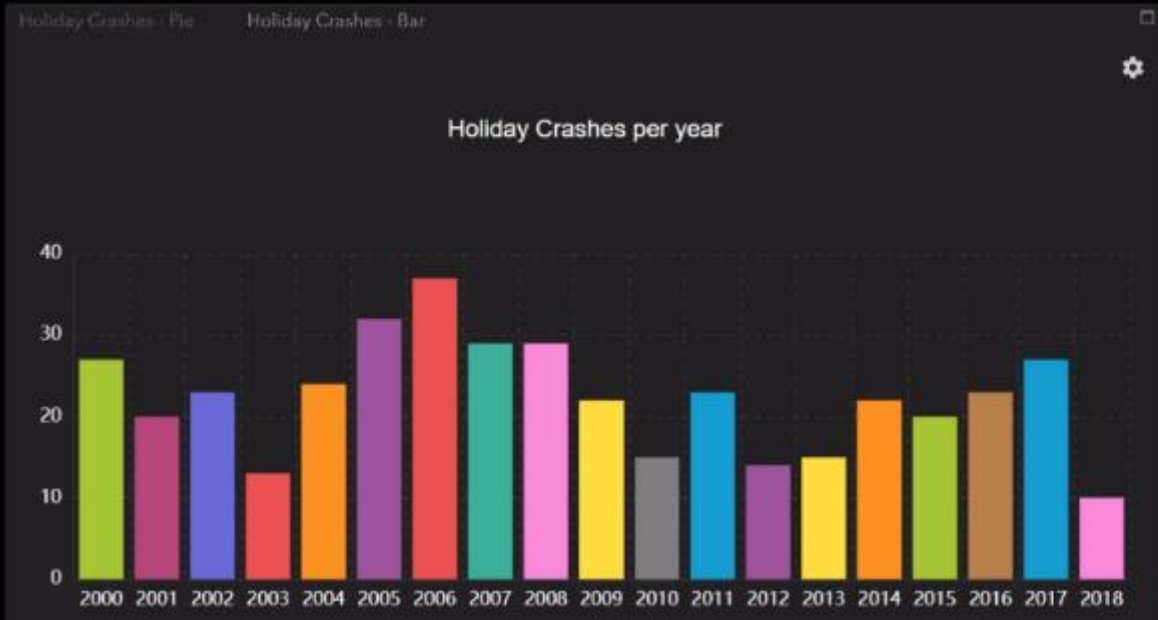
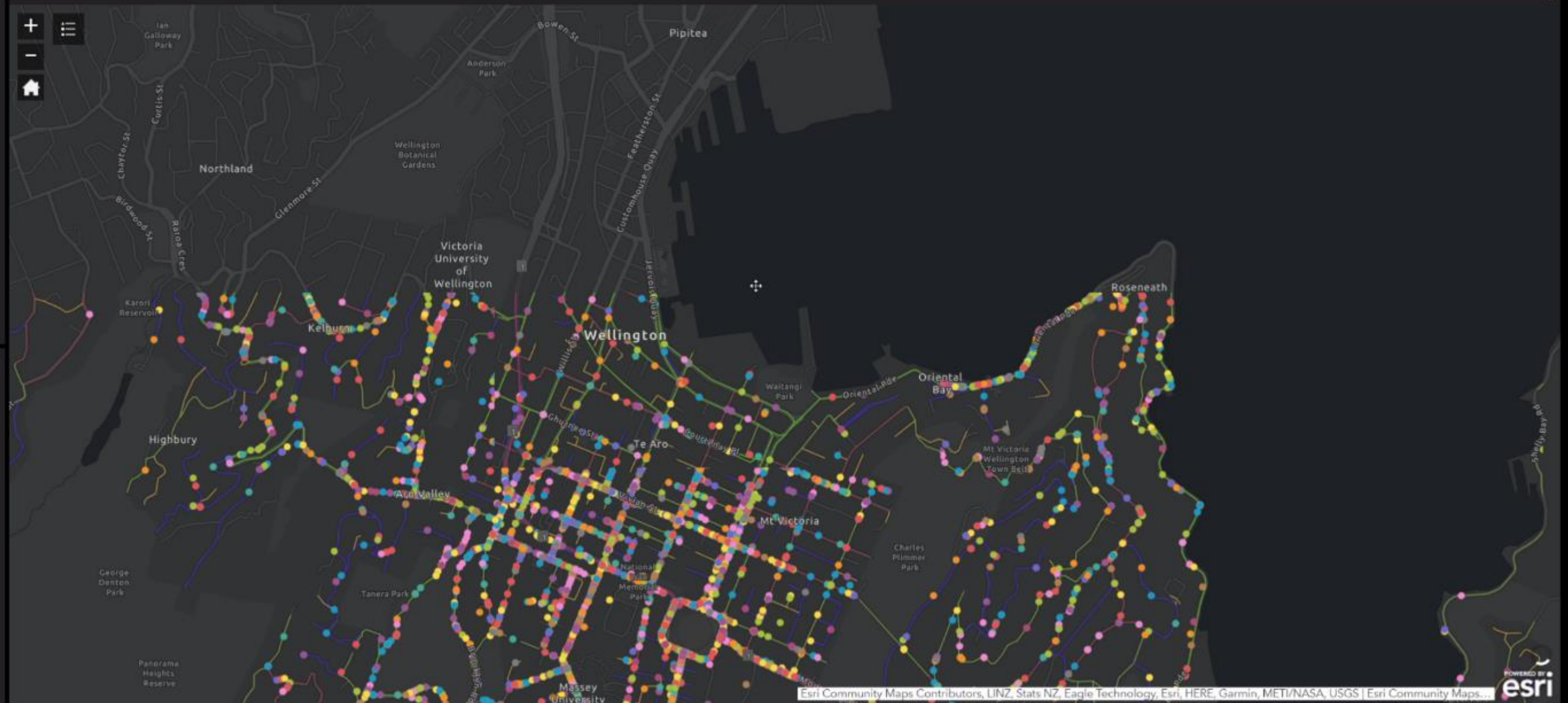
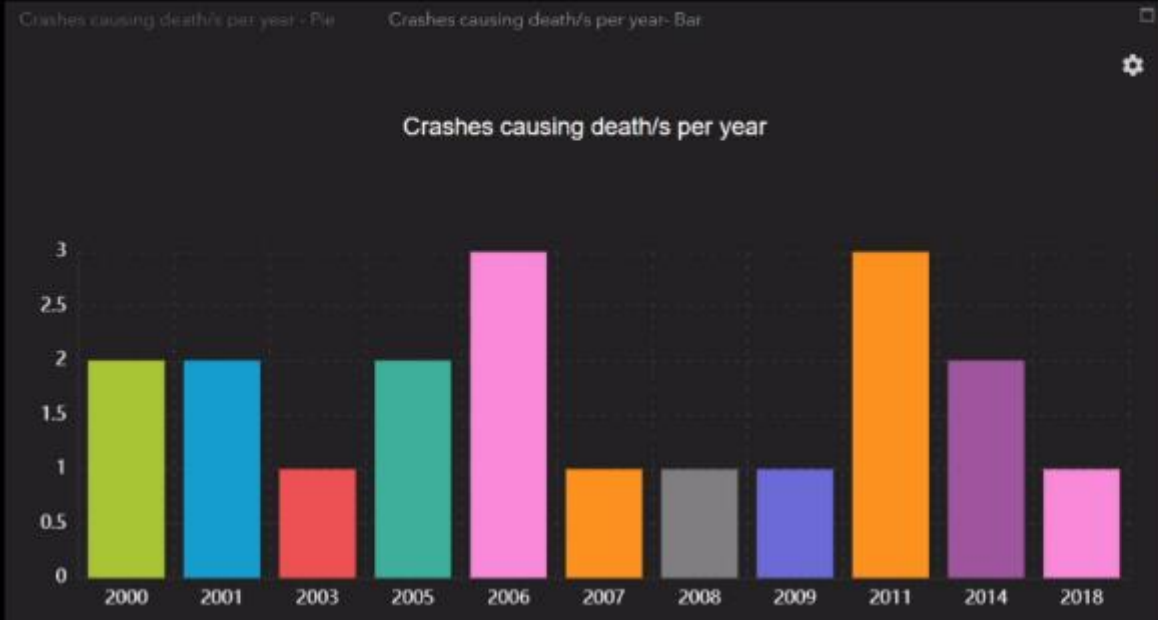
