International Transport Forum | CPB Corporate Partnership Board

Mobility Data: Changes and Opportunities

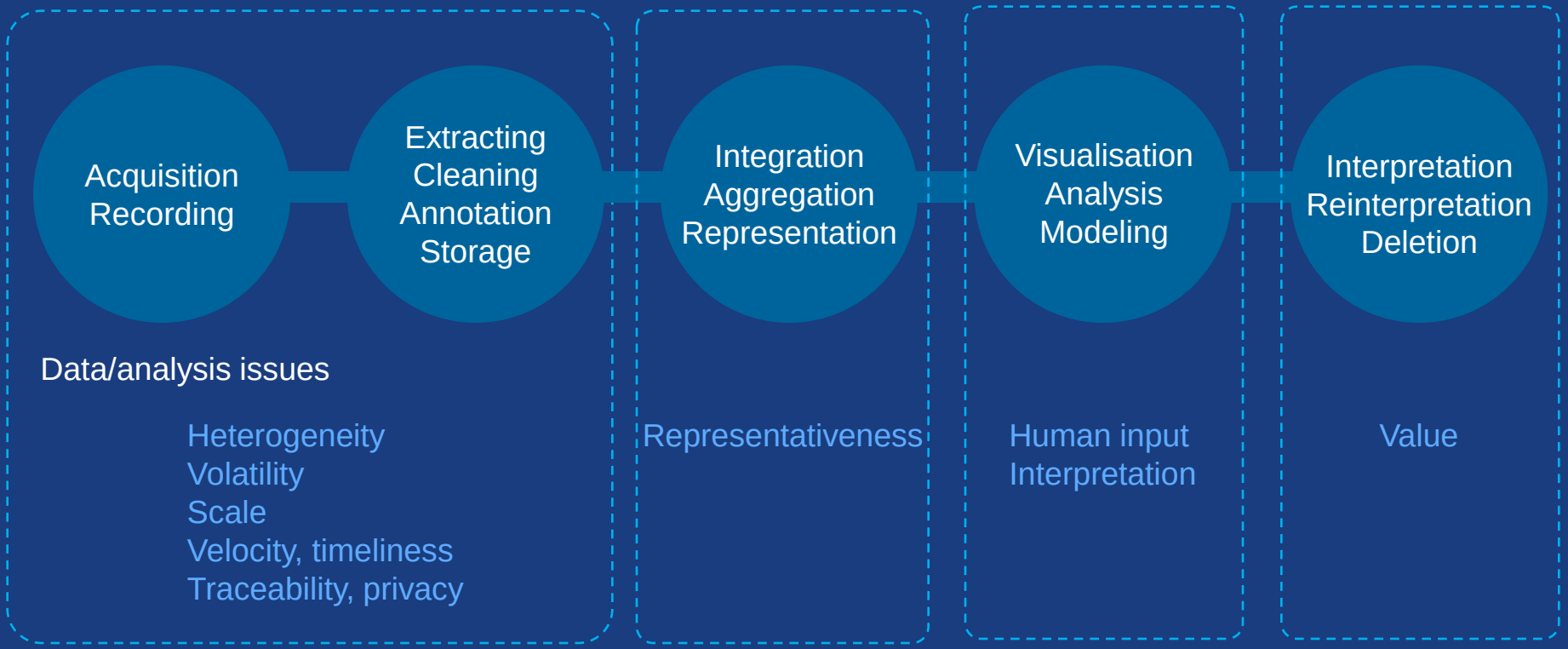
Participating Partners:
PTV Group, Kapsch TrafficCom

External Expert:
Carlo Ratti Associati

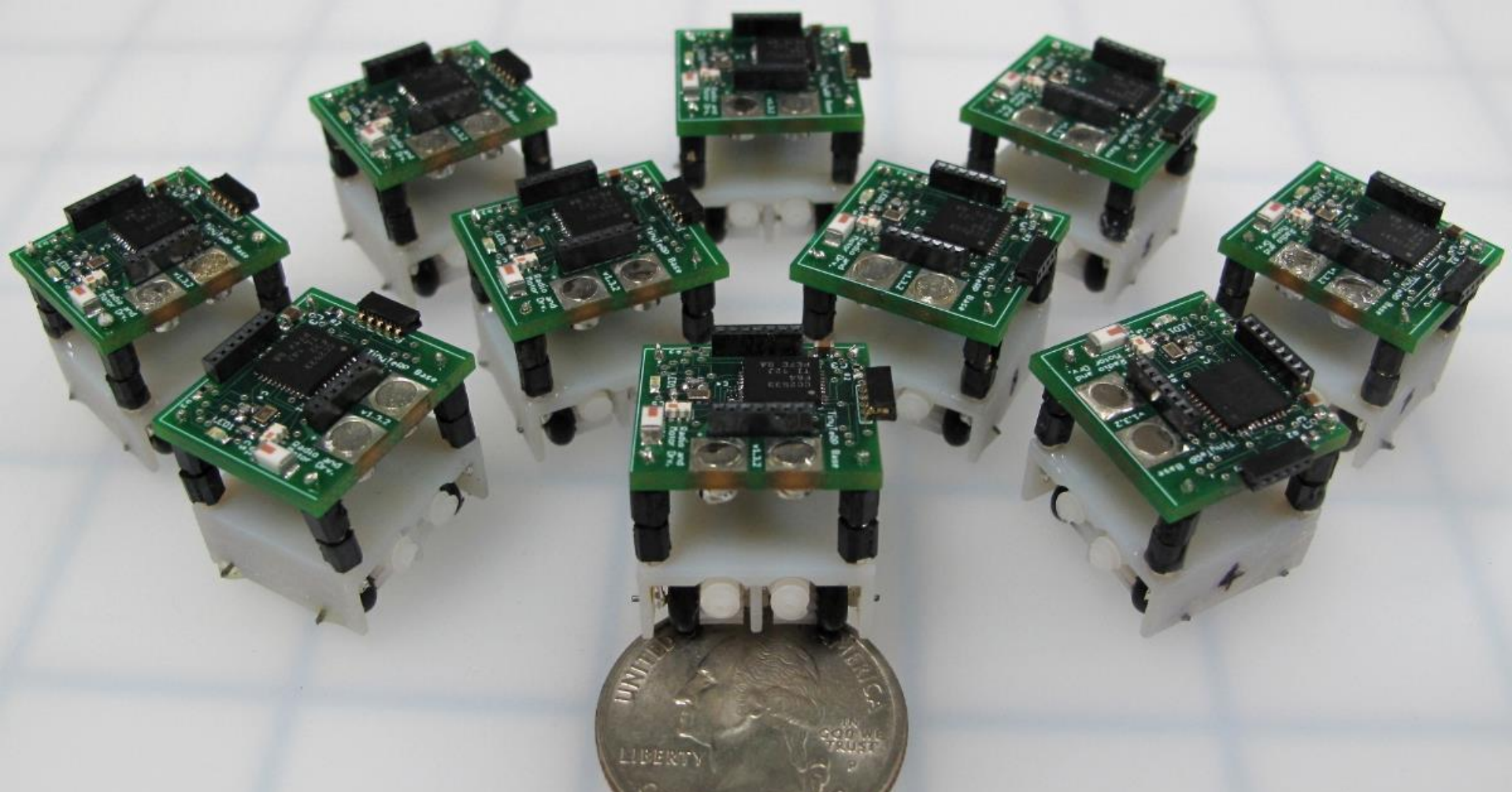
OECD

Big Data

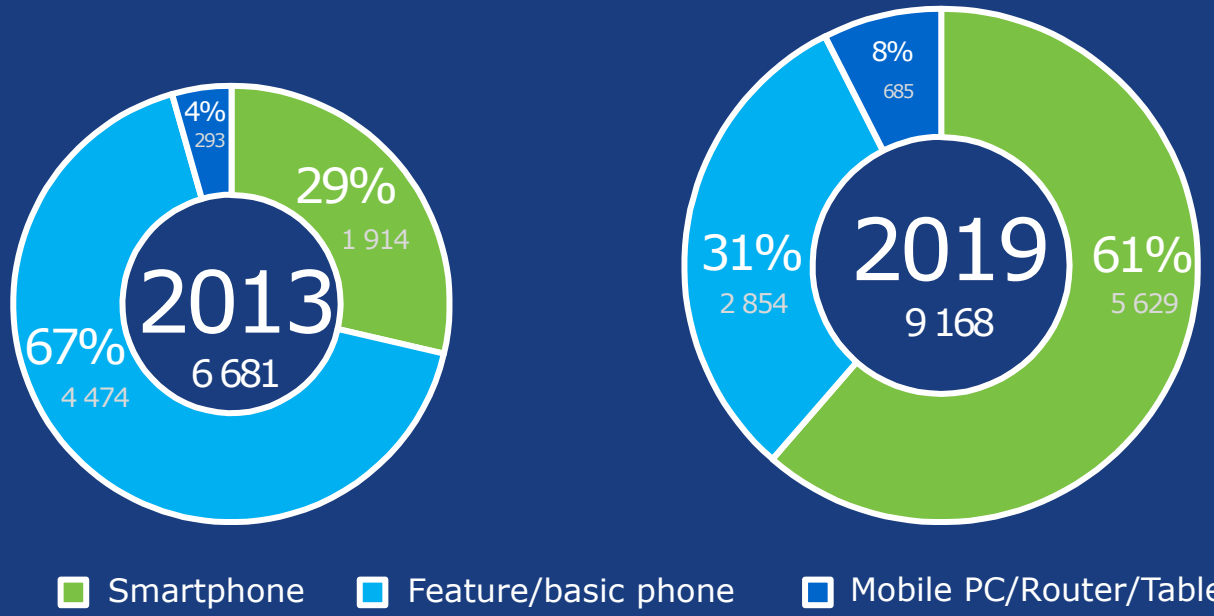
Data Analysis Pipeline



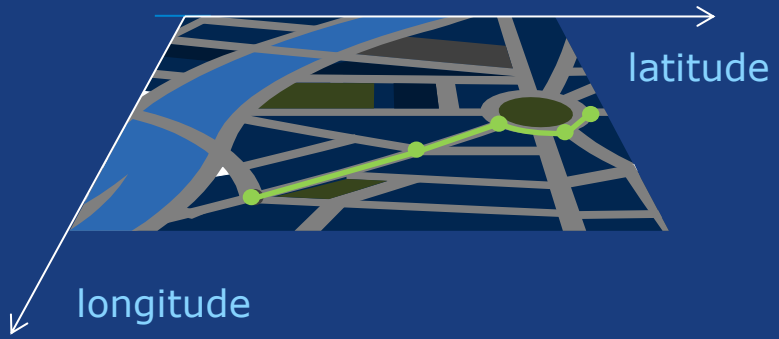
Big data has not done away with the need for statistical rigour since big data is not only prone to many of the same errors and biases in smaller datasets, it also creates new ones


LIBERTY

Global Mobile Subscriptions (millions)



