Providing Solutions

Spatial Thinking in Industry 4.0 and IoT Solutions

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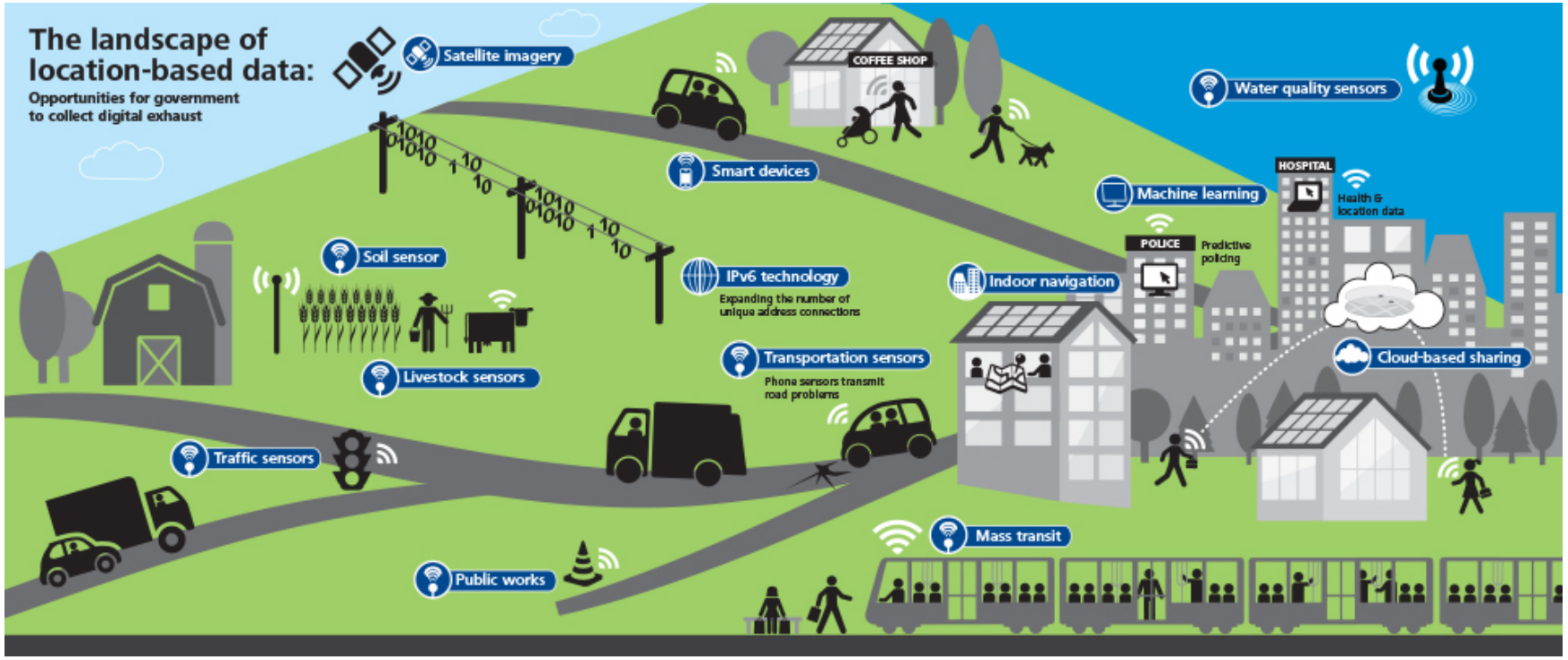
Location Intelligence & Internet of Things

"The Internet of Things (IoT) and digital business will produce an unprecedented amount of location-referenced data, particularly as 20 billion devices become connected by 2020. **Location is one of the most important pieces of information for understanding context** in sync with transactional, social, mobile, user and sensor data."

