Urban Informatics: Reshaping Urban Social Science and Policy

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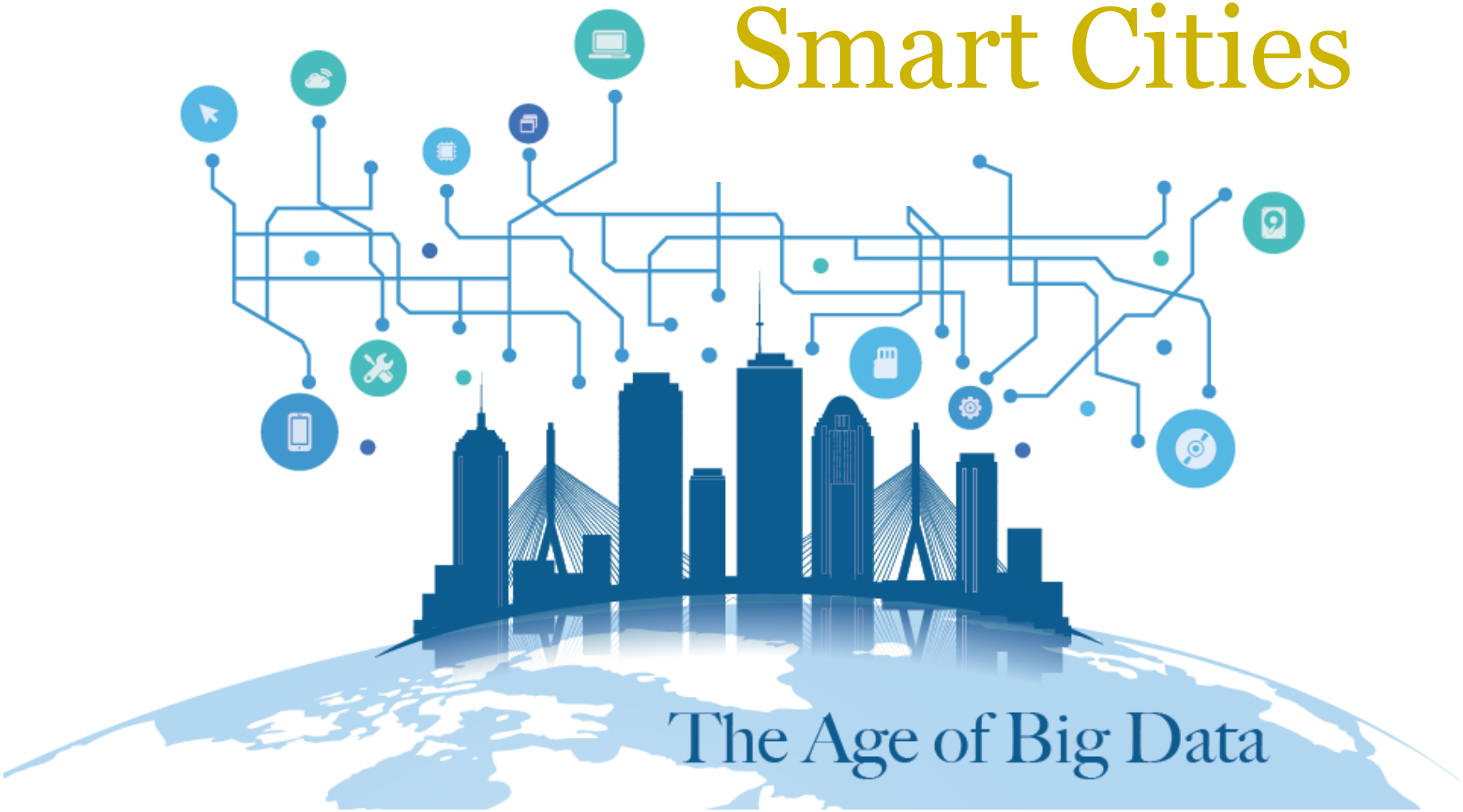
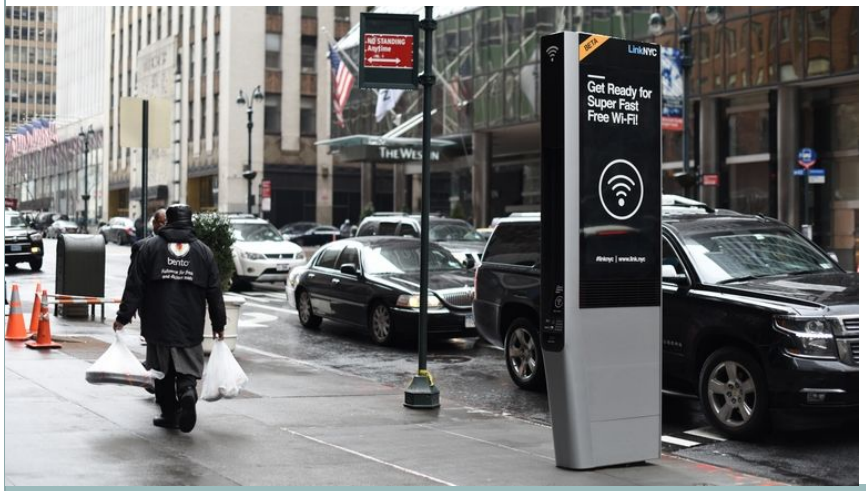
Smart Cities




nuTonomy


ARRAY of THINGS
Computation Institute /


LinkNYC
Get Ready for Super Fast Free Wi-Fi!

Discontents of the “Smart City”

- Technology is the answer, what was the question?
- Are we addressing the real needs of communities?
- Another newly emerging digital divide?
  - Between have and have-not institutions
  - Between can- and can’t-afford cities

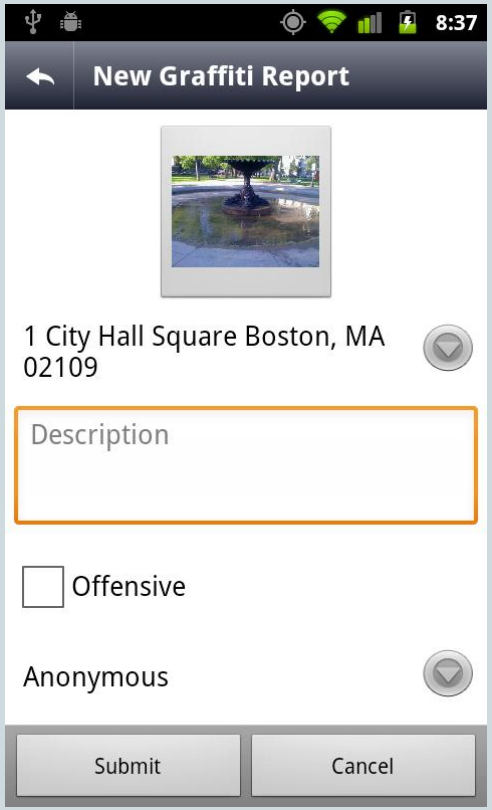
What Does it Mean for a City to Be Smart?

Transformation in the Mundane

Naturally-Occurring Data

parcel_num	ST_NUM	ST_NAME	LU	OWN_OC	YR_BUILT
100001000	104 A 104	PUTNAM	R3	Y	1900
100002000	197	LEXINGTON	R3	N	1920
100003000	199	LEXINGTON	R3	N	1905
100004000	201	LEXINGTON	R3	N	1900
100005000	203	LEXINGTON	R2	Y	1900
100006000	205 207	LEXINGTON	R3	Y	1900
100007000	209 211	LEXINGTON	R3	N	1900
100008000	213	LEXINGTON	R3	Y	1900
100009000	215	LEXINGTON	R3	Y	1900
100010000	217	LEXINGTON	R3	Y	1900
100011000	219	LEXINGTON	R2	N	1900
100012000	221	LEXINGTON	R3	Y	1900
100013000	223	LEXINGTON	R3	N	1900
100014000	225	LEXINGTON	R3	Y	1900
100015000	227	LEXINGTON	R2	Y	1900
100016000	235	LEXINGTON	R2	Y	1899
100017000	237	LEXINGTON	R3	N	1900
100018000	239	LEXINGTON	R3	N	1900
100019000	241	LEXINGTON	R3	N	1900
100020000	243	LEXINGTON	R3	Y	1900

Smart Phones

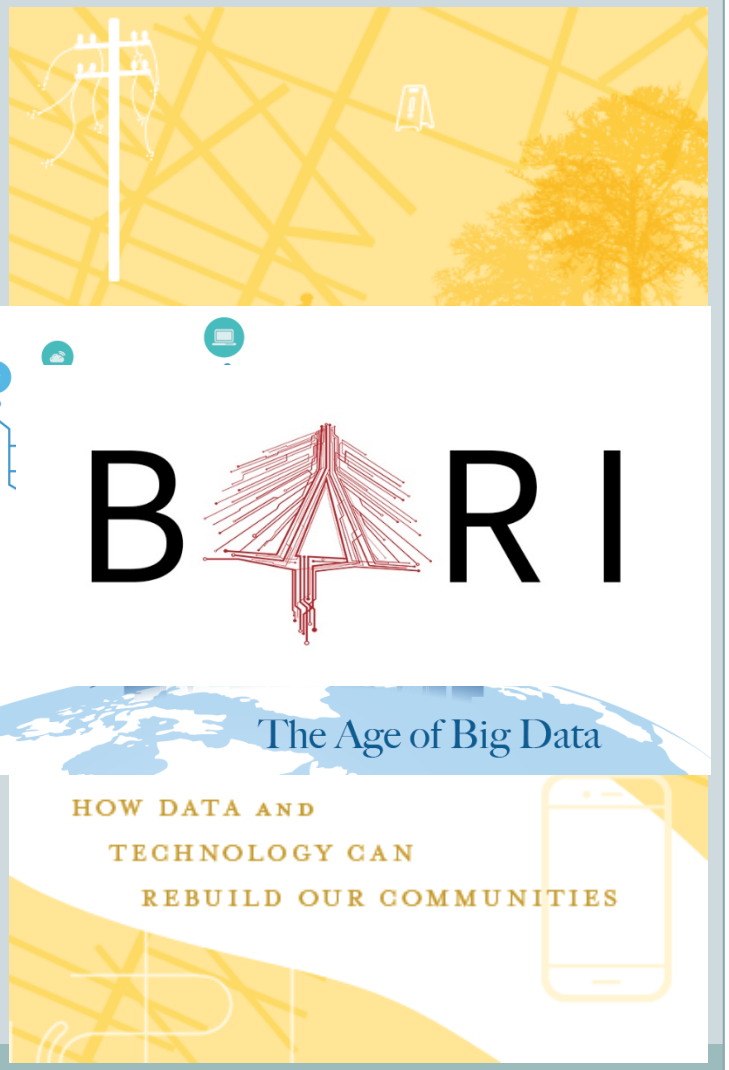


Transformation in the Mundane

- Vast array of applications
- Accessible to all cities and institutions (or, at least, more so)
- The future is now

The Urban Commons

- Urban informatics
  - What makes a city “smart”?
- The Boston Area Research Initiative
  - Data, research and policy
- Custodianship
  - The collaborative maintenance of Boston



