2013 Esri Europe, Middle East, and Africa User Conference

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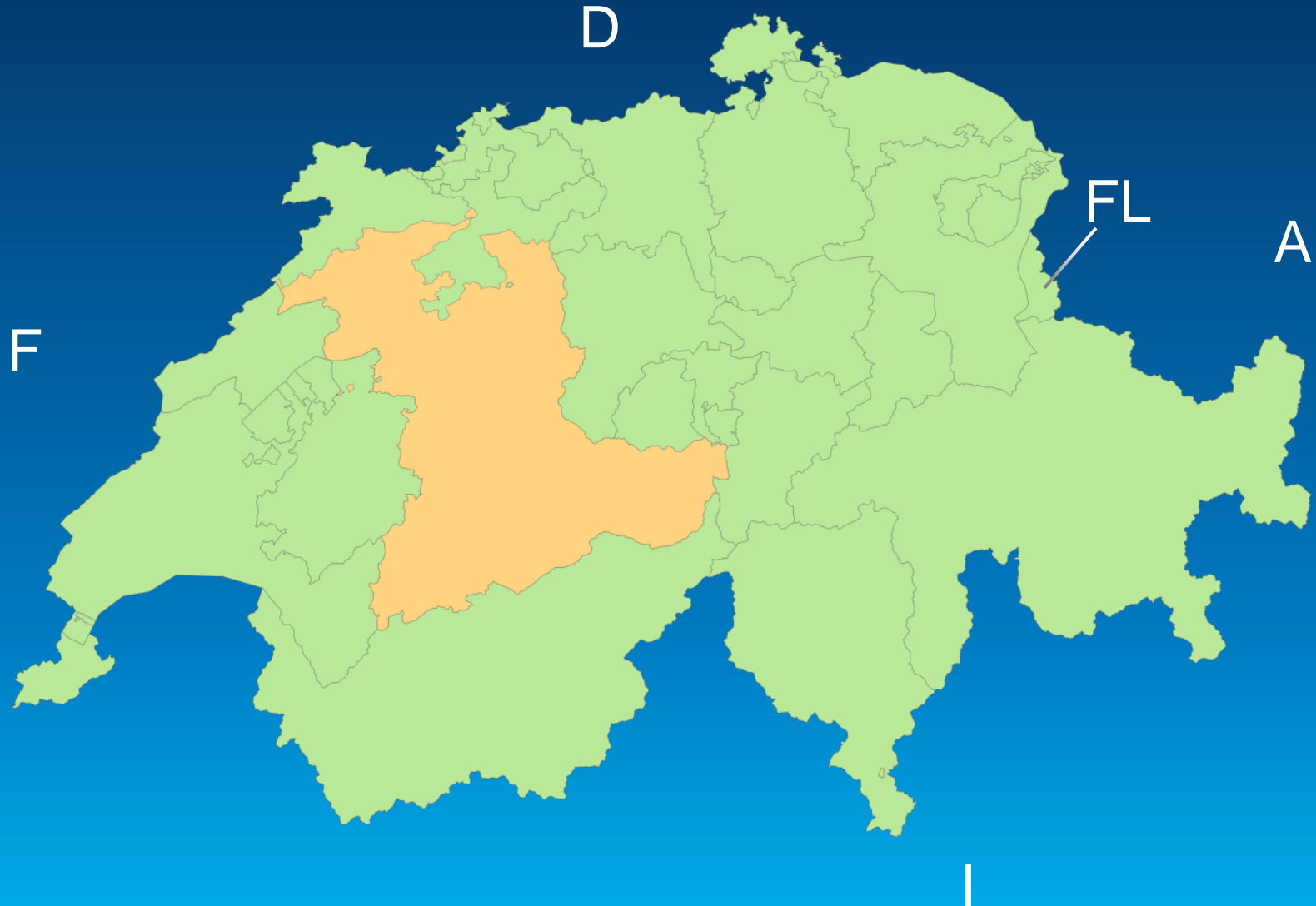
esri Deutschland

(Arc)GIS in Crime Analysis
at the cantonal police of Berne

Markus Schlager

POLICE

The cantonal police of Berne

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The cantonal police of Berne

- Canton Berne
- Population ~ 1,000,000

The cantonal police of Berne

The cantonal police of Berne

The cantonal police of Berne

The cantonal police of Berne

- City Bern
  - Population ~130,000
  - Capital of the canton Bern
  - Federal city of Switzerland

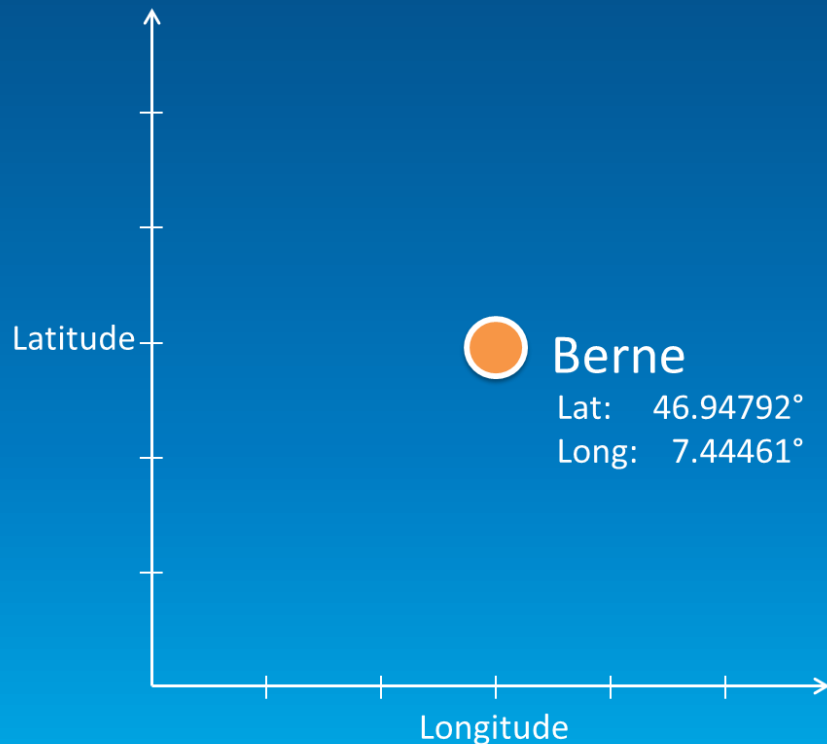# The cantonal police of Berne

- Place of Command
- ~ 2,800 employees

Our data base – the case

- When?

