

---

World Resources Institute

Rit Aggarwala, Co-Head of Labs, Sidewalk Labs

---

August 21, 2017

---

# Sidewalk Labs and the Fourth Urban Revolution

---

---

## **AGENDA**

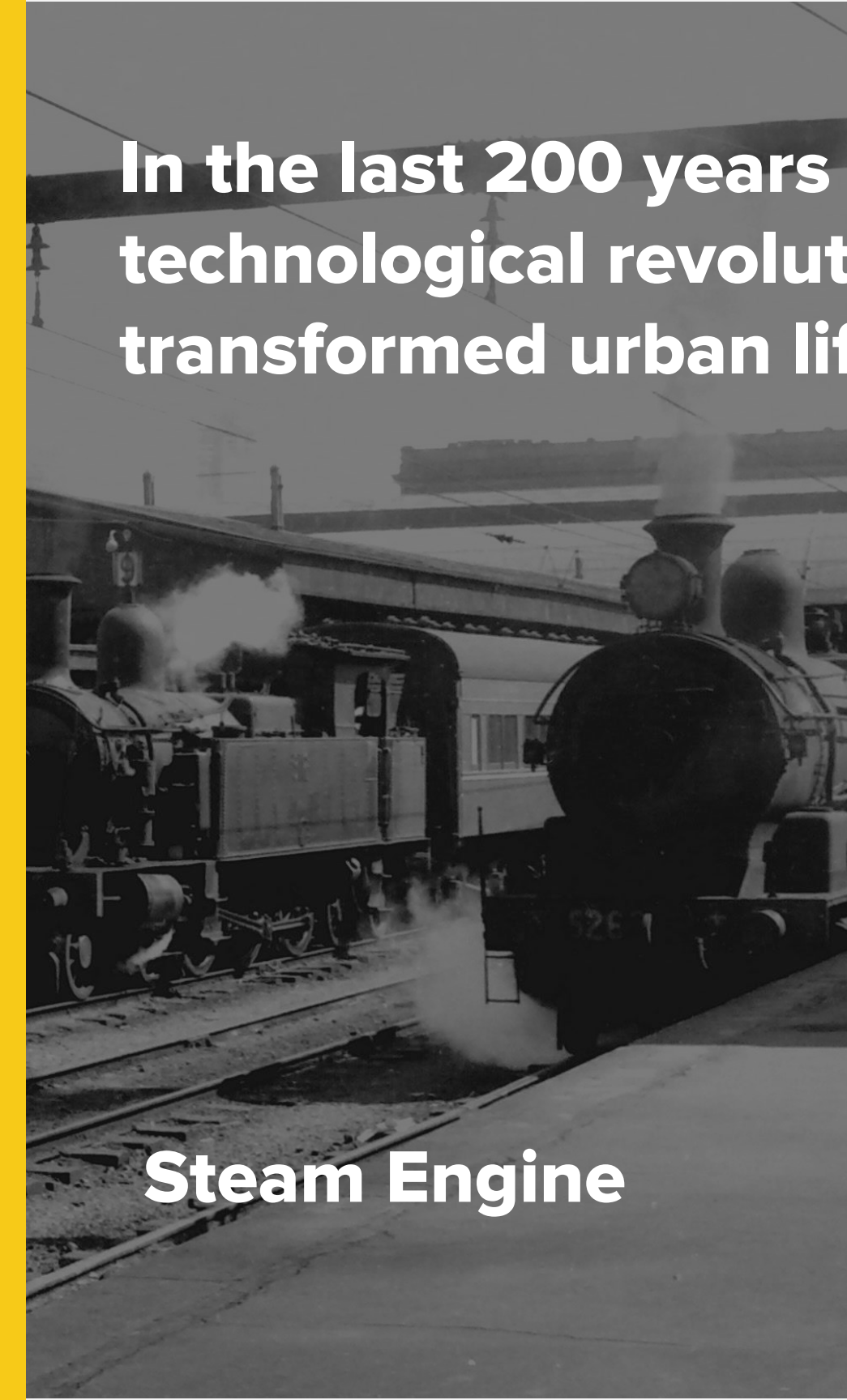
---

- 01. About Sidewalk Labs**
- 02. The First Principles of Urbanism**
- 03. Q&A**

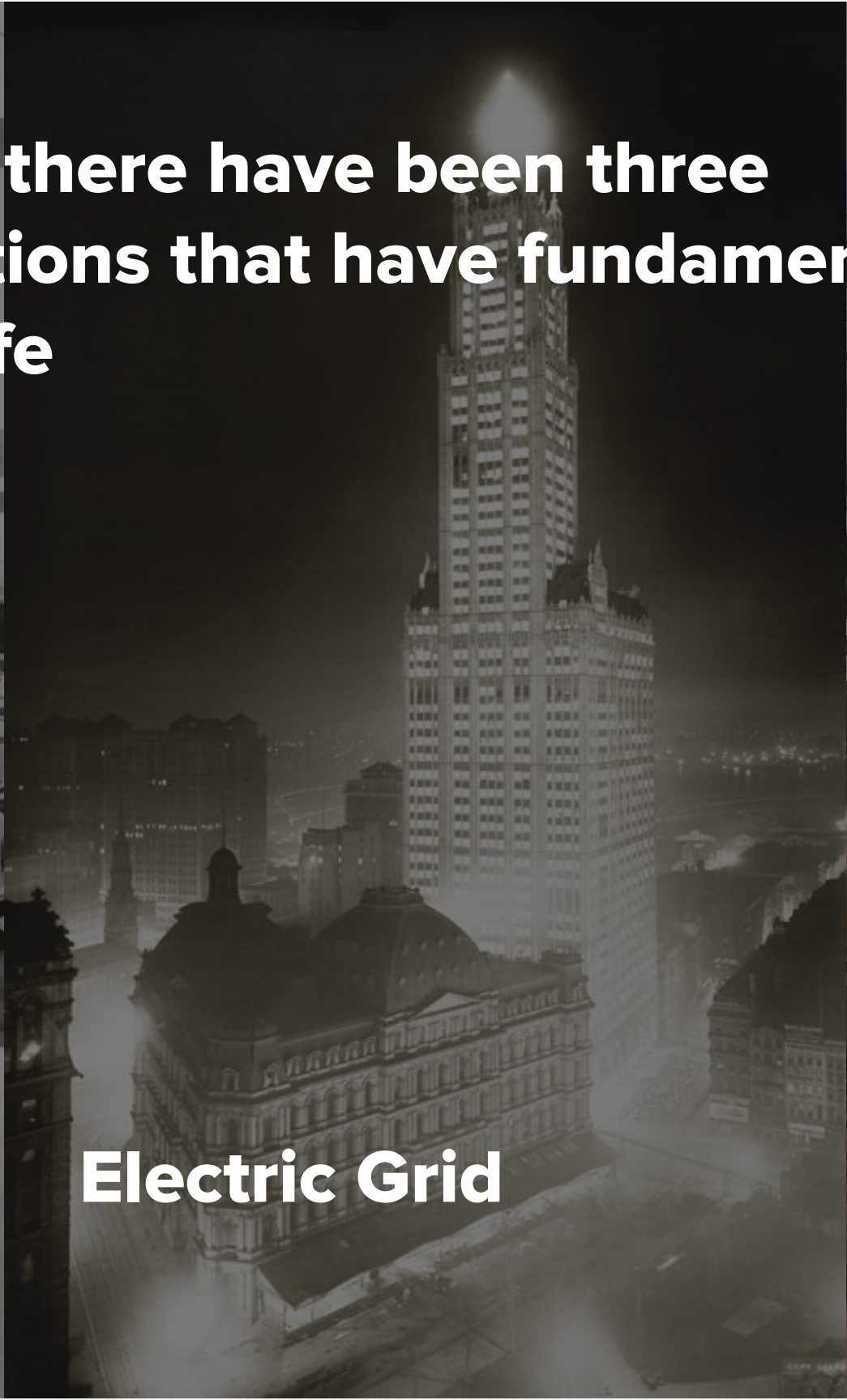
# The Fourth Urban Revolution

---

**In the last 200 years there have been three technological revolutions that have fundamentally transformed urban life**



**Steam Engine**



**Electric Grid**



**Automobile**

**We are on the cusp of the fourth revolution,  
made possible by exponential advances in  
digital technology**

**Ubiquitous  
Connectivity**

**Social  
Networks**

**Sensors**

**Inexpensive  
Computing**

**Digital  
Fabrication**

# Yet, to this point, cities haven't changed much since before World War II



1940s



2017

**Sidewalk Labs is reimagining  
cities from the internet up.**

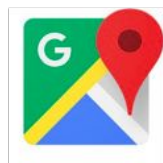
# Sidewalk was founded in 2015 as part of the Alphabet family of companies



# Alphabet

SIDE WALK LABS

Google



Maps



Self-Driving  
Vehicles

fiber

High-Speed  
Internet

verily

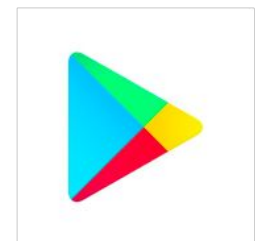
Health  
Data



Home  
Automation



Artificial  
Intelligence



Play