Urban Informatics

5 Themes of Urban Informatics

1) Novel Data Resources

2) Crowdsourcing and sensor technologies

Bases of the Field

Civic Data Ecosystem

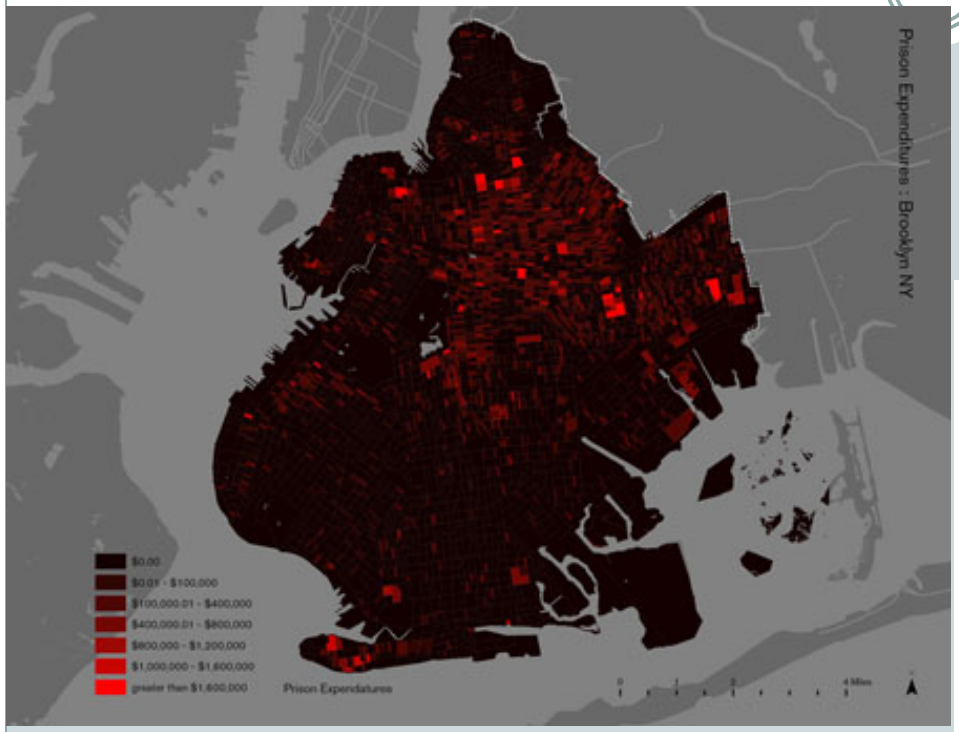
3) Widespread Data Sharing

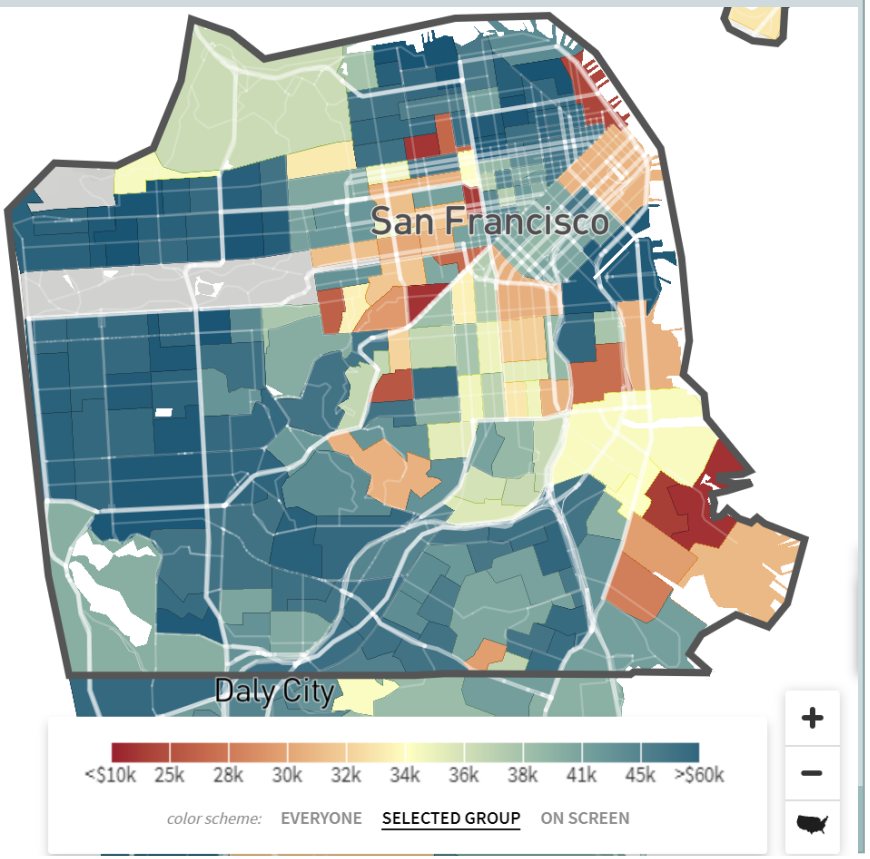
4) Technocratic policy innovations

5) Deeper understanding of the city

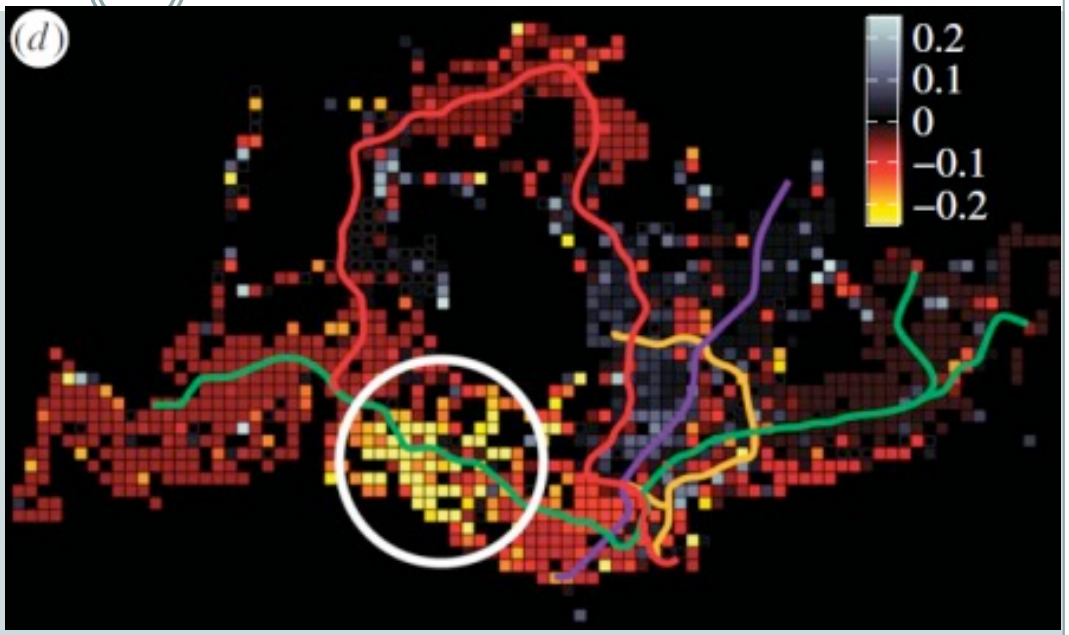
Products of the Field

Bases of the Field:
Novel Data Resources



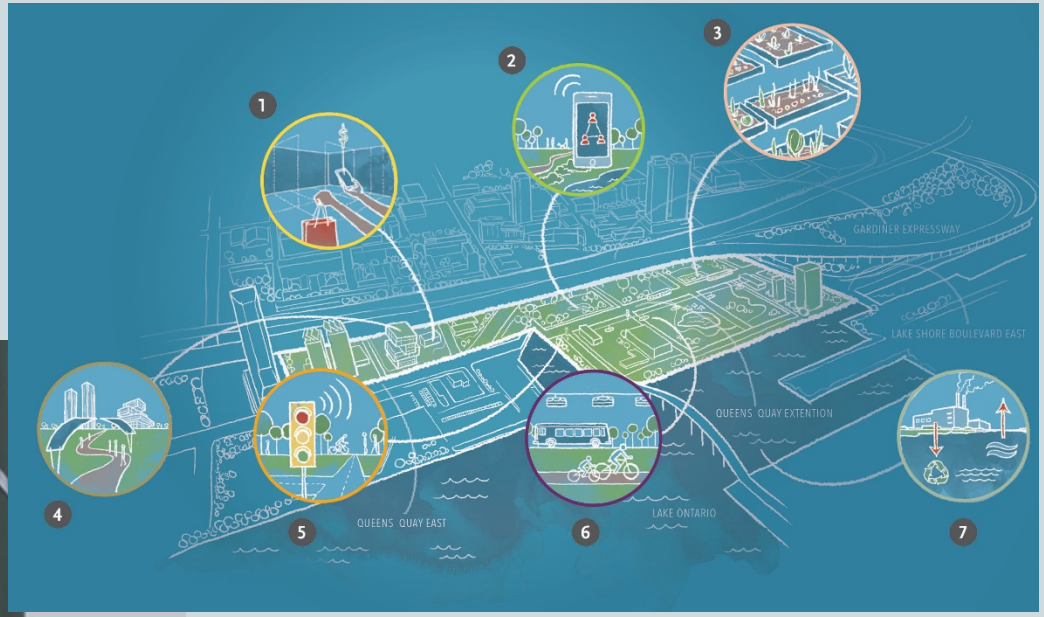


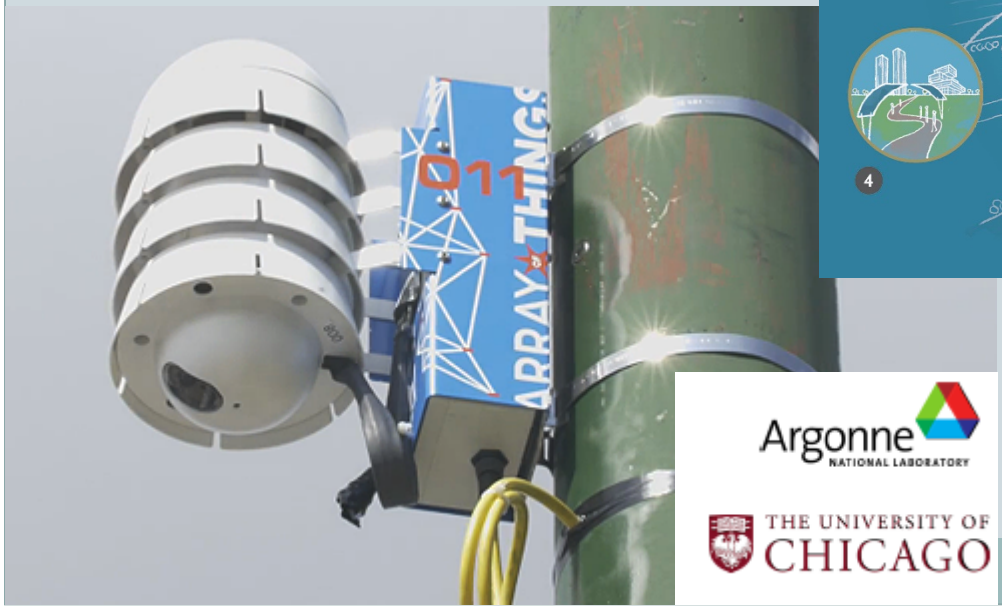
Bases of the Field:
Novel Data Resources



Bases of the Field: Crowdsourcing and Sensor Technologies

- Sensors tracking environment and activity.

