(d)1 Center of Excellence for Data

Smart Cities and Service Improvements Committee
September 2, 2021

- Matt Loesch, P.E., Assistant Public Works Director
- Arti Tangri, Enterprise Principal Technical Analyst – ITD
- Vince Pereira, Information Technology Manager – DOT
- Christine Keung, Chief Data Officer – MOTI
- Kin-Yip Chien, Data Scientist – MOTI
- Kevin Shaw, Service Designer – MOTI

Center of Excellence for Data:

- Introductions
- Orientation to the issues
- Approach
- Look back
- Deep digging with DOT
- Sample of Quick Victories

San José City Roadmap | FY 2021-2022

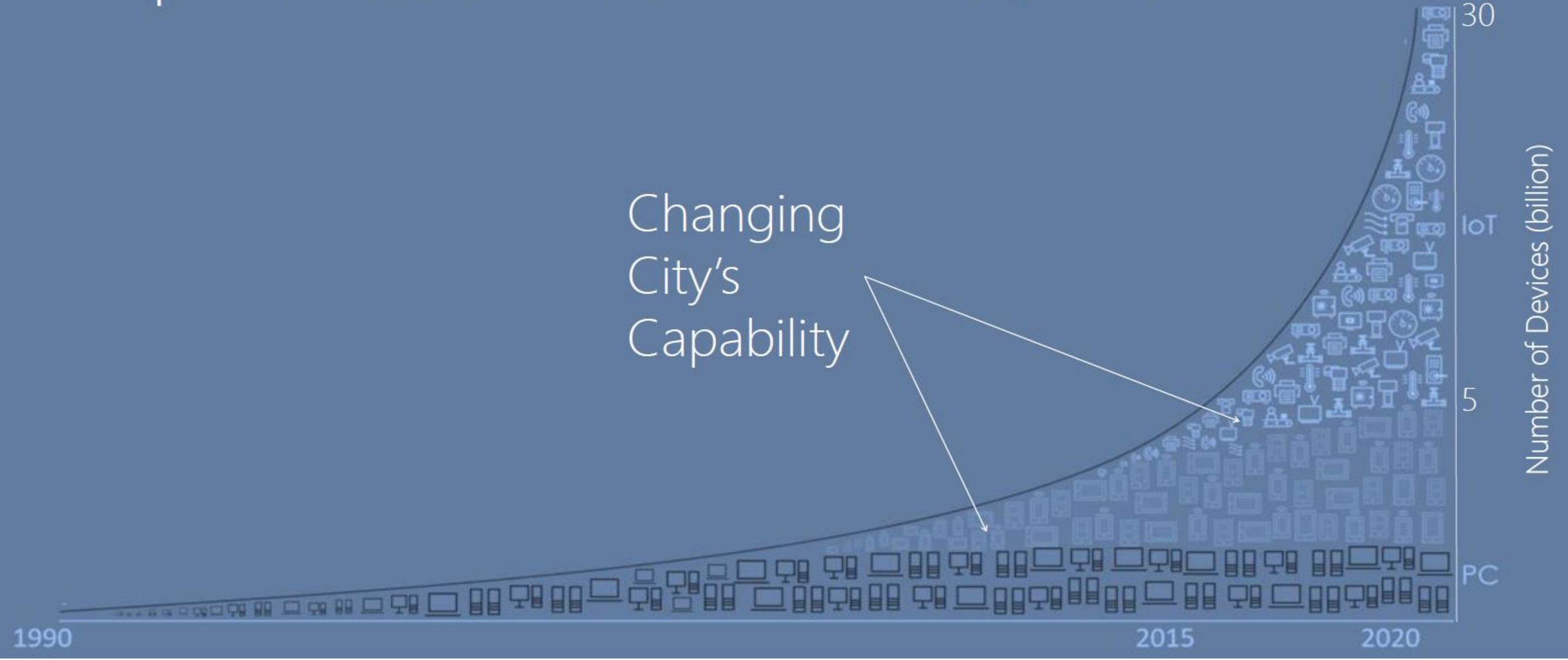
Legend: COVID-19 Response | Enterprise Initiatives