# Since its start, Sidewalk has worked to develop initiatives and companies focused on urban innovation



## Care Lab

Personalized social health care delivery

## Model Lab

Highly predictive measurement and planning tools

## Semaphore Lab

Street sending tech to enable real time management of the roads


# Intersection is reinventing information in public space

**BETA** LinkNYC

SIDE WALK LABS

12:48

 Trains arriving at West 4th Street

|   |                                |               |
|---|--------------------------------|---------------|
|  2   | Manhattan<br>Inwood/207th St.  | 2<br>Minutes  |
|  2   | Brooklyn<br>Lefferts Blvd.     | 5<br>Minutes  |
|  5  | Downtown<br>World Trade Center | 7<br>Minutes  |
|  R | Brooklyn<br>Bay Ridge          | 10<br>Minutes |

# Link

LinkNYC and LinkUK deliver ultra fast wifi, free phone and video calls, local search, wayfinding and listings, emergency and civic services, and rapid phone charging to millions of residents.

---

Free Gigabit Wi-Fi reaching **1.5mm+** registered users

---

800 Links deployed, with **5,000 more** on the way

---

Placement along key blocks and intersections in all **5 boroughs**

---

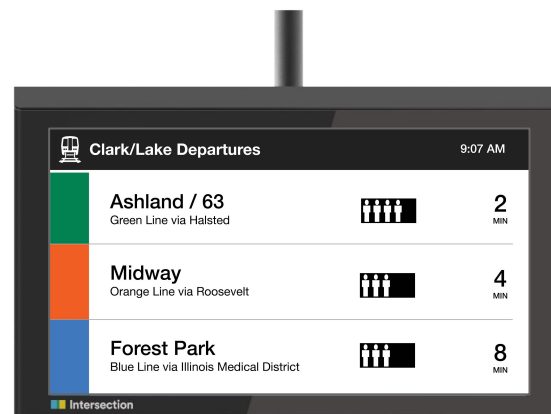
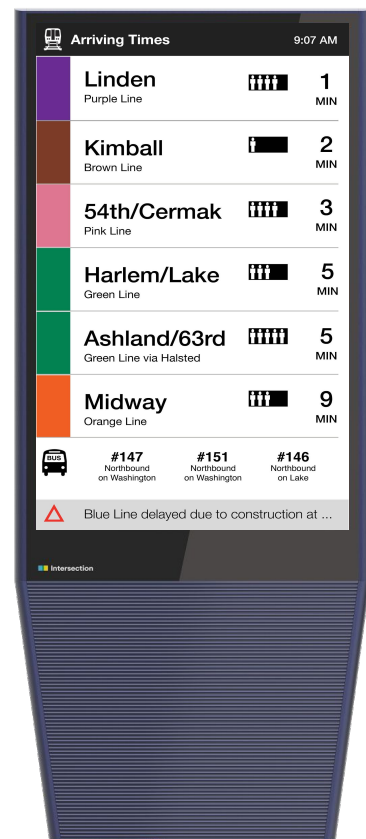
Generating **\$750mm** in revenue for New York City