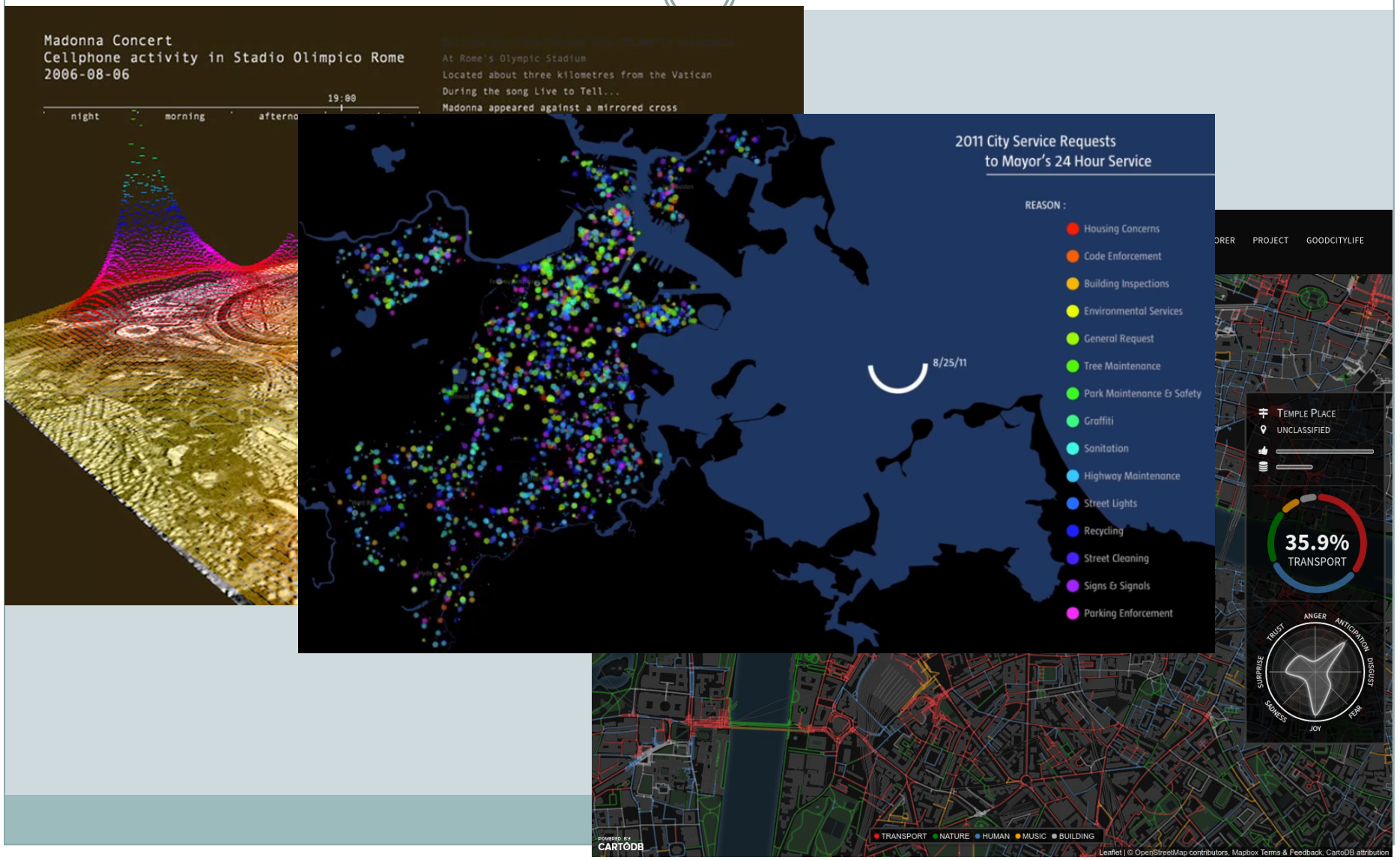




Argonne NATIONAL LABORATORY

THE UNIVERSITY OF CHICAGO

Bases of the Field: Crowdsourcing and Sensor Technologies



Bases of the Field: Crowdsourcing and Sensor Technologies

- A composite view of the city
- Diverse in content, spatially and temporally precise

- Intimate access to the *pulse of the city*.

5 Themes of Urban Informatics

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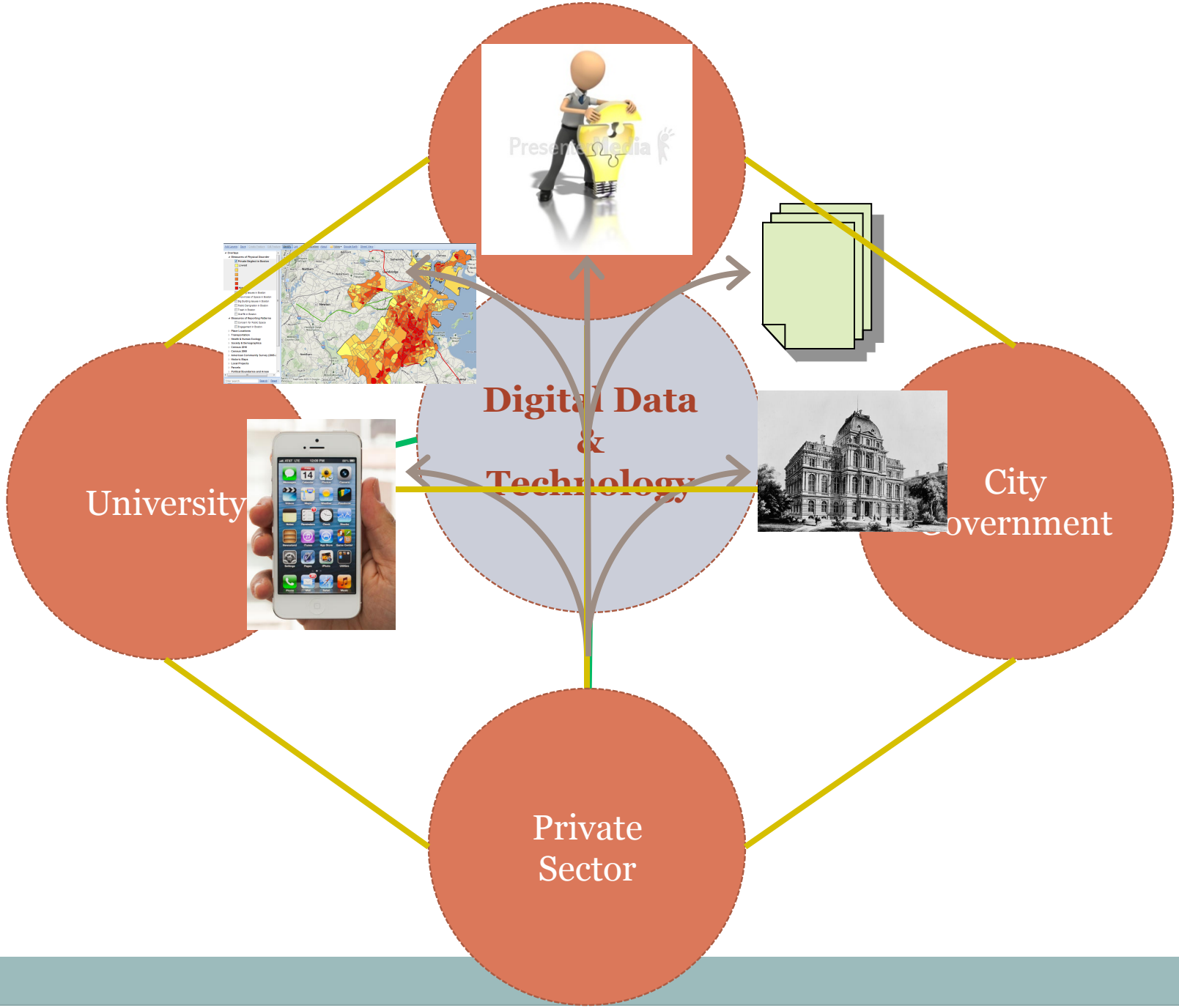
Bases of the Field

Civic Data Ecosystem

3) Widespread Data Sharing

Civic Data Ecosystem

Ecosystem: The community of species of organisms that inhabit a space, the physical characteristics of that space, and the interactions among them.


Digital Data
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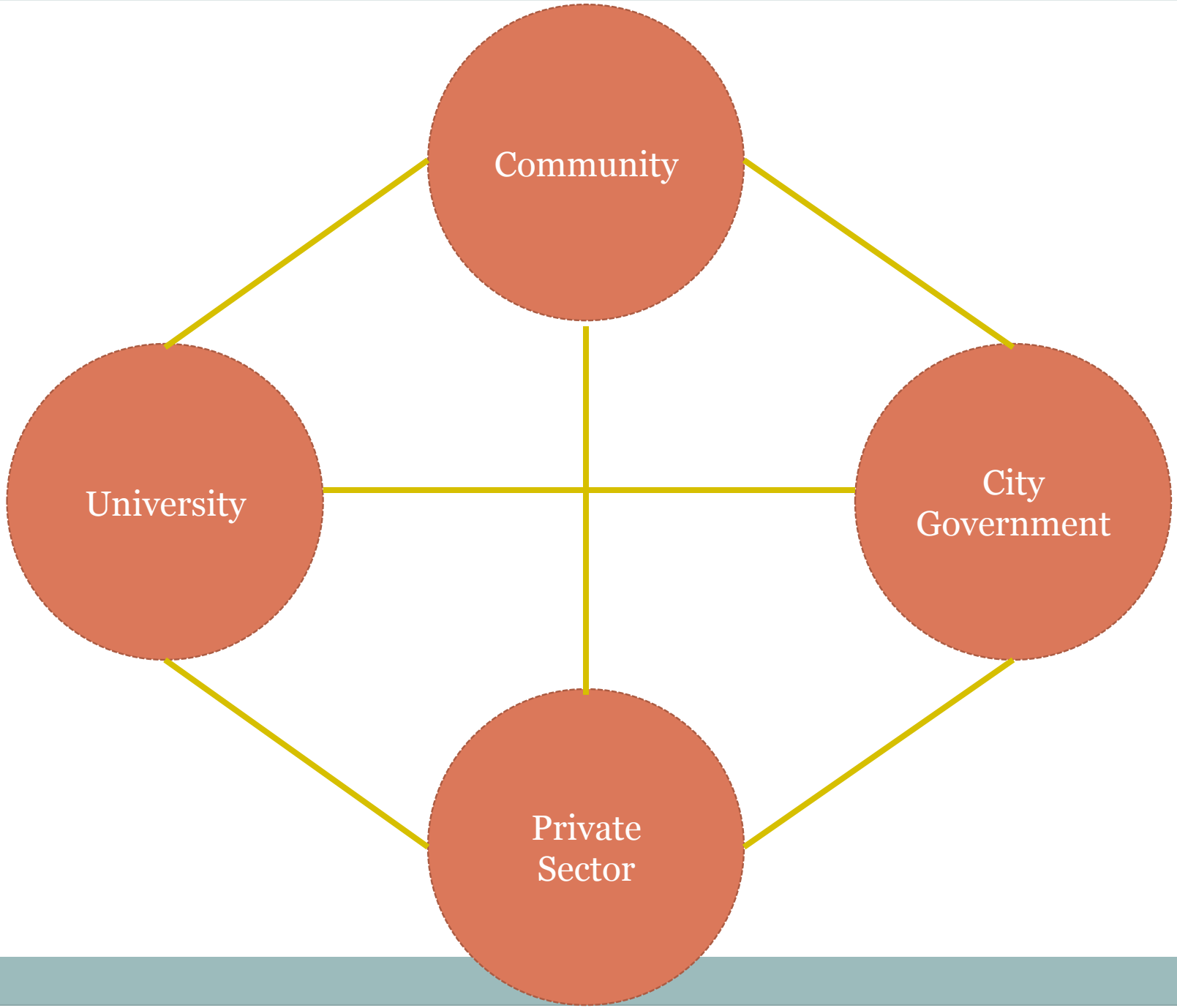
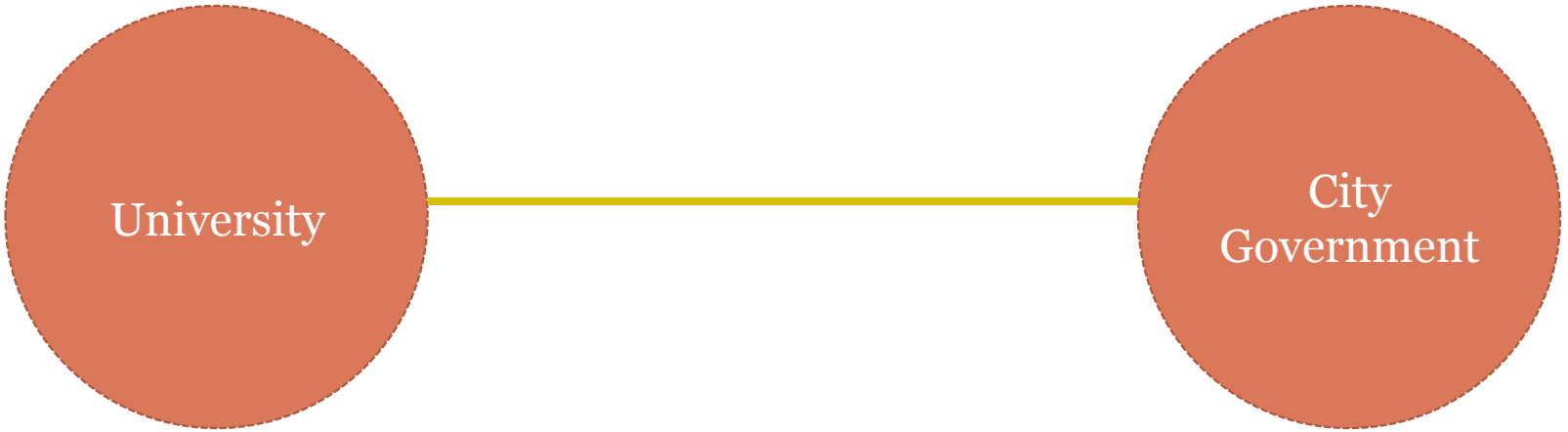
City
Government
Private
Sector