Human mobility is unique



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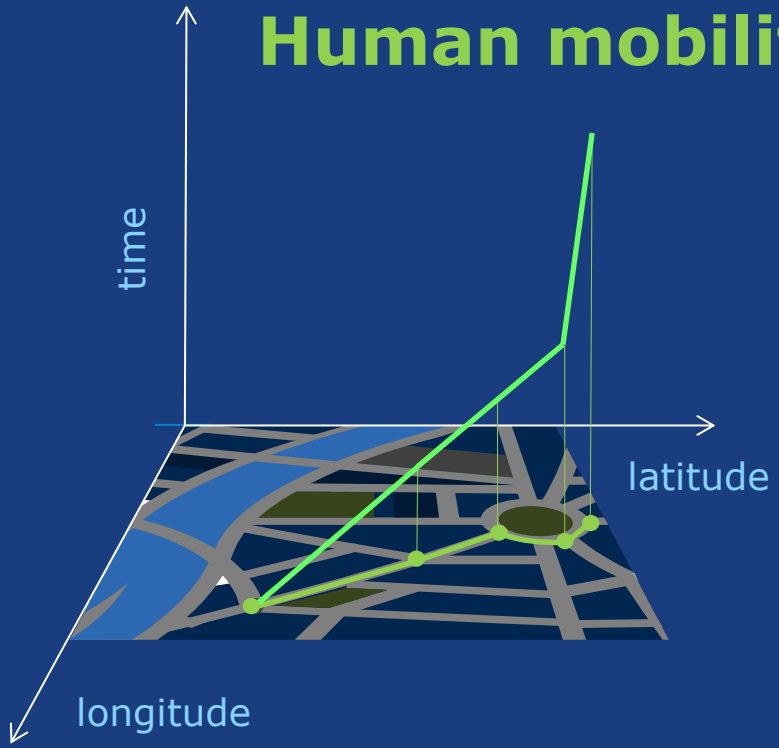
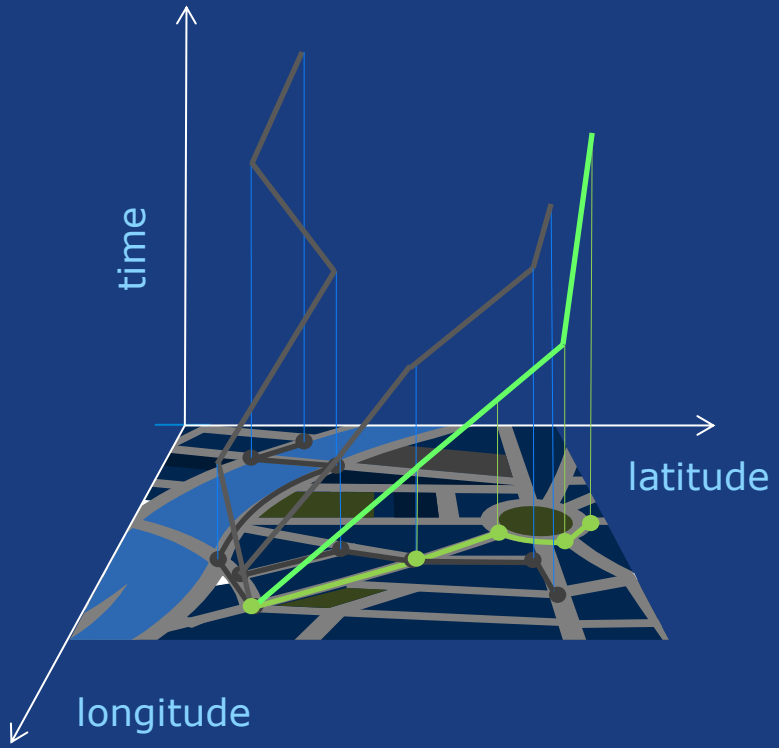
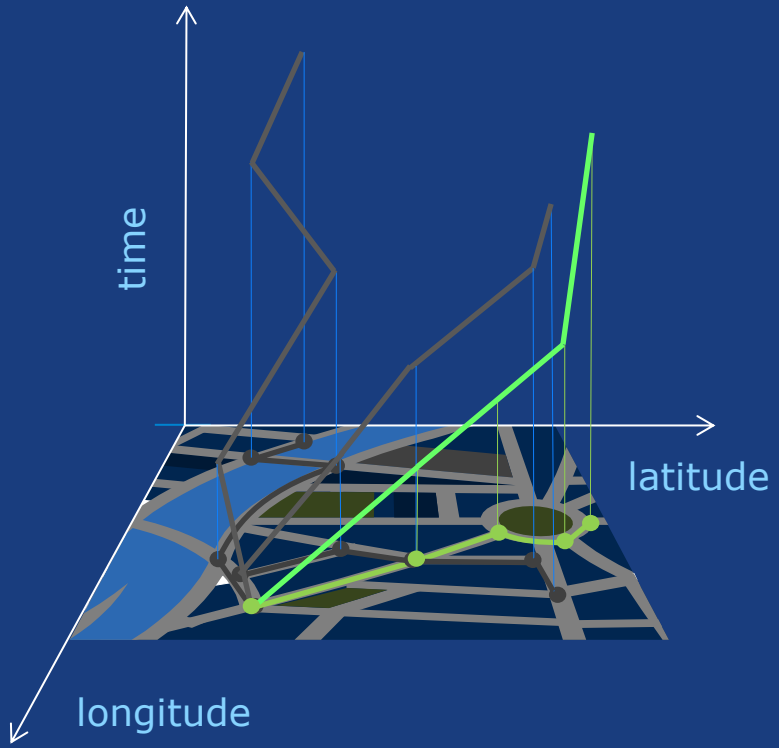
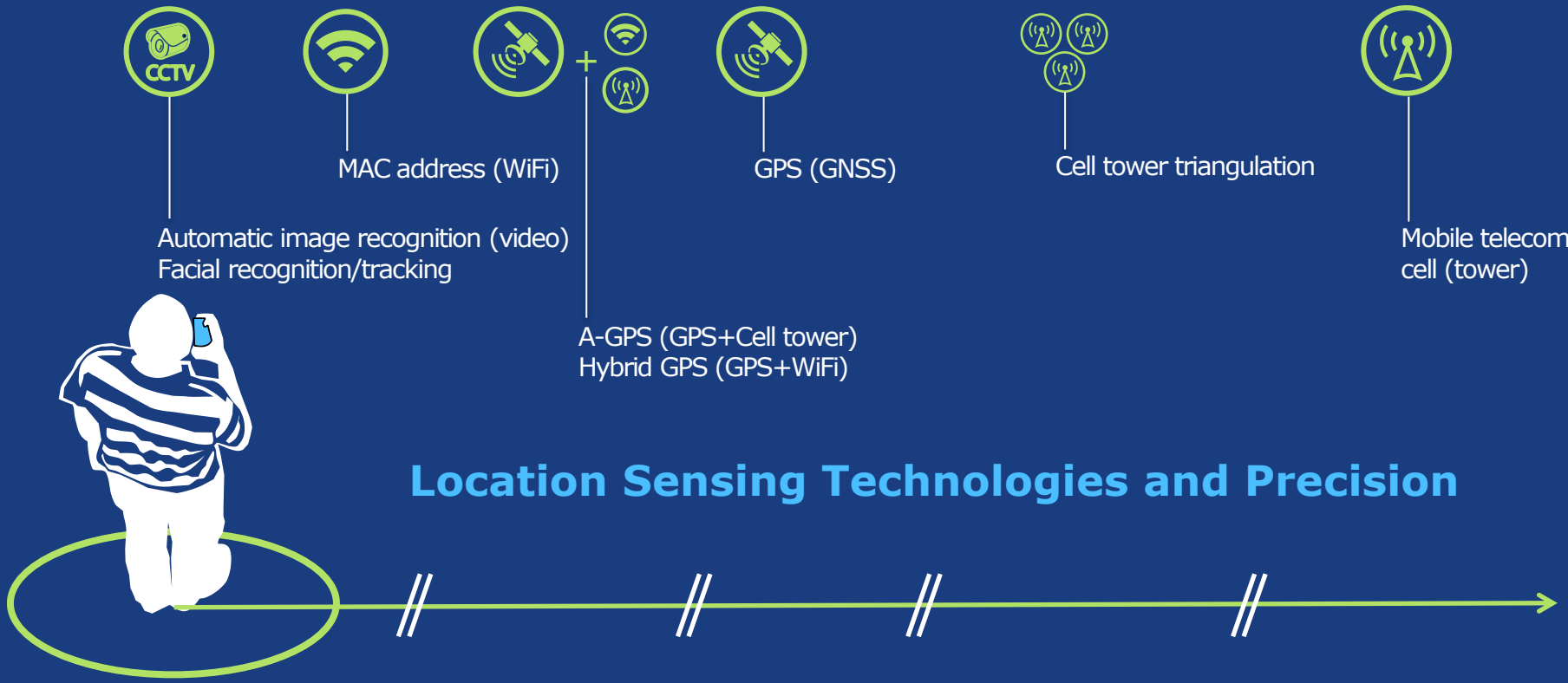


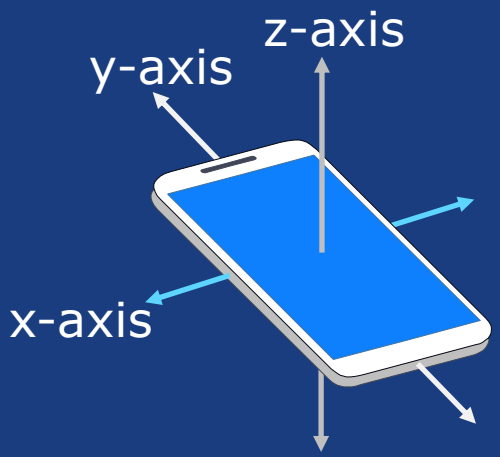

time
latitude
longitude

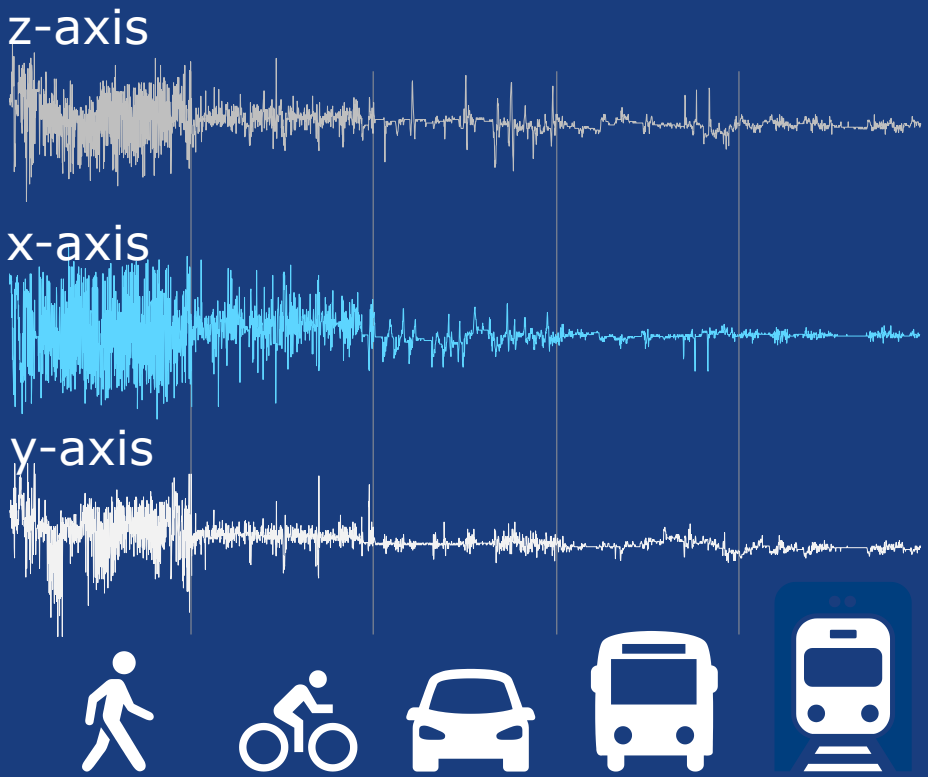


People’s patterns of movement in space and time are repetitive and predictable. These trajectories are powerful identifiers – like fingerprints


CCTV
MAC address (WiFi)
+
GPS (GNSS)
Cell tower triangulation
Automatic image recognition (video)
Facial recognition/tracking
A-GPS (GPS+Cell tower)
Hybrid GPS (GPS+WiFi)
Mobile telecom cell (tower)
Location Sensing Technologies and Precision
>1m
5-10m
5-50m
100-300m
100m to kms

