GeoSpatial Data Science for Urban Resilience: Challenges and Opportunities

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Our Vision

Sensing our cities in real-time will blend our problems.

Internet of Things

Two ways of looking at it:

- 31 billion worldwide physical devices that will be connected and able to exchange data by 2020.

- Intelligent interactivity between humans and things to exchange information & knowledge for fairness and equity.

Internet of Medical Things

Internet of People

Internet of Industrial Things

Internet of Money

bitcoin

Internet of Cows

Internet of Vehicles

Internet of Streets

GeoSpatial Data Science

Two ways of looking at it:

- It is now a very multidisciplinary endeavor, drawing on enhanced technologies, ubiquitous communications, and machine learning for learning from IoT data.

- It is about building analytical processes that will transform the relations between government, civil society and private sectors.
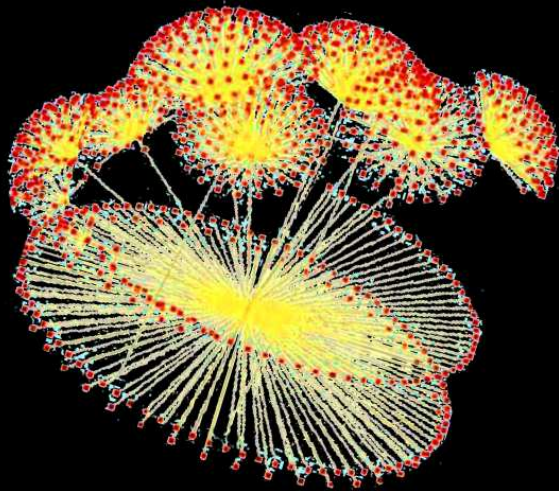
Challenges from an IoT data perspective