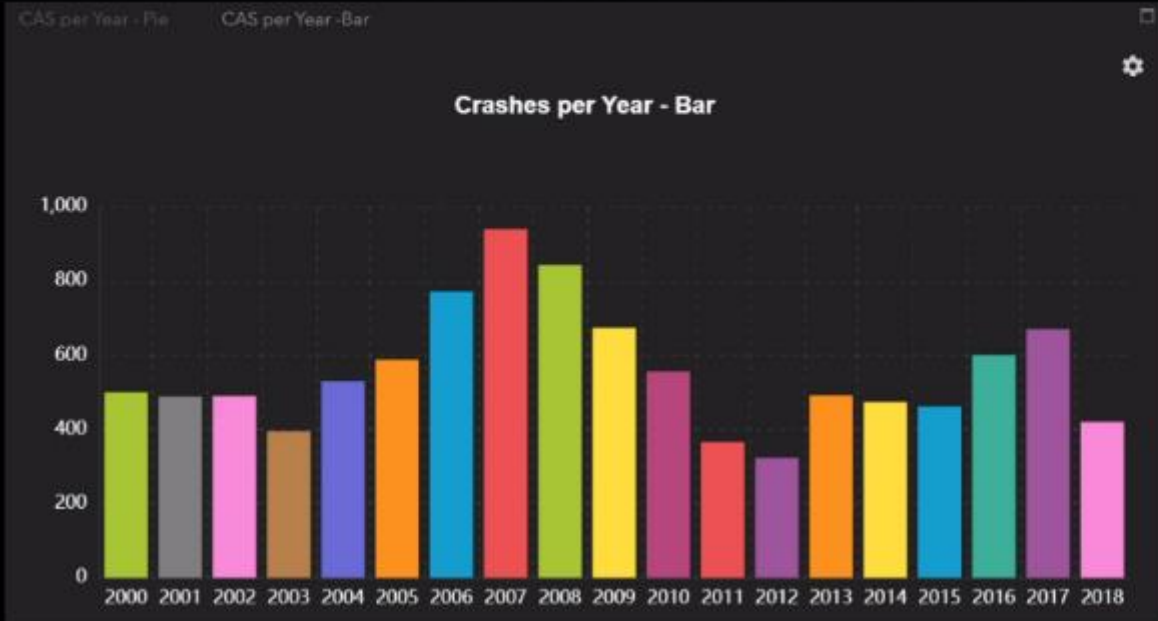
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We don't just talk the talk – we also walk the walk ...