Community
University
City Government
Private Sector


University
City Government

BOSTON UNIVERSITY

UMASS BOSTON

1880

NORTHEASTERN UNIVERSITY
LVX VERITAS VIRTVS
BOSTON, MASSACHUSETTS

BOSTON COLLEGE

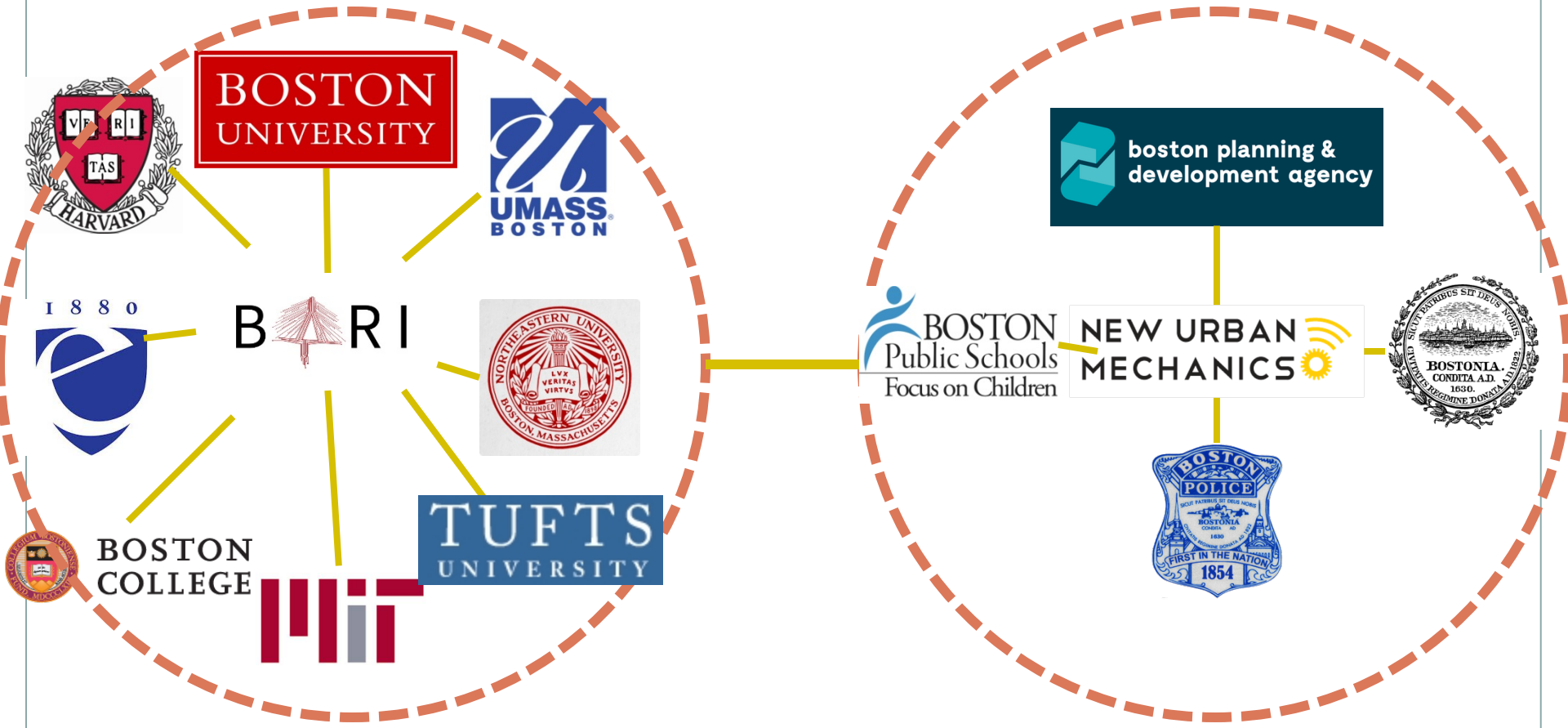
TUFTS UNIVERSITY

City Government

BOSTON
COLLEGE

The Boston Area Research Initiative

- Bringing together researchers, policymakers, practitioners, and community leaders to envision and realize the future of the city.
- With the goal of leveraging data and technology to enhance equity, justice, and democracy.
- Primary focus on Greater Boston as a model for cities across the country and world.
  - www.bostonarearesearchinitiative.net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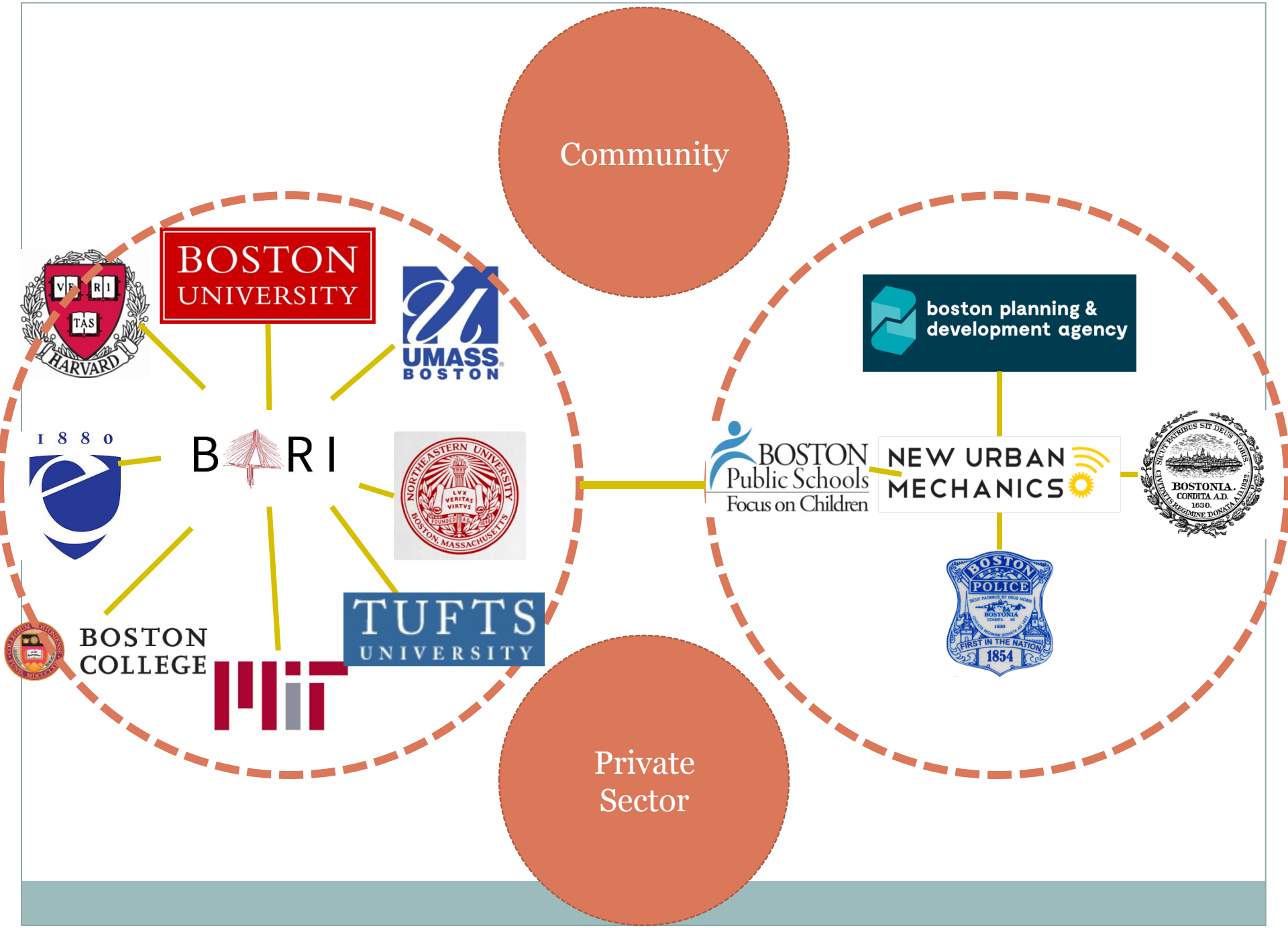
NORTHEASTERN UNIVERSITY
BOSTON COLLEGE
TUFTS UNIVERSITY
boston planning & development agency
BOSTON Public Schools
Focus on Children
NEW URBAN MECHANICS
BOSTONIA CONDITA A.D. 1630.
BOSTON POLICE
FIRST IN THE NATION
1854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TUFTS UNIVERSITY
MIT
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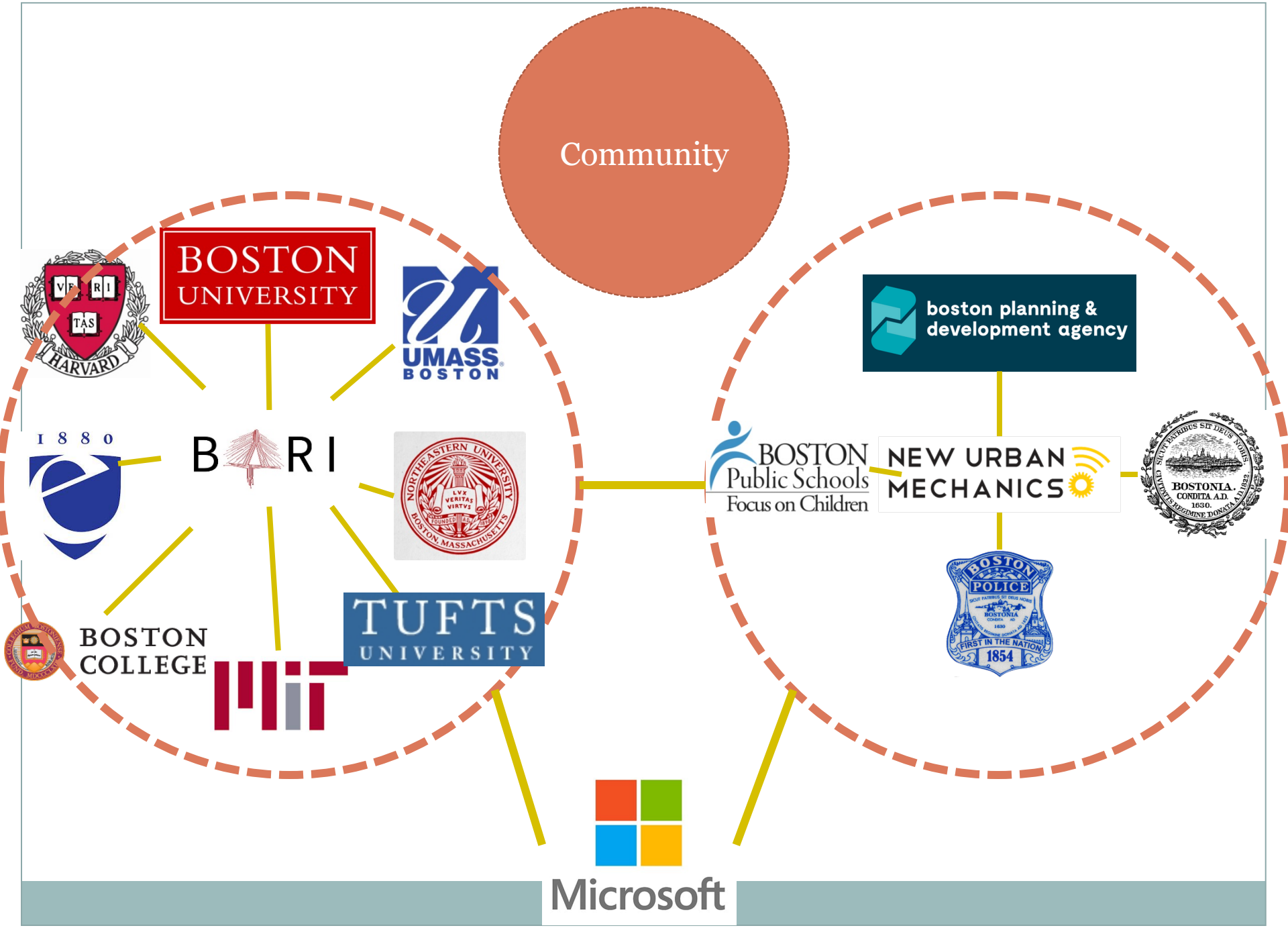