Mode detection from accelerometer signals





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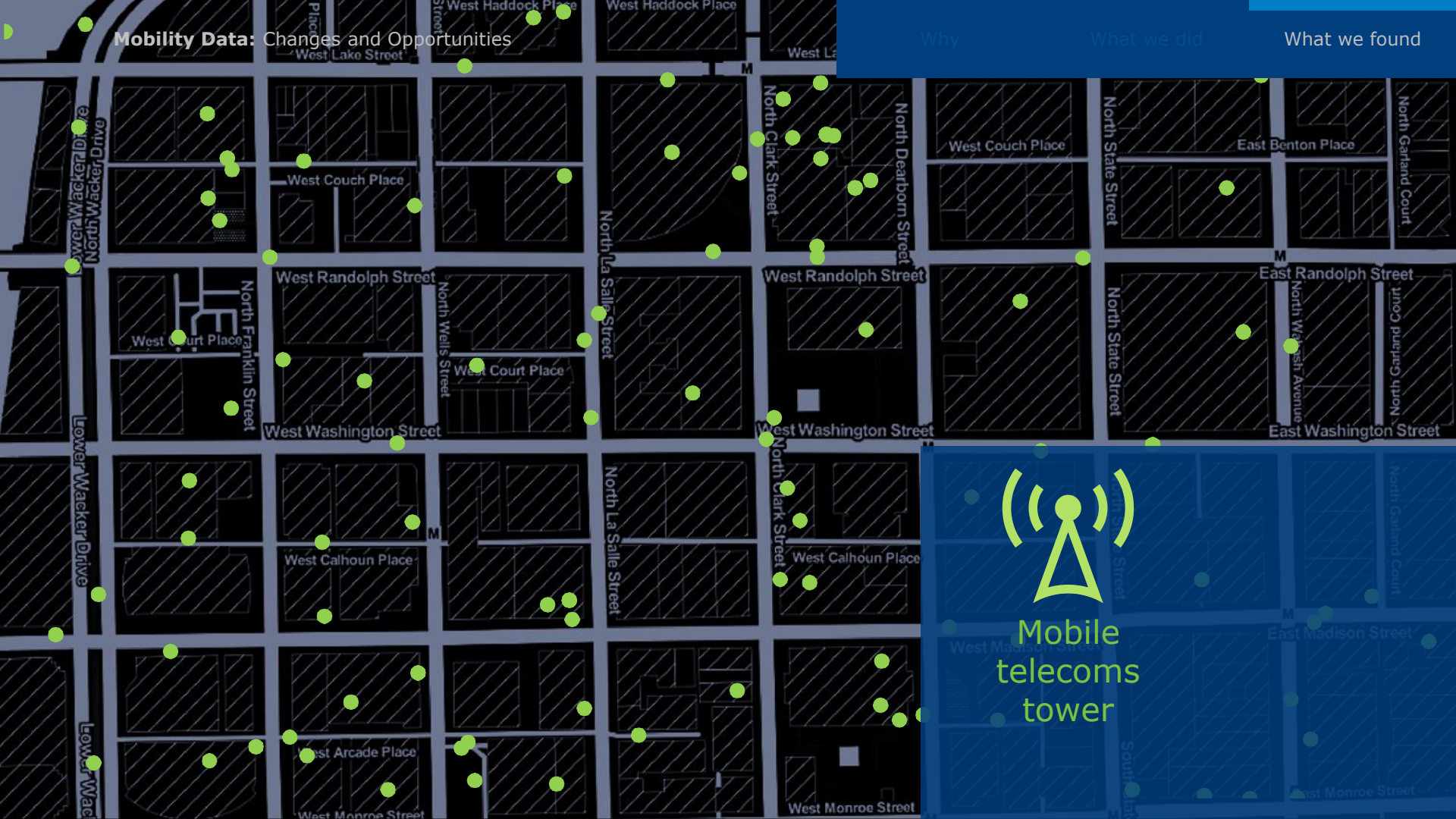
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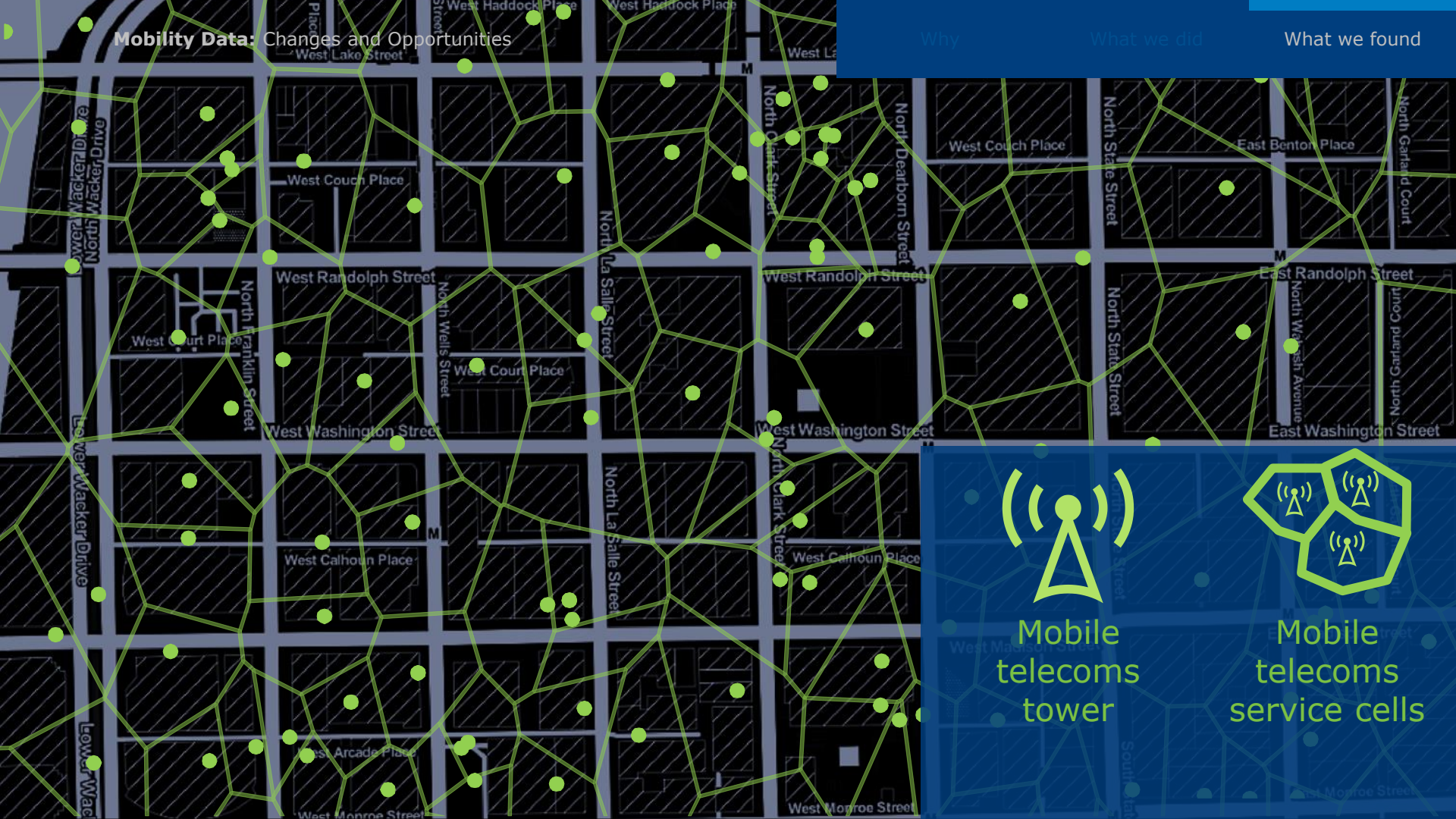
West Calhoun Place
West Monroe Street
East Madison Street
Mobile telecoms tower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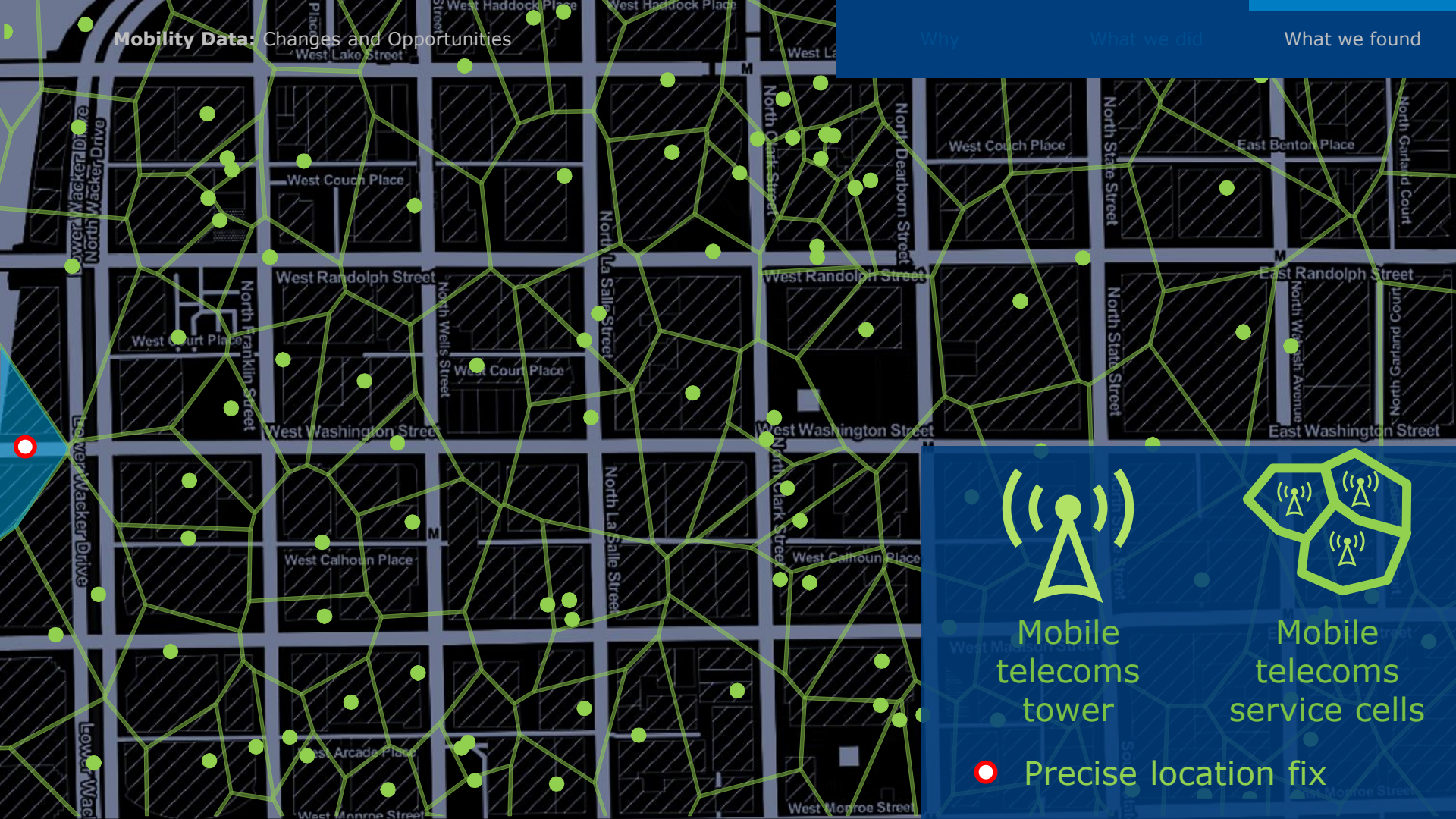
West Arcade Place
West Monroe Street
Mobile telecoms tower
Mobile telecoms service cells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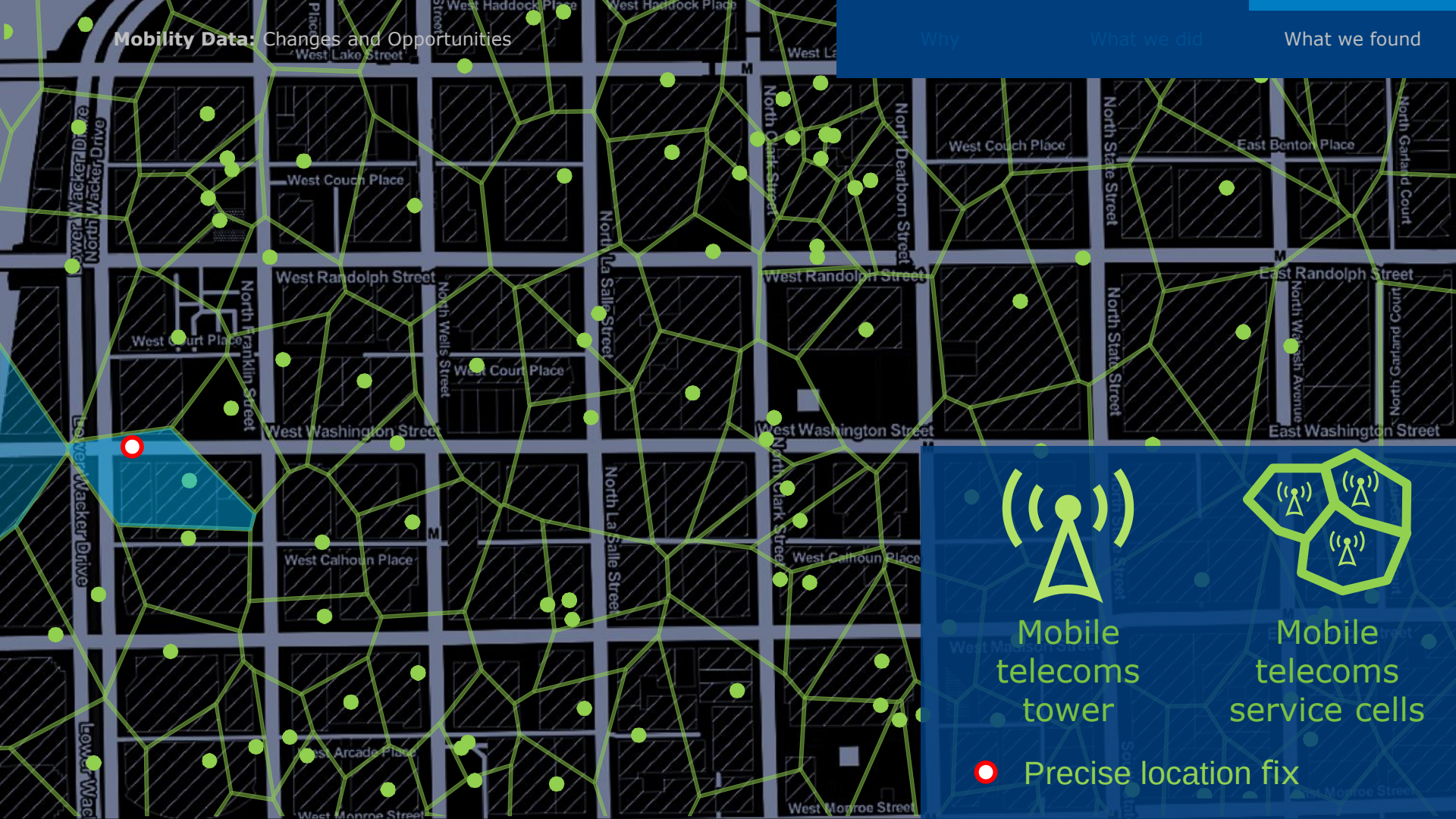
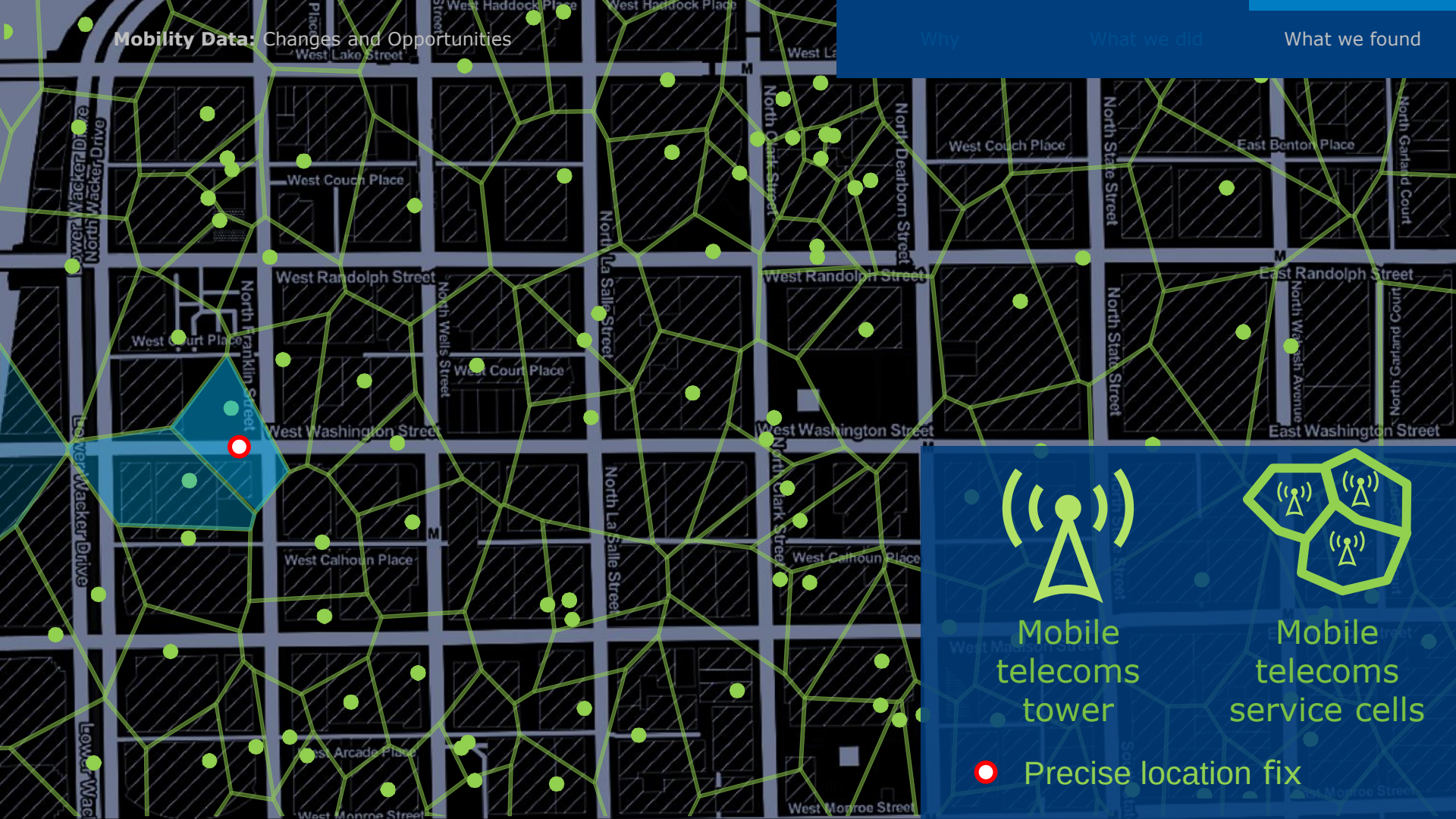
Mobile telecoms tower
Mobile telecoms service cells
Precise location fix