Enterprise Priority	Project	Strategy	Policy
COVID-19 Pandemic: Community + Economic Recovery	Housing Stabilization; Re-Employment + Workforce Development; Small Business Recovery; Food + Necessities Distribution; **Digital Equity**; Child Care		Build Back Better + Recovery Taskforce
Emergency Management + Preparedness	Vaccination Taskforce		Soft-Story Building Earthquake Retrofit Policy
Creating Housing + Preventing Homelessness	Emergency Housing Construction + Operation; Sheltering + Enhanced Encampment Services	North San José Strategy	Encampment Management + Safe Relocation Policy
Safe, Vibrant, + Inclusive Neighborhoods + Public Life	Police Reforms Work Plan; San José 311 + Service Delivery; Encampment Waste Pick-Up BeautifySJ; Vision Zero Traffic Safety	Equity Strategy Development; Neighborhood Services Access Strategy	
Building the San José of Tomorrow with a Downtown for Everyone	Align Zoning with General Plan; Development Services Transformation; Google Development; Major Real Estate Development Projects	BART + High-Speed Rail Strategy	
Smart, Sustainable, + Reliable City: 21st Century Infrastructure	Pavement, Fire, EOC, Transit Capital Improvements; Regional Wastewater Facility Capital Improvements; Electrical Service for Major Development; Climate Smart American Cities Climate Challenge	Lowering PG&E Above Market Costs for Clean Energy	

Enterprise Priority Foundational	Project	Strategy	Policy
Strategic Fiscal Positioning + Resource Deployment	Federal + State Recovery Advocacy; Secure City Cybersecurity; Procurement Improvement; Pension Obligation Bond Analysis	Budgeting for Equity; City Roadmap Budgeting, Accountability, + Performance	
Powered by People	Continuity of City Services; Safe Workplace; Employee Health + Wellness; **Drive to Digital**; **Effective Teams**	**City Workforce Diversity + Skill Building**	

Approved by Council on March 16, 2021

Importance of Data to Smart Cities



Where we find ourselves

Observations:

- Fractured as spatial data was
- Many vectors of input
- Many storage locations
- Few obvious system connections
- Most approaches have been singular & not sustainable

City Departments:

- Interest to be data driven
- Gaps in knowhow
- Cavern in capacity

Center of Excellence for Data: Strategies

- Adjust Organizational Approach
- Add a Data Equity Lead resource
- Spatial Data Success to influence tactics
- Do the Data Chores
- Teach & Train the organization
- Don’t miss chances for Quick Victories

DATA ⟶ METRICS ⟶ PERFORMANCE

OBJECTIVES

Democratize the Value of Data

for the elected officials, city staff, and people of San José

Foster Communities of Practice

to grow the breadth, depth, and expertise of our data practices

Enable Data-Driven Actions and Decisions

that improve our effectiveness, efficiency, and equity

STRATEGIES

- Build Usable Data Assets
- Provide Operative Analytic Tools
- Enable Cross-Functional Insight
- Lower the Barrier
- Raise the Ceiling
- Grow the Footprint
- Aid Data-Driven Analysis
- Spur Organizational Change

DATA ⟶ METRICS ⟶ PERFORMANCE

Look Back

San Jose Open Data Approach

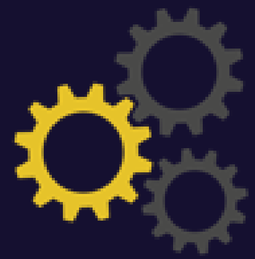
Technology

- Open Data Architecture (ODCA)
- City Open Data Environment (CODE)
- Support Internet of Things (IoT) scale and Artificial Intelligence