ZAG | CAS Data Demo



Select

Select Clear

Layer

- All Crash Data 0 ...
- Crashes holiday periods 0 ...
- Crashes causing deaths 0 ...
- Crashes causing death - Holiday 0 ...

- Dividing counts – weekday, time, type.
- Base maps best suited with heat maps.
- Specific division with clustering.
- 1km buffer on incident.
- Detail of incidents within given selection.

2019 Victimization Analysis
Last Refreshed Mon 18 Nov 19 10:37

Weapon | Theft and Related Offences

Division | Theft and Related Offences

Victimisations
6,029

Hour

Victimisations by Subdivision

Theft (Except Motor Vehicles)	4,928
Motor Vehicle Theft and Related Offences	1,014
Illegal Use of Property (Except Motor Vehicles)	87

Victimisations and Cumulative Victimations by Year and Month

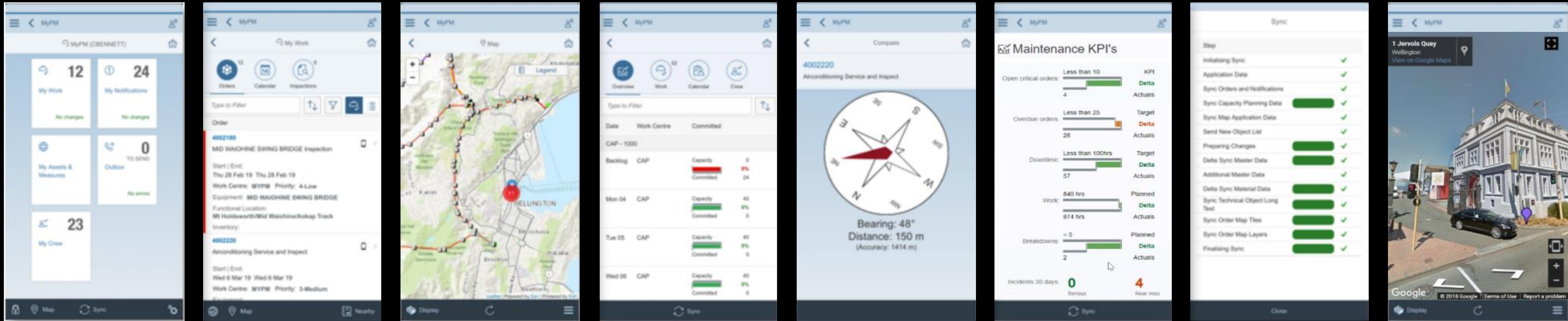
Year	Month	Victimisations	Cumulative Victimations
2018	Apr	607	607
	Aug	1,312	1,312
2019	Feb	1,971	1,971
	Jan	2,672	2,672
2019	Jul	3,345	3,345
	Jun	3,939	3,939
2019	Mar	4,638	4,638
	May	5,339	5,339
2019	Sep	6,029	6,029