GIS Layers
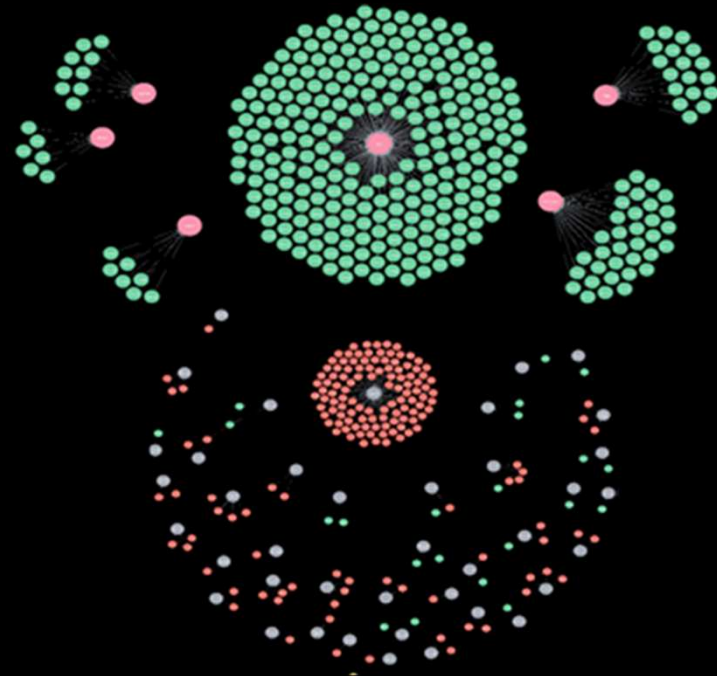

Fine-Grained Data Points
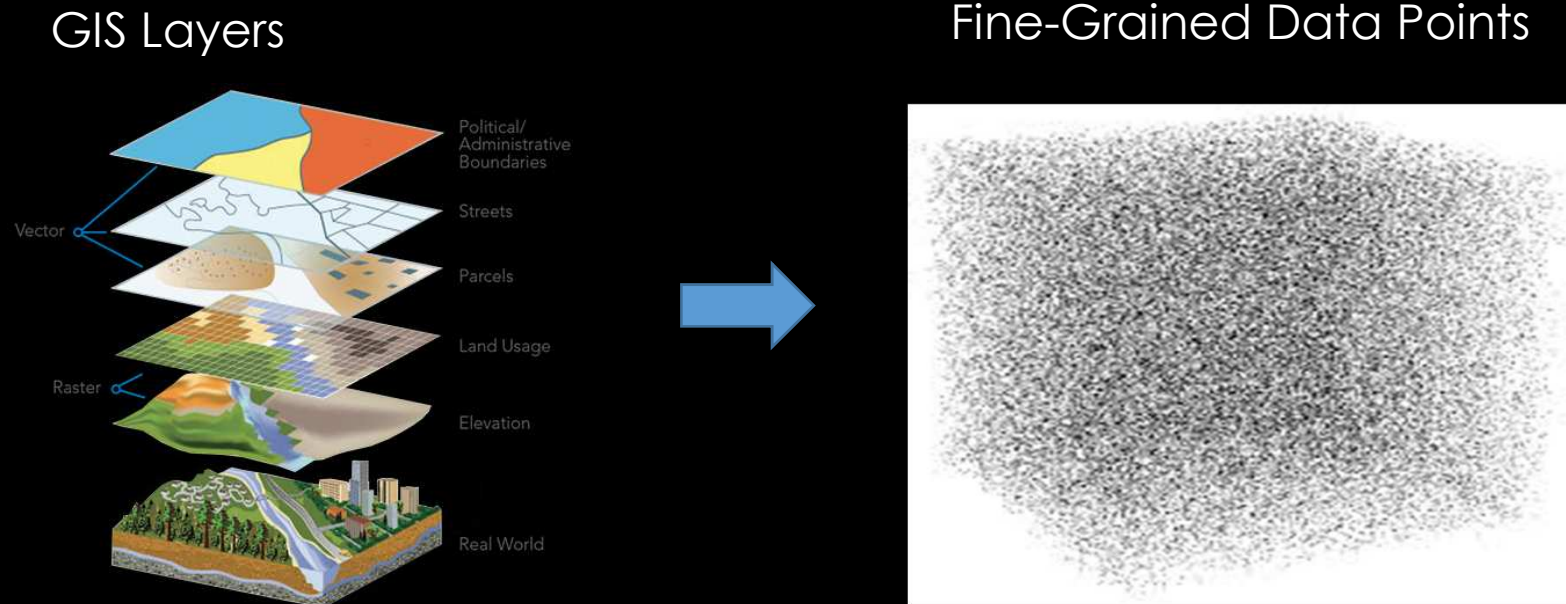
- From very low data rate to high data rate
- From fixed things to a need to support mobility

Biological Network
Protein-Protein Connectivity
CoNe Lab
University of Michigan

Transit Network
Trip-Trip Connectivity
People In Motion Lab
University of New Brunswick
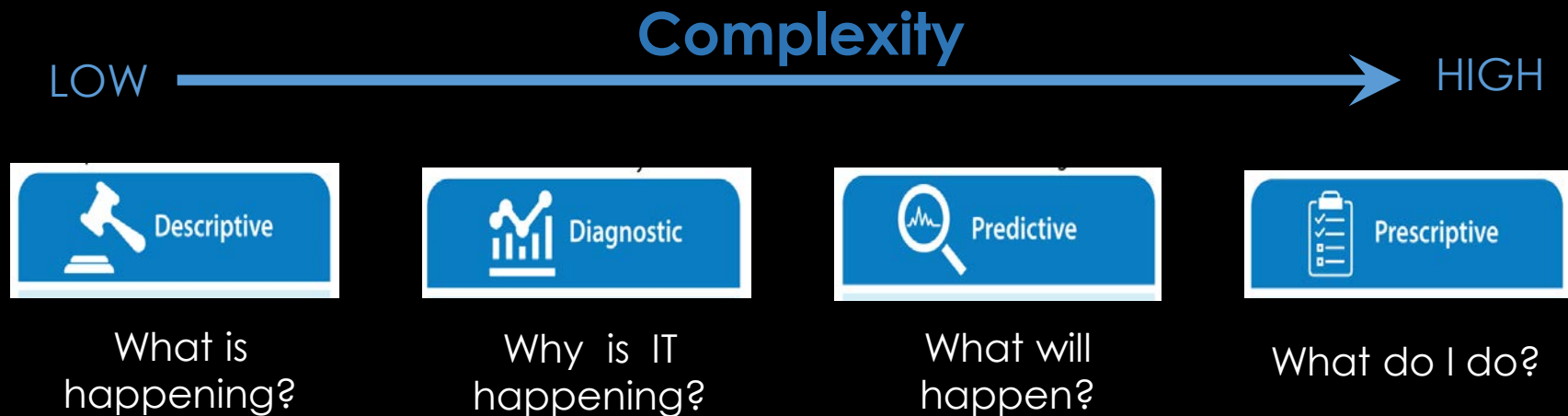
The Path Forward