Gartner's May 2017 *Forecast Snapshot: Location Intelligence Software, Worldwide, 2017* report

Location becomes an integral dimension of data, allowing information patterns and decisions to be viewed through the lens of place. The use of GIS in the field of medicine and infrastructure planning grows as governments open up their GIS databases for public use.
Deloitte University Press



Spatial Intelligence & Spatial Thinking

We, at AlmavivA, stress the terms “Spatial Thinking” & “Spatial Intelligence” to point out the need to design event based IoT and AI solutions, where the EVENT has a quantity, a timestamp and, of course, a location.

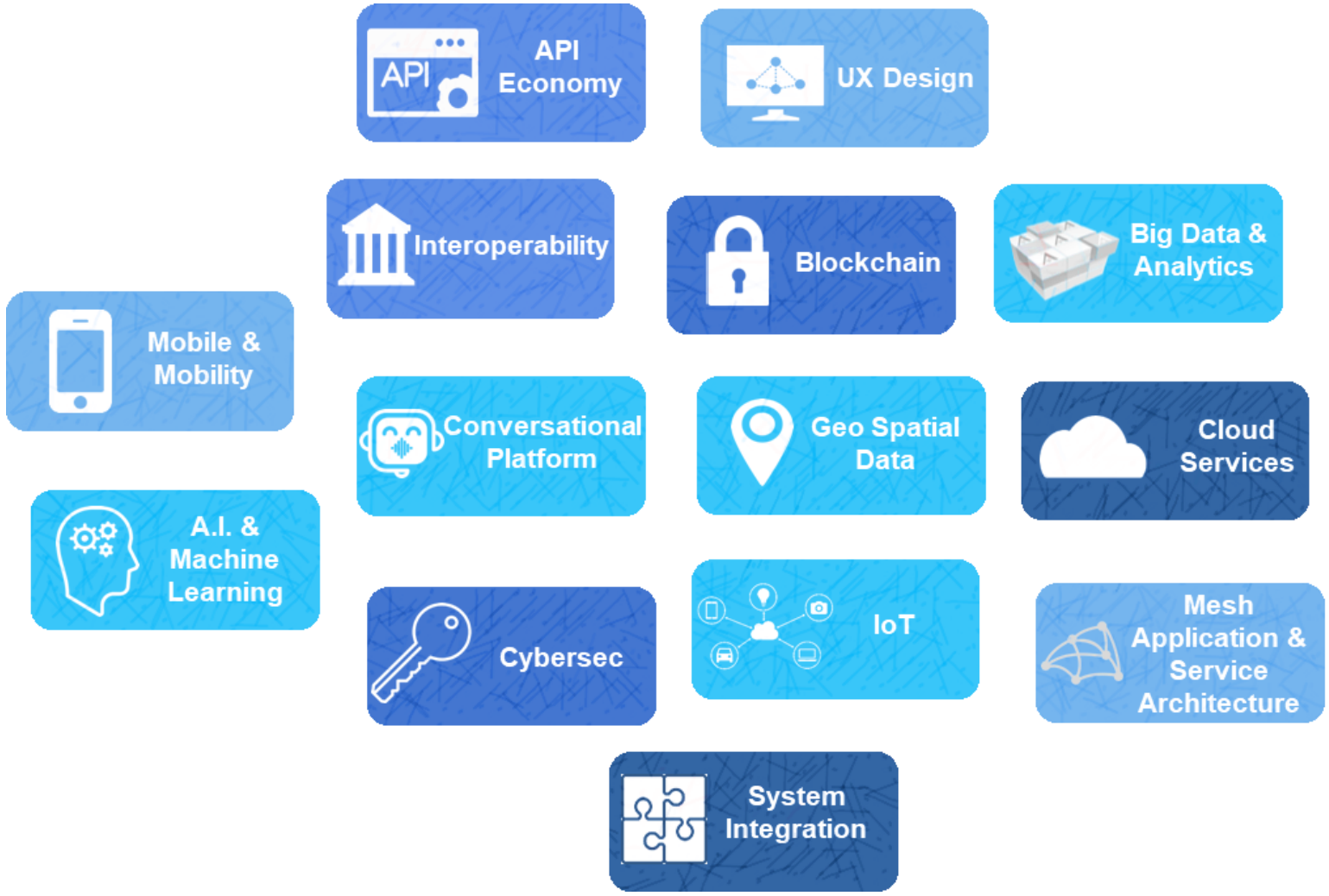
“Spatial Thinking” it’s not just about Geographical Information System or Location Intelligence, it’s about leverage on multiple technologies to achieve solutions that are able to map and manage a land-wide Cyber Physical System …. a Spatial Digital World.