People

- Champions
- Skills/Strengths
  - Analytics
  - AI/ML/DL
- Practice

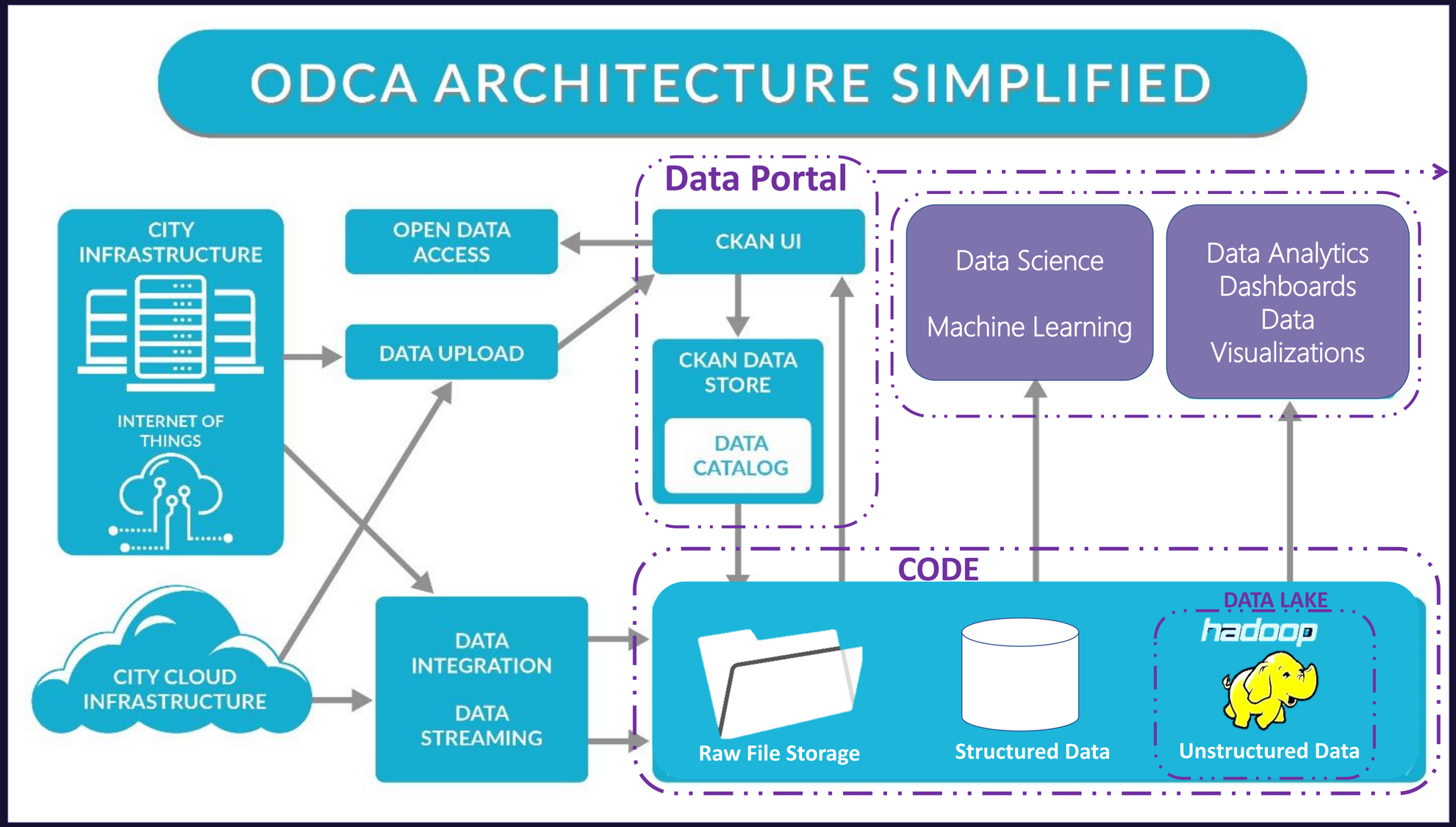
Processes



- Data governance
- Data journalism
- Community interaction
- Decision making

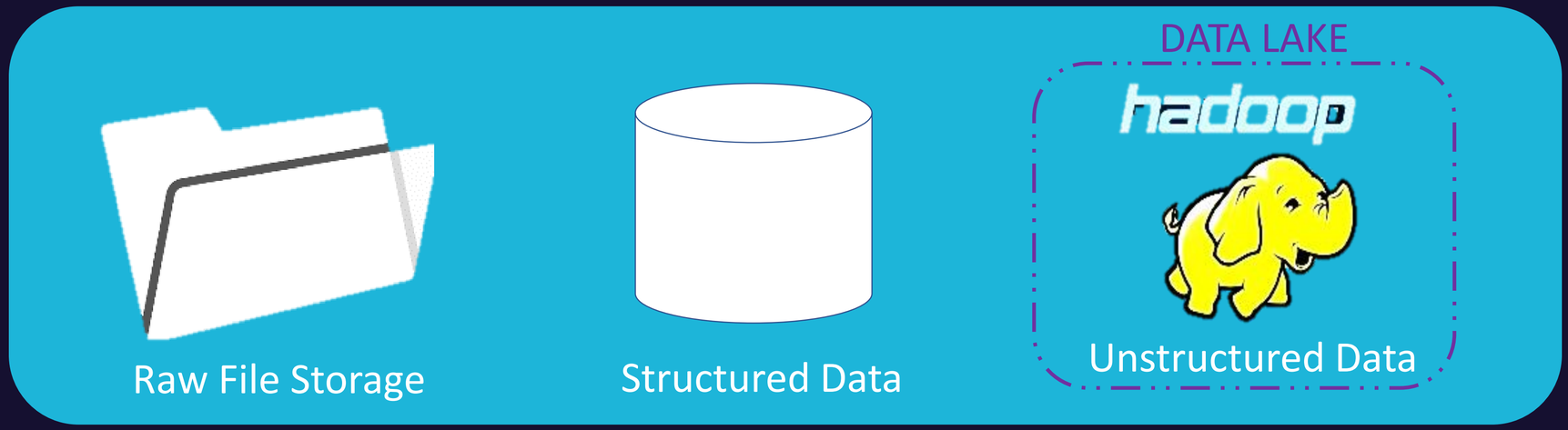
Setting Foundations…

Foundational Work– Open Data Community Architecture



Foundational Work – City Open Data Environment

- 0.5 PB of dedicated data storage
- Data Segregation
  - *Raw File Storage – 5%*
  - *Structured Data – 0.1%*
  - *Unstructured Data – under development*