Selection | Victimations Cluster
Victimations Cluster 239 objects

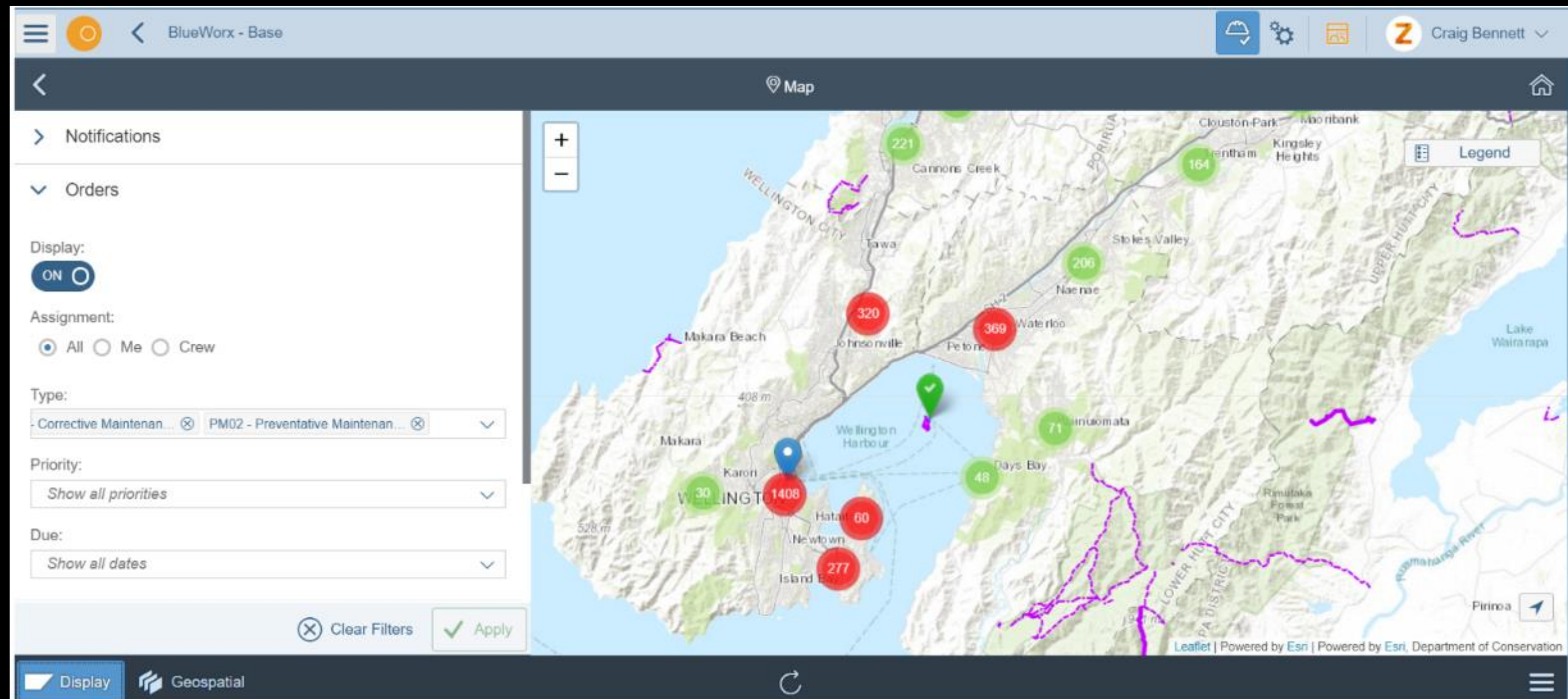
Area_Unit	District_ID	Group	Location_Type	Locn_Type_Division	Station_ID	Sta
Adelaide	12	Illegal Use of a Motor Vehicle		Other Location	12,503	Wellington
Adelaide	13	Illegal Use of Property (Except Motor Vehicles)		Community Location	13,603	Wellington



Zag BlueWorx – for Asset Management Workflows



- To mobilise your SAP PM (Plant Maintenance), Zag can provide:
 - BlueWorx mobile solution for the field officers.
 - BlueWorx Crew add-on for the supervisors.
 - BlueWorx H&S – coming ...



From your GPS location, filter all officers on your current map using language and qualification information.

Examples

Show Me:

- Closest **on duty** colleague who can speak **Maori** and is certified to deal with **children**?
- Show me all **on duty** colleagues who are carrying **tasers**?
- Where are **on duty** colleagues **Basilisk** and **Goblin**?





Examples (continued)



Show Me the distance and direction (compass) to:

- Closest **on duty** colleague who can speak **Maori** and is certified to deal with **children**?
- Show me all **alerts** and additional **real-time** information **onsite**?



ZAG

Thank You!



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ZAG

LET OTHERS ZIG