- Where is UBIQUITOUS
- Geospatial solutions are no-longer stand-alone systems, industry has made a move towards offering business wide integrated solutions and its embedment in the business processes
- Merging the physical, digital and biological worlds
- Location-based decisions (LBD)

if you are not in a map, you don’t exist ☺

Spatial Thinking: enabling technologies

GIS is just one of the technologies we need to design end-to-end solutions that are able to unleash the power of **location sensible platform and applications**.



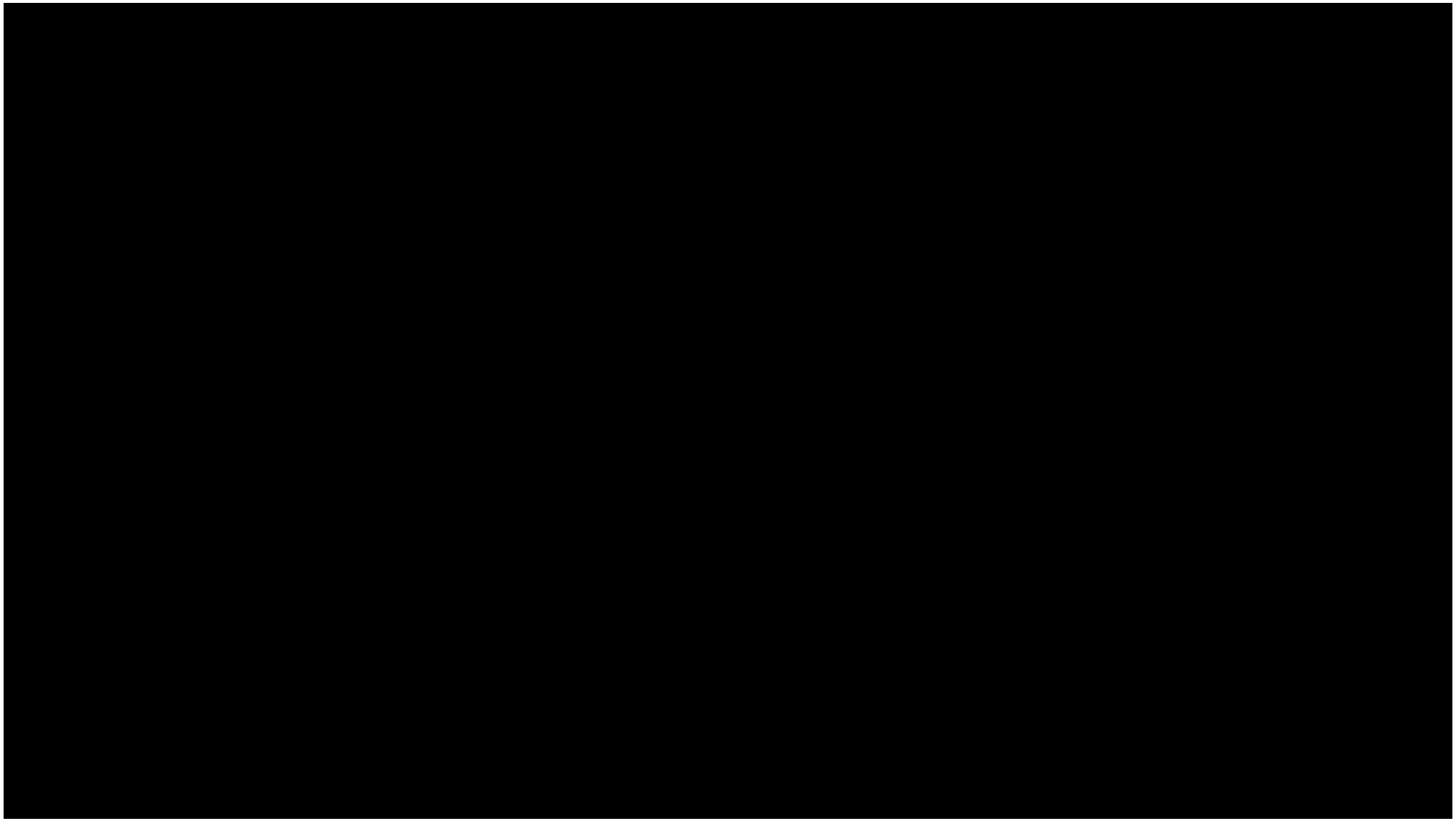
Spatial Thinking & Blockchain: Proof of Location

