

SuperMap Big Data GIS Technology

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SuperMap Software Co., Ltd

Key Technologies of SuperMap GIS 10i

SuperMap GIS 10i

Big Data GIS

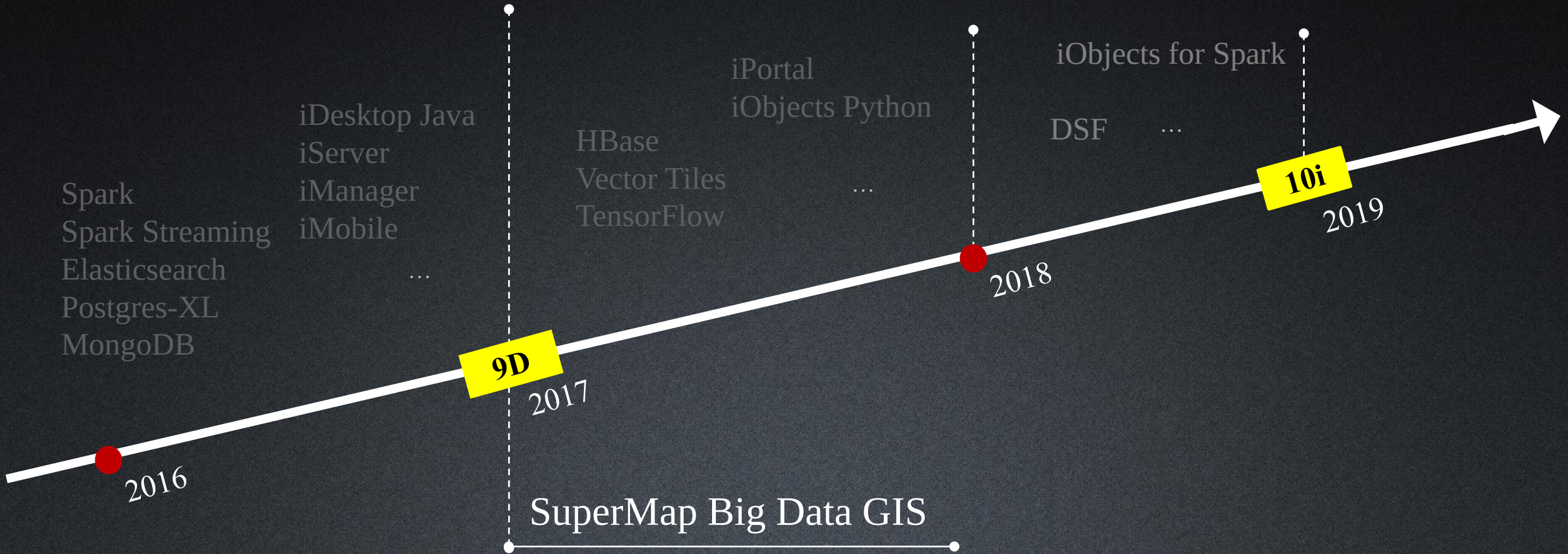
AI GIS

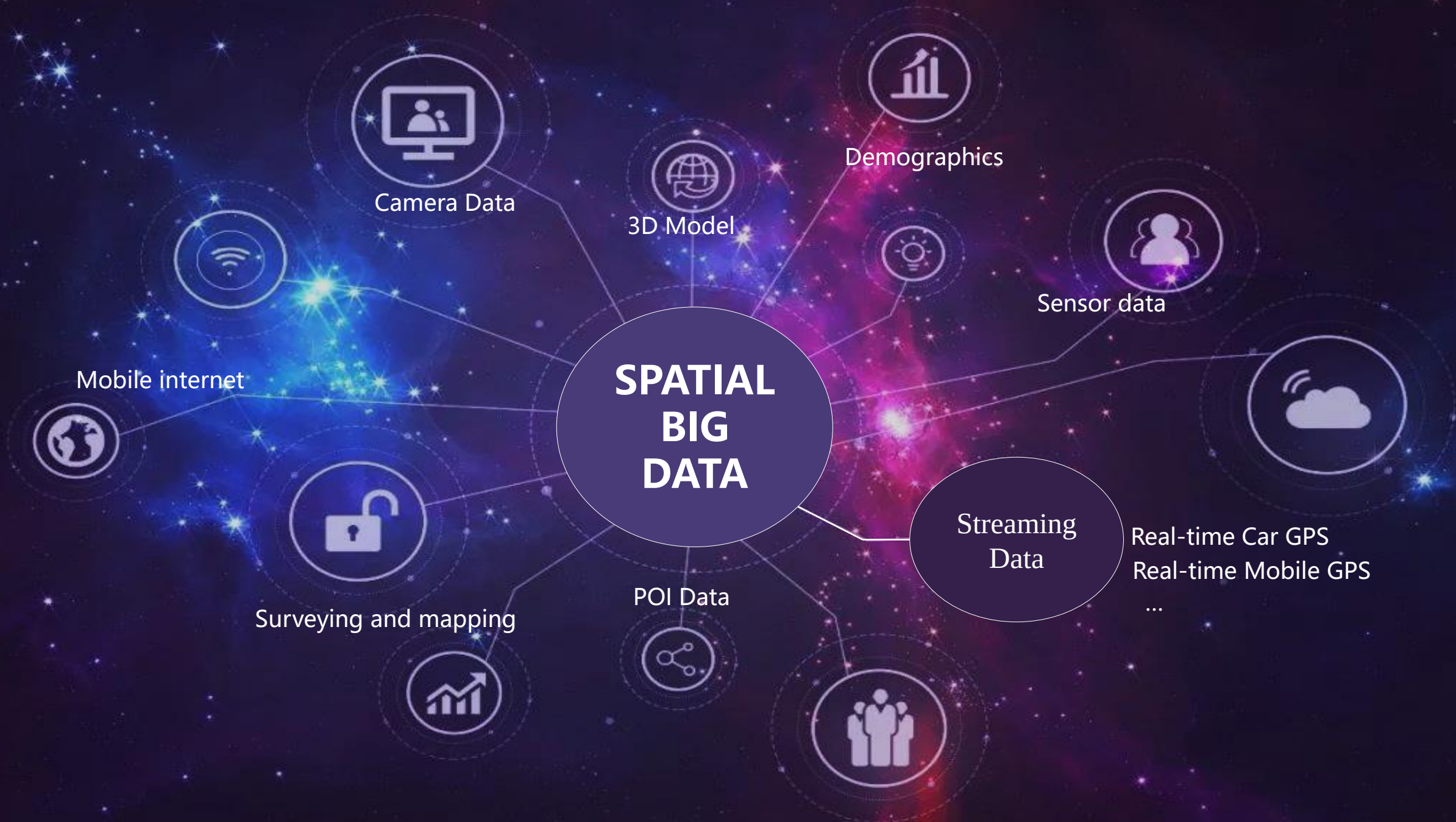
New **T**hree Dimension GIS

Cloud Native GIS

Cross Platform GIS

History of SuperMap Big Data GIS





**SPATIAL
BIG
DATA**
with **Location**

Large **Volume**

Low **Value** Density

Rich **Variety**

Fast **Velocity**

Camera Data

3D Model

Demographics

Sensor data

Mobile internet

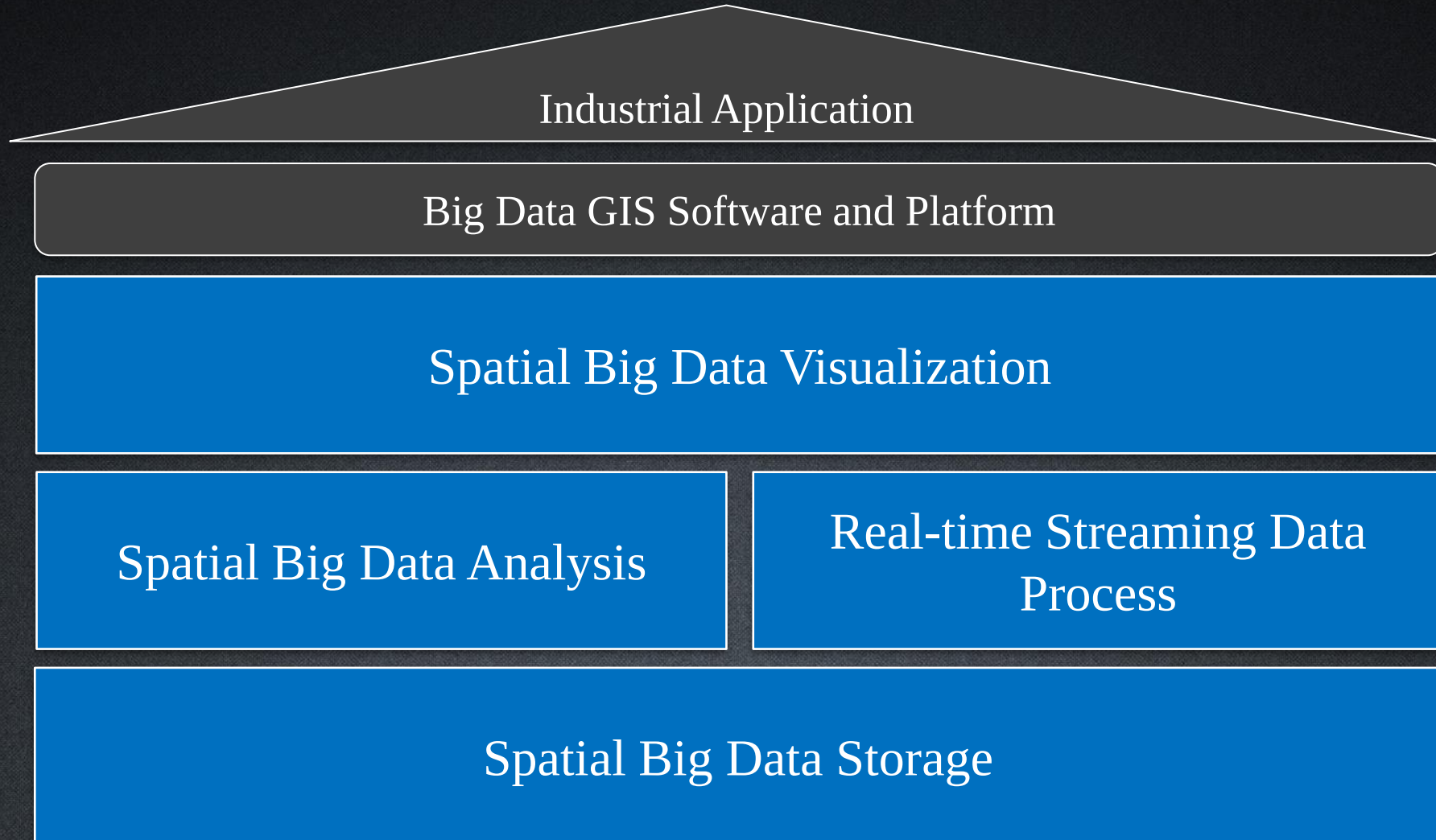
Surveying and mapping

POI Data

Streaming
Data

Real-time Car GPS
Real-time Mobile GPS
...

Big Data GIS Technologies





Spatial Big Data Storage

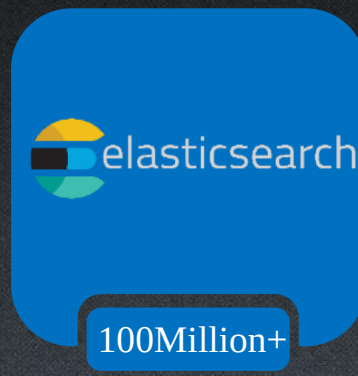
Distributed Spatial Data Engine



- Vector/raster data
- Multimode spatial query
- Millisecond response
- Super large scale data



- Vector/raster data
- Full Quantity Computation
- Powerful distributed analysis capabilities
- Full Quantity Analysis