Mobile telecoms tower

Mobile telecoms service cells

Precise location fix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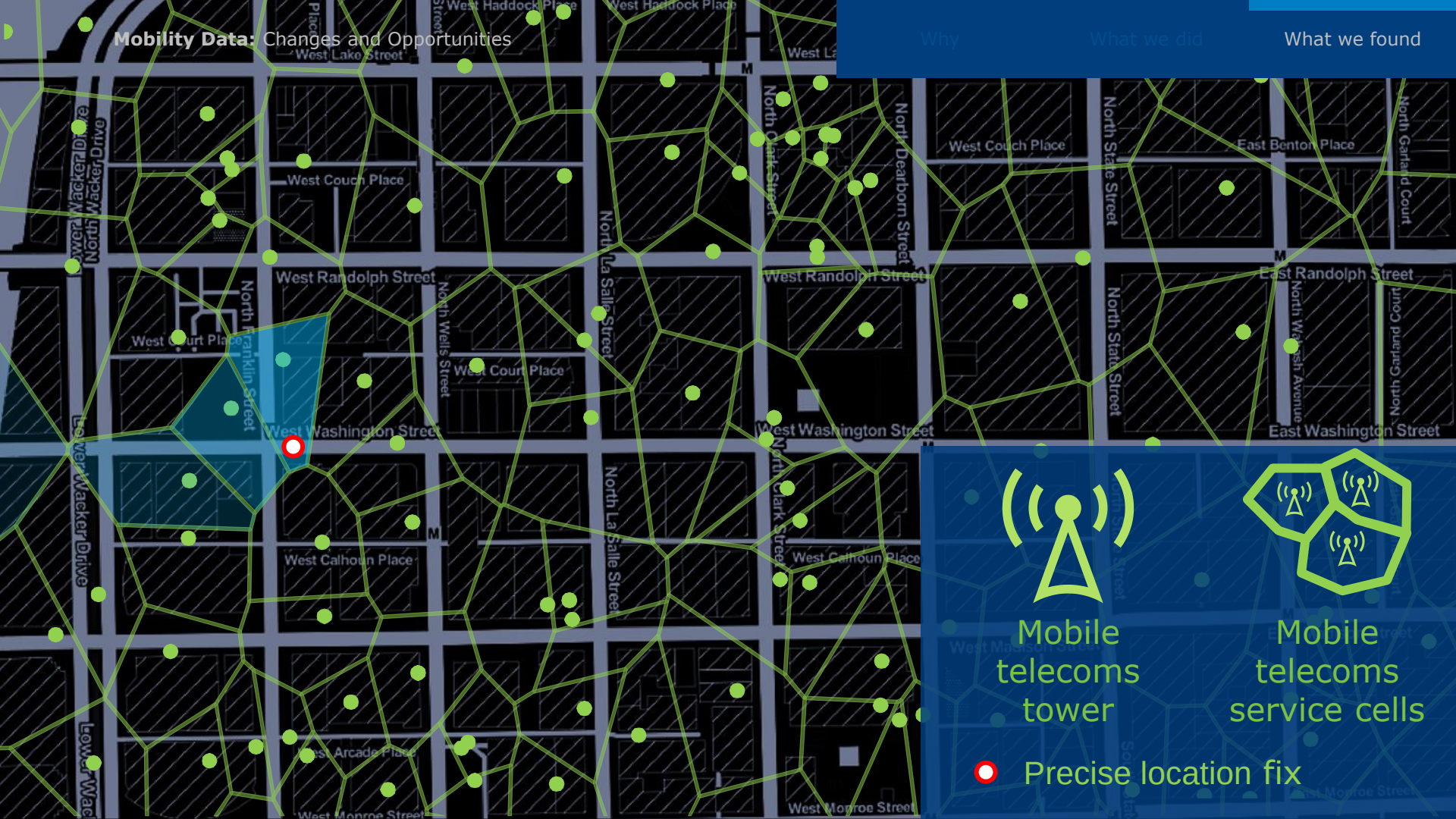
Precise location fix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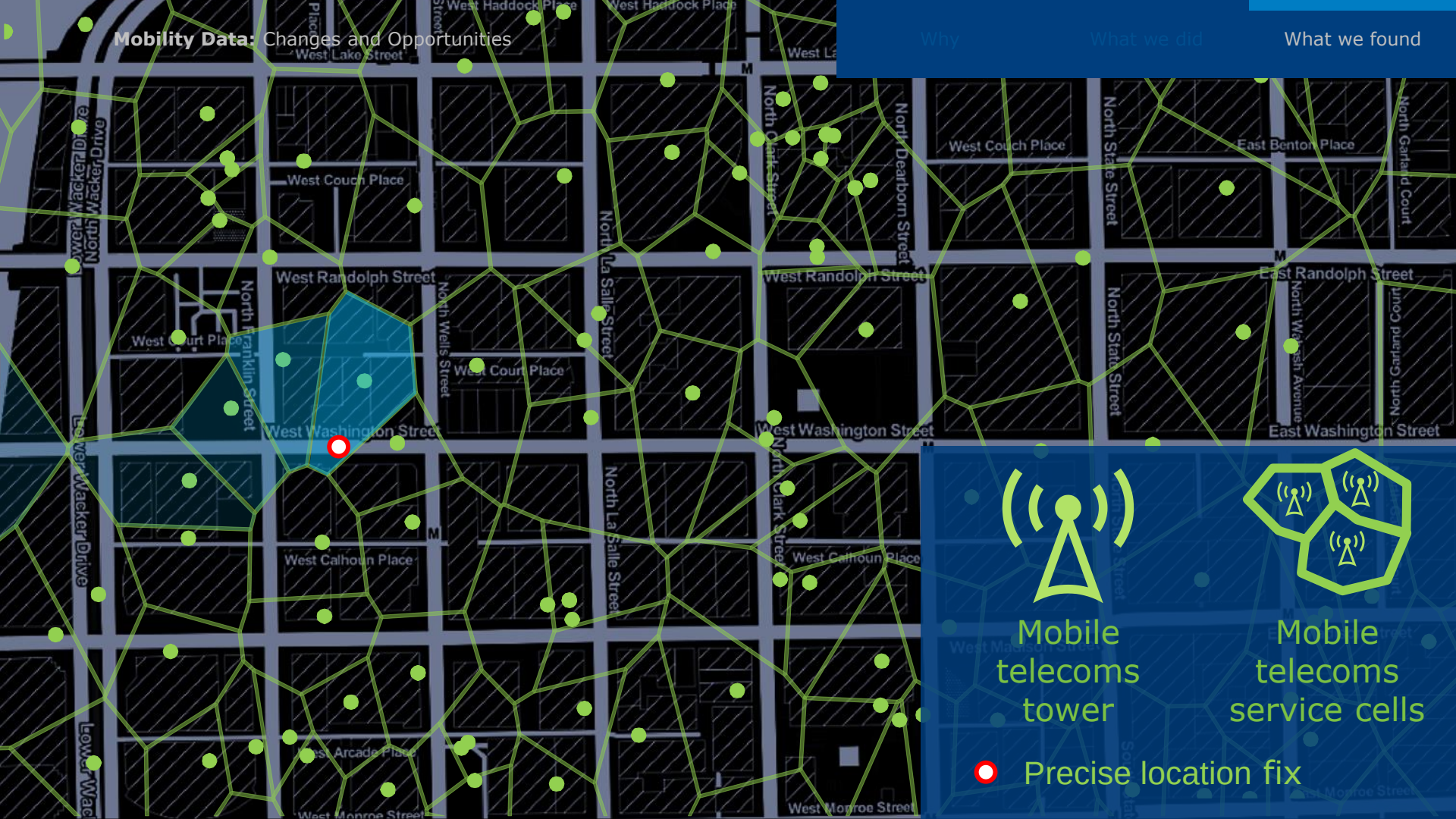
Precise location fix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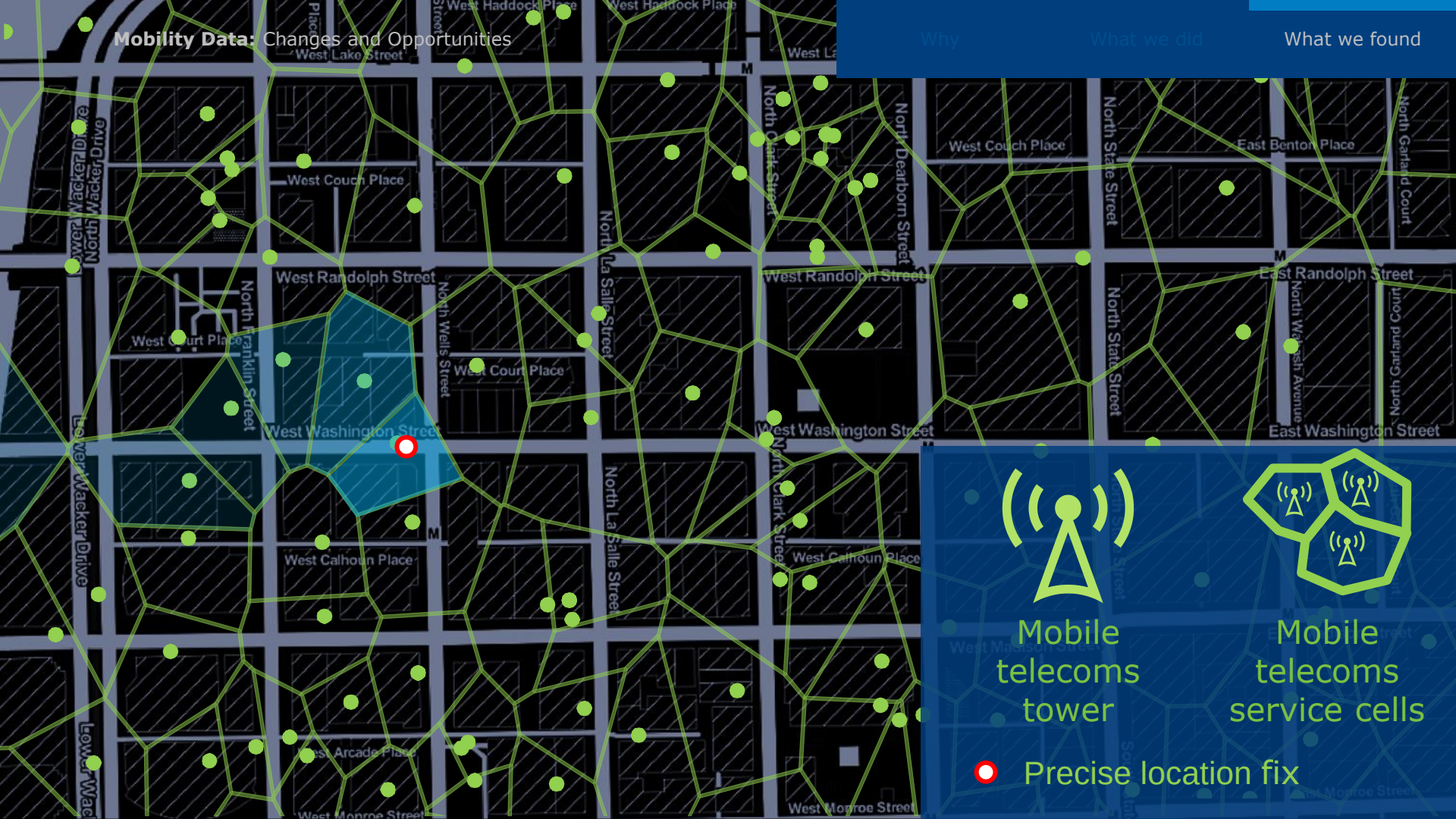
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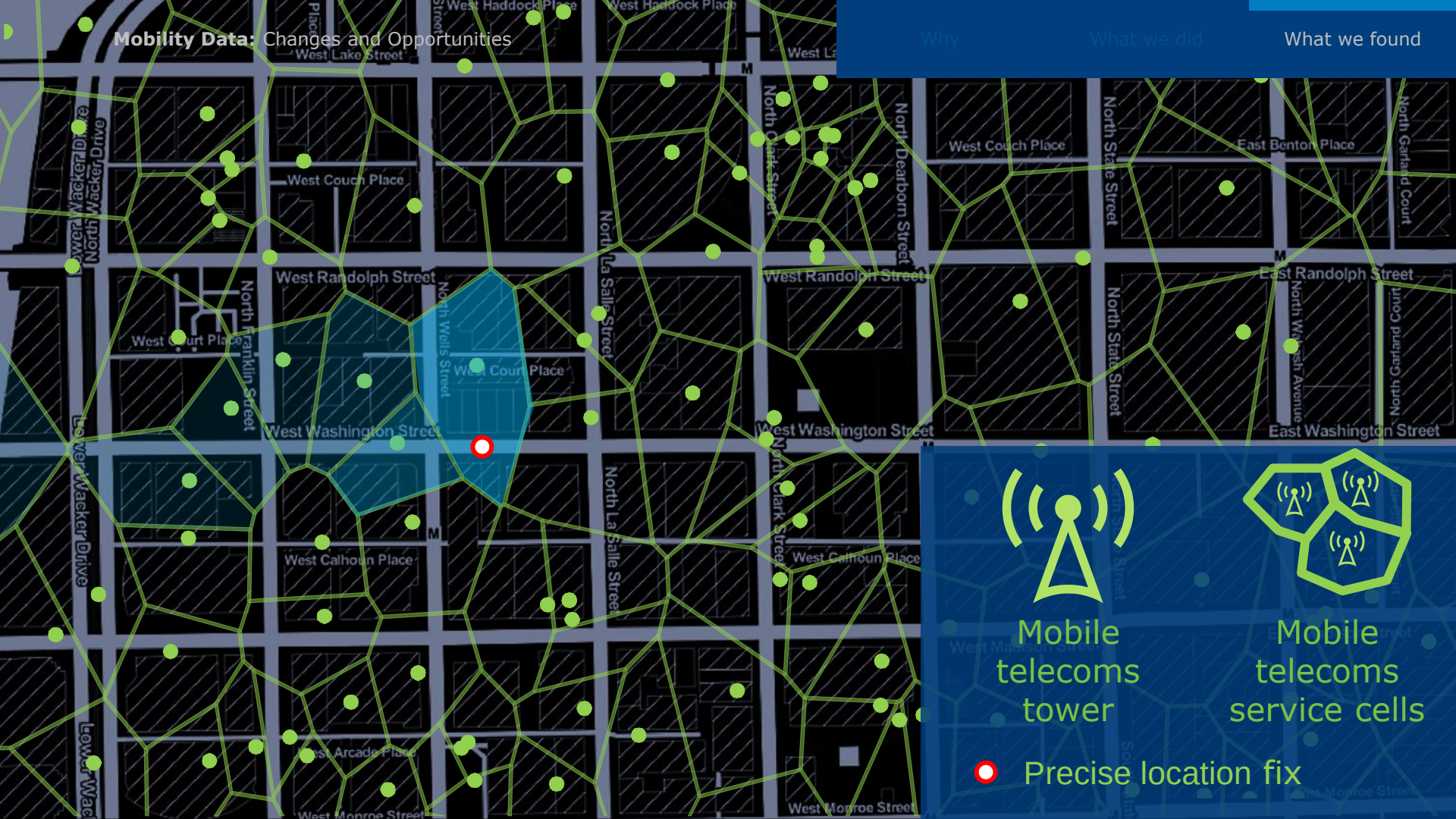