Private Sector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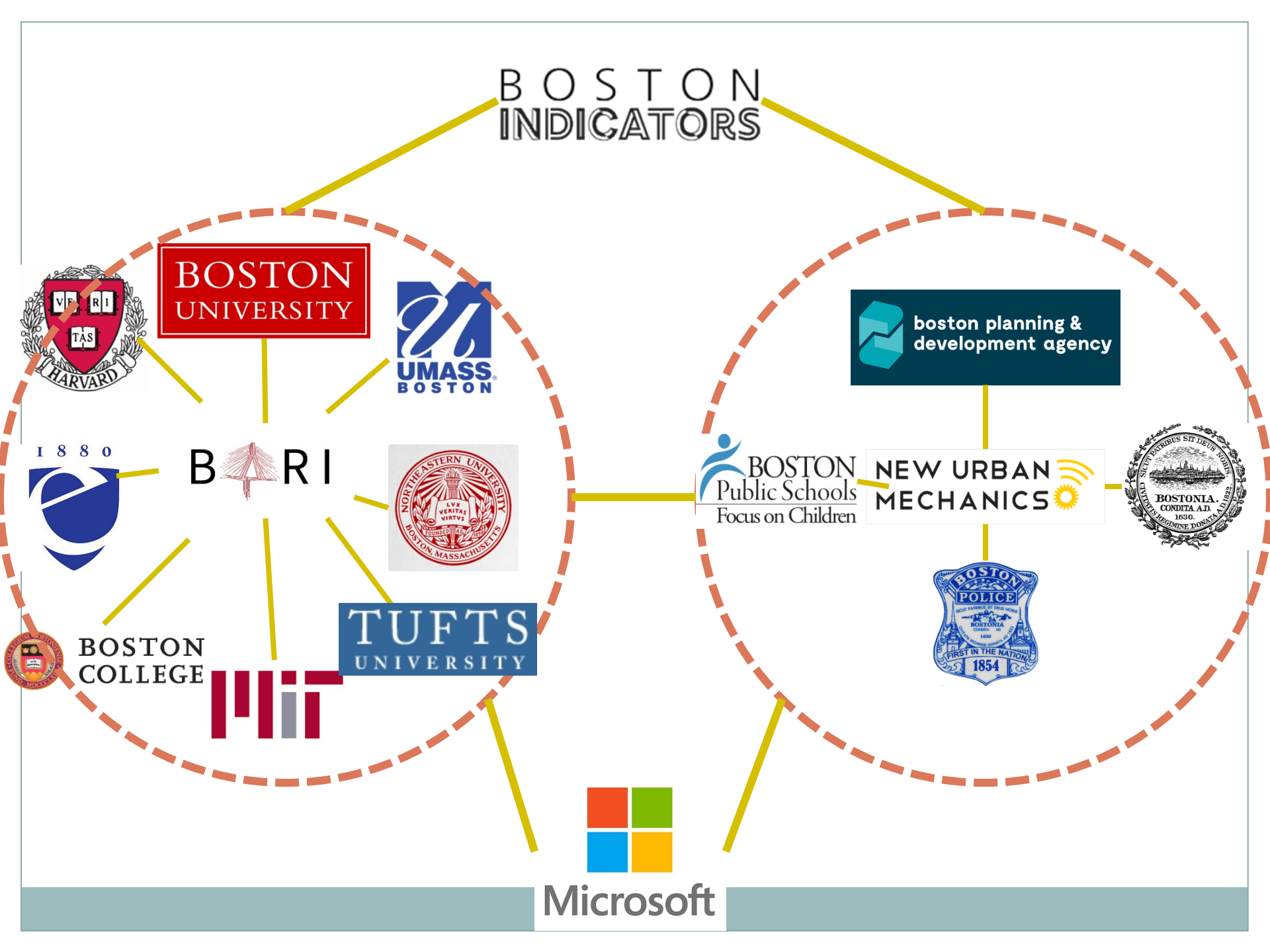
BOSTON INDICATORS
BOSTON UNIVERSITY
UMASS BOSTON
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BARI
NORTHEASTERN UNIVERSITY
BOSTON, MASSACHUSETTS
BOSTON COLLEGE
TUFTS UNIVERSITY
boston planning & development agency
BOSTON Public Schools Focus on Children
NEW URBAN MECHANICS
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BOSTON POLICE
FIRST IN THE NATION
1854
Microsoft

The Boston Area Research Initiative: Main Activities

1. Pursuing core research-policy partnerships
2. The Boston Data Portal, making emergent data sources accessible for research, policy, and practice
3. Convening and supporting a thriving civic data ecosy

BARI

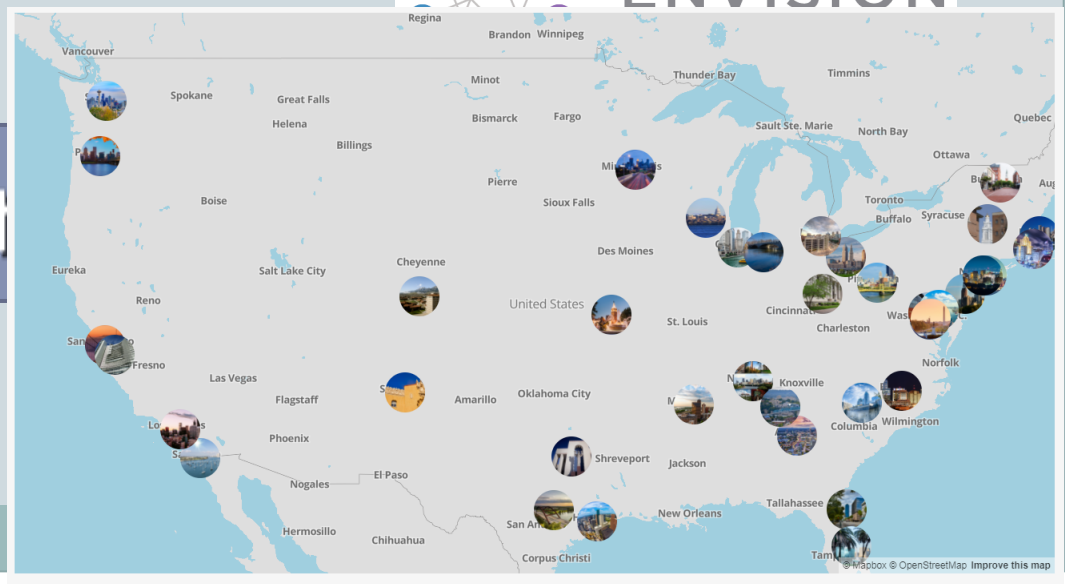
Coordinating the Civic Data Ecosystem

- Academic Centers
- City Offices
- Integrated Data Systems
- Non-profit Test Beds
- National Consortium

Metro21
Carnegie Mellon University

METROLAB NETWORK

ENVISION



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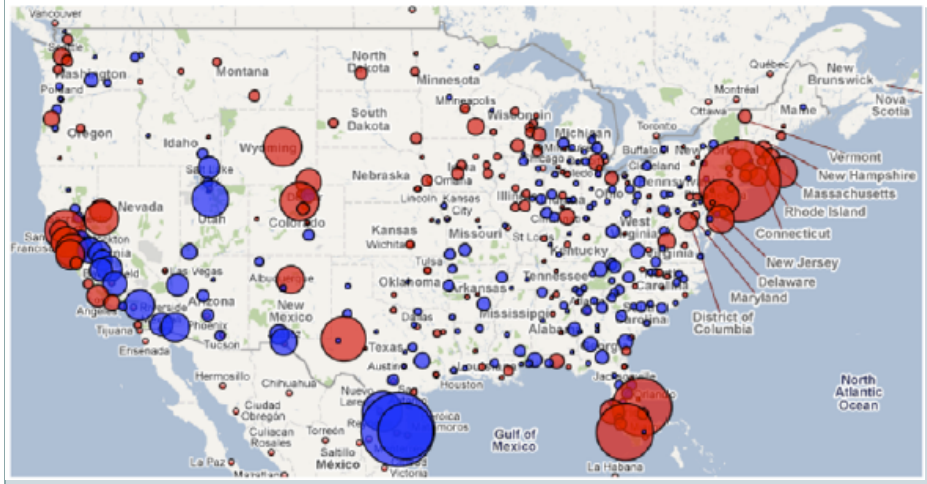
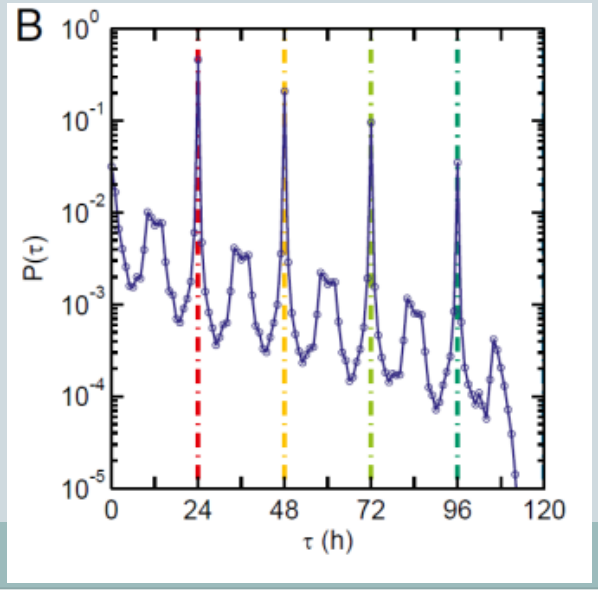
Products of the Field