- Streaming data
- location data



- Grid tiles
- Vector tiles
- 3D tiles



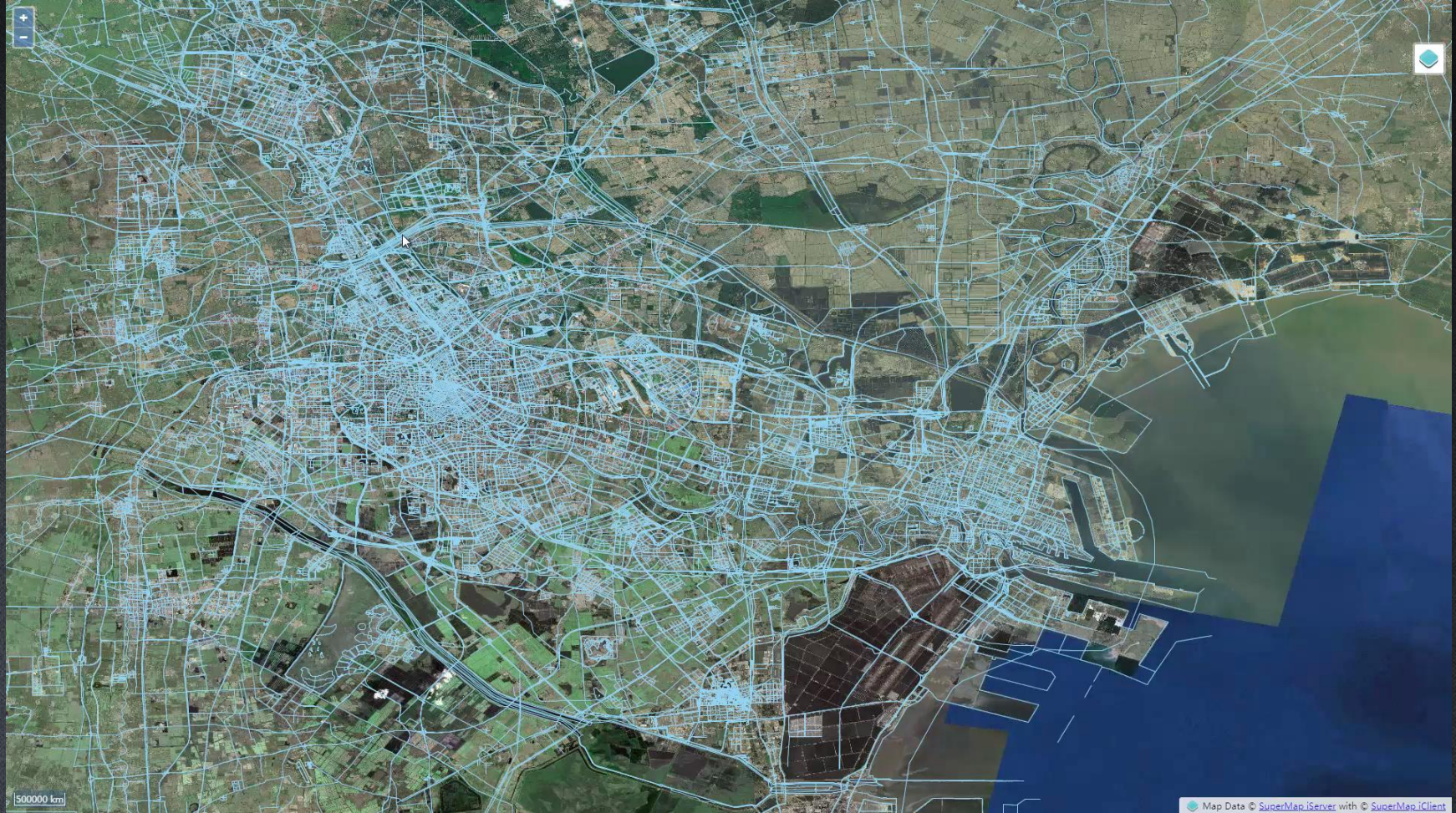
- Vector/raster data
- SQL support

HBase for data management

APACHE
HBASE

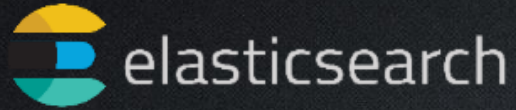


First Choice of Distributed
Data Storage Management



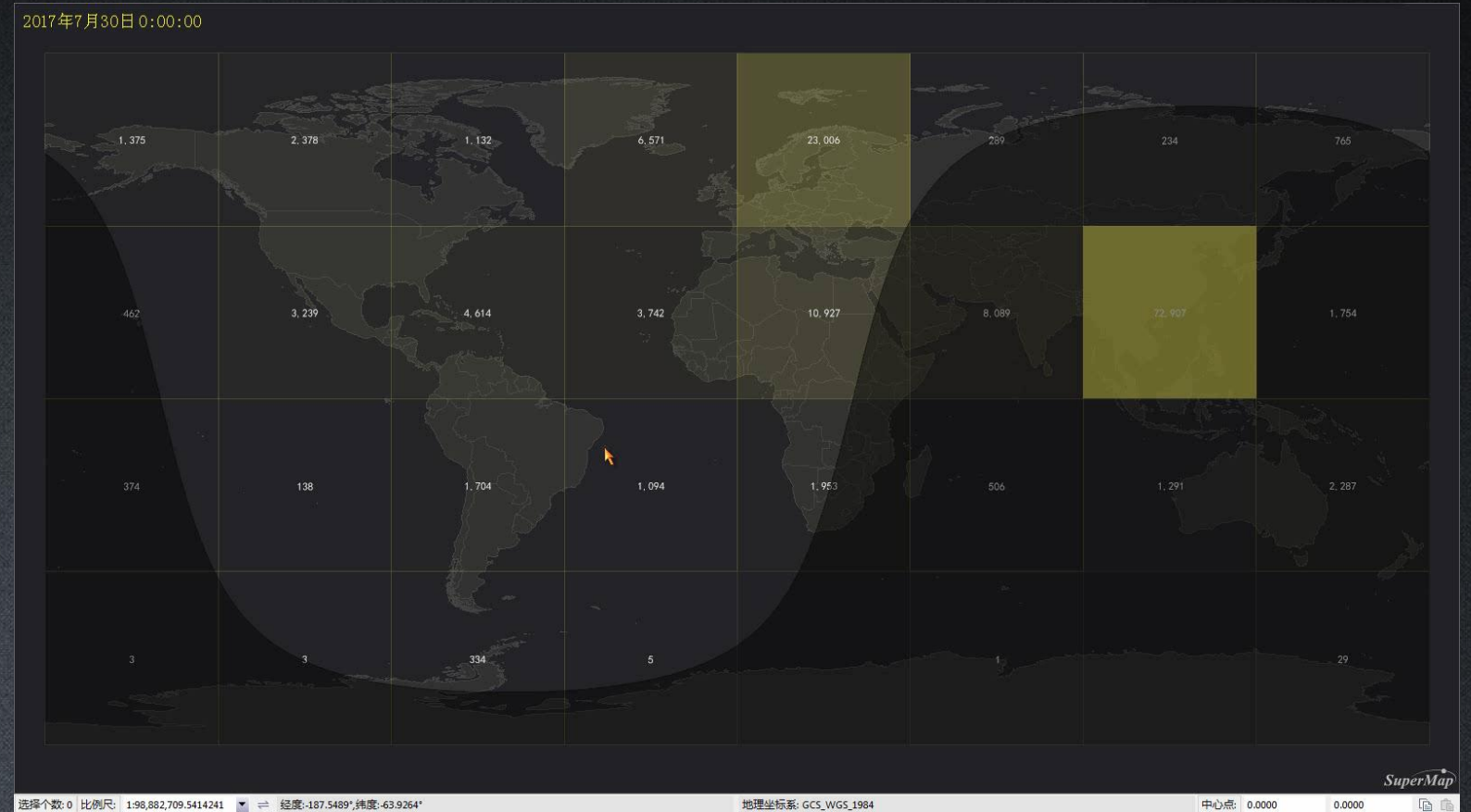
450 Million Features

Elasticsearch for streaming data

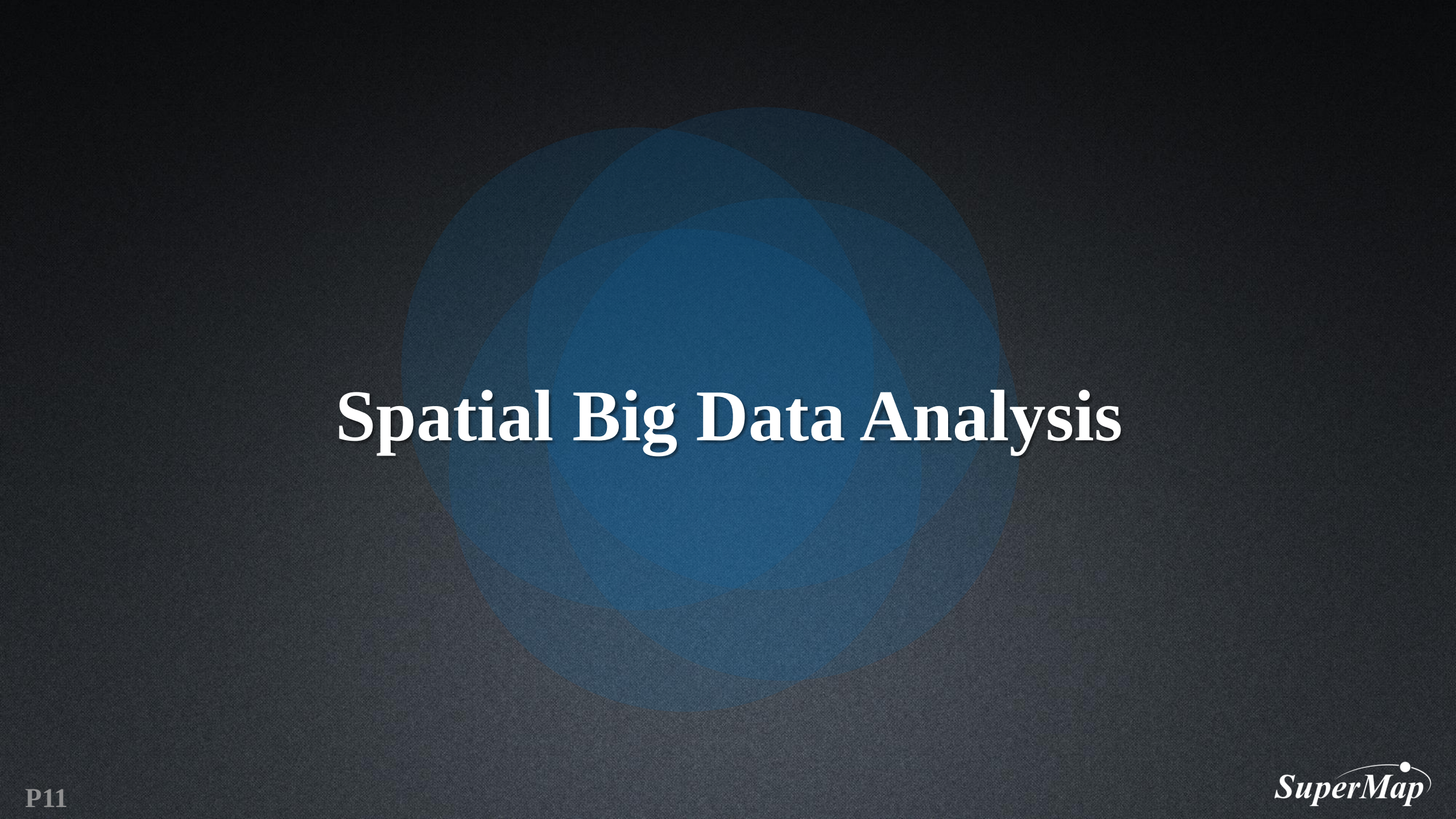


2° 04' 21.6"	0° 40' 30.4"	4° 12' 53.3"	383° 30.9"	438° 43.6"	48° 42.3"	3° 10.3"	1° 00.0"
5° 03' 18.3"	1° 08' 53.1"	8° 30' 08.6"	426° 42.1"	381° 16.5"	20° 13.1"	42° 41.9"	52° 44.1"
5° 00' 56.1"	13° 11' 38.4"	50° 22' 14.3"	5° 13' 22.1"	333° 48.0"	99° 48.0"	104° 39.2"	186° 18.9"
800° 33.2"	11° 48' 95.1"	33° 48' 21.1"	6° 01' 1' 30.0"	1° 11' 5' 33.3"	111° 18.1"	180° 14.1"	188° 00.4"
1° 102° 49.3"	1° 41' 5' 50.0"	10° 49' 1' 36.2"	8° 48' 8' 12.0"	6° 13' 1' 38.3"	989° 04.2"	513° 8.0"	141° 03.4"
5° 38' 1' 46.6"	1° 02' 1' 28.0"	1° 02' 1' 12.0"	5° 51' 2' 13.4"	5° 14' 5' 49.0"	1° 04' 5' 91.6"	433° 41.5"	465° 8.0"
381° 54.1"	1° 11' 5' 14.3"	330° 21.3"	1° 38' 5' 13.0"	210° 52.8"	218° 04.0"	415° 41.1"	181° 92.8"
1° 082° 48.2"	321° 12.0"	511° 53.6"	269° 32.1"	343° 24.6"	511° 12.1"	386° 42.8"	286° 14.8"