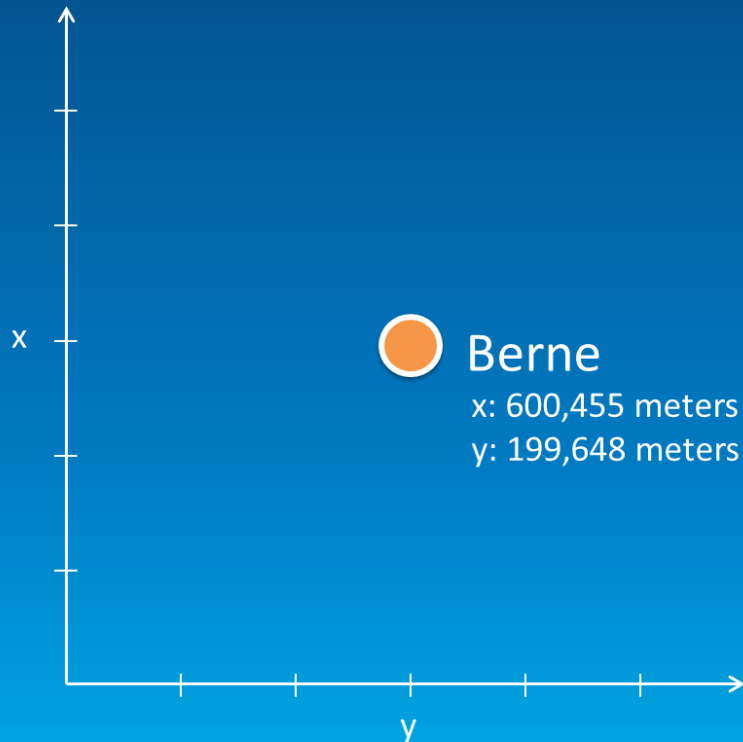- What?

- Who?

- Where?

- …

- …

- Why?

Our data base – the case

- Where?
  - Latitude and Longitude

Latitude

Berne
Lat: 46.94792°
Long: 7.44461°

Longitude

Our data base – the case

- Where?
  - x and y (Swiss national coordinate system)