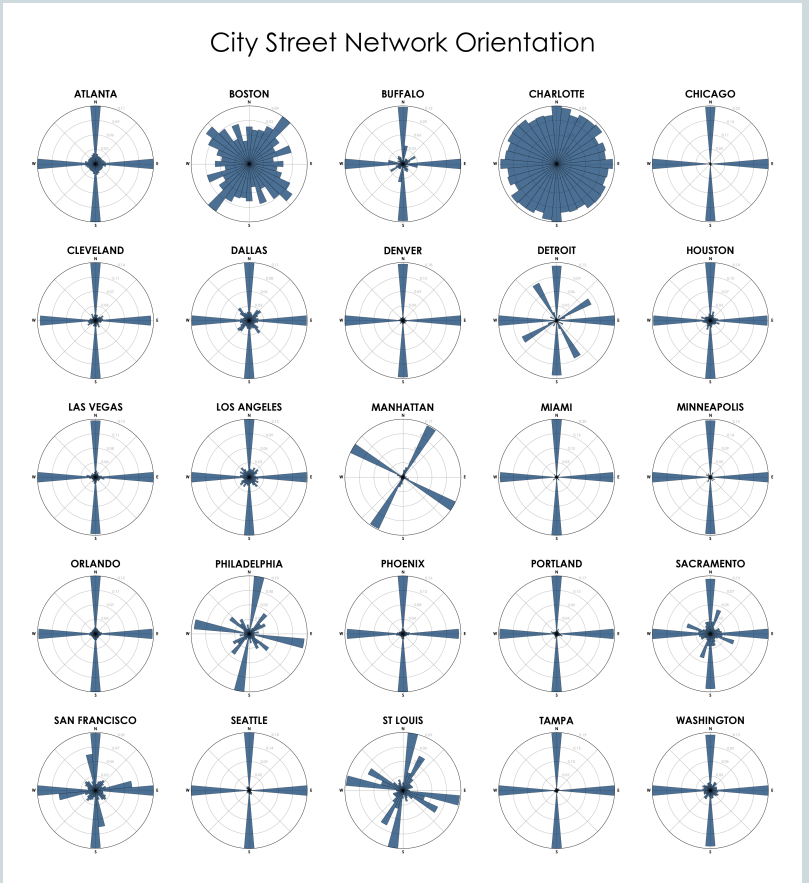
Products of the Field: Policy Innovation

- Gov 2.0 / civic technology
- Dashboards
- New policies, practices, and systems
  - Engineering
    - South Bend's backflow resistant sewers
    - New York City's safer streets
  - Social
    - Microgeographical prediction and management of crime, fires, and related.
    - Anticipating risk for child abuse in Allegheny County.
    - Responses to climate change and disasters.
    - Managing chronic and episodic homelessness

Products of the Field: New Urban Science

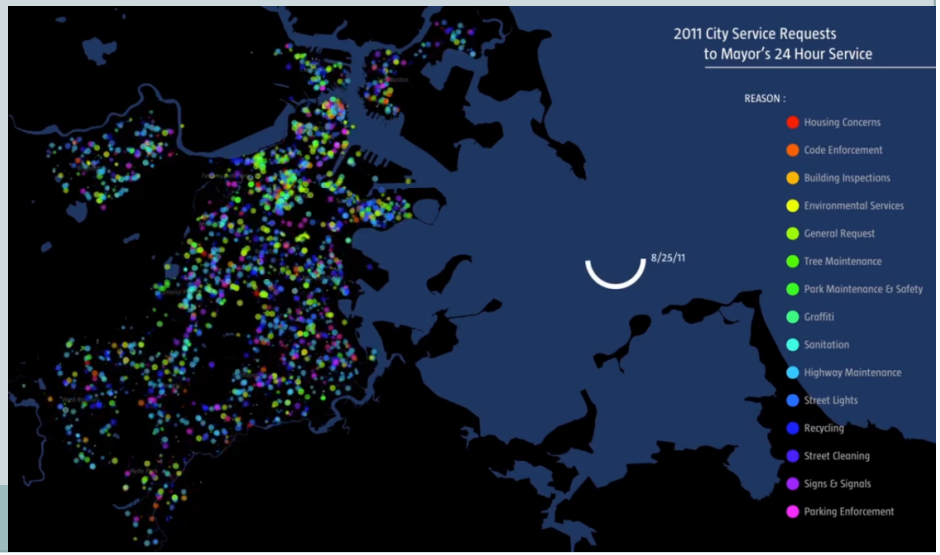






Products of the Field: True Convergence

- New data and phenomena can drive new science.
- 311 as a window onto neighborhood maintenance.
  - ~500 requests per day.
  - ~50% reference issues in public spaces.
  - Unique in its content and precision.

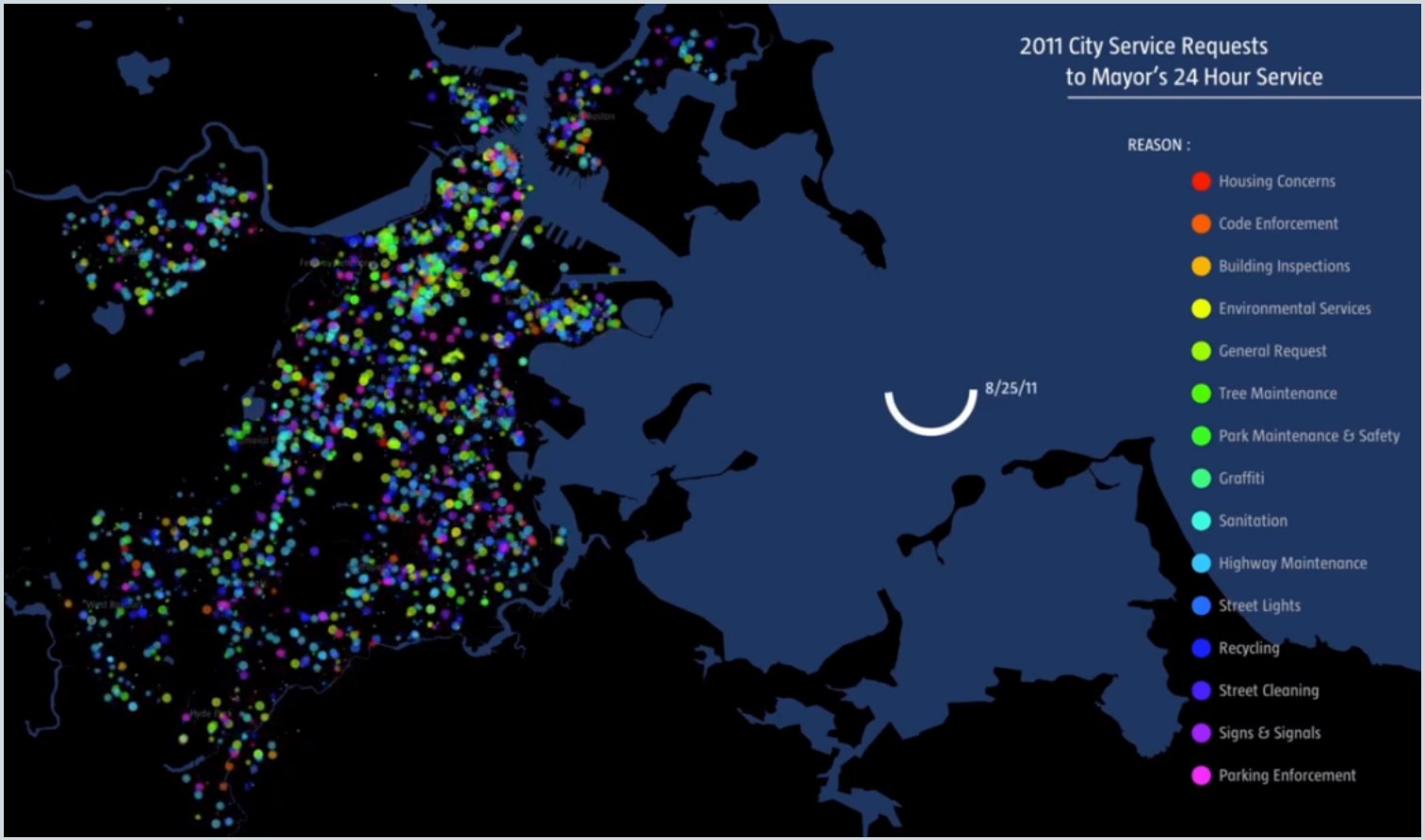


What's Urban Informatics like in Your Community?

The Problem of Naturally-Occurring Data for Science

DISENTANGLING THE INTERPRETATIONS OF 311 REPORTS

Products of the Field: True Convergence



The Problem of Naturally-Occurring Data: What's Missing?

1. *Content*: What is it we're trying to measure?

2. *Validity*: Do the cases measure "real" conditions?

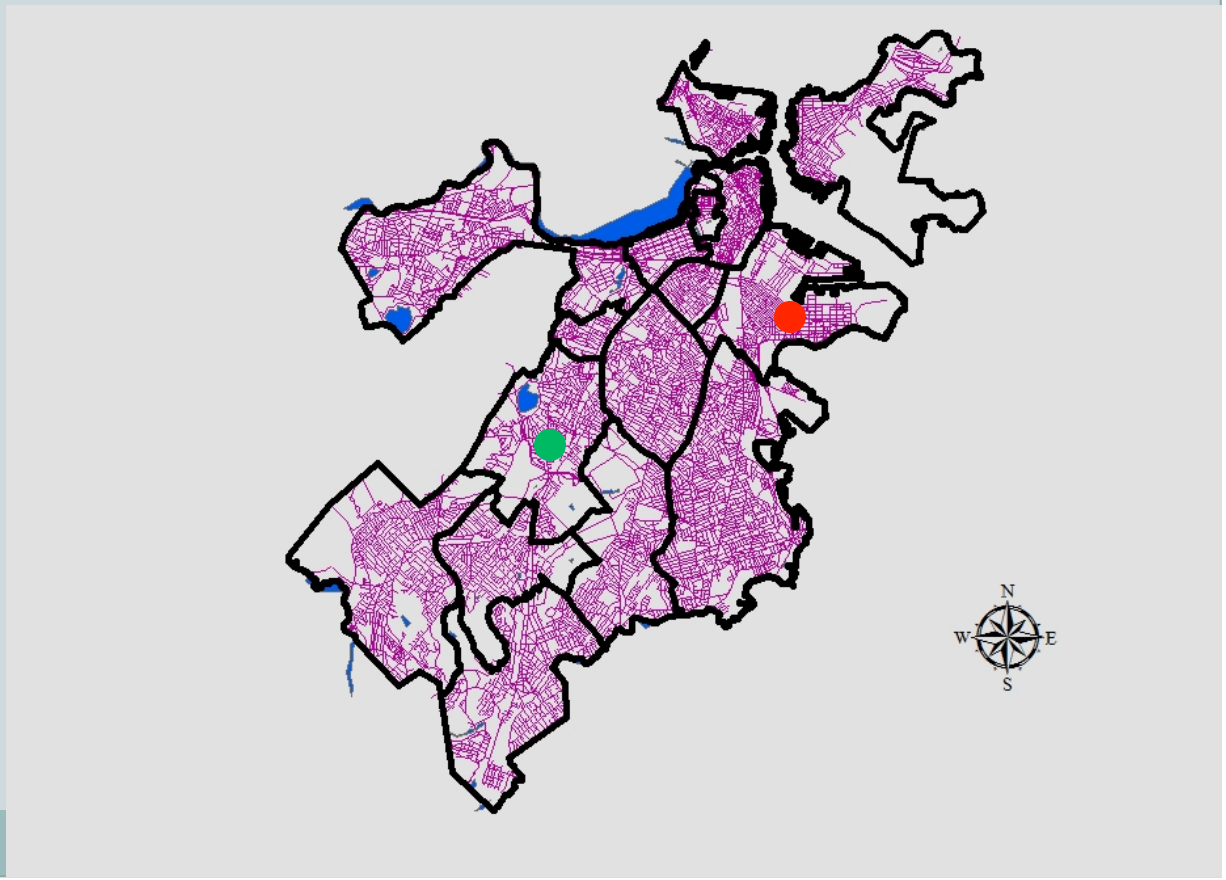
3. *Reliability*: How often and for what geographic scale can they be measured?