---

**More data than any city** has ever collected: 3 HD Cameras (with local compute) with cluster of environmental sensors; network of beacons, WiFi enabled precise geolocation - indoors/outdoors

---

# Through its product deployments around the world, Intersection is already amassing valuable data, producing insights and gaining experience



## INTERSECTION'S "LOCAL GRAPH" OF DATA

### Intersection Data

People count

Traffic

Environmental  
(e.g. air quality, sound)

Interactions  
(e.g. tablet usage)

Computer vision/  
machine learning

Location services infrastructure

### 3rd Party Data

Audited audience  
measurement

Appended  
demographics

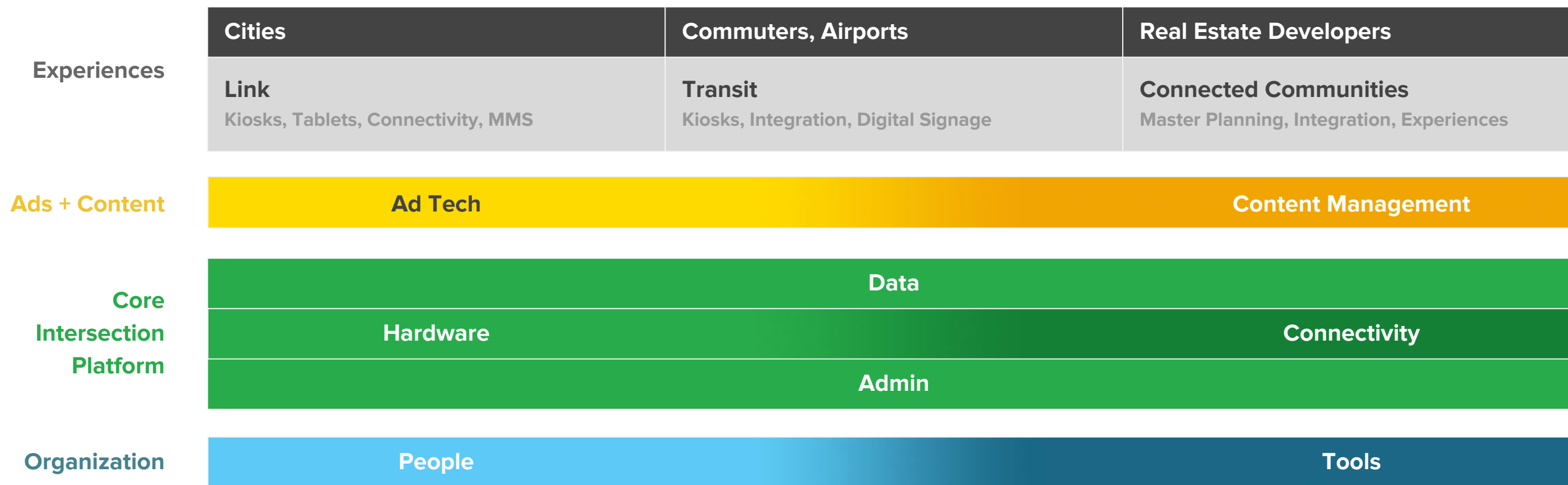
Proprietary buying  
agency segments

Foot traffic patterns  
(post location visit)

Retail transactions

Advertisers' CRM

# The ecosystem Intersection is creating—rich data, infrastructure to collect it, and the operational experience to manage it—is a critical foundation for Sidewalk’s vision