Streaming data
Storage

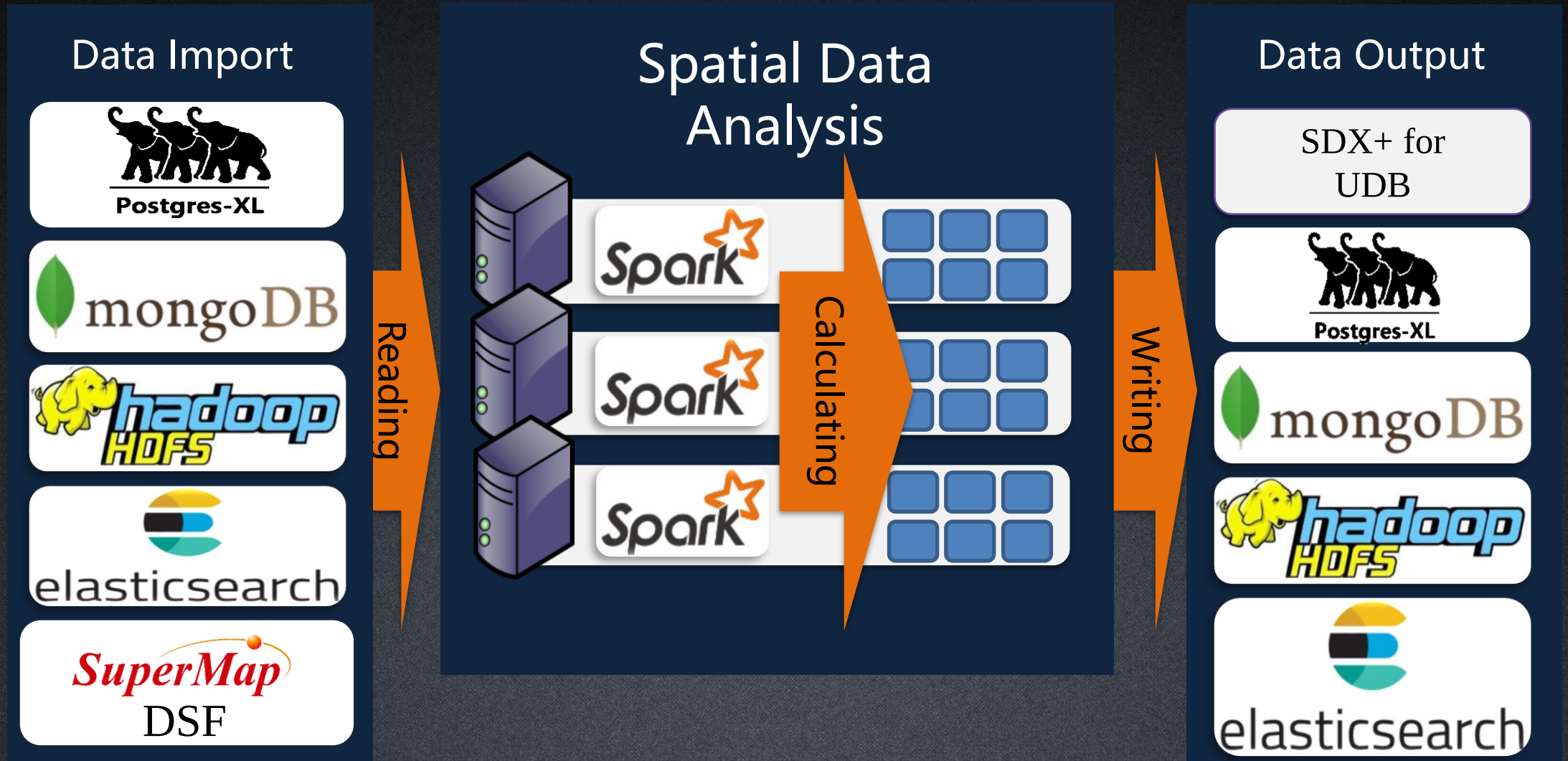


Real-time grid map of 1 billion airplane locations



Spatial Big Data Analysis

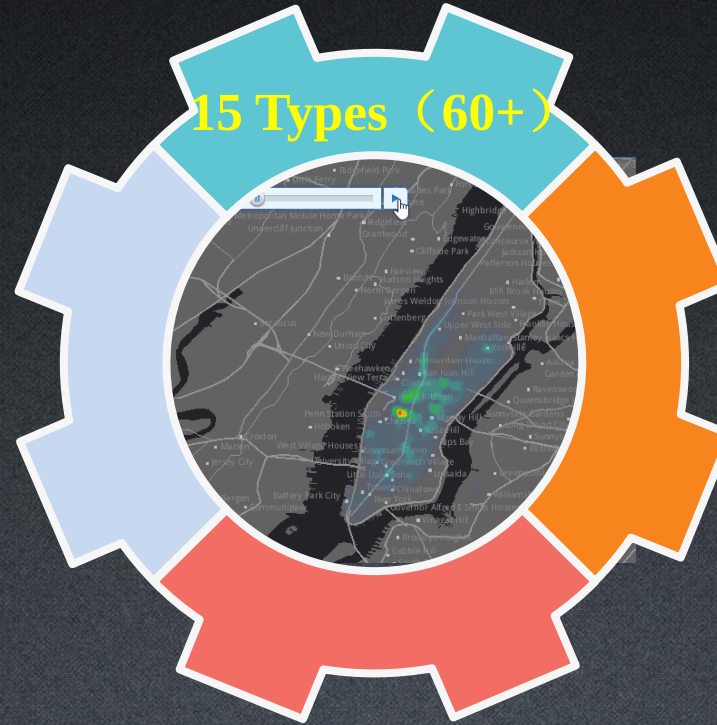
Big Data Distributed Analysis Frame



Spatial Big Data Algorithms

Spatial Vector Data Analysis

- Overlay Analysis
- Buffer Analysis
- Hot Spots Analysis
- OD Analysis
- ...



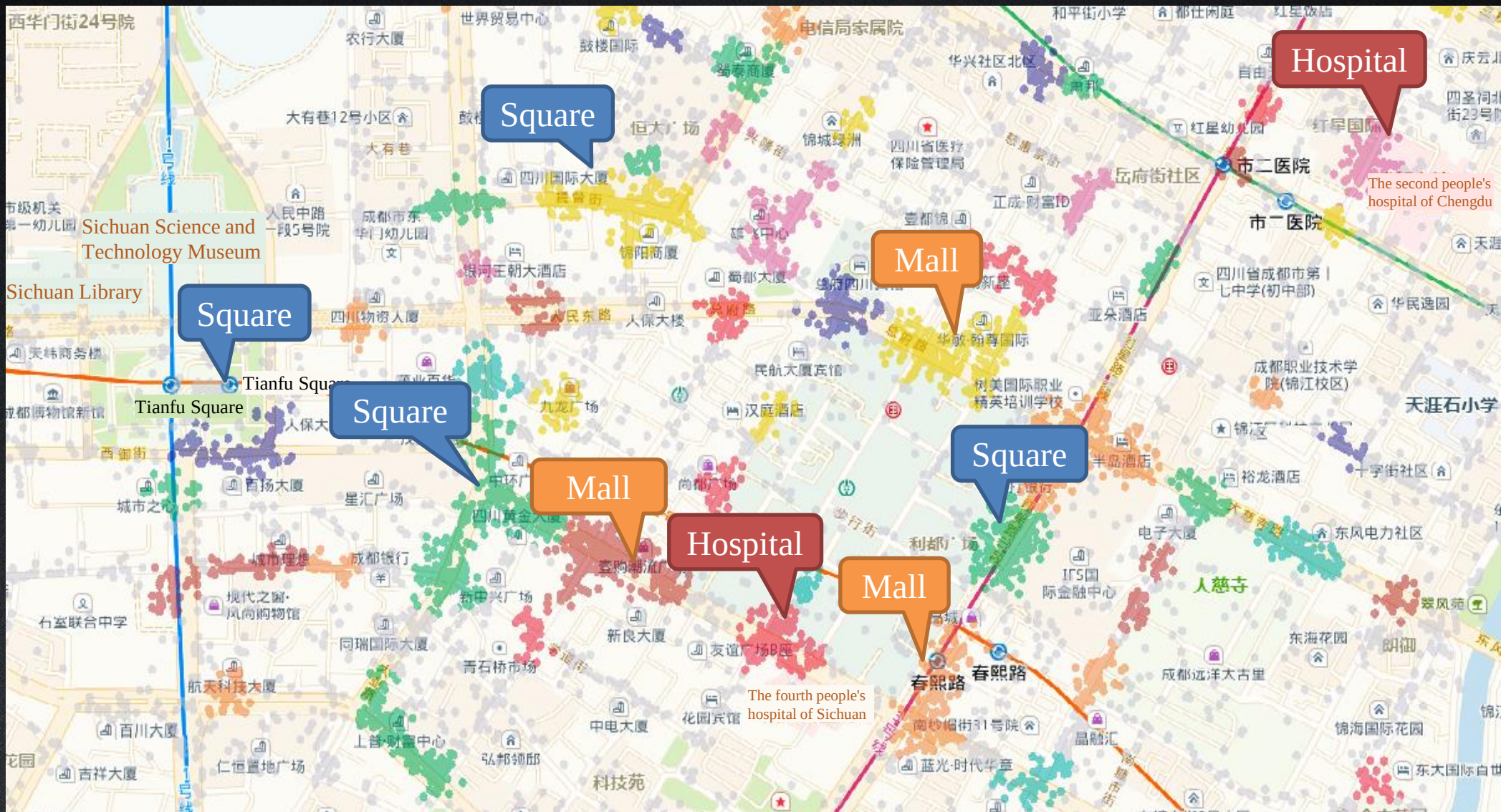
Spatial Raster Data Analysis

- Resample
- Slope Analysis
- NDVI
- ...

Distributed Spatial Machine Learning

- Cluster Analysis
- Regression Analysis
- Random Forest Analysis
- ...