What 311 Reports Can Measure

"Broken Windows"	Custodianship
• Reports capture events and conditions reflection deterioration and denigration. • Assumes that the distribution of reports align with objective conditions.	• Reports reflect the impulse of individuals to care for public spaces. • Assumes that need is even across spaces.

Addressing Validity in 311 Reports

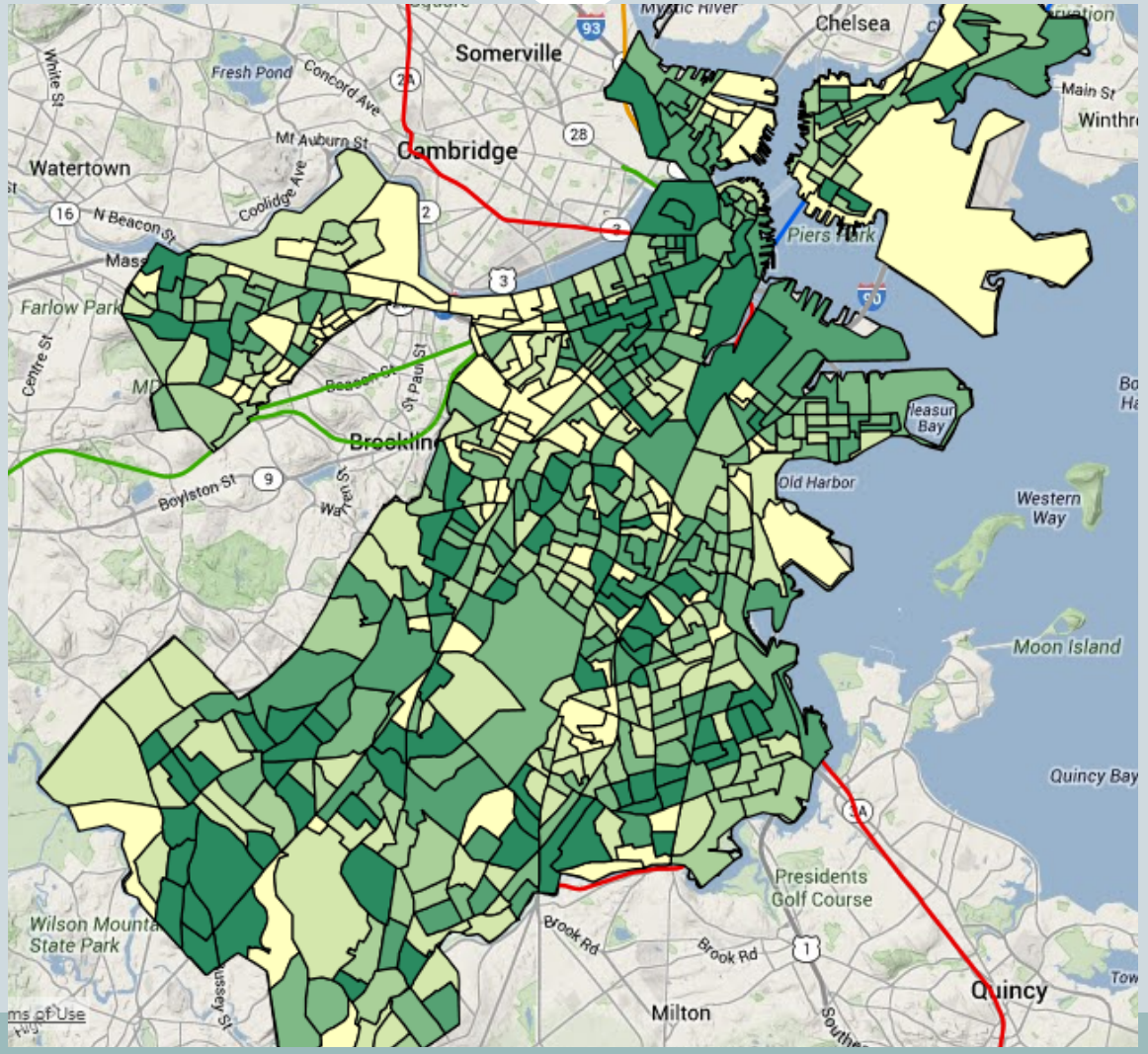
- How do we disentangle the signals of broken windows and custodianship in the data?



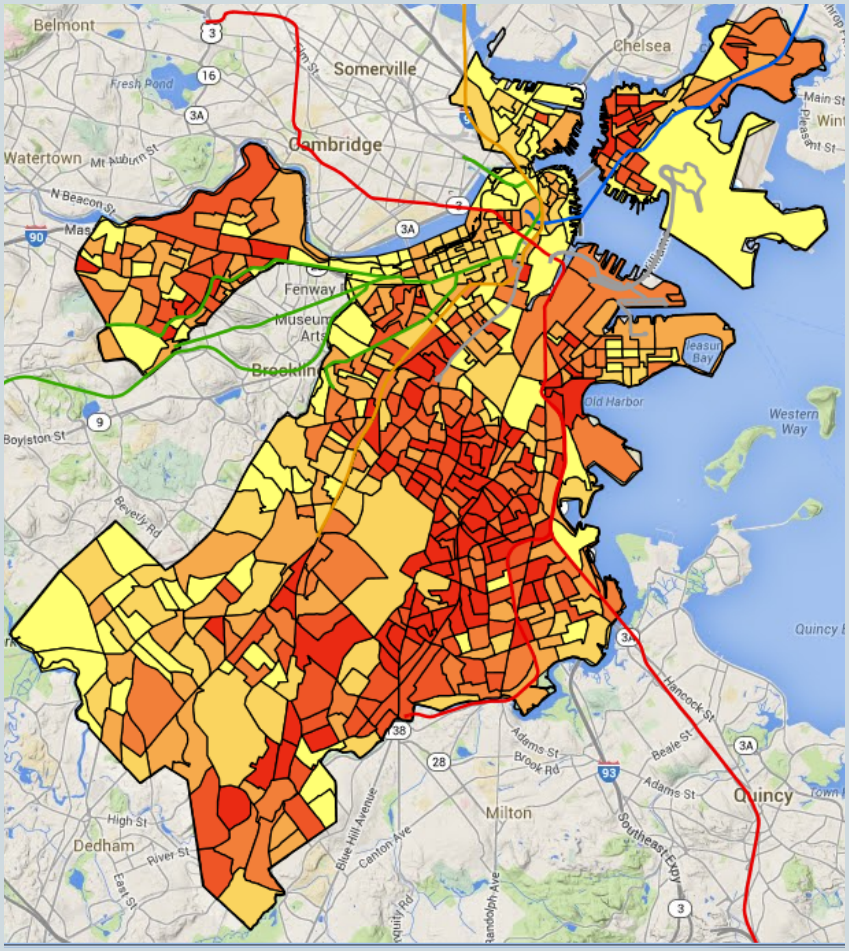
Separating Out Custodianship

- An objective measurement of custodianship.
  - Identified 244 street light outages across Boston.
  - Public Works assessed quality of all sidewalks.
- Additional measures from within the 311 database to estimate custodianship.
  - Registered users reporting “public” issues
  - Registered users reporting more than 2 “public” issues/year

Custodianship across Boston



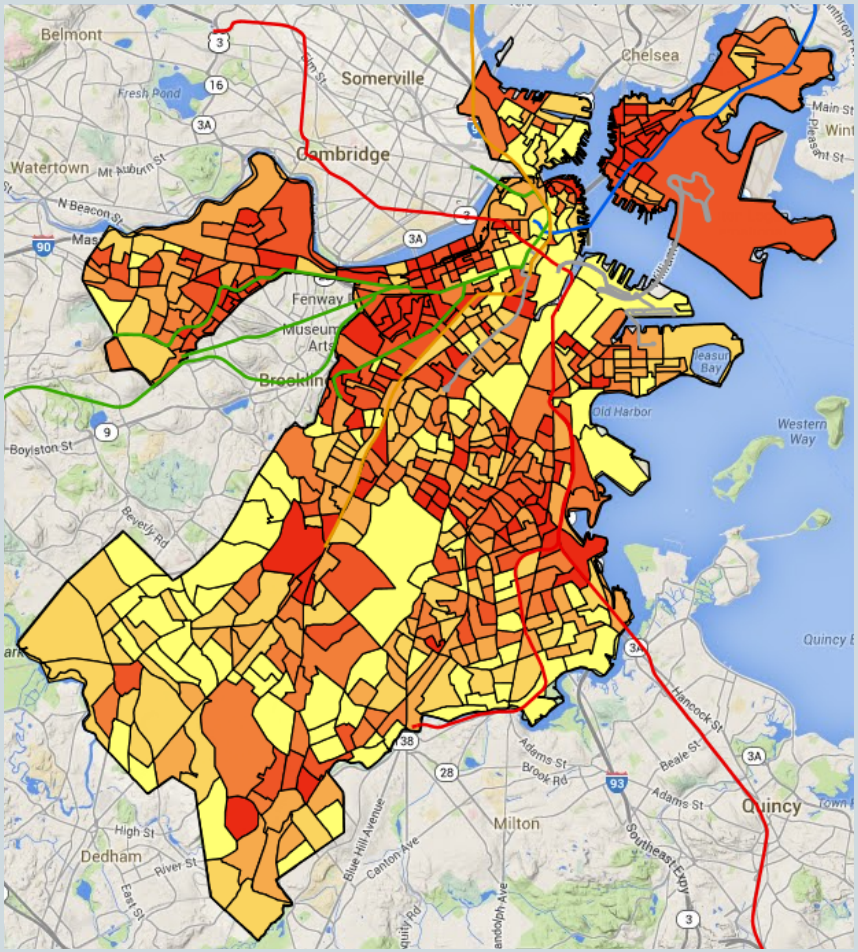
Broken Windows: Private Neglect



- Counts of:
  - Housing issues (12 case types; e.g., bedbugs)
  - Uncivil use of space (7 case types; e.g., illegal occupancy)
  - Big buildings (3 case types)
- Adjusted for local custodianship.