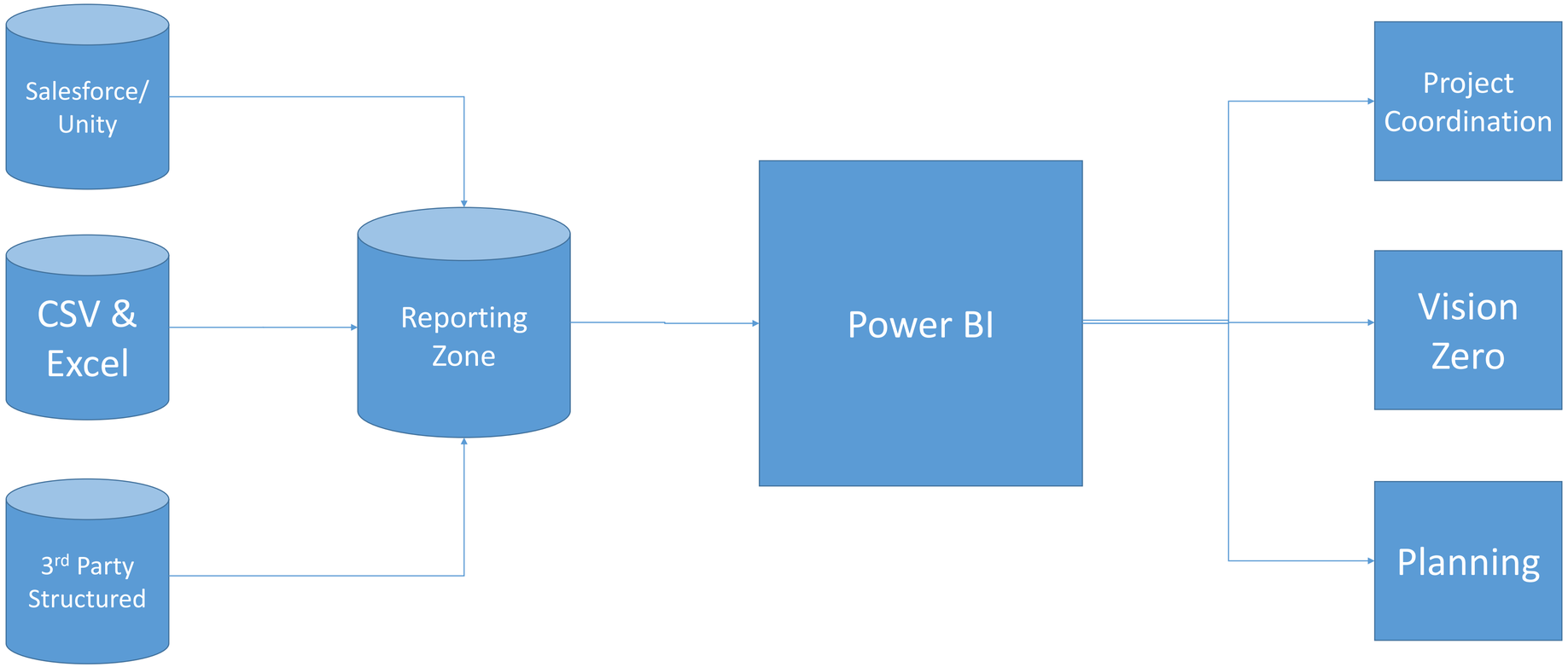
Deep digging with DOT…

DOT Data Logistical Strategy

- Combine DOT's Data strategic vision across Divisions
  - Cross collaborate and align across Divisions & Departments
  - Increase efficiency and reduce costs
- Data Sources
  - Salesforce/Unity
  - DOT Reporting Zone -> ITD Data Lake (Data Repository)