Cluster Analysis: Hot spot of taking taxi



OD Analysis: People flow in morning and evening peak

06:00

TianTongYuan

1. TianTongYuan –
Residential area

2. GuoMao - CBD

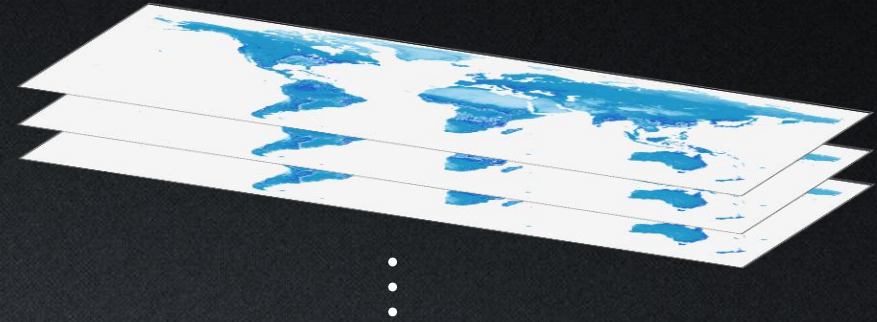
06:00

GuoMao

Zonal Statistic: 60 years precipitation of basins



Basin polygons in North America
613 MB



Annual precipitation of 1959-2018
60 years Tif, 329 GB



4.28 Hours

4 CPU, 16 GB
* 6 Workers



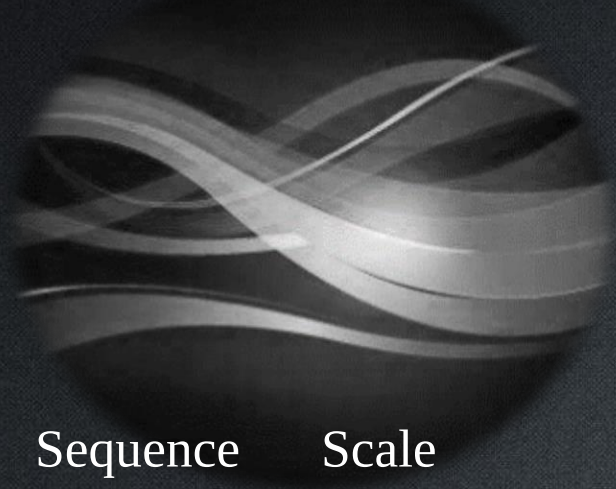
min < X < 92264153
92264153.9 <= X < 184528307
184528307.8 <= X < 276792461
276792461.7 <= X < 369056615
369056615.6 <= X < 645849077
645849077.3 <= X < 738113231
738113231.2 <= X < 830377385



Streaming Data Process

SuperMap Streaming Data Service

Real-time
Streaming Data

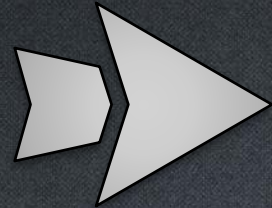


Sequence

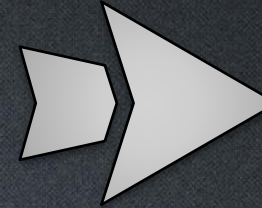
Scale

Fast

Continuous



Streaming
Service



Result

Spark
Streaming

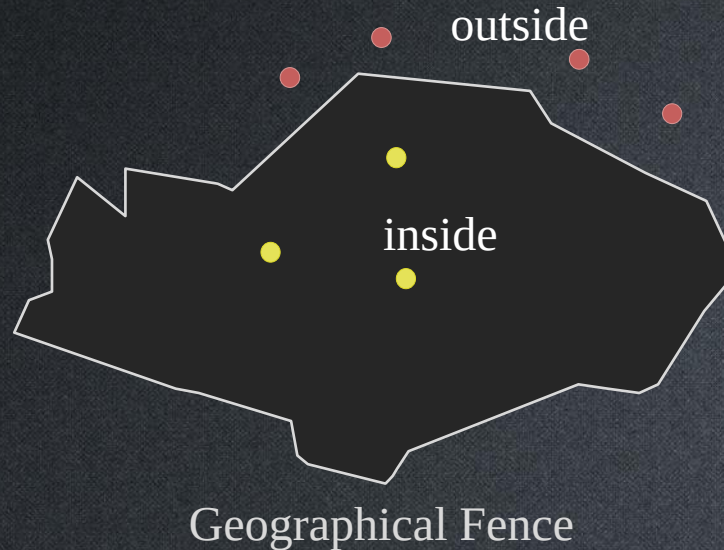


Streaming Data Process Algorithms

- Attribute Filter

[speed]>120,
([x] >= -180 && [x] <= 180) && ([y] >= -90 &&
[y] <= 90)

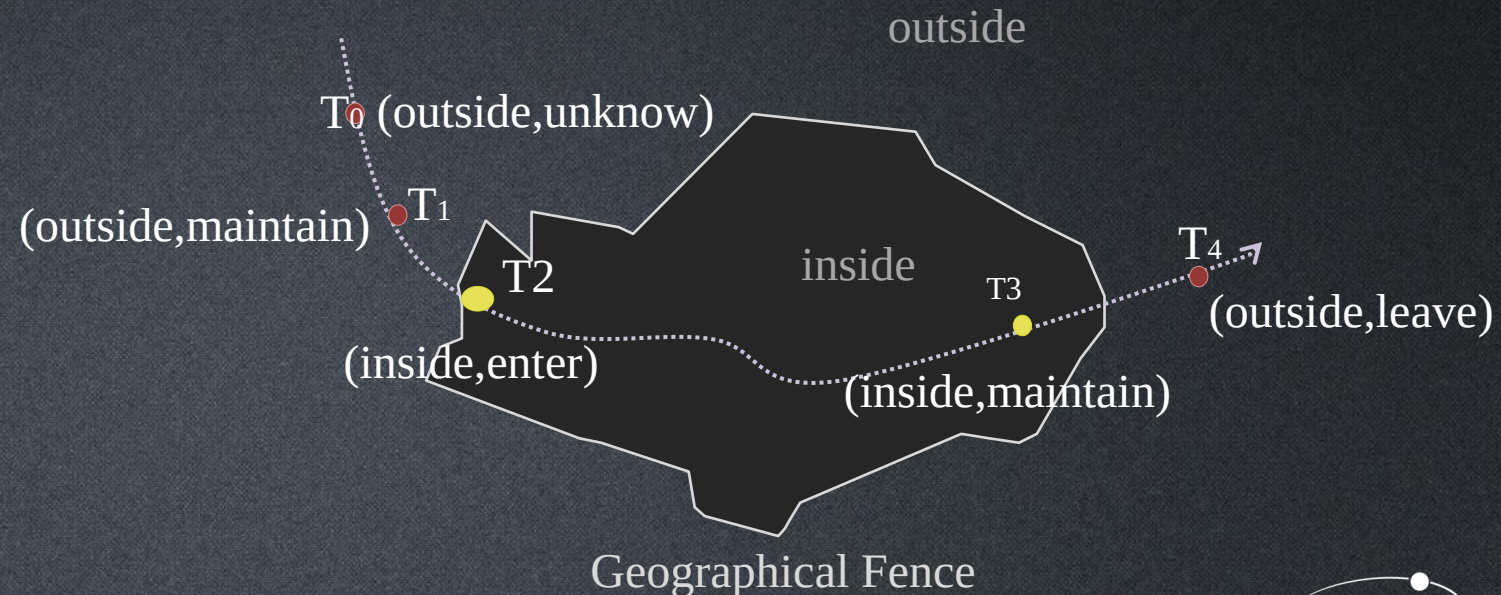
- Spatial Filter

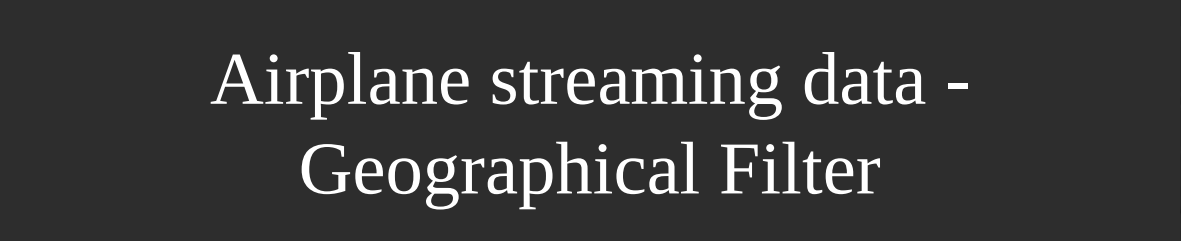


- Attribute Map

[longitude] / 600000,
[receivertime] = currentTime()