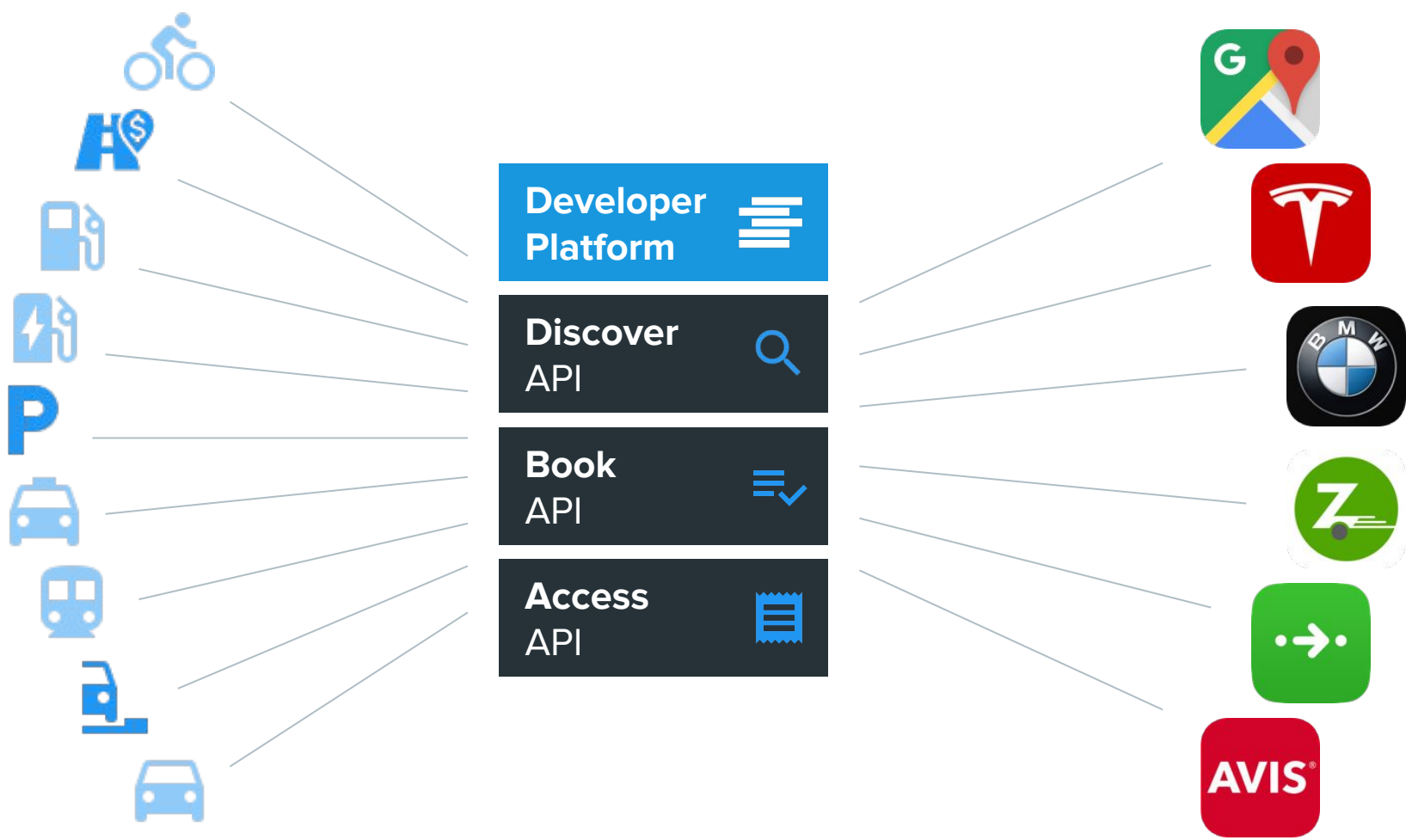
# Flow

Flow's mobility services platform allows users to easily discover, book and access different elements of a trip by bundling and surfacing priced options in any UI. By providing the entire ecosystem with previously fragmented integrations, Flow accelerates the move towards a world in which mobility is as easy to find & use as information is now.

**Tolling:**  
Fixed & dynamic toll rates are aggregated and normalized for Seattle and the Bay Area.

**Parking:**  
On-street parking regulations are collected using our Tango-based app Surveyor. Off-street facilities are integrated.

**Curb Usage:**  
Computer vision approach is been applied to loading zone enforcement use case with all violations detected and a 33% rate of false positives.



**Mobility Service Providers:**  
Flow is developing a distribution network of mobility providers across 7 sectors. Actively engaging:

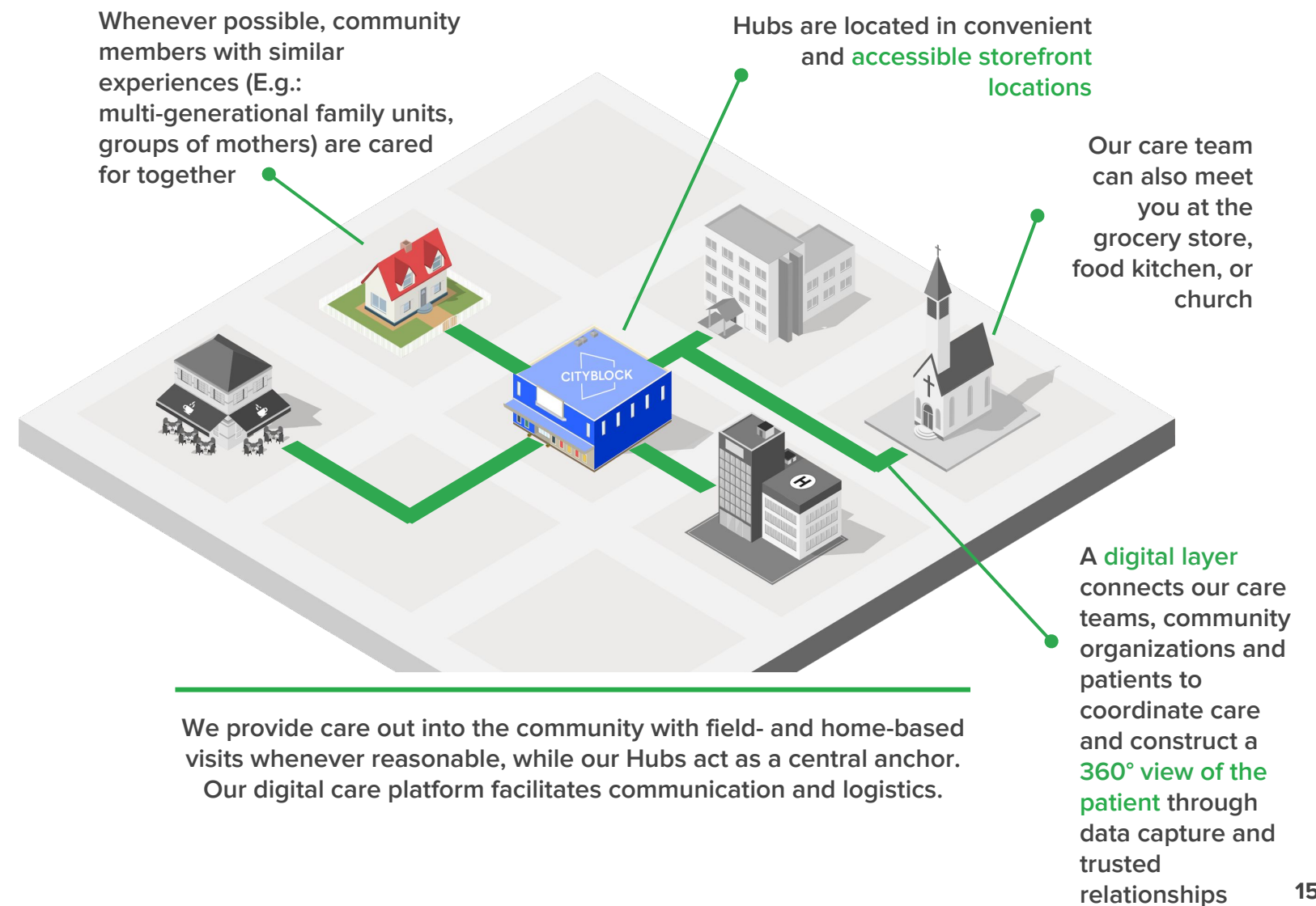
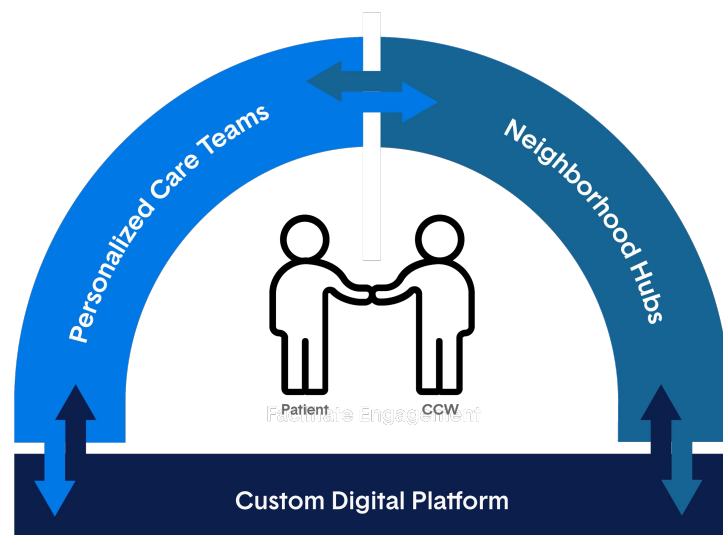
- 4 car share companies
- 5 navigation app
- 3 car rentals
- 2 real estate companies
- 9 auto manufacturers