Ordinarily, GPS is incredibly reliable, so much so that we have collectively become dependent on a functioning geopositioning system.
The New York Stock Exchange uses GPS to time automated computer trades, ATM's and credit card transactions require location data, even the electrical grid relies on GPS synchronized time stamps to deliver electricity without causing power surges, not to mention the transportation, navigation, and mobility use cases of the technology.

Most of the global financial system depends on GPS, and attack vectors with this data have become increasingly evident, so that we need a reliable proof of location.

Proof of Location allows users and smart agents to privately record authenticated location data at times of their choosing, and then reveal their personal information at their discretion (GDPR compliant), by presenting a fraud-proof location (and time) claim.

Spatial Thinking & Blockchain: Asset Tracking & GEO Data Value in I40



Almaviva

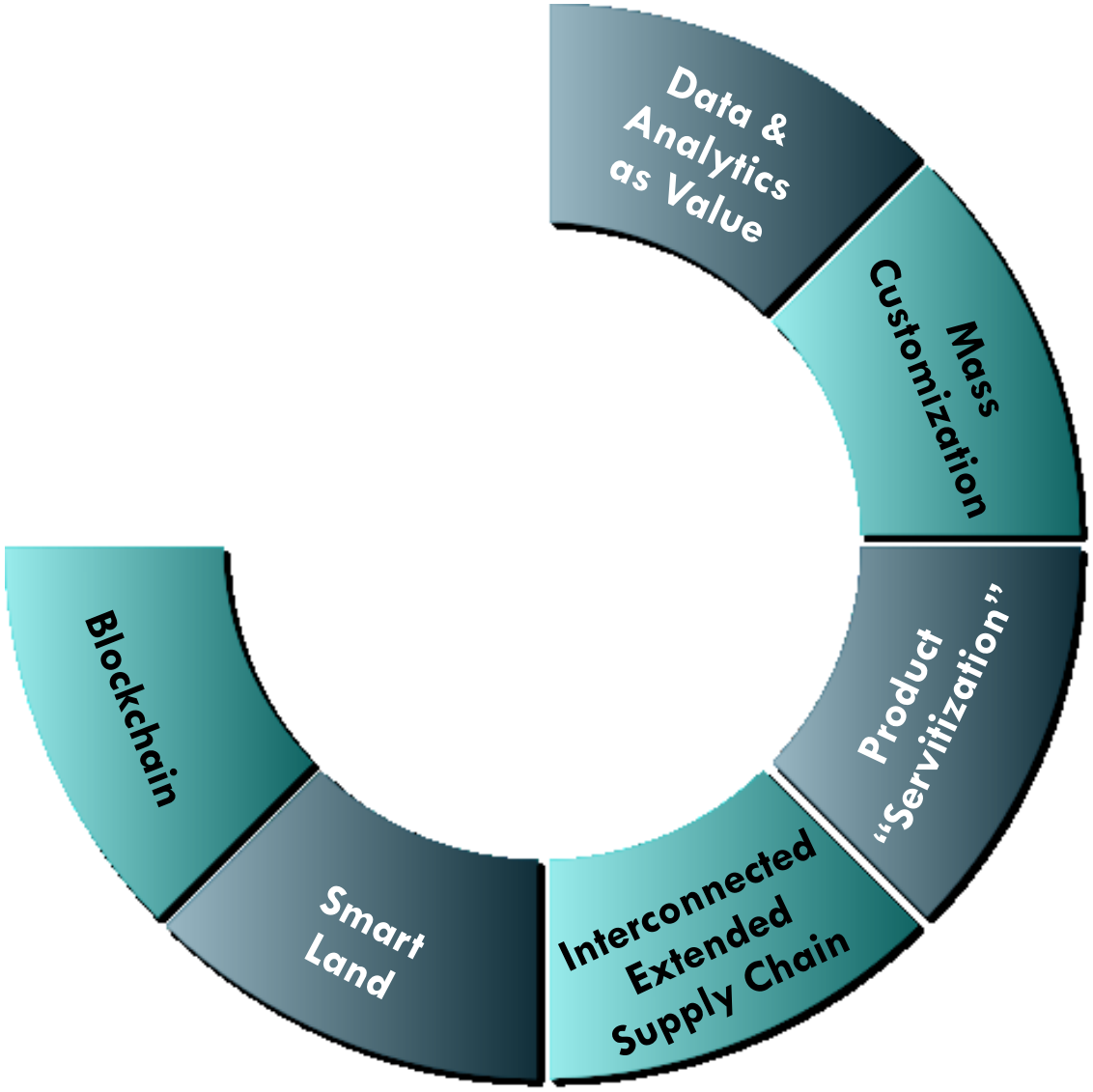
Providing Solutions

Grazie.

BACKUP

…Focus On Geo-Enabling technologies: IoT, cloud, AI, BigData, Blockchain

Industry 4.0 is driving
the convergence of technologies,
smudging the line between physical
and digital ecosystems.