- Spatial Map





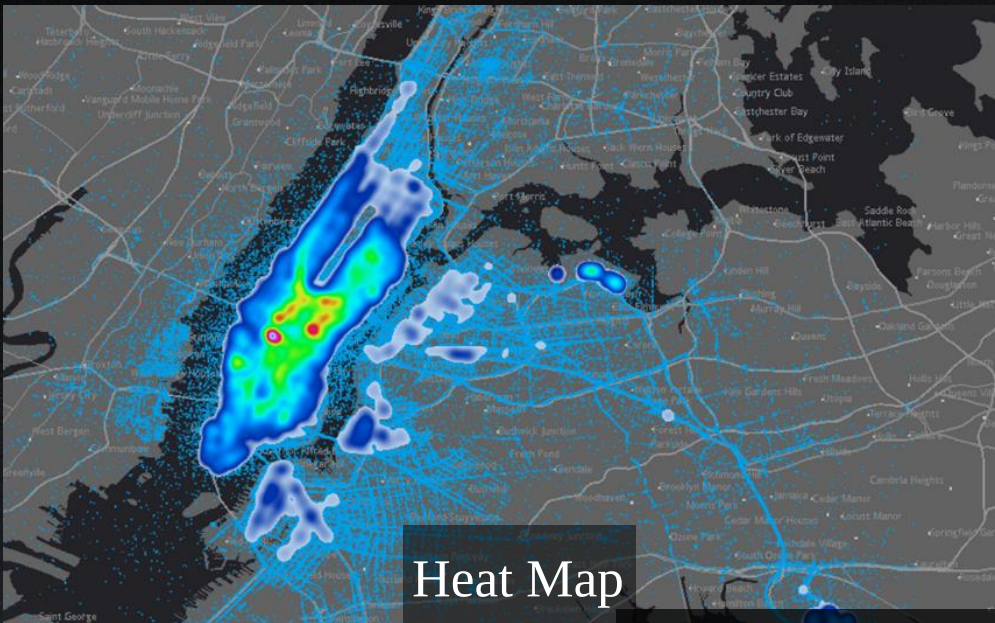


Spatial Big Data Visualization

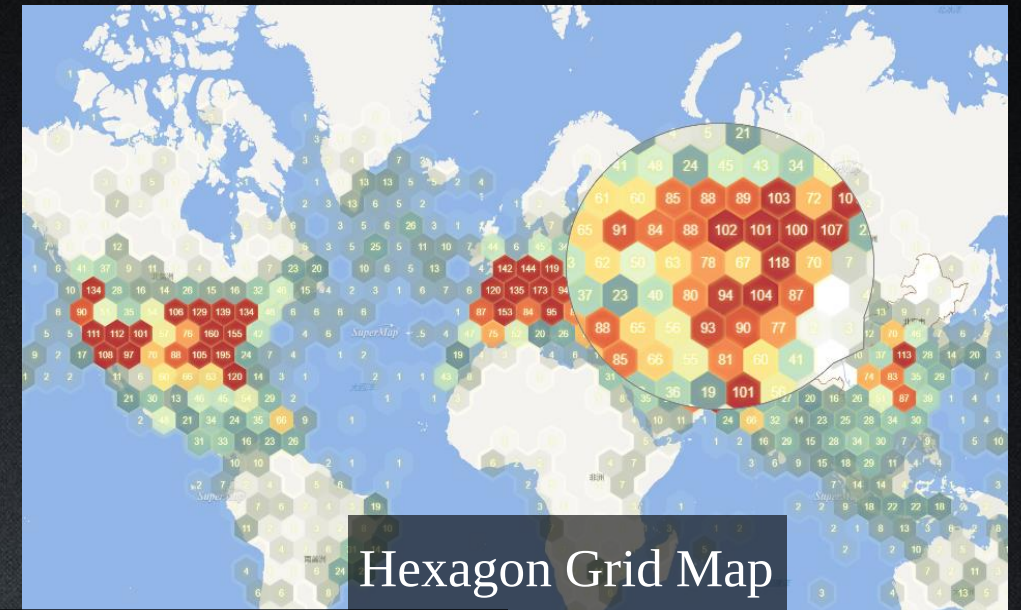


Long tracks

Tracks of global air lines
Raw point data of global air planes (Billion)