# Sidewalk's Care Lab

Care is building a new type of care delivery company for urban-dwelling populations with complex needs. People who live in cities require care that can flex in non-traditional ways to address varied and often non-medical needs.

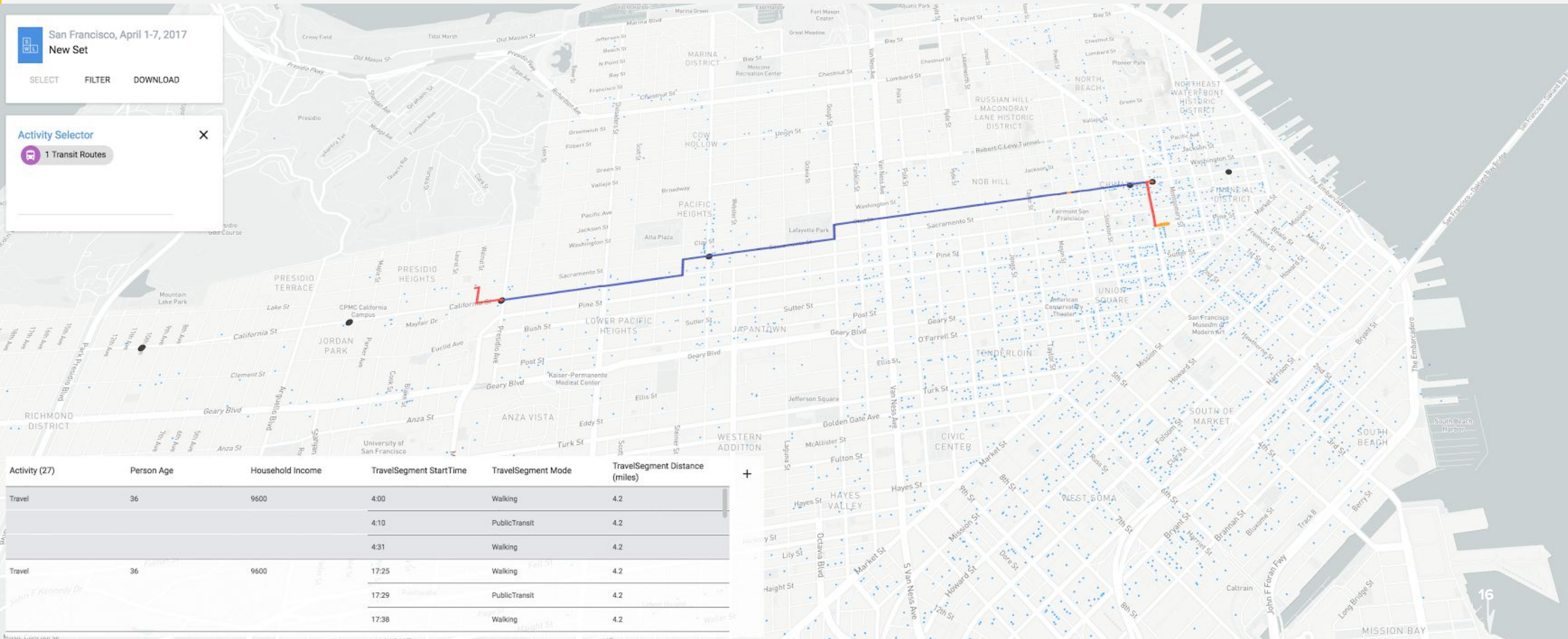
Care's model, Personalized Social Care, is designed specifically to address the unique needs of cities, including significant demographic trends (income and age), with deeply integrated behavioral health and social service delivery capabilities.

Purpose-built technology, a highly-leveraged field staff, and sophisticated risk modeling make this possible at national scale.



# Sidewalk's Model Lab

Model empowers planners to predict and measure impact of transport and land use decisions using a highly predictive “synthetic population”. We are building our first “Replica” in the Bay Area to prove our data science methods.





# Sidewalk's Semaphore Lab

Semaphore implements street sensing technology to enable real-time management of roadways (signal timing, etc.) with an eye towards making roads safer and more efficient.