Spatial Thinking: enabling technologies

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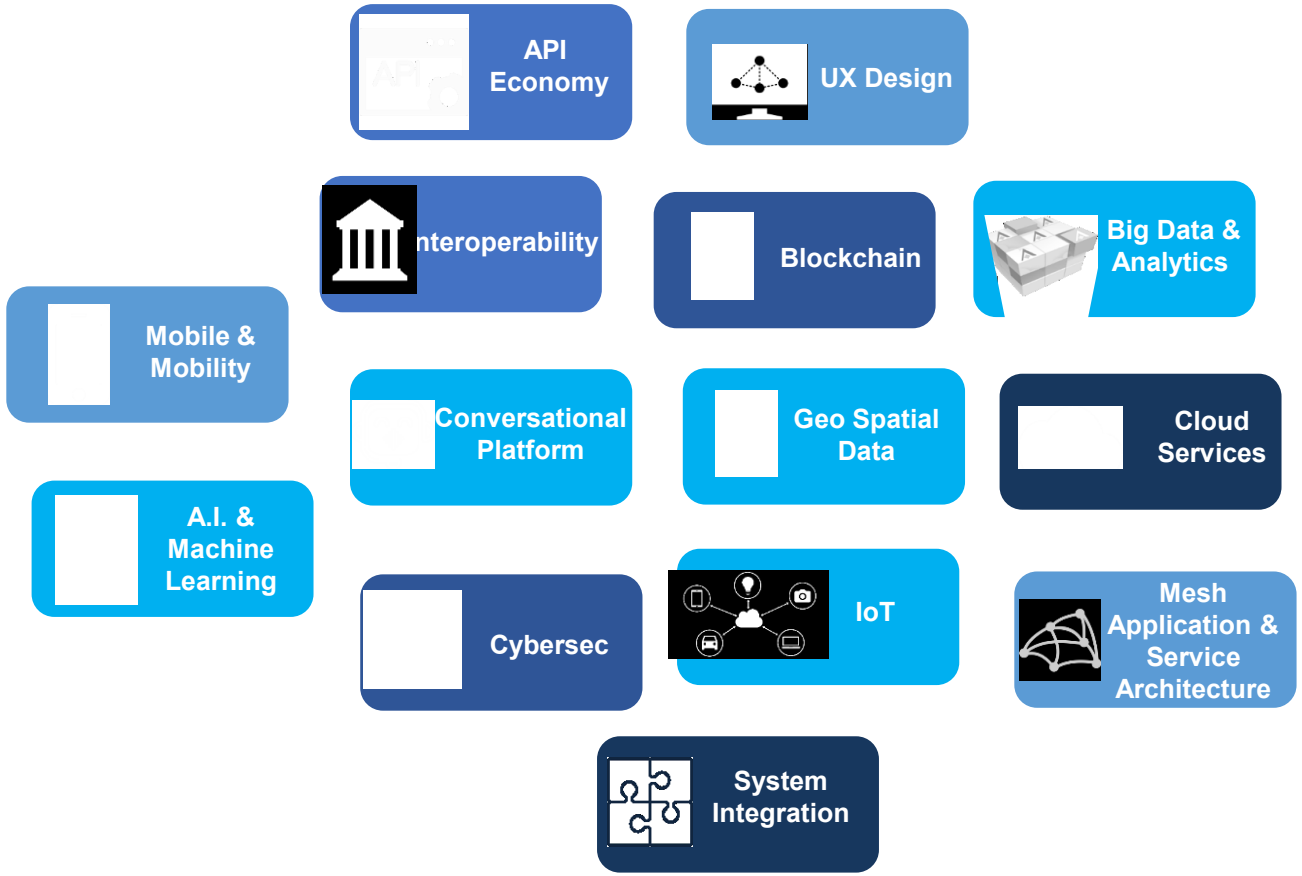