x

○ Berne
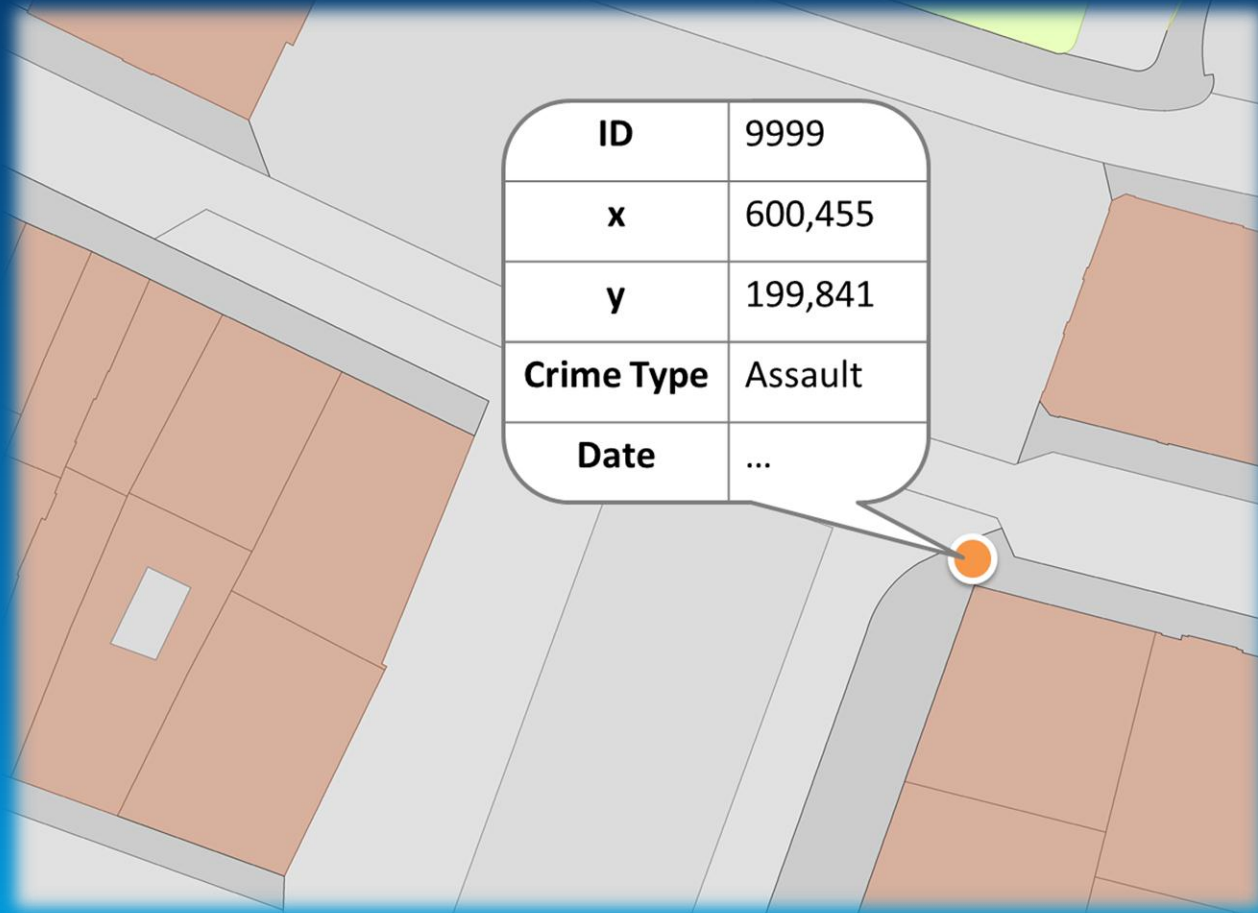x: 600,455 meters
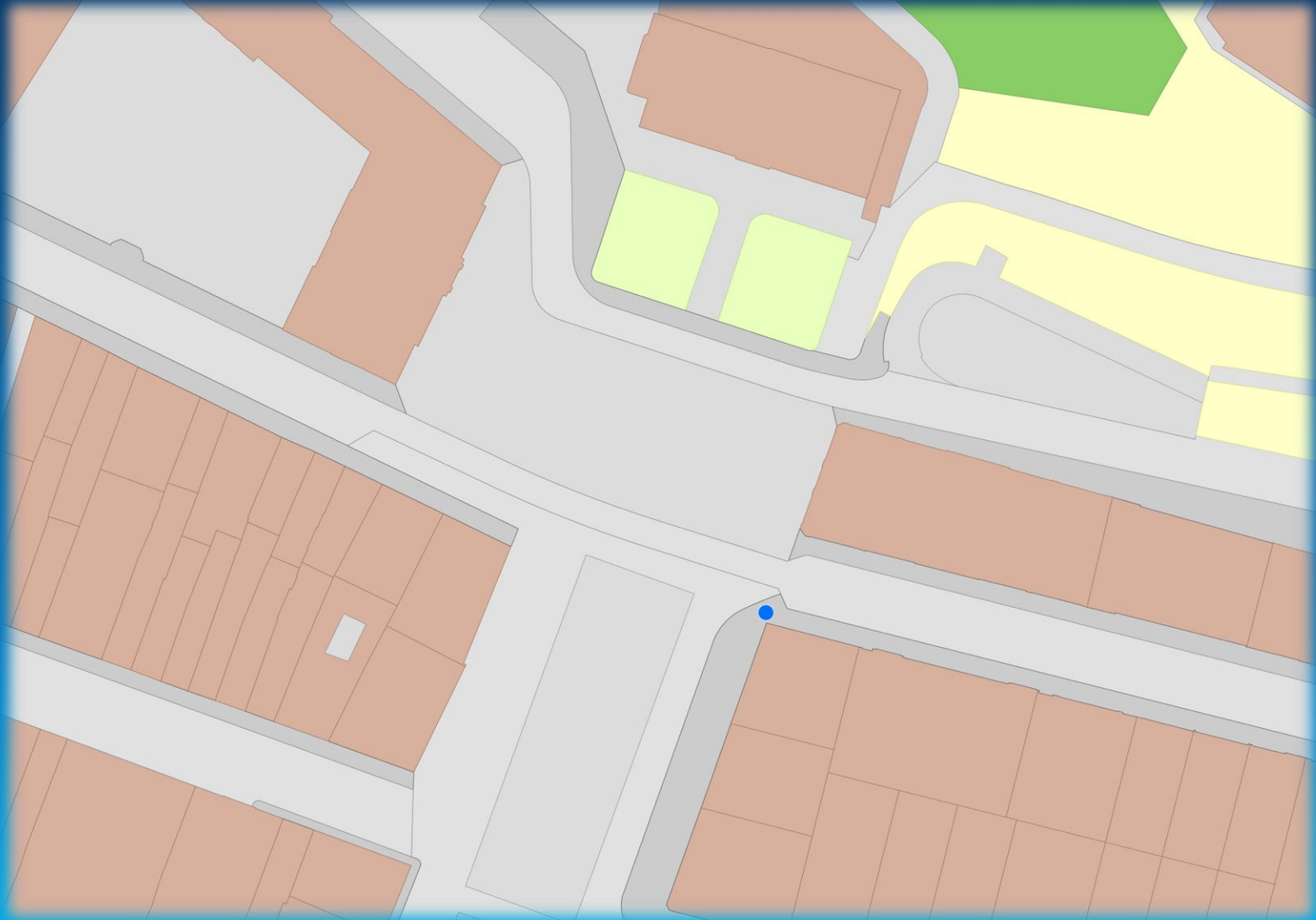y: 199,648 meters