**Today, no city stands as a  
model for our urban future**

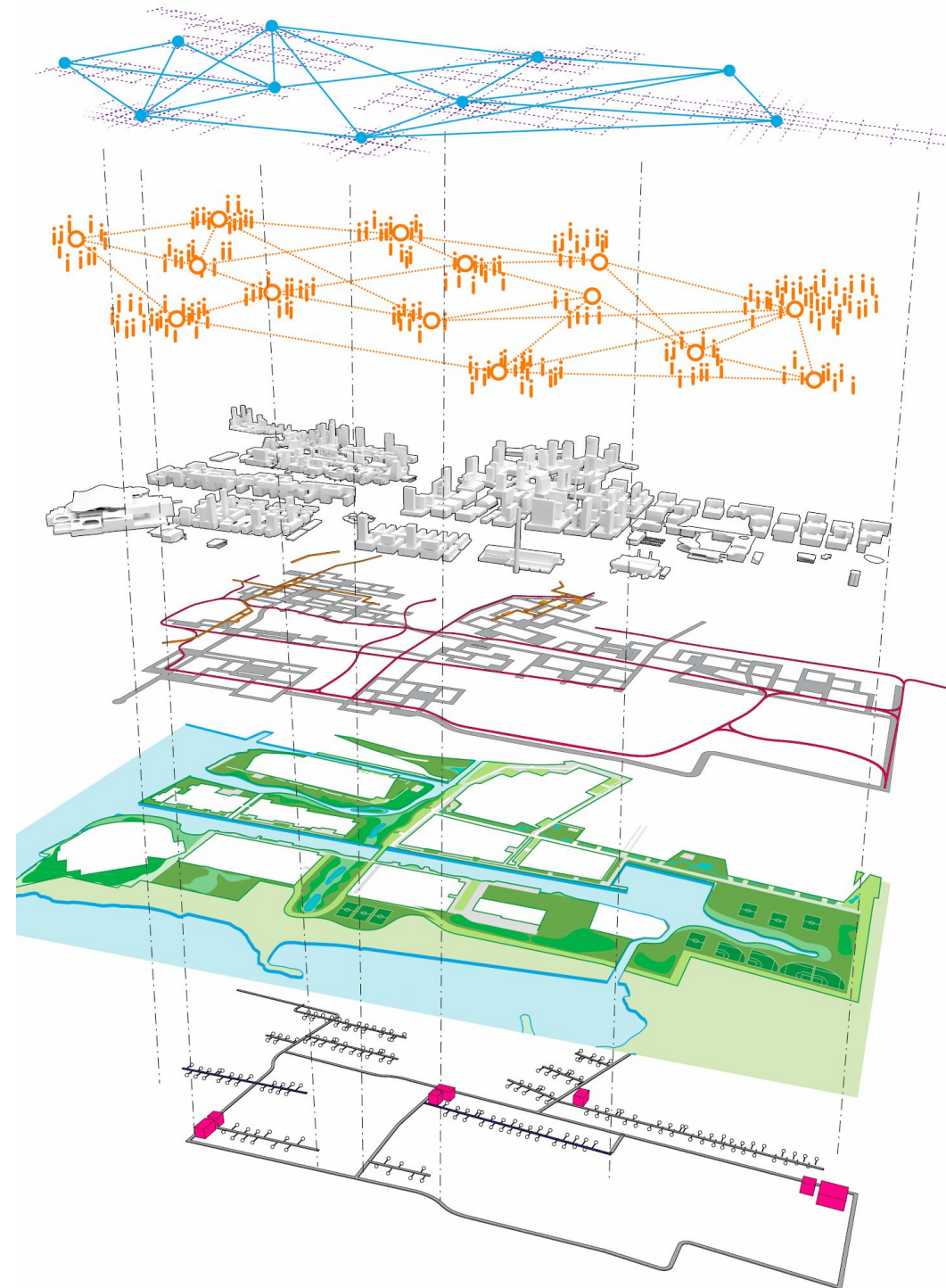
# **In addition to partnering with cities to develop these businesses, Sidewalk has spent a year developing a model for the future city**

- Convened working groups with the world's foremost experts
- Studied every prior smart city attempt and recognized that the biggest impediment to real change was rooted in the technologist-urbanist divide
- Built a team specifically engineered to bridge that divide, comprised of unparalleled expertise in technological innovation and city development, planning, and management

**Sidewalk is pursuing a large-scale district that can serve as a living laboratory for urban technology — a testbed for coordinated solutions, a foundation for people to build on, and a vision for other cities to follow**

# Sidewalk's approach conceives of the city as a platform

The power of the platform lies in the combination of the digital and physical working as one. The digital layer is a new and transformative element that enables connectivity, access, and data integration across the four components of the four physical layers, each of which is a radical rethinking of existing urban paradigms.