Design innovative and social responsible IoT technologies
for a world in which 'automation'
will be embedded in virtually everything around us.
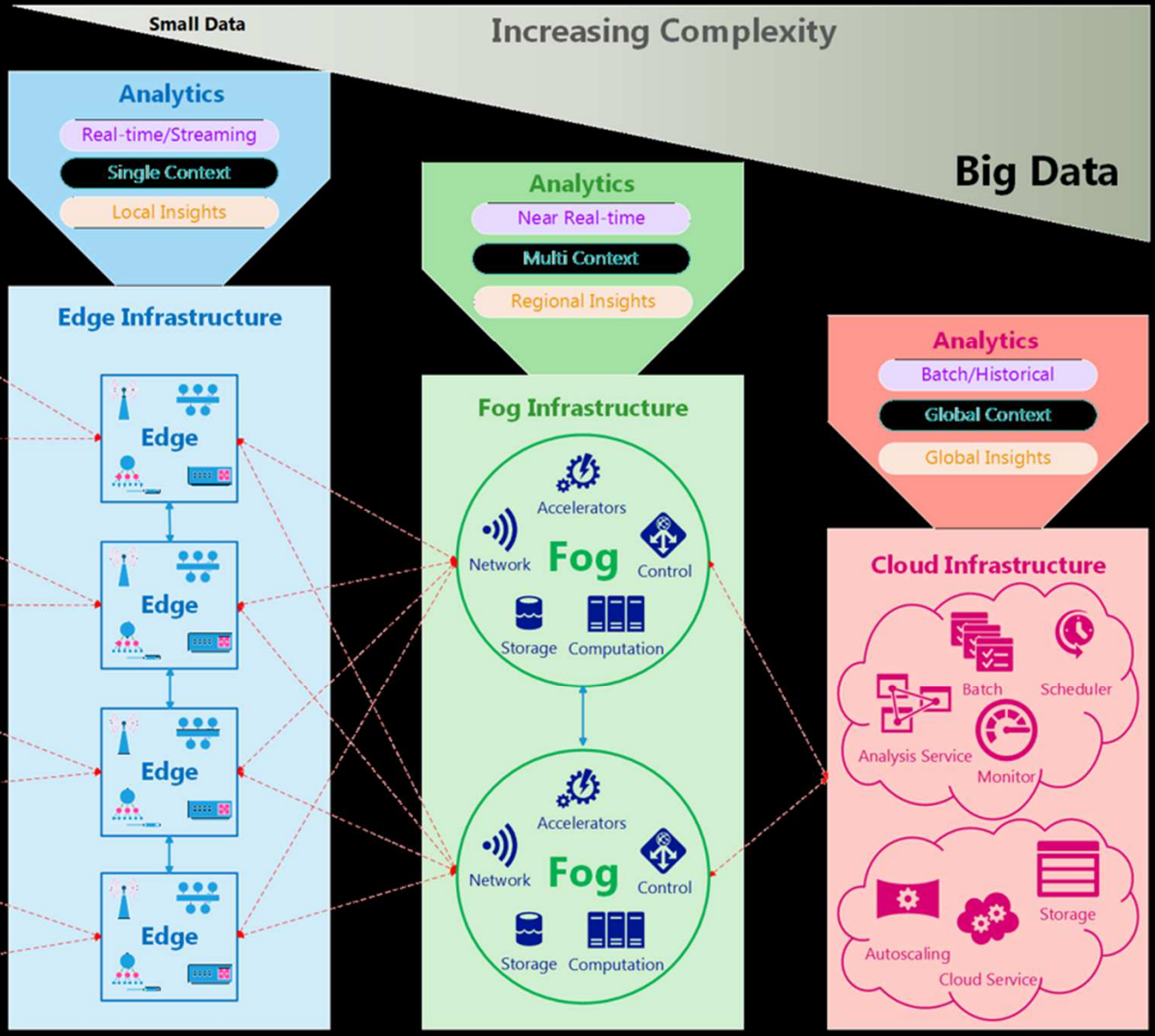
OPPORTUNITIES
Residents Demand
Community Management

Challenges from a Data Science perspective

Complexity

LOW ———————————————————————————→ HIGH

Descriptive	Diagnostic	Predictive	Prescriptive
What is happening?	Why is IT happening?	What will happen?	What do I do?

- Analytics Everywhere: from IoT device to the cloud
- Algorithmic Transparency: inspire trust and confidence

Cao and Wachowicz (2018)

The Path Forward

Render analytical processes accountable for
their operations for a world in which 'intelligence'
will be embedded in virtually everything around us.

OPPORTUNITIES
Urban Governance
Urban Systems
Urban Security

People in Motion

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