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Mobile telecoms service cells

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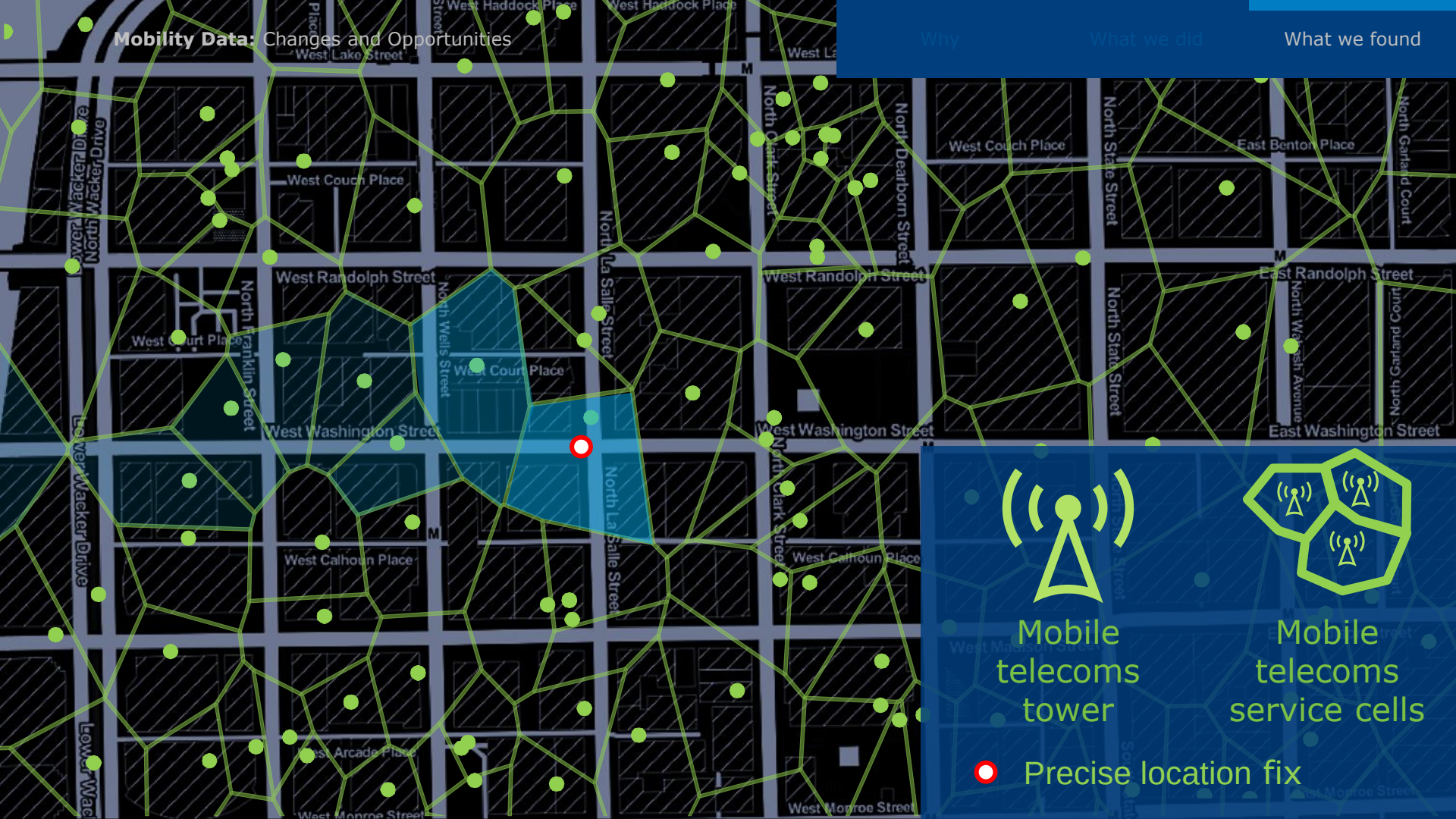
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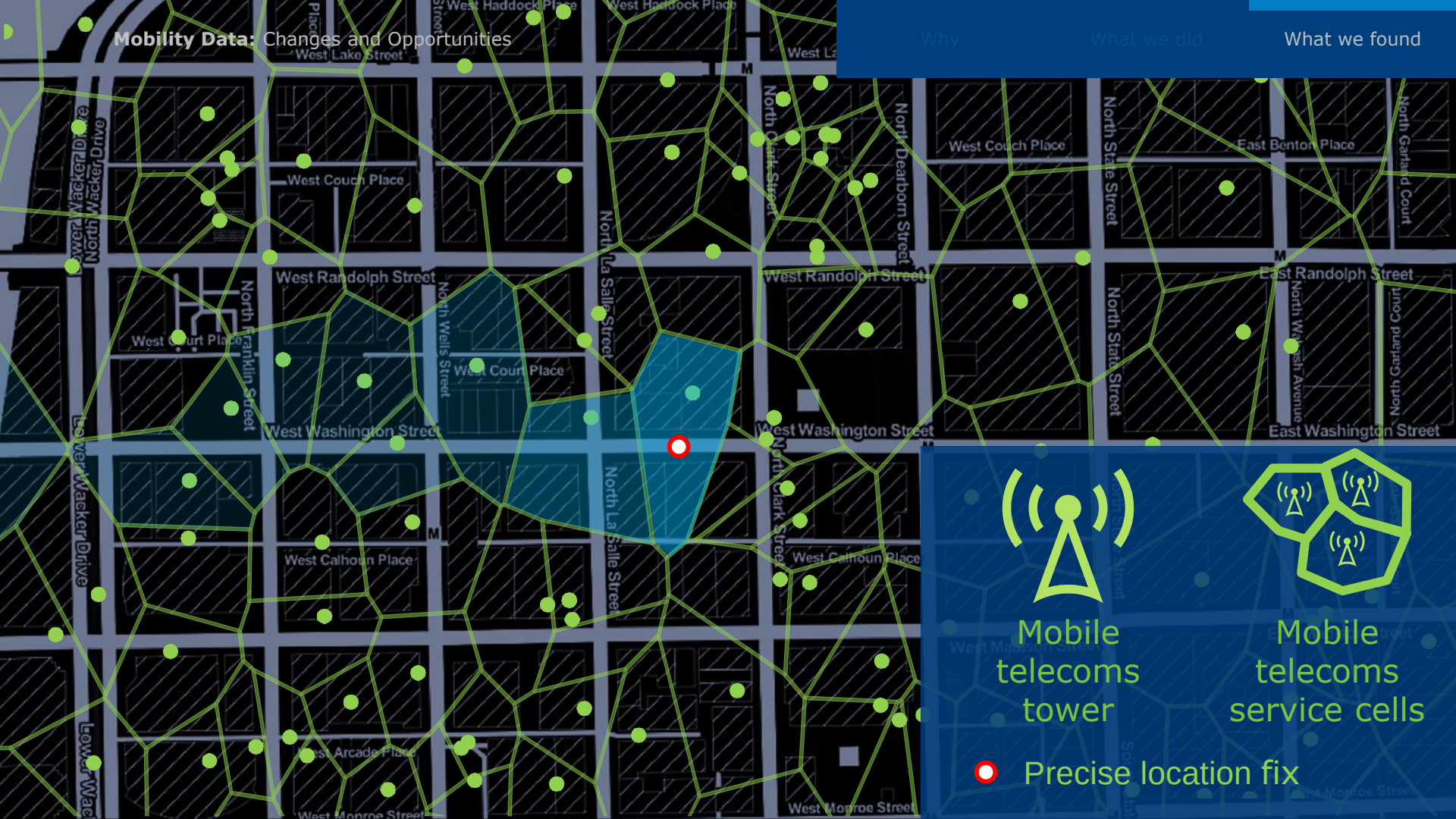