y

Our data base – the case

- Where does the "Where" come from?
  - Emergency control center
  - Patrol or Police station
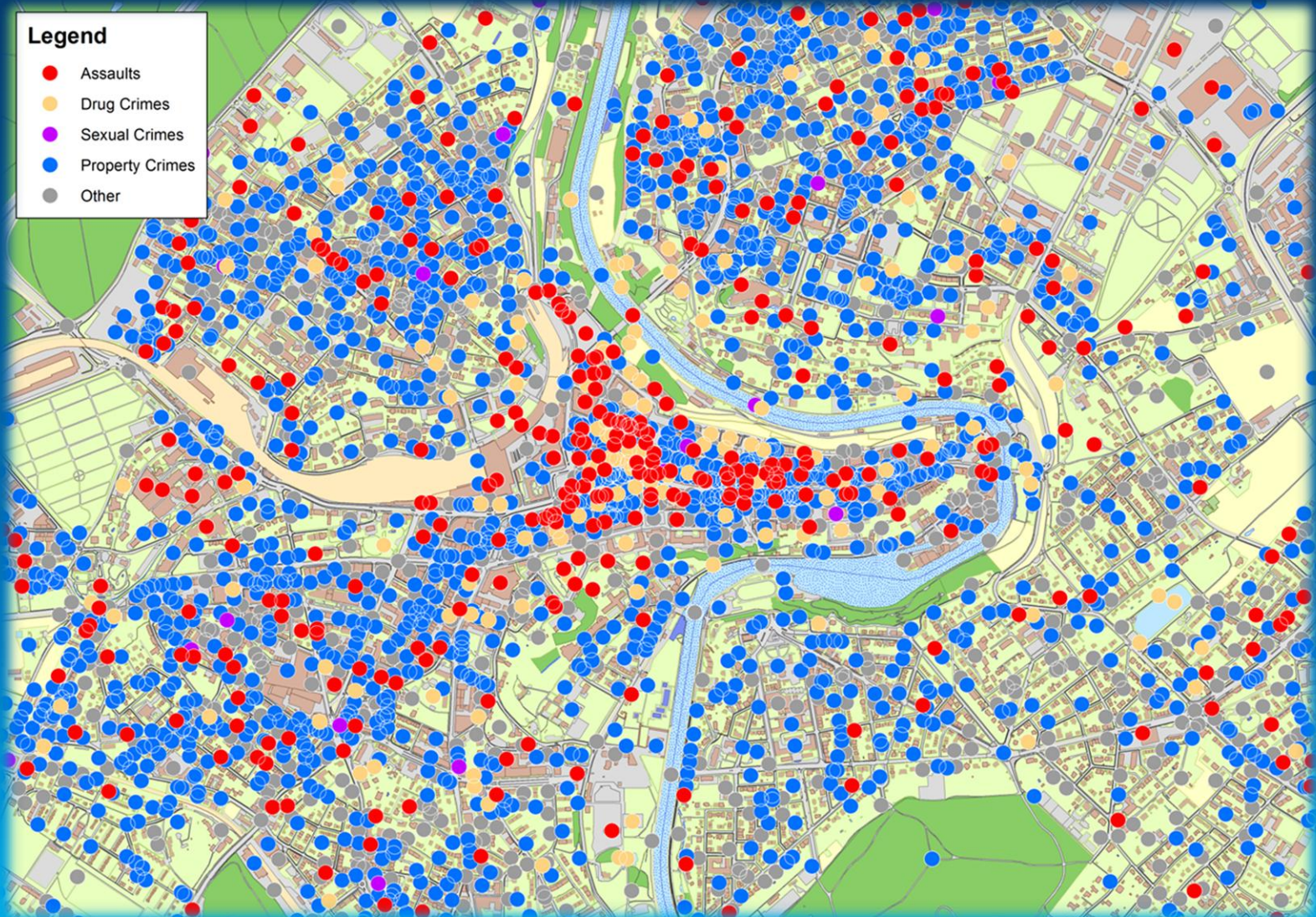- Every case has a location
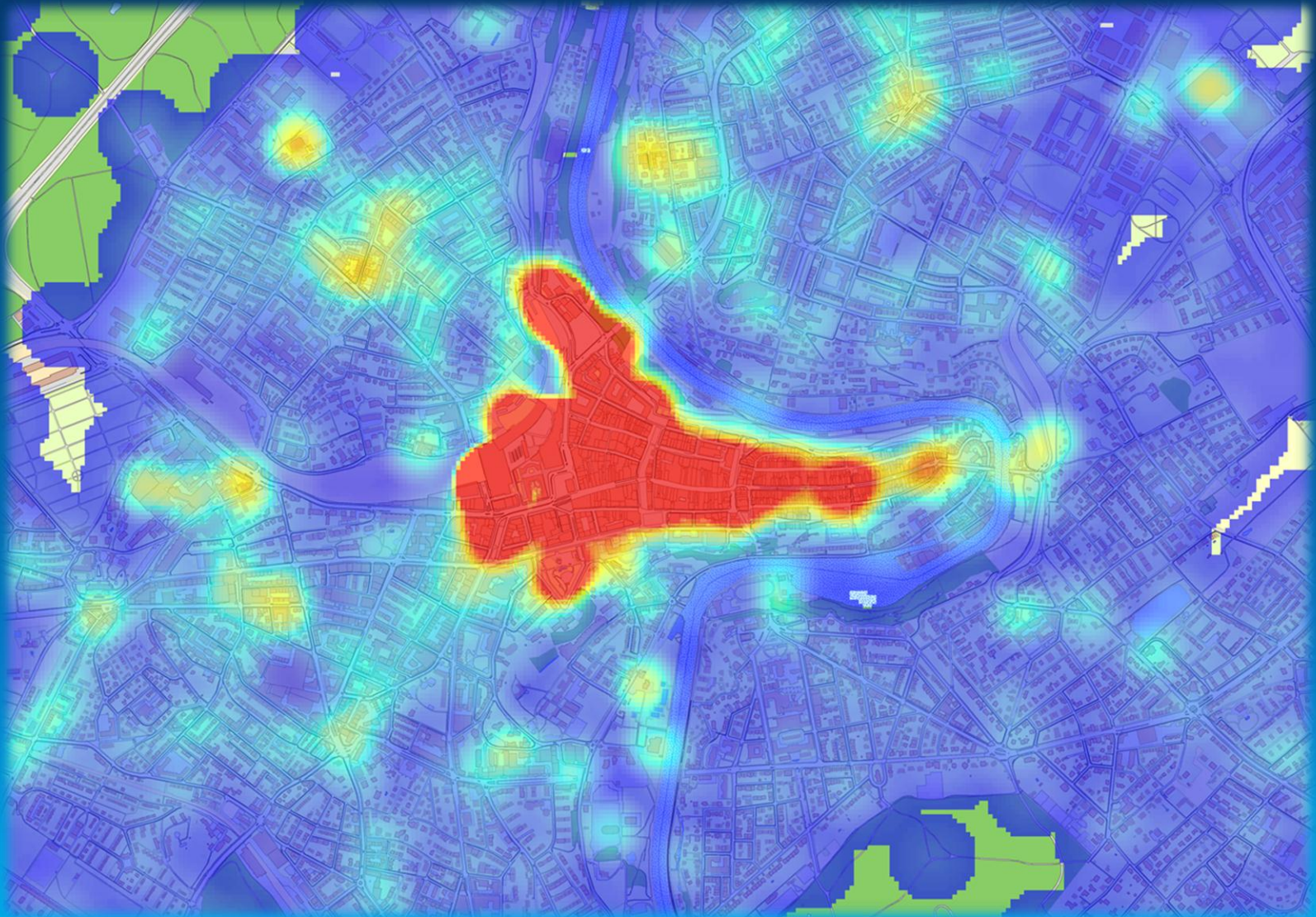- Cases → Database

Our data base – the case

Bring order to the chaos

Bring order to the chaos

Bring order to the chaos

Crime Analysis?