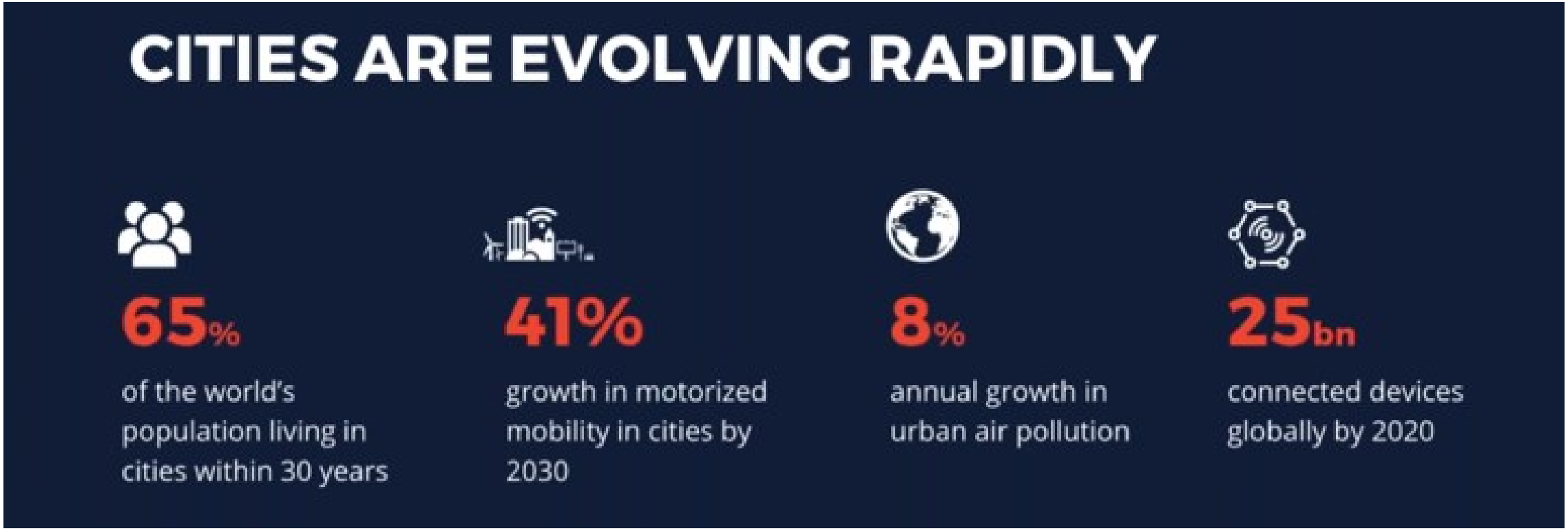
Proof of locations

bring geo to the blockchain - Decentralization

- The history of geospatial is one of centralization. From its **military beginnings** to its navigation portfolio, physical space has long been defined by single actors
- The Vulnerabilities of GPS
- new technological innovations mean new challenges in ensuring private, accurate, and secure geospatial data
- new spatial frameworks that are not vulnerable to fraud or third party interference

Gartner report on location data

"The Internet of Things (IoT) and digital business will produce an unprecedented amount of location-referenced data, particularly as 25 billion devices become connected by 2020. Location is one of the most important pieces of information for understanding context in sync with transactional, social, mobile, user and sensor data."



Geospatial Value And Impact In Economy

- Geospatial market was estimated at $400 billion in 2016.
  this market is expected to reach approximately $440 billion by 2020.
- Increasing commercialization of upstream Earth Observation value chain: shift in demand from data only to end-to-end solution, in insurance, monitoring, agriculture.
- New technological advancements are empowering a whole new set of people
- Democratization of data, high-quality data, is required. Focus on high quality, making it available to people will open up unforeseen value and opportunities
- Geographic Information System (GIS) and Remote Sensing (RS) Technologies have great opportunities to utilized the Free and Open Source Satellite imageries

Space Revolution

- Democratization, Commercialization And Monetization
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- Geographic Information System (GIS) and Remote Sensing (RS) Technologies have great opportunities to utilized the Free and Open Source Satellite imageries
- Reduced SPACE between space and common people
- Targeting either creation/support for big data analytics platforms through and opening up new markets for EO products