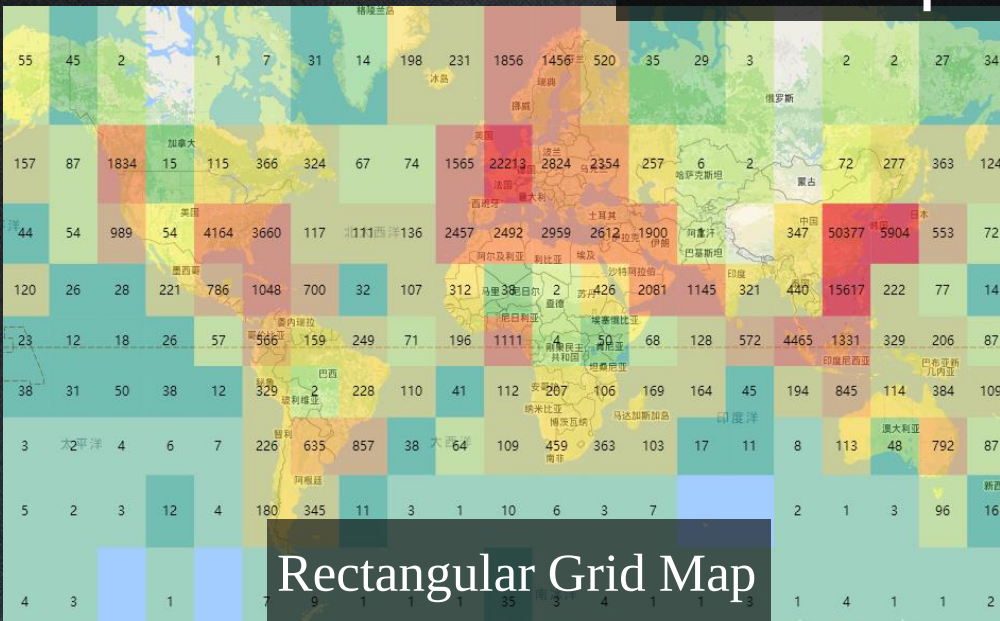


Heat Map

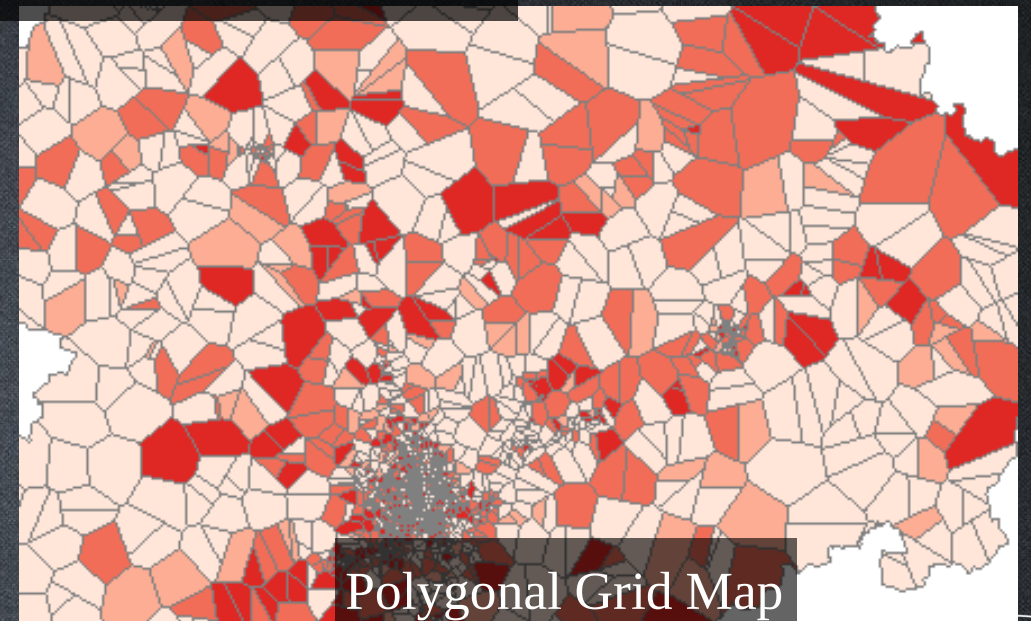


Hexagon Grid Map

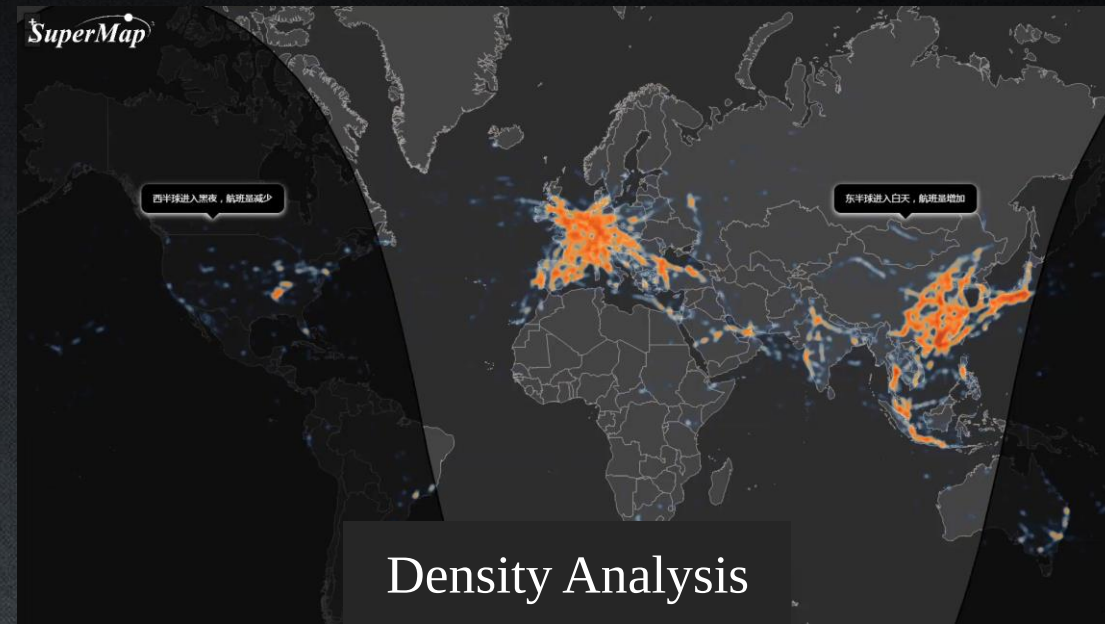
Static Spatial Data Visualization



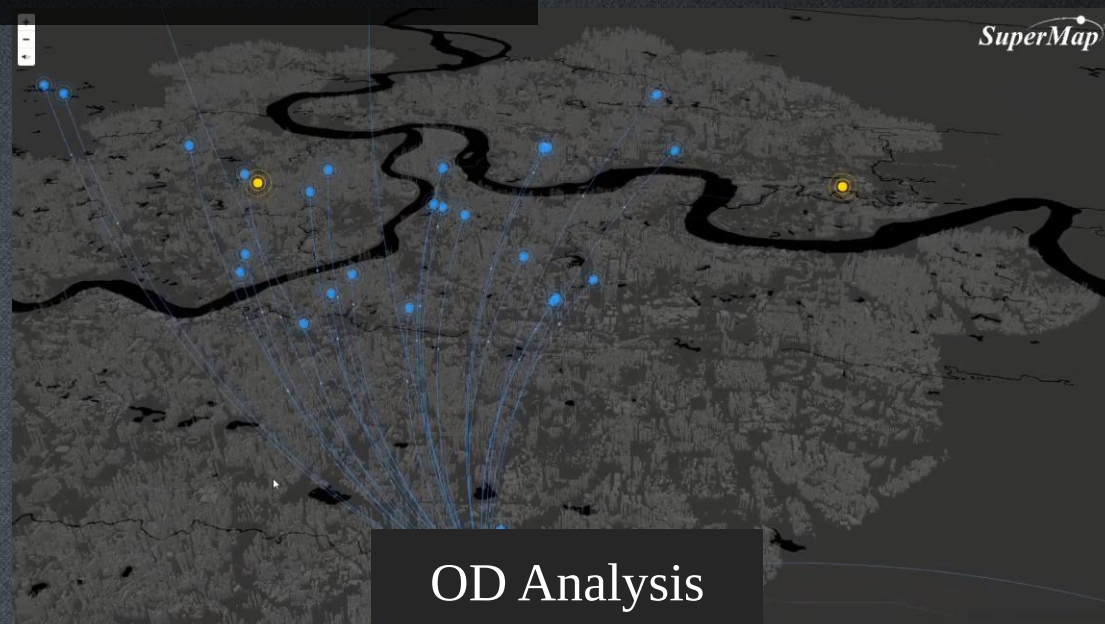
Rectangular Grid Map



Polygonal Grid Map



Streaming Data Visualization





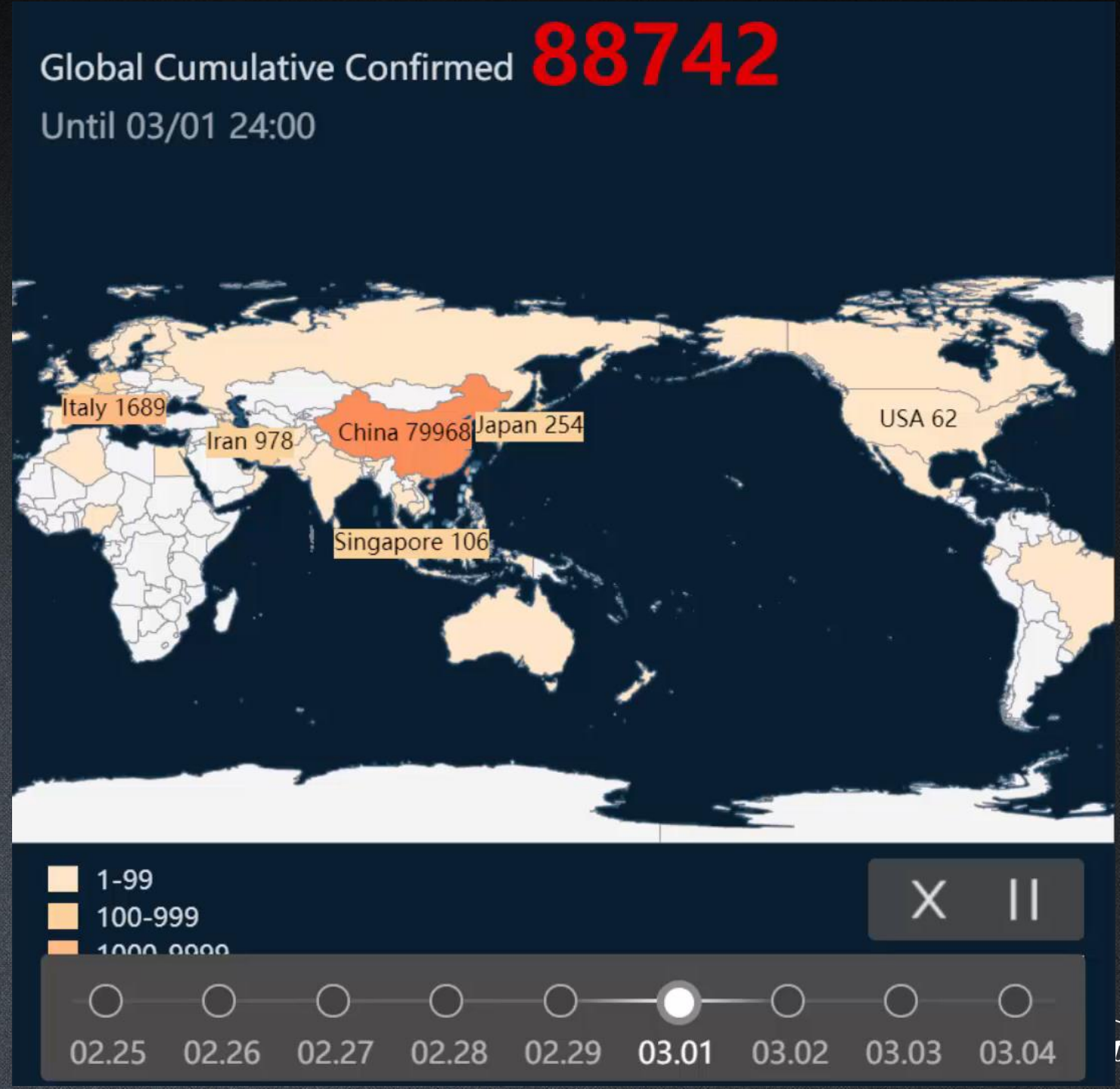
Simulation 3D Model & Real-time Traffic Density Analysis