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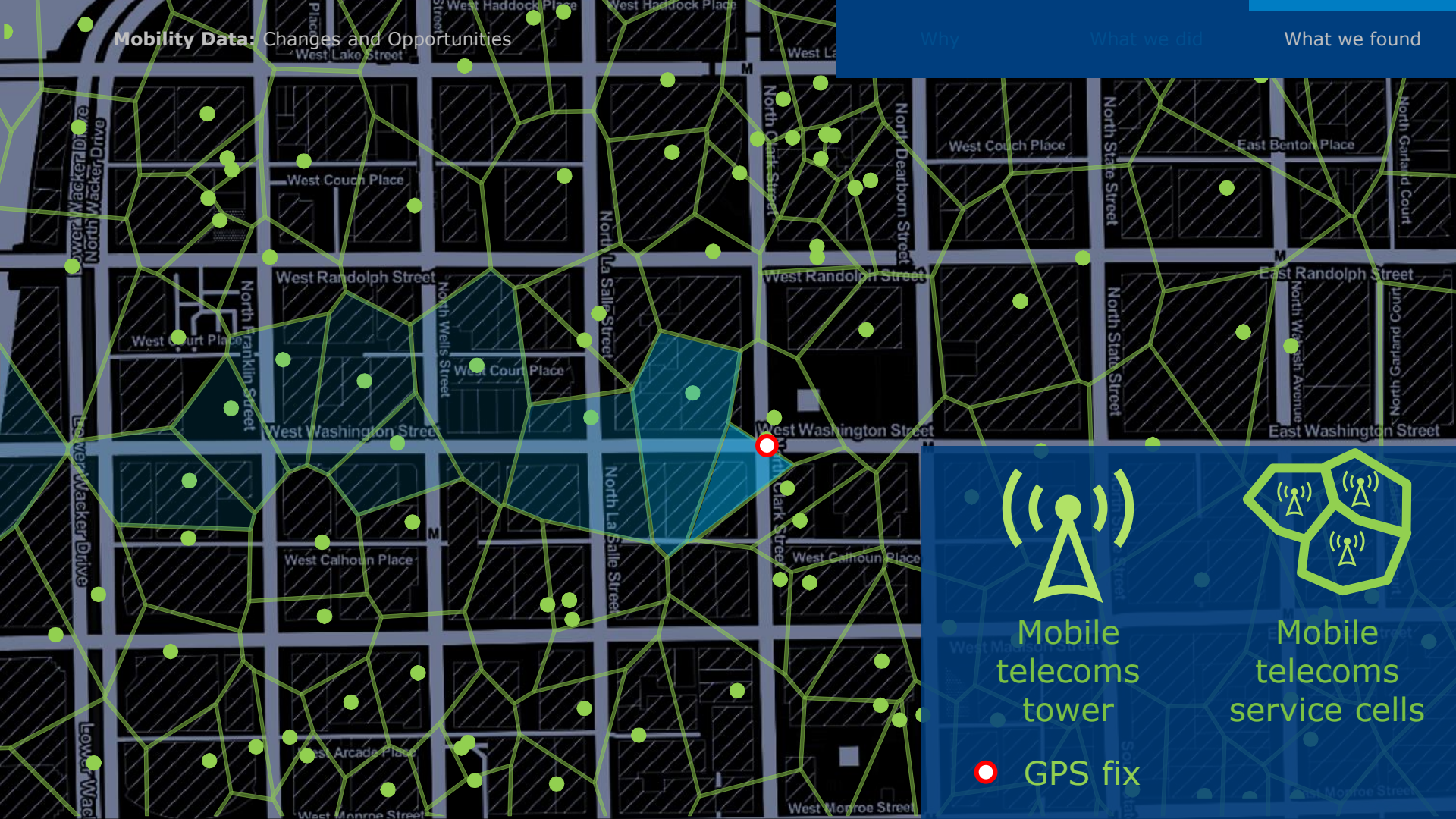
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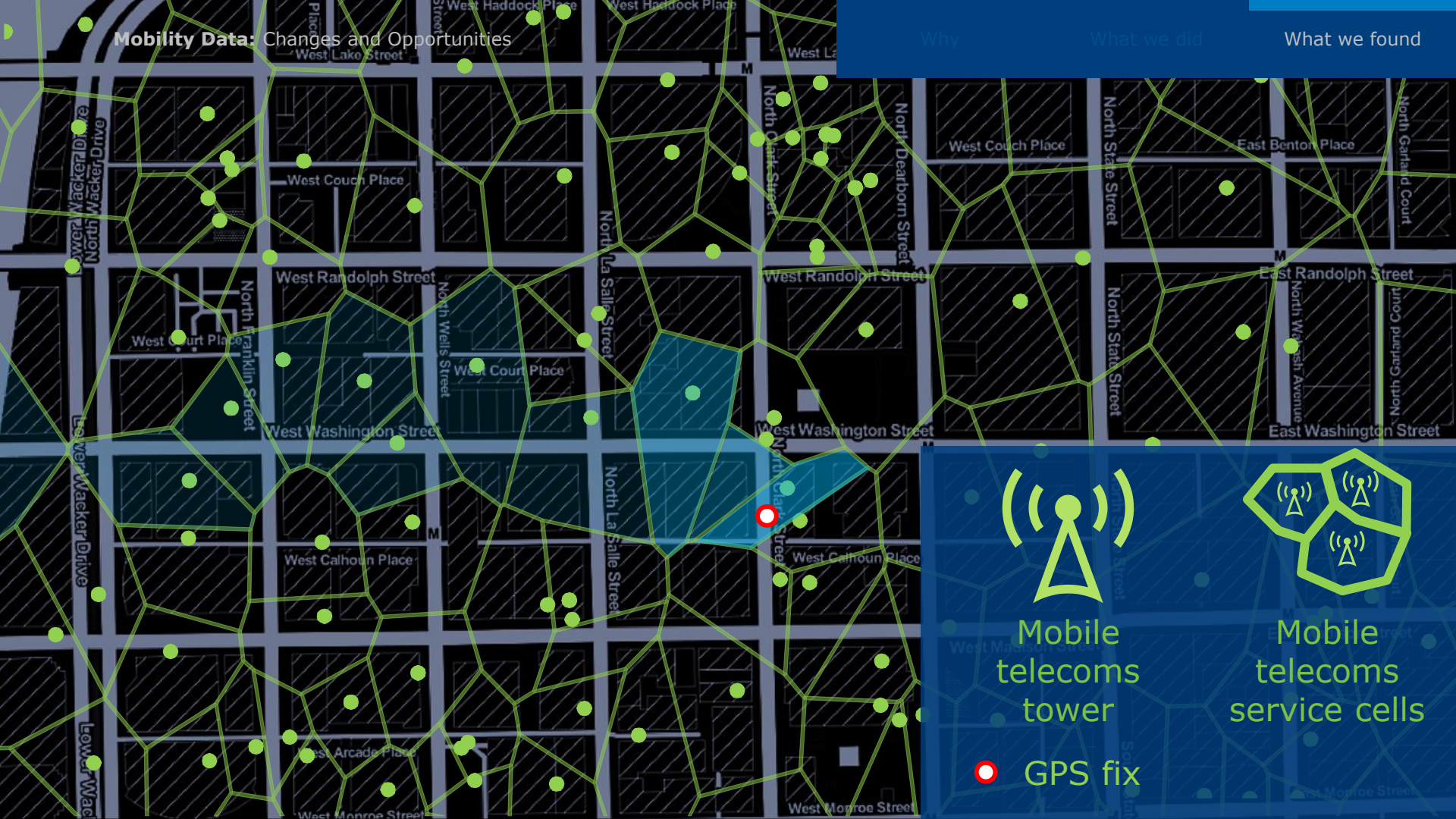
GPS fix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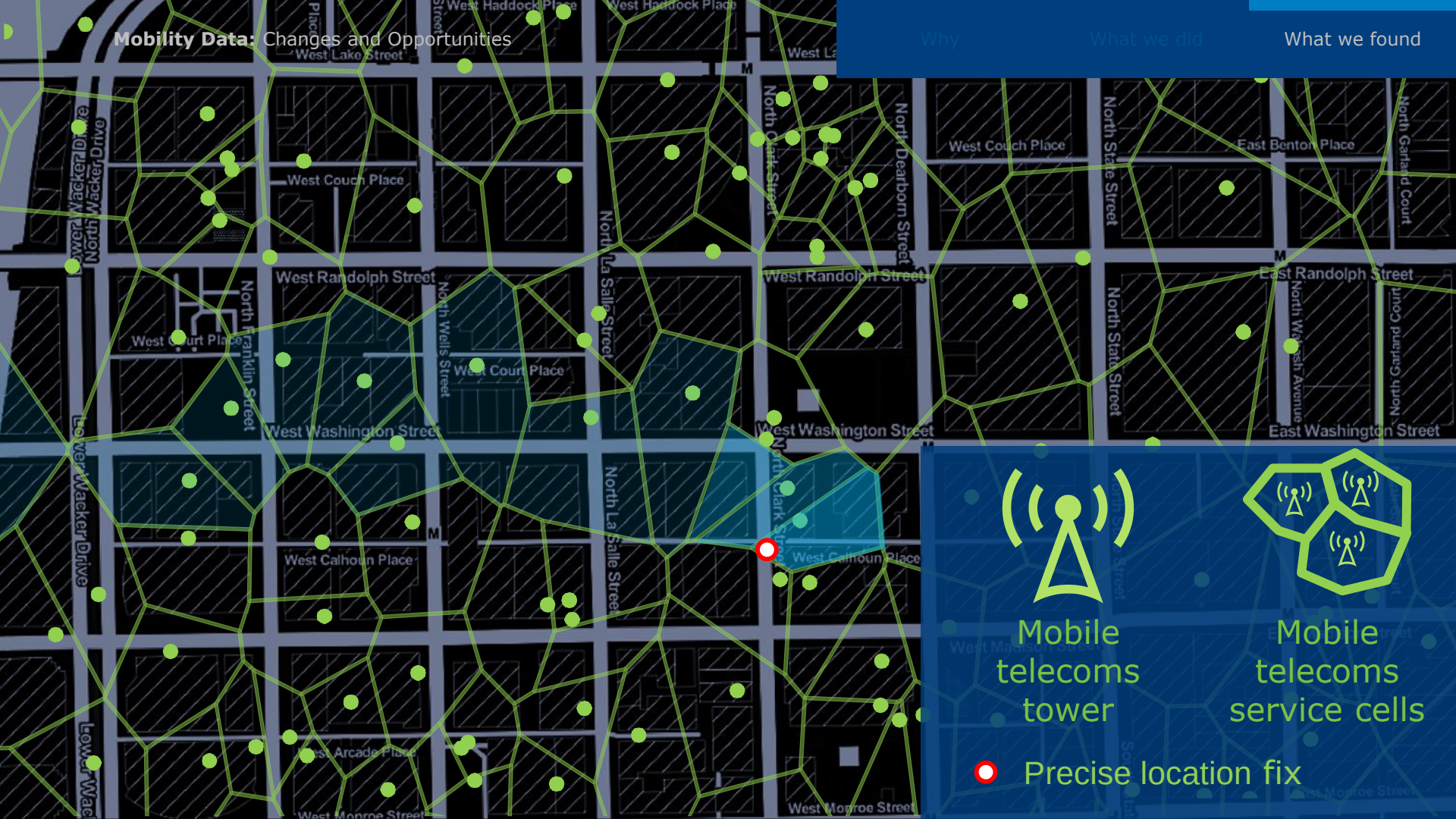
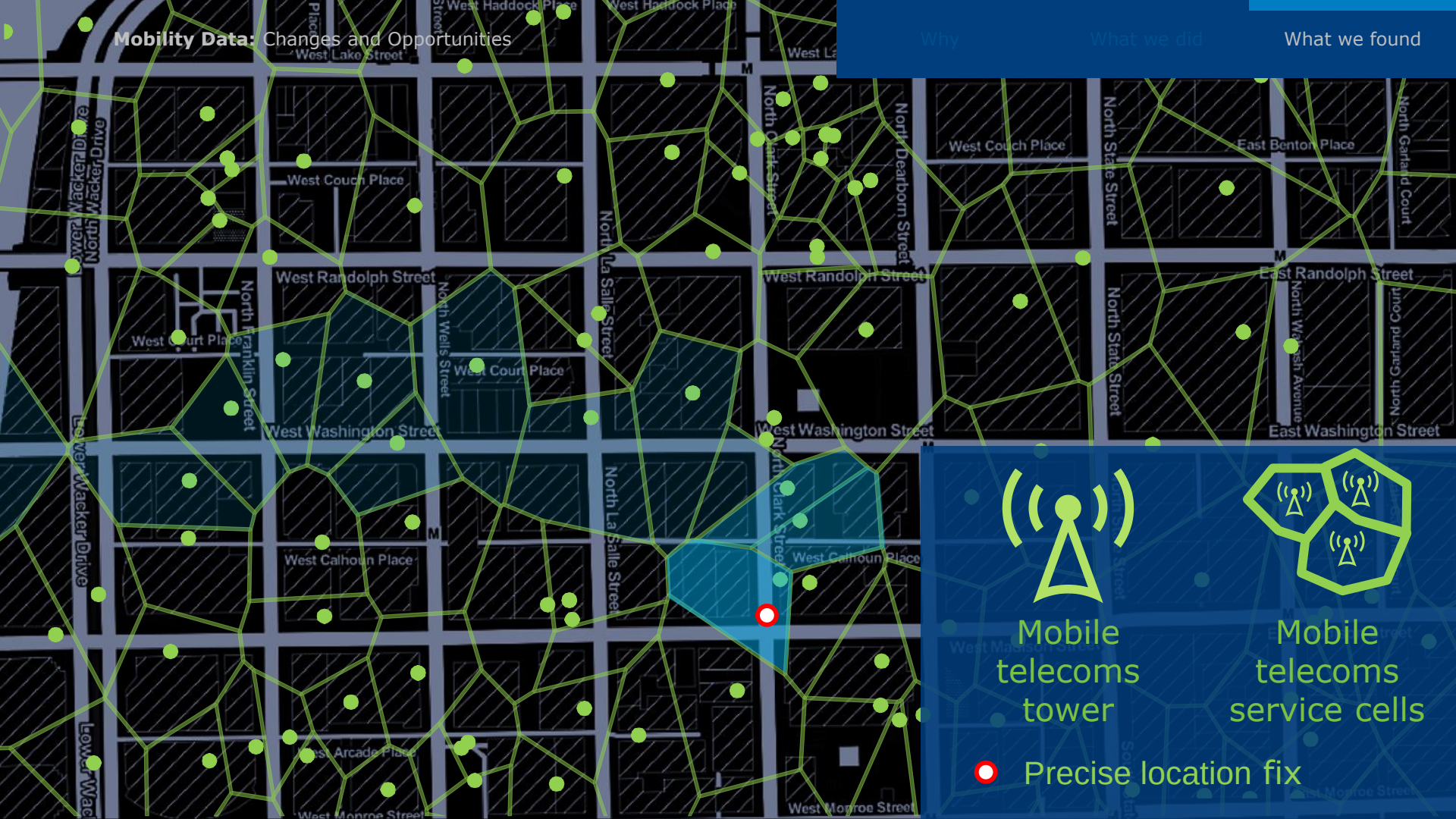