- Systematic study of crime and disorder problems

- Assists police:
  - Criminal apprehension
  - Crime and disorder reduction
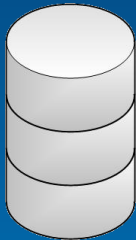 - Crime prevention
  - Crime evaluation

According to Boba (2008) – Crime Analysis with Crime Mapping
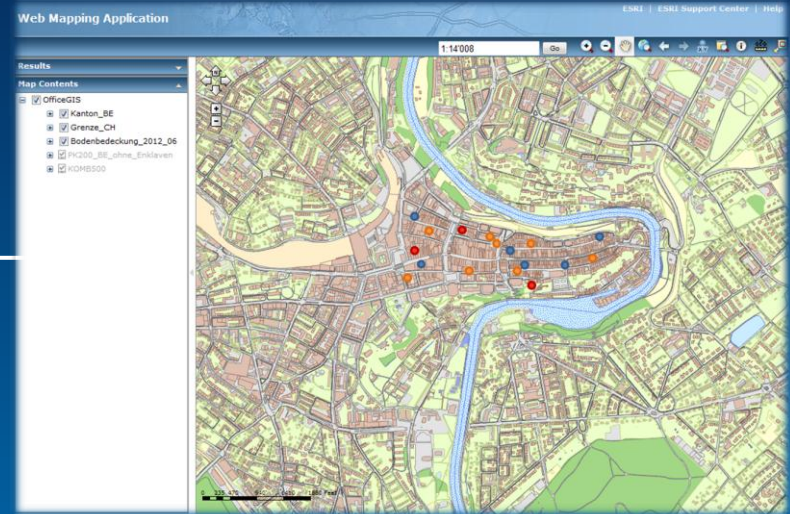
GIS Crime Analysis Tasks