Broken Windows: Public Denigration

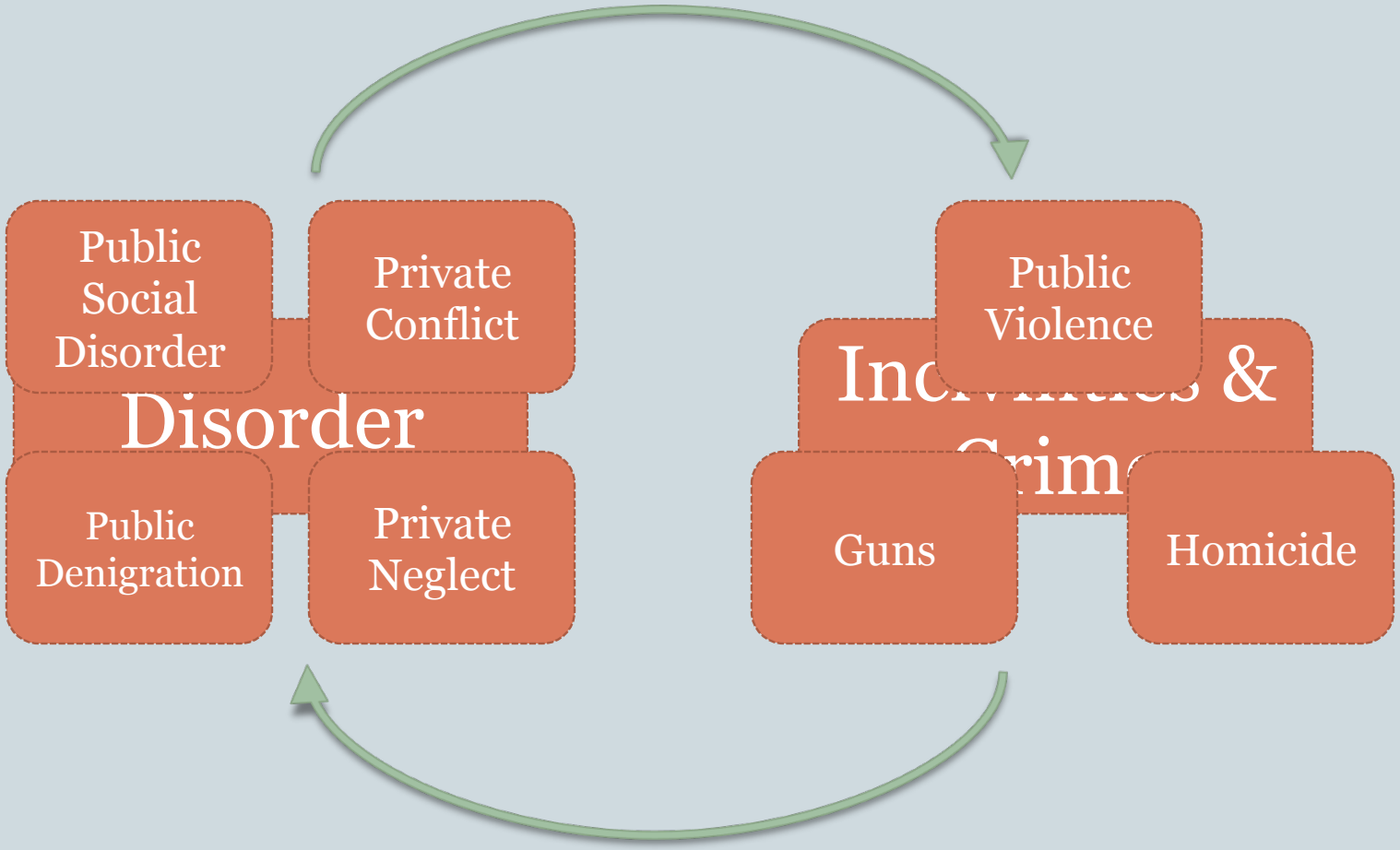
- Counts of:
  - Graffiti (2 case types)
  - Trash (5 case types; e.g., illegal dumping).
- Adjusted for local custodianship.



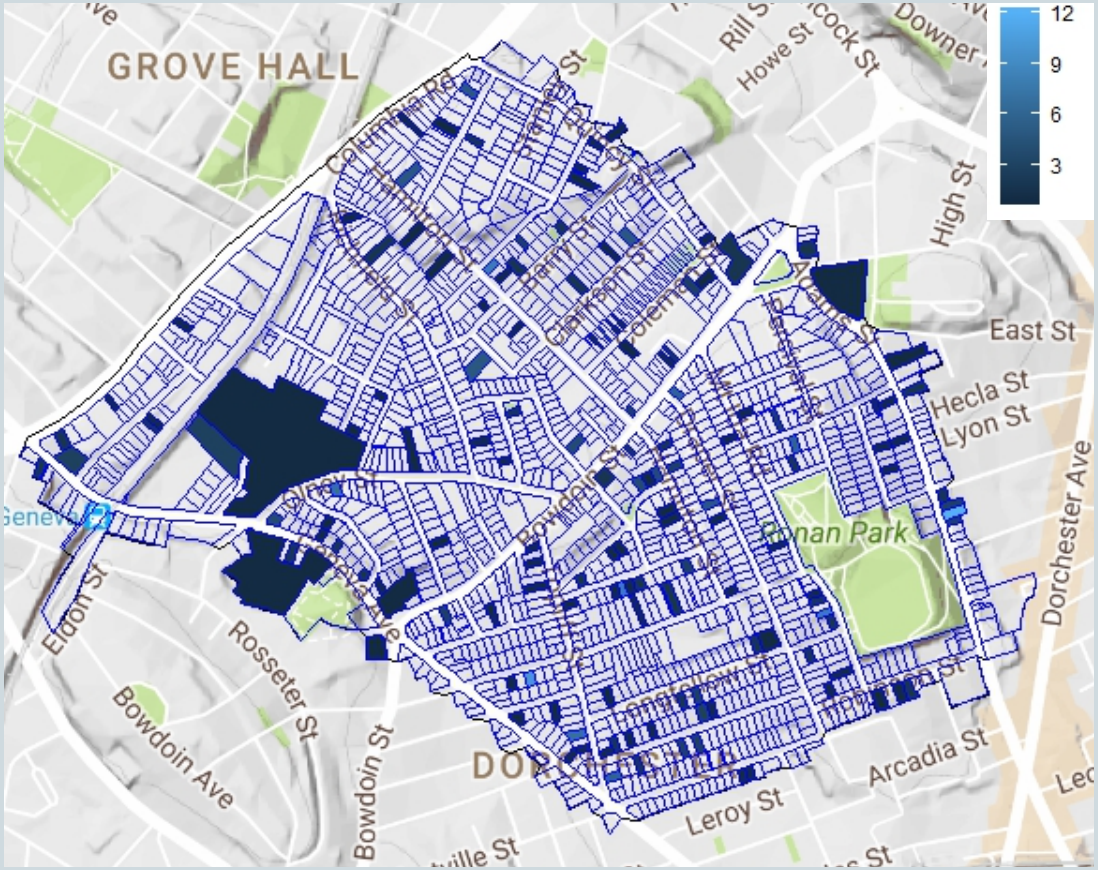
Final Measures of Physical Disorder

- Multi-dimensional
  - Five lower-order and two higher-order measures
- Nearly costless
- Continuous across time and space
  - Can be measured every two to six months.
- Numerous research and practical applications

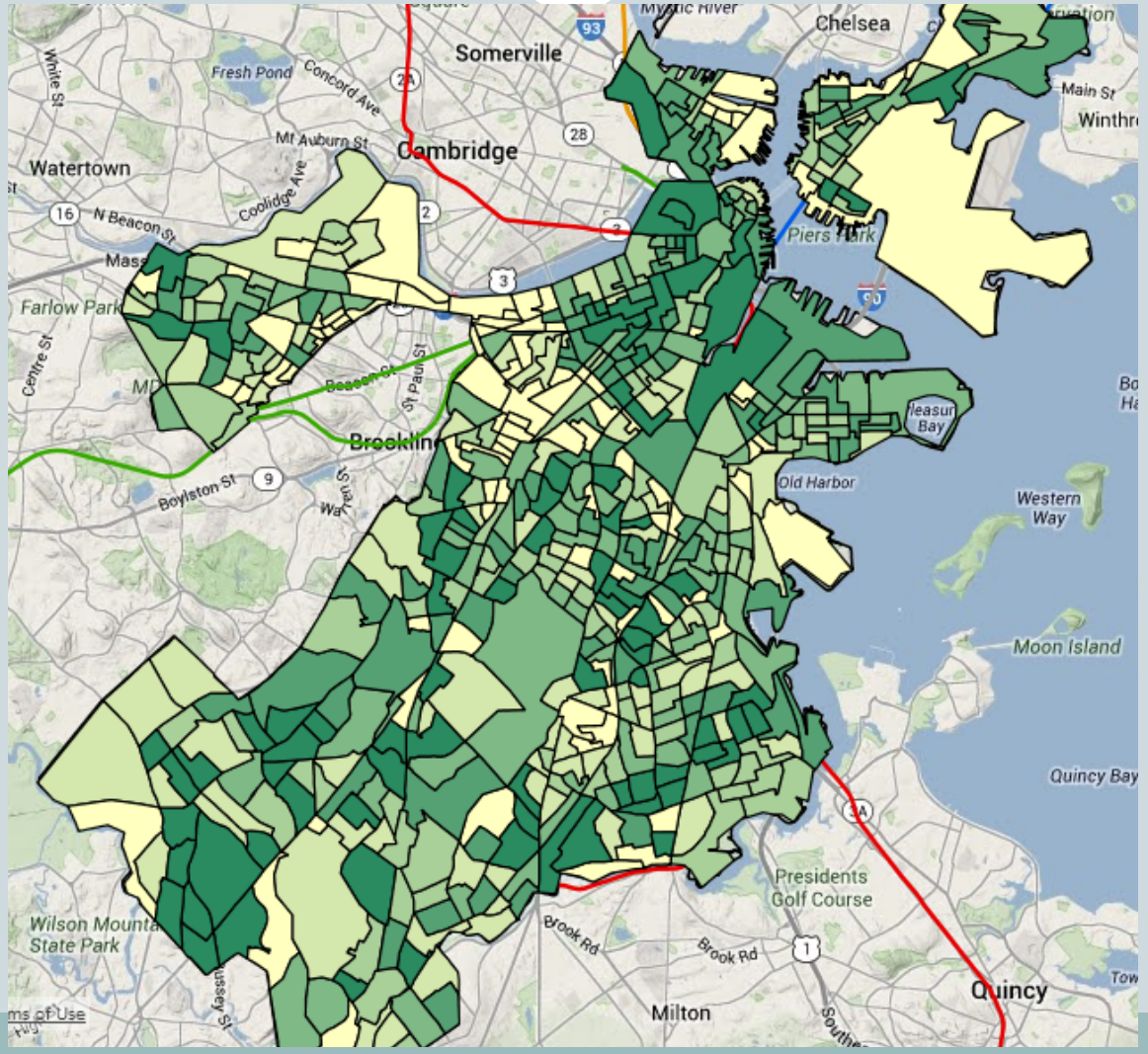
Testing Broken Windows Theory: The Cycle of Disorder and Decline



Zooming in on Neighborhood Conditions



Custodianship across Boston



Understanding Custodianship

- Never studied at this level of detail.
- Could teach us much about how neighborhoods work
- …And inform 311 systems and their management

Food for Thought

- Some argue that urban informatics is just using technology to solve the same problems in new ways. Is this a complete statement, or is there an ethos or style to the current manifestation of urban informatics that is more than just “tech”?
- Where is urban informatics headed? What will it look like in 1, 5, 10, 25 years?
- Much of this work is in the wild west of “open data”. What will it take to establish and maintain data standards?