Mobile telecoms tower

Mobile telecoms service cells

Precise location fix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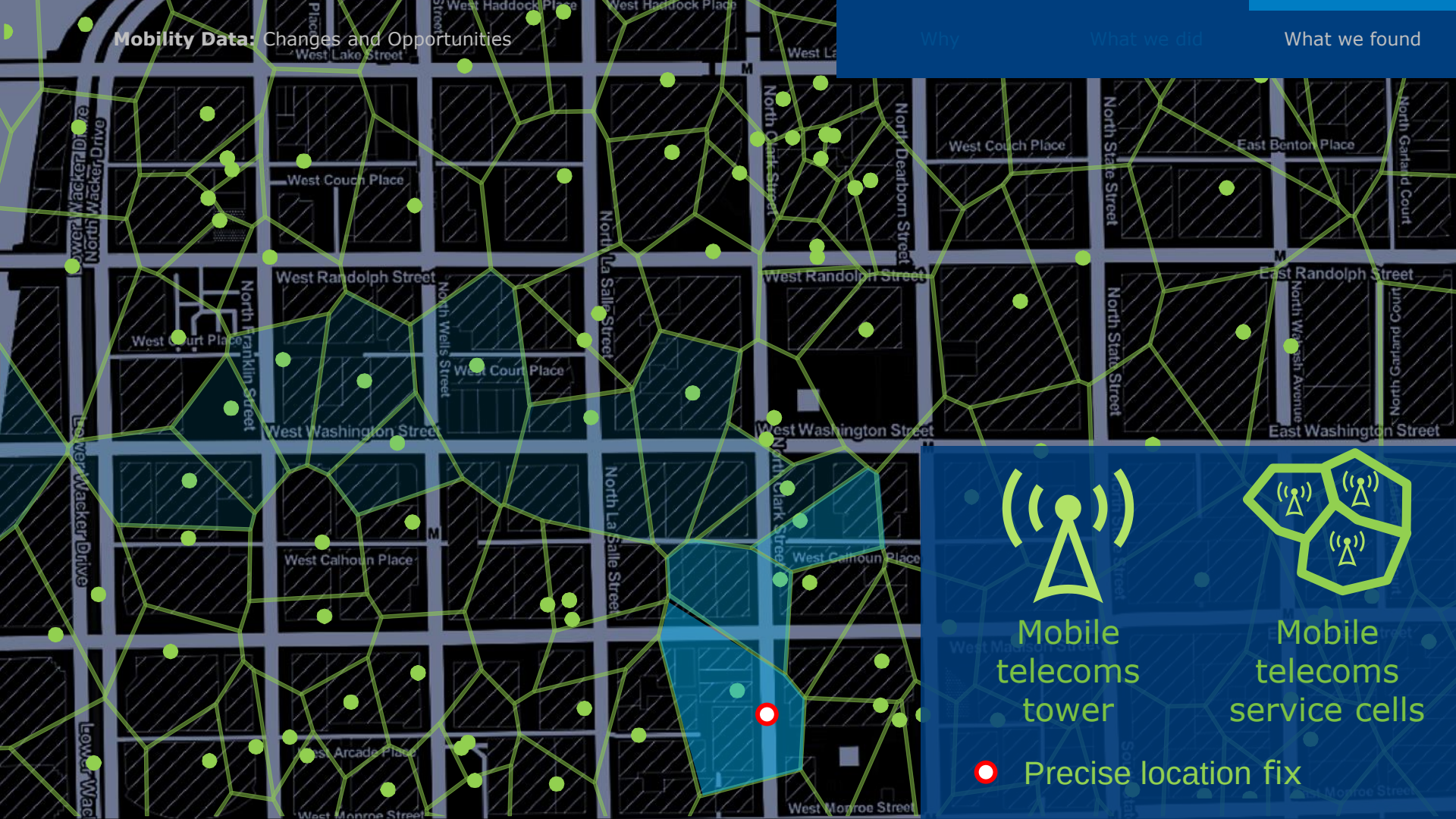
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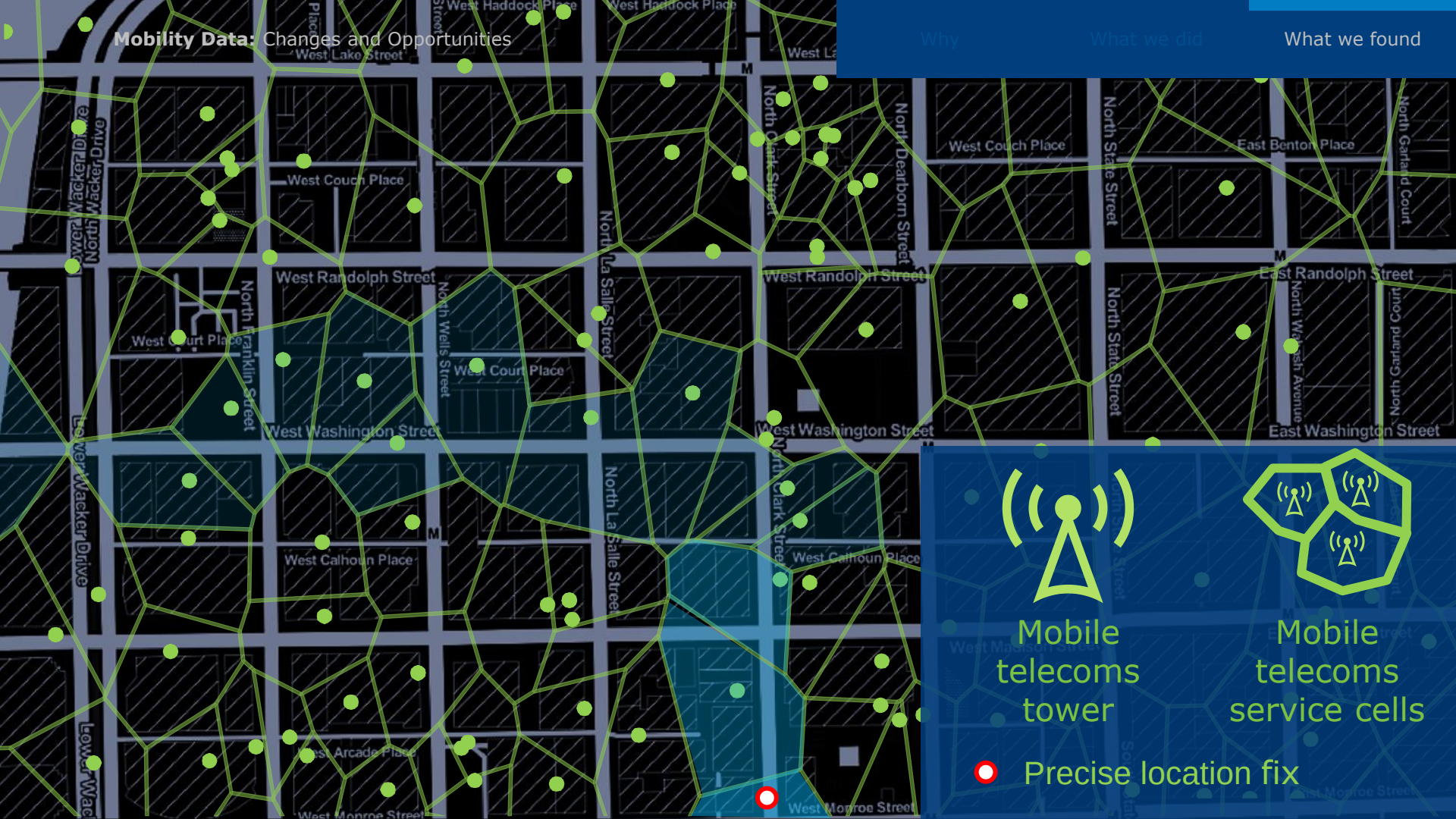
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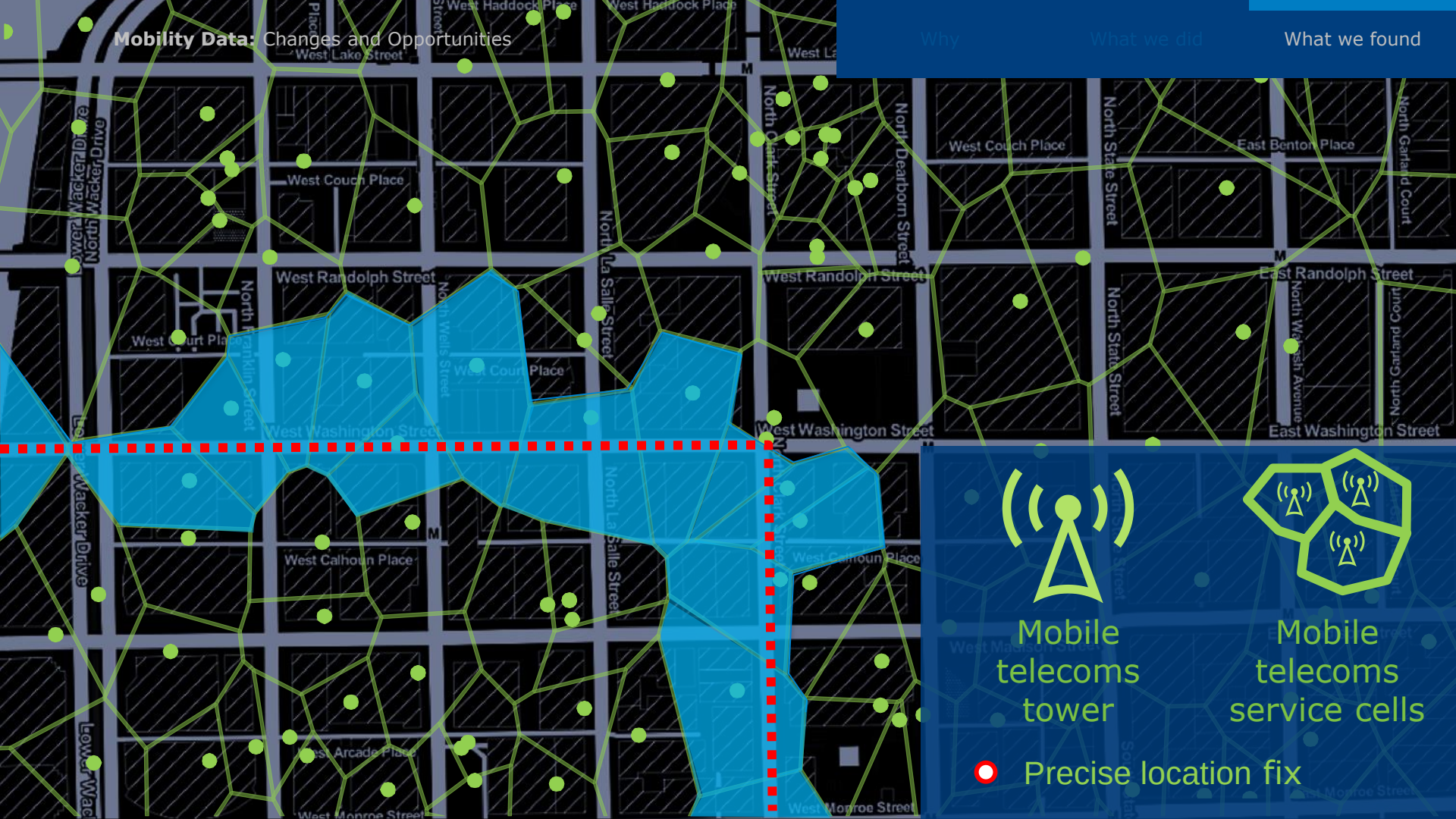
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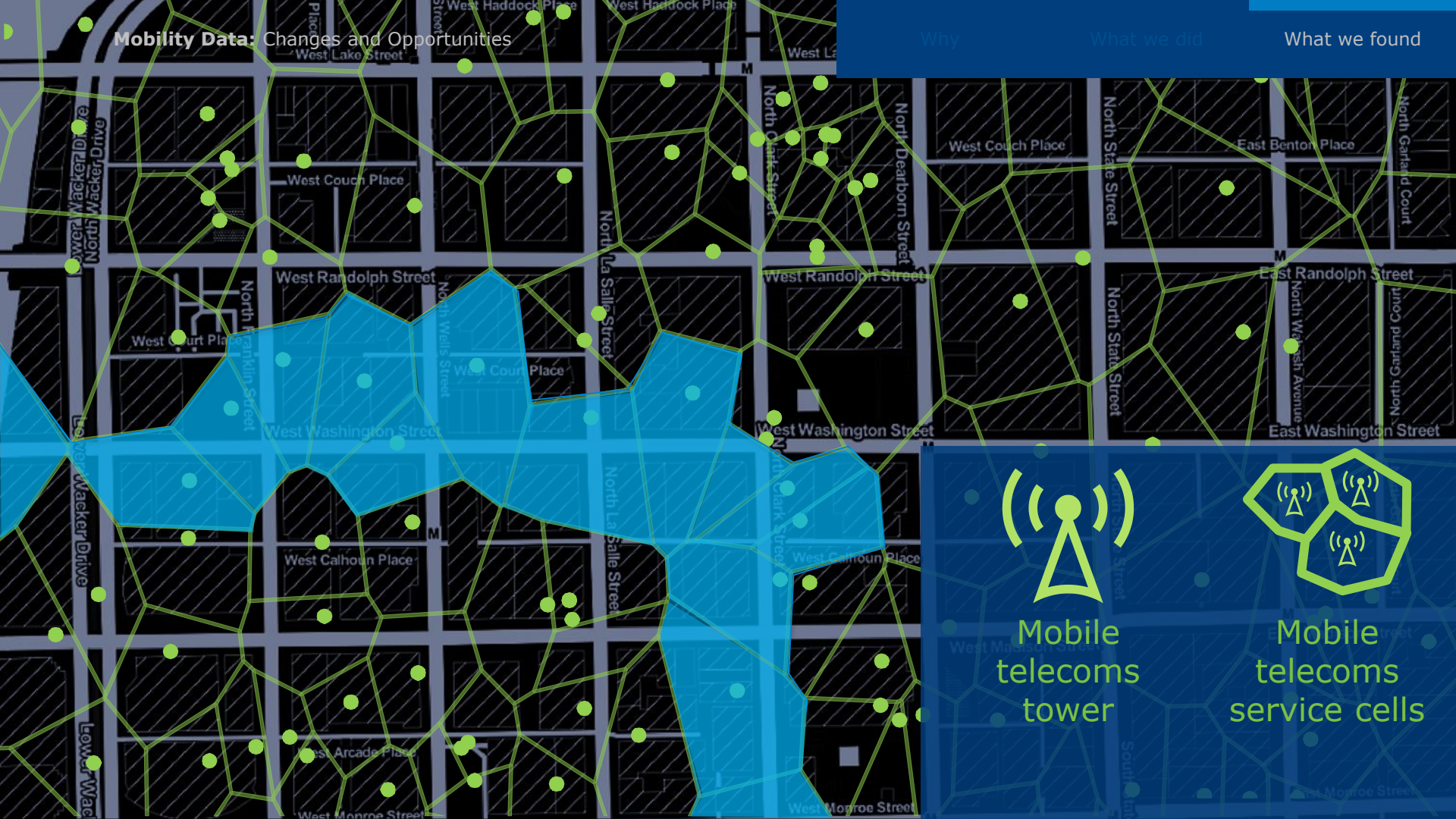