- Filter

- Classify

- Visualize

- Analyze

GIS resources

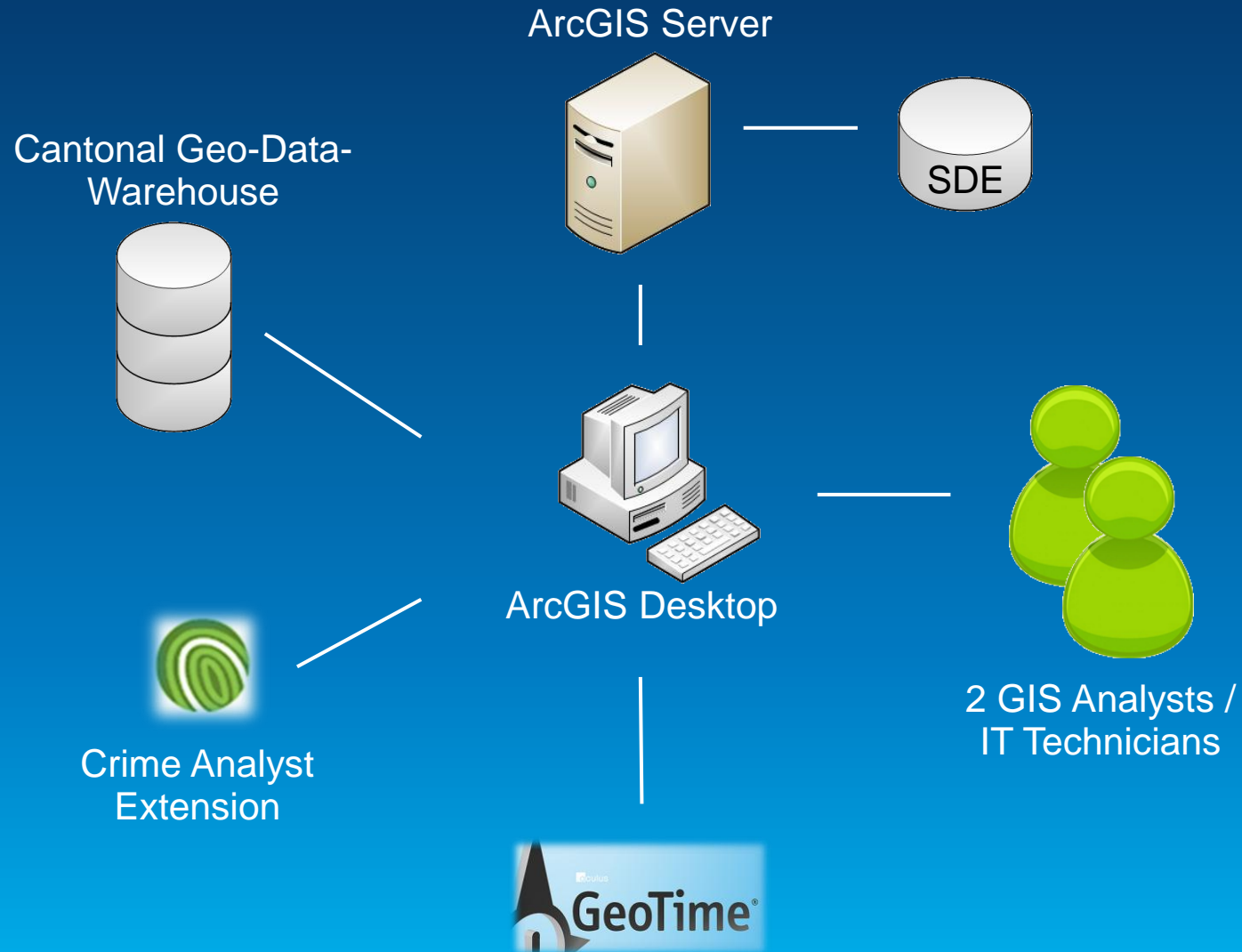
Cantonal Geo-Data-Warehouse

ArcGIS Server

ArcGIS Desktop

Crime Analyst Extension

GeoTime®

2 GIS Analysts / IT Technicians

GIS resources

ArcGIS Server

SDE

Cantonal Geo-Data-Warehouse

ArcGIS Desktop

2 GIS Analysts /
IT Technicians