DIGITAL LAYER

COMMUNITY SERVICES

BUILDINGS

MOBILITY

PUBLIC REALM

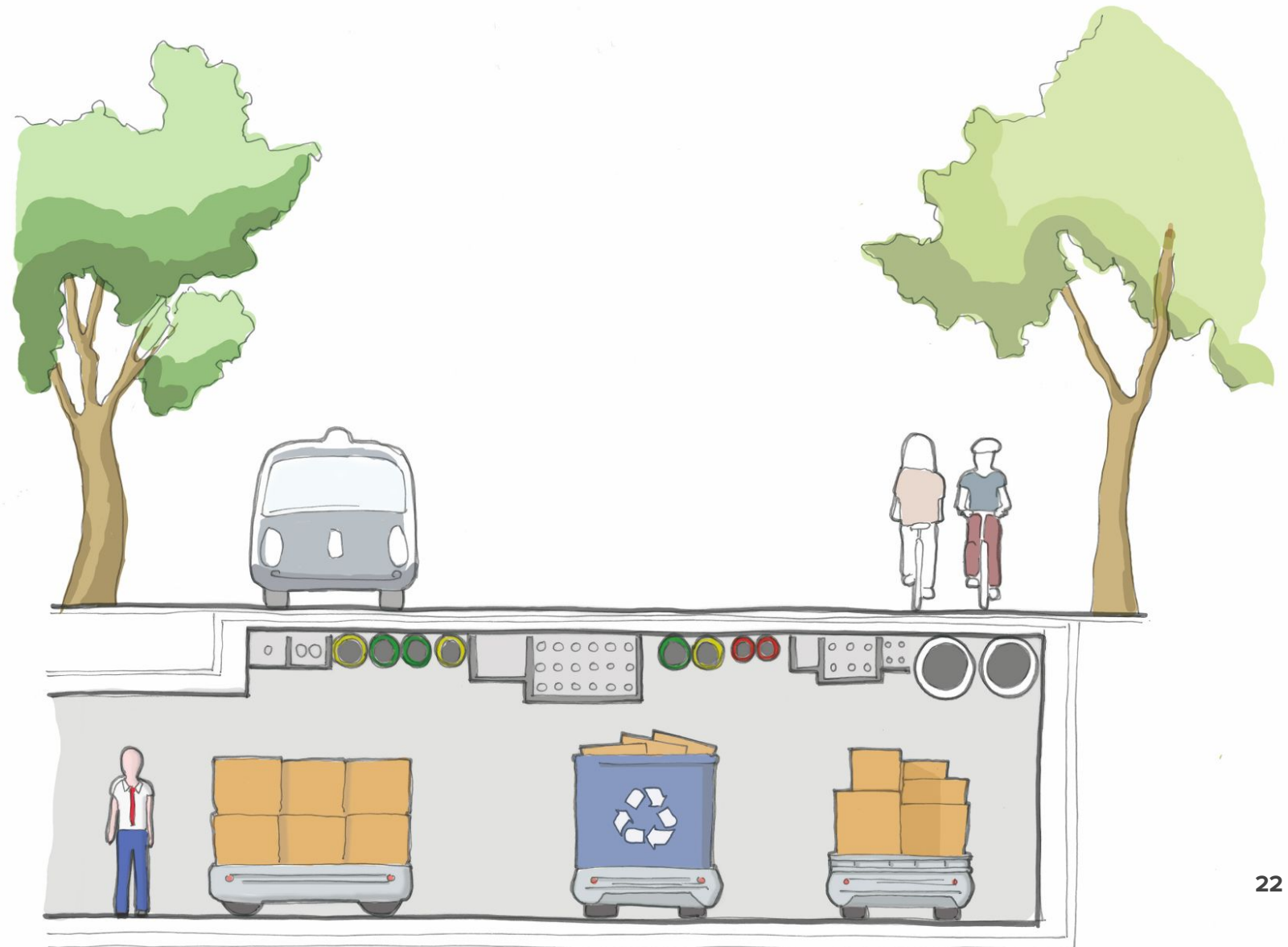
INFRASTRUCTURE

# 1

## A new standard of **SUSTAINABLE INFRASTRUCTURE**

By adopting distributed, decentralized infrastructure, utilizing sensors and robotics to increase automation, and implementing heat exchangers we can create **new levels of environmental sustainability while maintaining reasonable costs.**

- Building Standards
- Active Demand Management
- Advanced Microgrid
- Thermal Grid
- Smart Disposal Chain
- Utility Channels

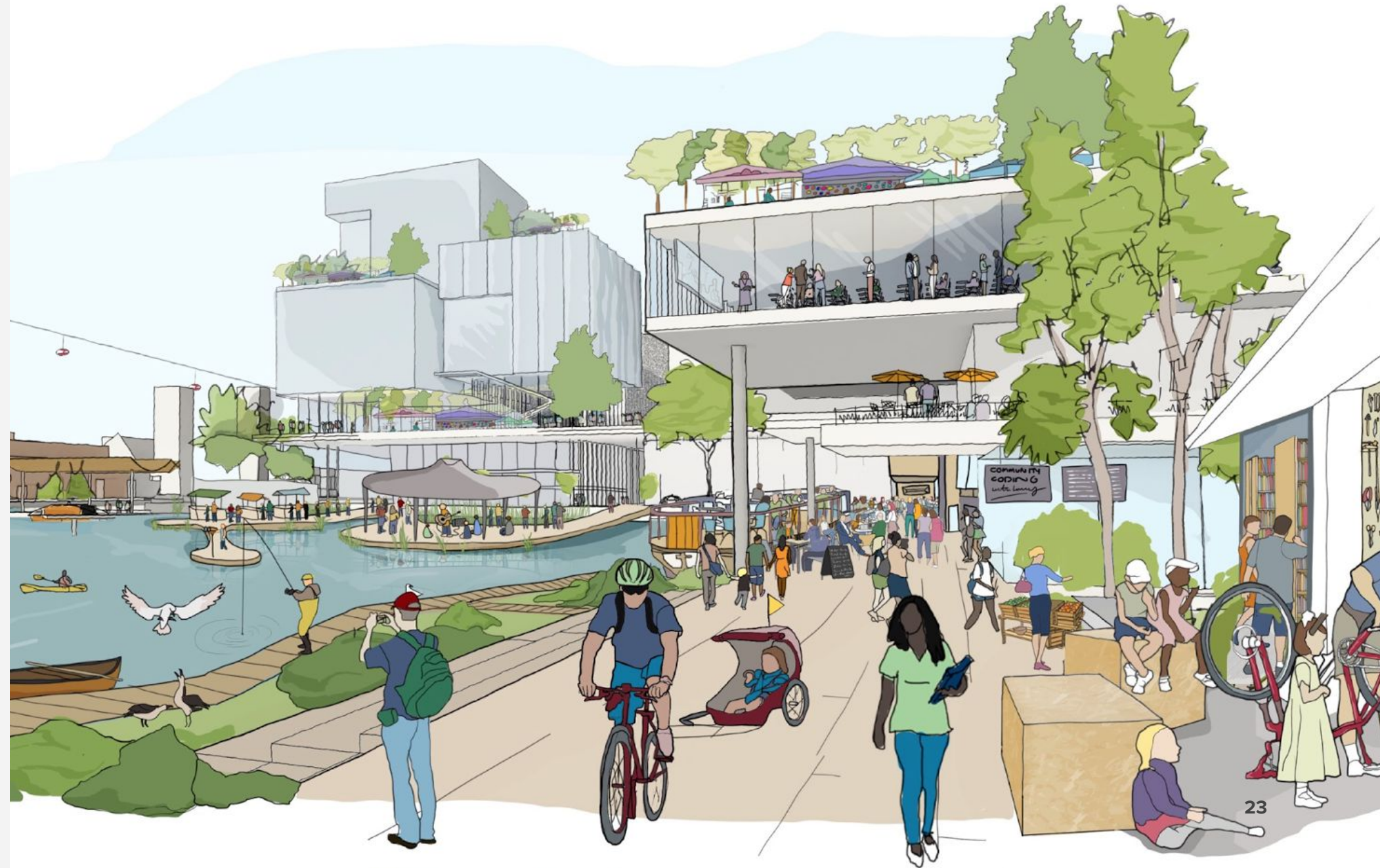


# 2

## A **PUBLIC REALM** that serves as the city's living room

With computer vision and AI that can monitor physical spaces, new materials that enable weather mitigation, and sensors that allow for environmental conditions to be tracked and physical assets to be managed, we can deliver a public realm that is **usable as often as possible, comfortable, safe, and personalizable.**

- Streets That Put People First
- Radical Mixed-Use Built Environment
- Programmable Public Space  
Flexible Retail, Cultural and  
Community Amenities
- Weather Mitigation