Spatial Thinking in Industry 4.0 and IoT solutions

The Fourth Industrial Revolution is driving the convergence of technologies, smudging the line between physical and digital ecosystems.

INDUSTRY4.0: IOT

Big data, data science, and data-driven decision-making are big buzzwords in public policy circles these days. Governments at all levels, along with researchers, advocacy organizations, and others are beginning to **make better use of their data**and apply emerging data science tools to address questions in housing, health, education, employment, and public safety.

INDUSTRY 4.0 : GEOSPATIAL

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INDUSTRY 4.0 : GEOSPATIAL

UC: where should PA open anew hospipal
Is the hospital

- We evaluated Hospital locations to understand how local administration is currently serving their citizens, where the local administration should place a new hospital, and to quantify the ROI of opening a new hospital.

- We used the following data sources and analyses:
    1. Hospital locations and distribution center locations
    2. Demographic data from to see the population served by each hospital
    3. Spatial clustering analysis to create logical clusters of hospital for each route
    4. Optimized routing, the most efficient route from a start/stop location to a set of other locations, to see time and distance of each route
    5. Created logical clusters of stores using the clustering analysis in CARTO to find logical groups of stores.

Next, we assigned these groups to the nearest distribution center, and made some minor adjustments for outliers that needed to be assigned to different distribution centers.

We used the same clustering analysis to create logical clusters for each of the routes originating from the distribution center.

We used the optimized routing to find the most efficient route from the distribution center, to each of the stores, then back to the distribution center.

https://www.youtube.com/watch?v=x_iMRAi2hu0

RIFERIMENTI PER APPROFONDIRE LA TEMATICA