Crime Analyst
Extension

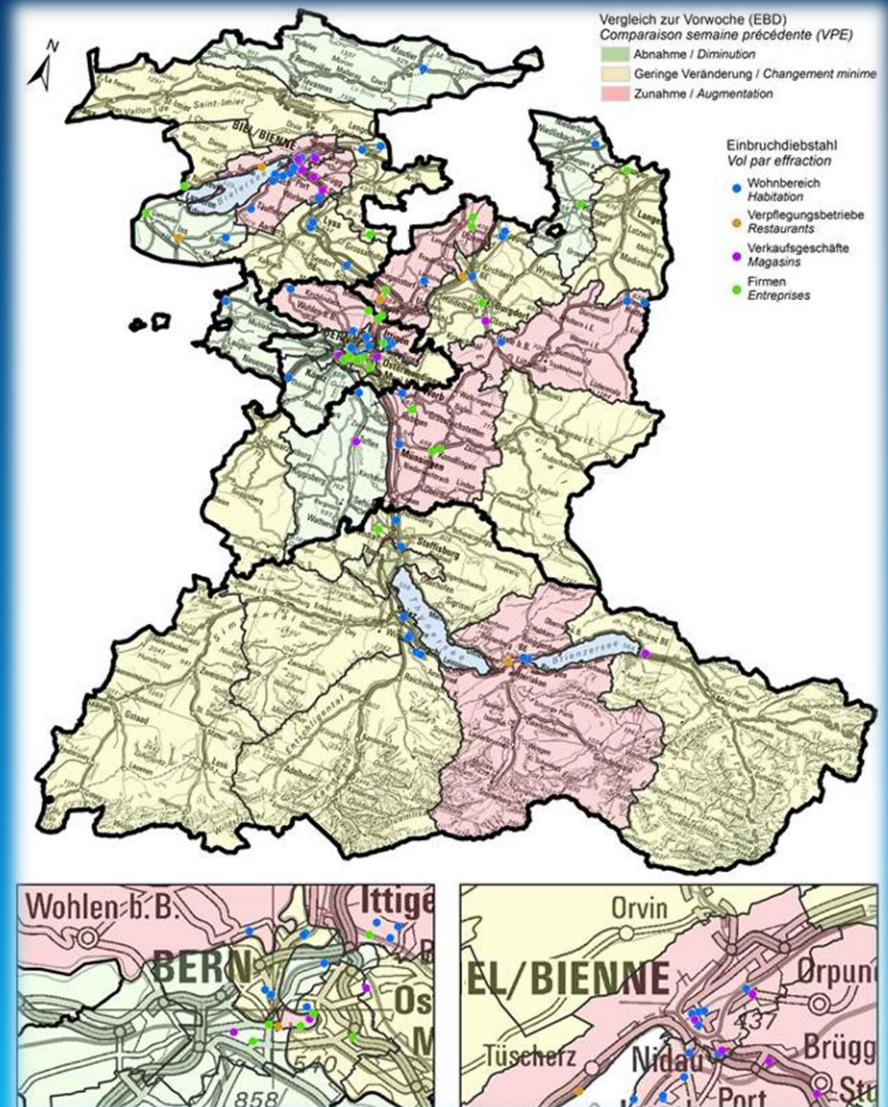GeoTime®

Hotspot maps

- Pros:
  - Easy to read
  - Graphically expressive
- Cons:
  - High risk of misinterpre-
    tation - i.e. **red** implicates
    dangerous!
  - Relativization can be difficult -
    which parameters?
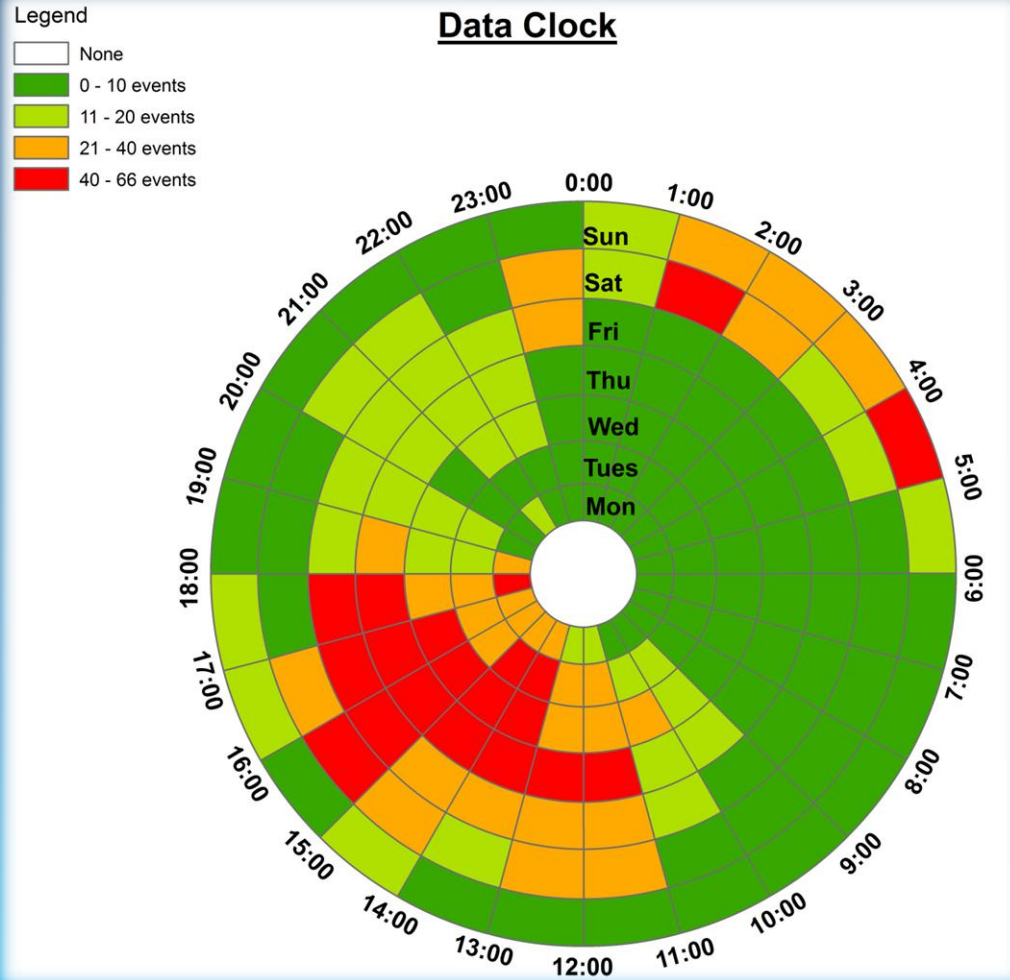
Choropleth maps