Mobile telecoms tower

Mobile telecoms service cells

4 co-located data points within an anonymised track sufficient for 95% re-identification rate

FOURSQUARE
VISA

Data Use and Privacy: New Perspectives

Traditional Approach	Emerging New Perspectives
Data actively collected with data subject and data user awareness.	Data from machine-to-machine transactions and passive collection – difficult to notify individuals prior to collection.
Personal data is predetermined, well-identified and binary (personal/not personal).	Personal data dependent on combinatory techniques and other data sources or may be contextual and dependent on social norms.
Data collected for a predetermined specific use and for a duration in line with that use.	Social benefits, economic value and innovation come from co-mingling data sets, subsequent uses and exploratory data mining.

World Economic Forum, 2013

Data Use and Privacy: New Perspectives

Traditional Approach	Emerging New Perspectives
Data accessed and used principally by the data subject.	Data user can be the data subject, the data controller and/or third party data processors.
Individual provides consent without full engagement or understanding.	Individuals engage in meaningful consent, understand how data is used and derive value from data use.
Data privacy framework seeks to minimise risks to individuals.	Data protection framework focuses more on balancing individual privacy with innovation, social benefits and economic growth.

Privacy by design

new data paradigm

individuals keep their own data, requesters transmit code

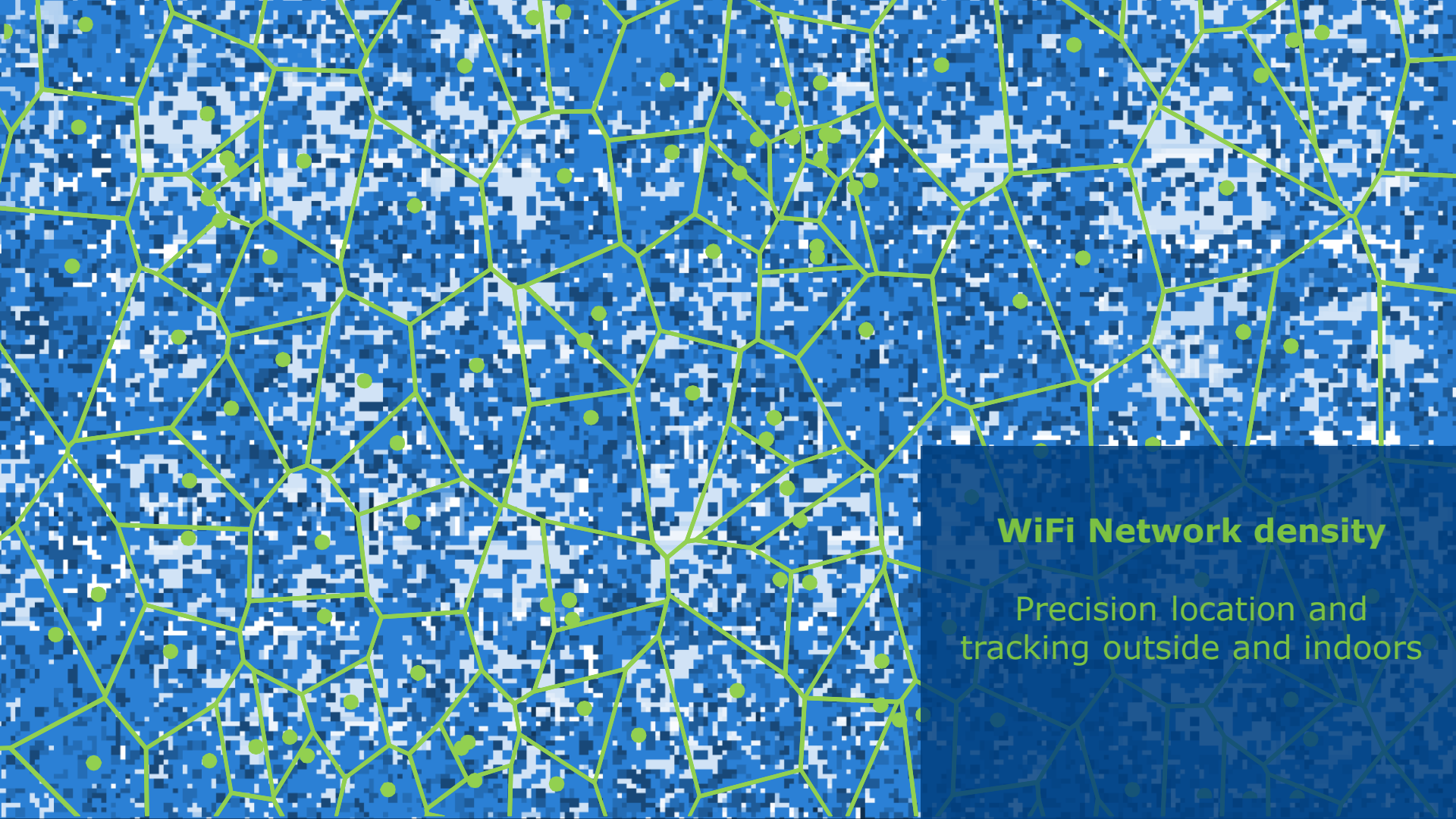
Policy insights:

Privacy integrated into technologies at the outset

New models for public-private data-sharing

Transport authorities will need to audit data they use

International Transport Forum
CPB
Corporate Partnership Board
OECD


WiFi Network density
Precision location and
tracking outside and indoors