# 3

## A **MOBILITY** system that is more convenient than the private automobile

Through self-driving vehicles, new forms of shareable public transit, and sensors that allow us to optimize a complex system, we can deliver a **transportation system that prioritizes walking, biking, and shared rides and dynamically allocates its roadway network to improve congestion.**

- Ground Traffic Control System
- Self-Driving Taxibots
- Personal Rapid Transit
- Directed Parking
- Responsive Traffic Signals
- Mobility as a Service





# 4

## **BUILT ENVIRONMENT** that is more usable, efficient and affordable

Through advanced manufacturing that enables mass customization, sensors that track structural performance, and robotic delivery, we can create **new types of flexible and adaptable buildings that require less space per person and reduce costs, increasing efficiency and affordability.**

- Outcome-Based Code
- Building Typologies (Loft)
- Construction Methodologies (Tall Timber, Prefab construction)
- Occupancy Models
- Financing Structures



# 5

## A close-knit **COMMUNITY** that uses data to improve city services

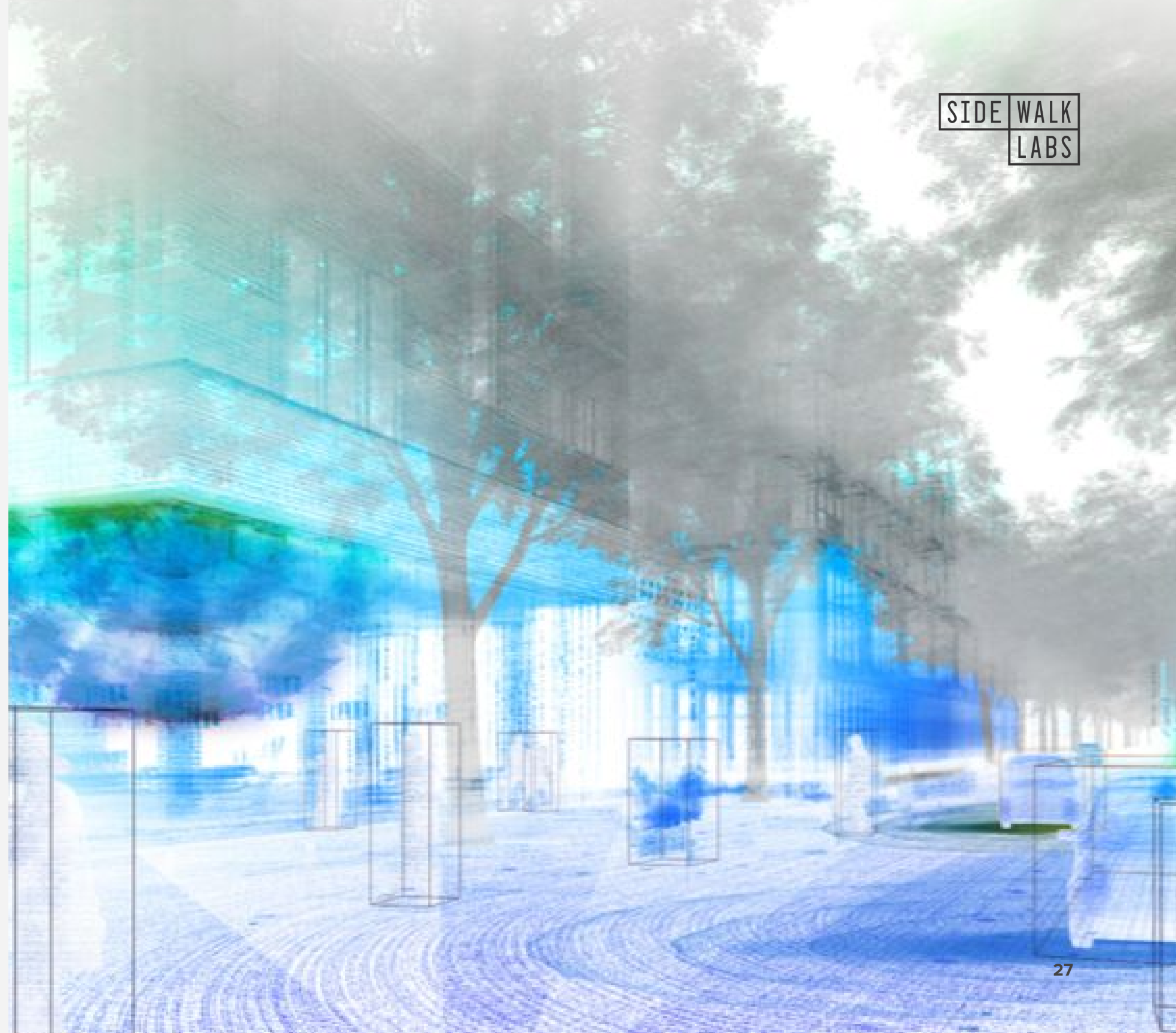
Unprecedented availability of social and other forms of data will enable us to provide integrated approaches to social and community services **that deliver better outcomes to individuals at lower cost.**

- Urban Data Platform - a single unified source of information that allows for efficient city operation and supports innovation
- Model - a simulation environment for innovators to test ideas and solicit feedback
- Care - tech-enabled health services, providing local solutions to whole-person health for low-income urban populations



**A DIGITAL LAYER,**  
powered by ubiquitous  
connectivity underpins  
all of this, which is why  
Intersection was our  
first investment

When ubiquitous connectivity is truly built into the foundation of the city, it is possible to use the data that is generated to deliver new urban experiences and enhanced quality of life.



# First Principles of Urbanism

---

# The Six Attributes of Density

1. Lower consumption
2. Higher asset utilization
3. Easier physical interactions
4. Greater reliance on central systems
5. Greater need for courtesy
6. More coordination

# Efficiencies

**Lower consumption**

**Higher asset utilization**

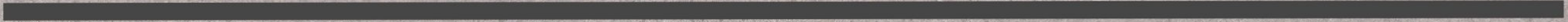
**Easier physical interactions**

# Frictions

**Greater reliance on central systems**

**Greater need for courtesy**

**More coordination**



**When technology makes density **more** valuable, cities will be more attractive.**

**When technology makes density **less** valuable, cities will be less attractive.**

# Q&A

---



# SIDE WALK LABS