- Pros:
  - Easy to read
  - Good for comparison
- Cons:
  - Non-uniform areas →
    relativization

Crime Analyst

- Hotspot calculation

- Crime Counts

- Journey-to-Crime

- Repeat Victimisation

- Comparative Case Analysis
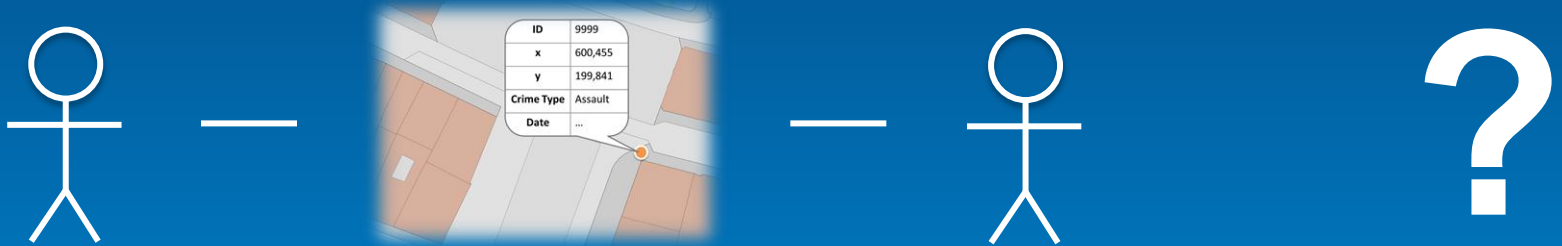
- …

- Data Clock

Data clock

Cell Site analysis

- What?
  - Analyse Call data records from phone provider
  - Determine the location of a mobile device at the time,
    - phone calls
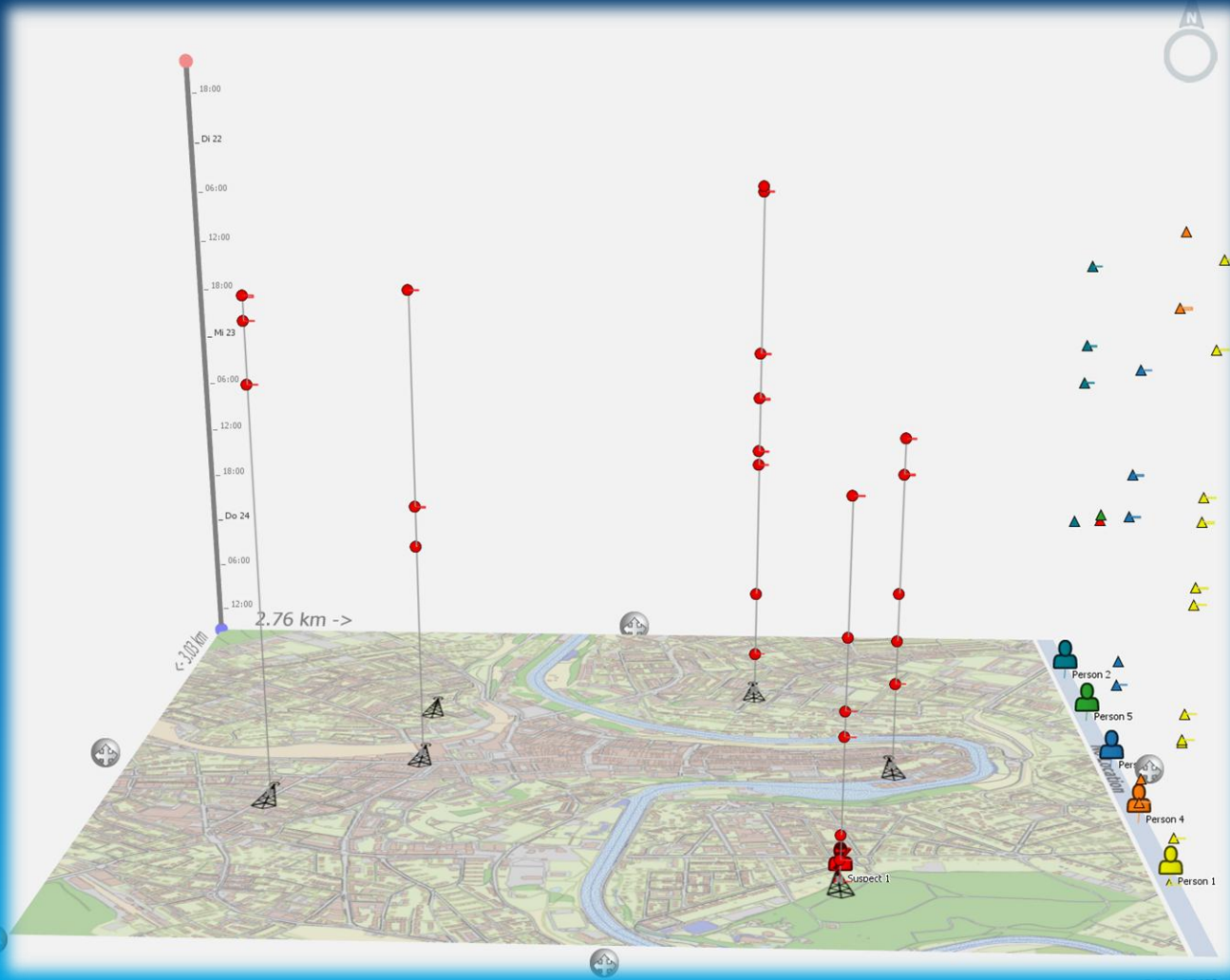   - SMS
    - MMS
    - data connections
    occurred.
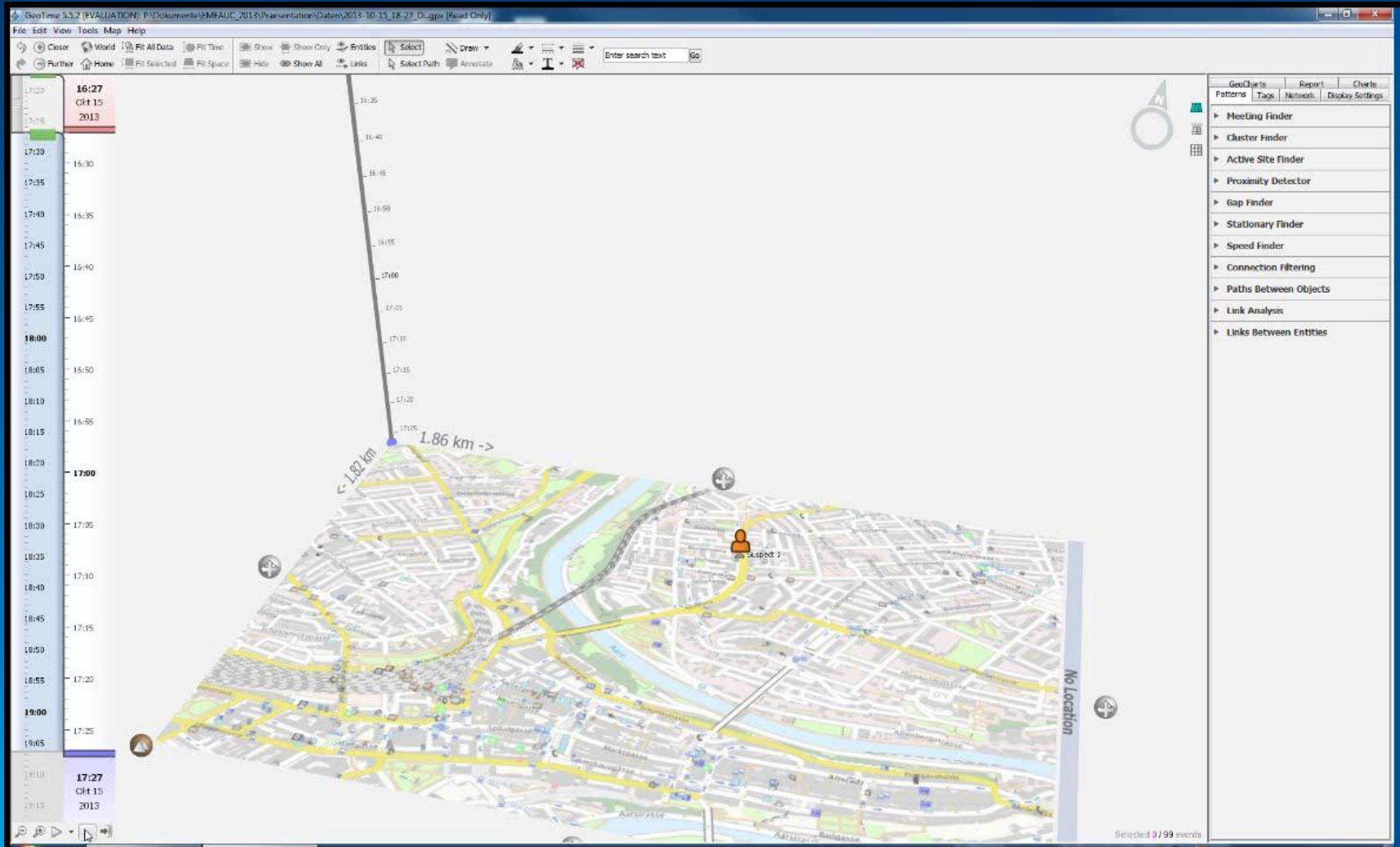
Cell Site analysis – use cases

GeoTime

- Viewer and (visual) analysis tool

- Spatio-temporal data

- Pattern-detection-algorithms
  - Meeting finder
  - Proximity Detector
  - Gap finder
  - Stationary finder
  - …

GeoTime – 3D View

GeoTime – Video

Challenges and outlook

- Case database not spatially enabled → exports
- (Data-) Isolation of highly specialized subsystems
- Data-privacy → online-services, cloud…
- Growing need for GIS-visualisations
- Applicability of crime-analysis methods and applications
- Federalism

Questions?

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