平均速度 35.00
当前速度 35.00
当前流量 0.00
当前流量 2

Dynamic Polygon Map of COVID-19

<https://ncpviz.supermapol.com>



SuperMap Big Data GIS Product System

Industrial Application

Big Data GIS Software and Platform

Spatial Big Data Visualization

Spatial Big Data
Analysis

Real-time
Streaming Data
Process

Spatial Big Data Storage



SuperMap iServer

Distributed
Analysis Service

Streaming Data
Service



SuperMap iDesktopX

Big Data Toolbox



SuperMap iObjects for Spark/
SuperMap iObjects Python

Big Data API

SuperMap Big Data GIS Product System

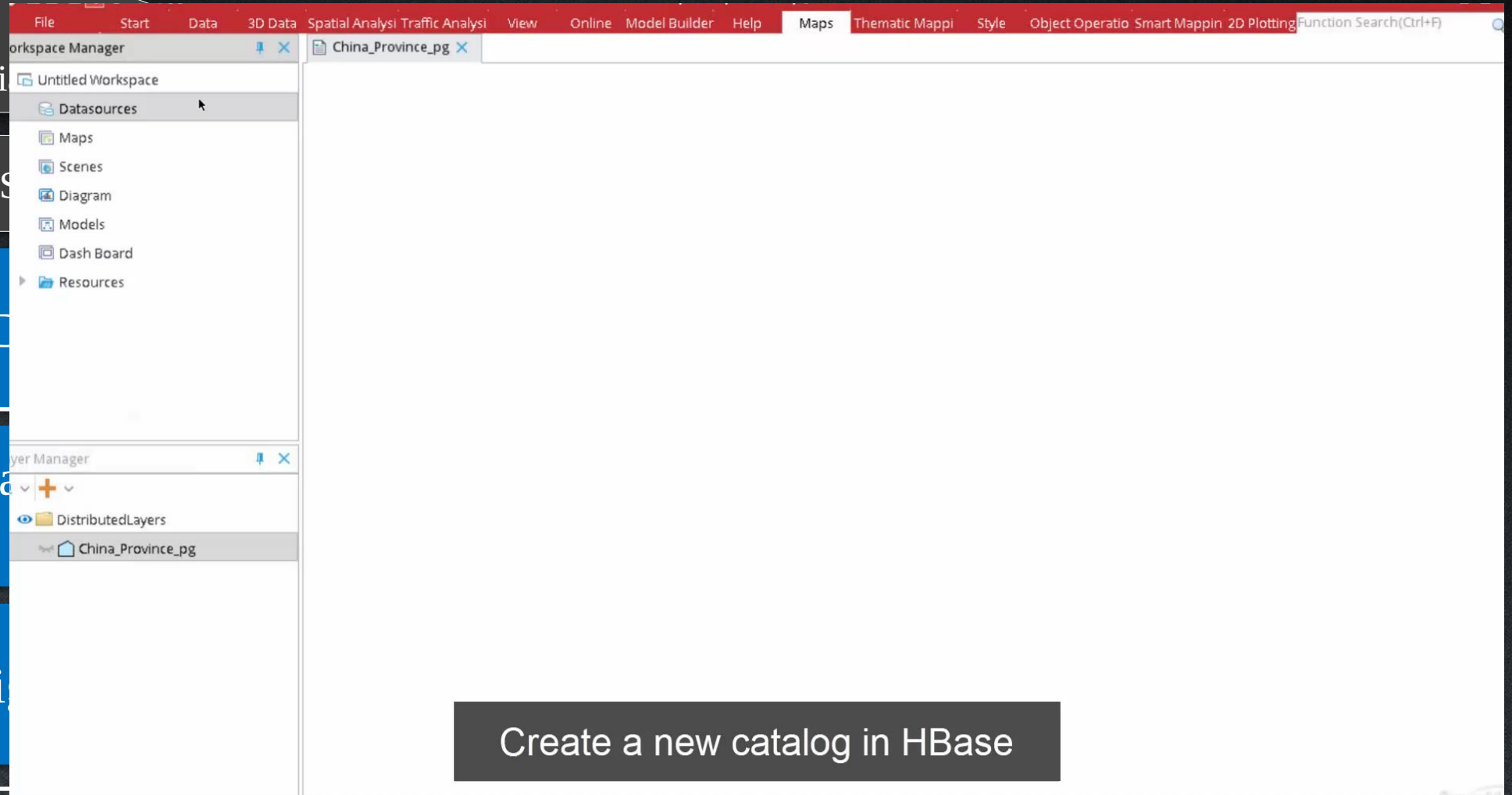
Industrial

Big Data GIS S

Spatial Big D

Spatial Big Data
Analysis

Spatial Bi



SuperMap Big Data GIS Product System

Industrial Application

Big Data GIS Software and Platform

Spatial Big Data Visualization

Spatial Big Data
Analysis

Real-time
Streaming Data
Process

Spatial Big Data Storage

Multi-Terminal



SuperMap iServer

Distributed
Analysis Service

Streaming Data
Service



SuperMap iDesktopX

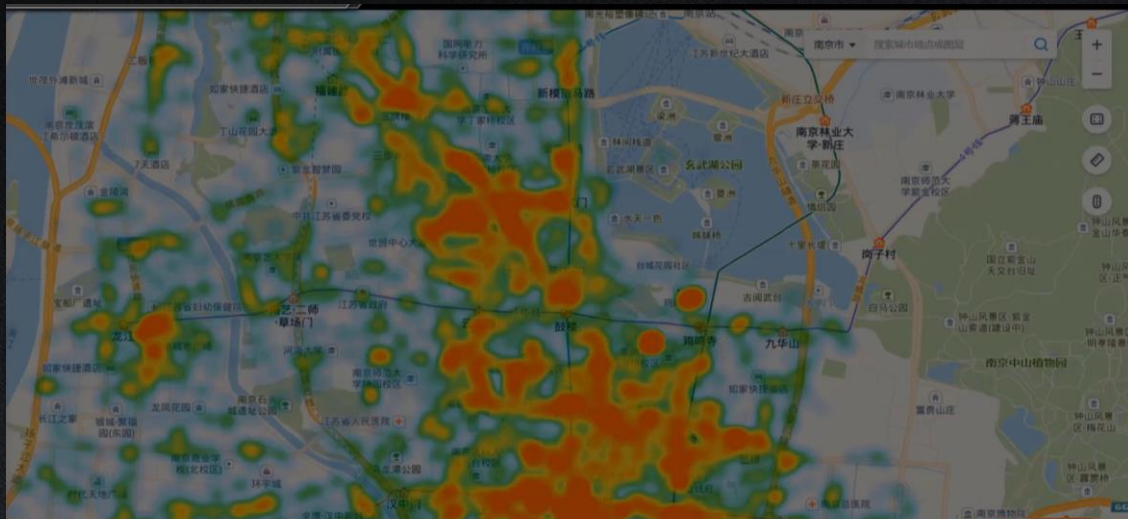
Big Data Toolbox



SuperMap iObjects for Spark/
SuperMap iObjects Python

Big Data API

“Ready to use” WebApps



DataViz



DataInsights



MapDashboard

DataViz:

<https://www.supermapol.com/web/maps>

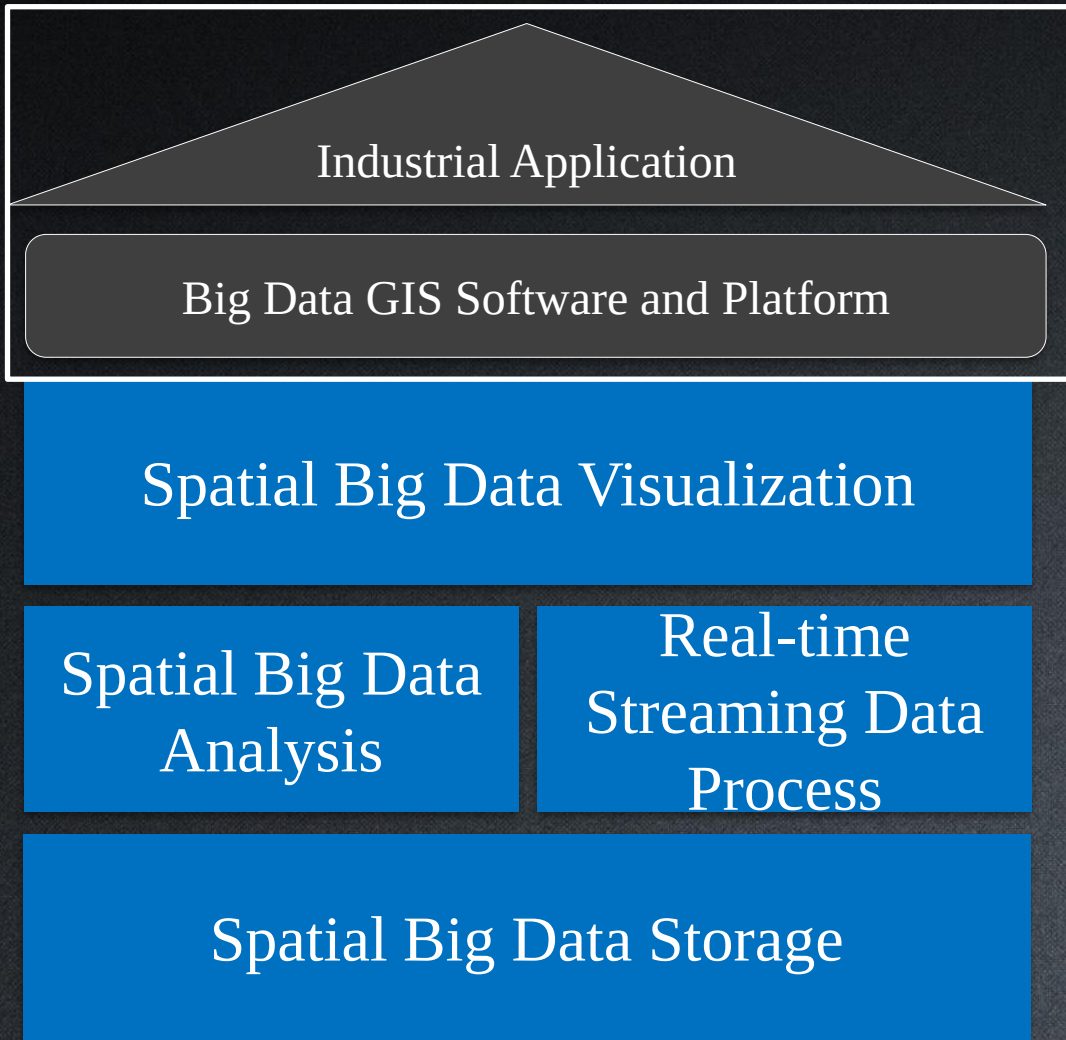
DataInsights:

<https://www.supermapol.com/web/insightsworkspaces>

MapDashboard:

<https://www.supermapol.com/web/mapdashboards>

SuperMap Big Data GIS Product System



SuperMap



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