    - structured & unstructured data
  - System/application data
  - 3rd party data
- Ensure we adhere to all Security and Digital Privacy Standards
- Partners
  - UrbanLogiq (UL) & Arup

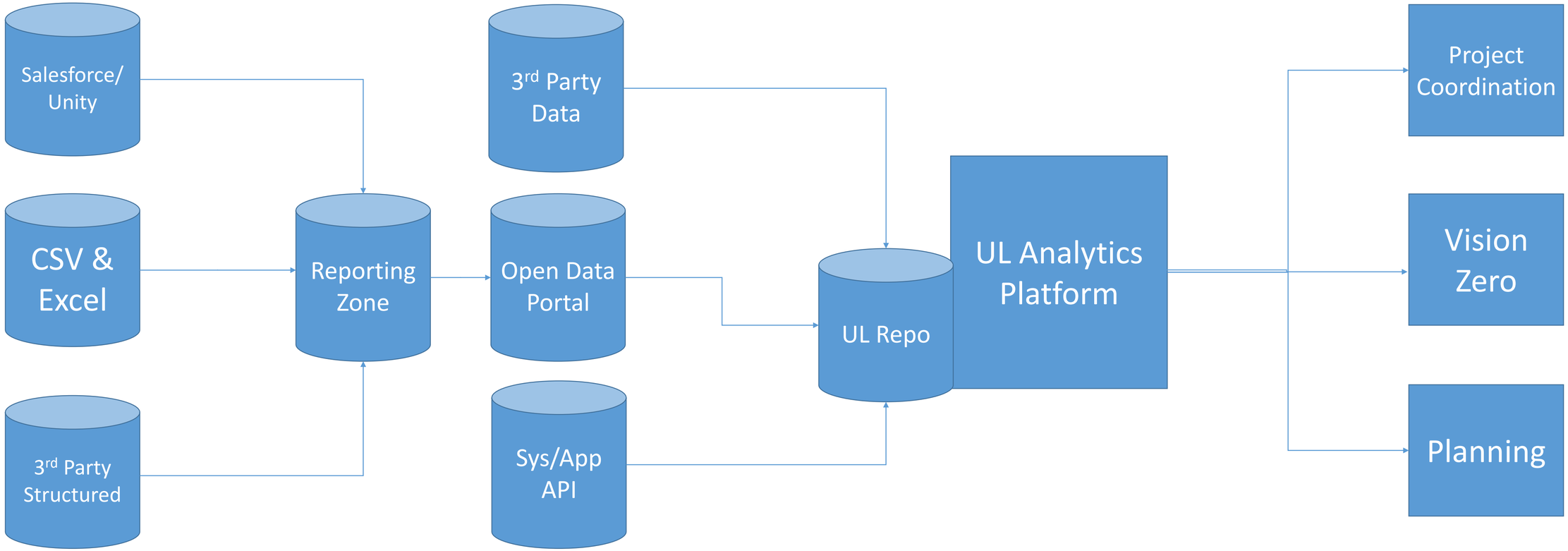
General Analytics

Developing Use Cases for a general (lower level) analytics



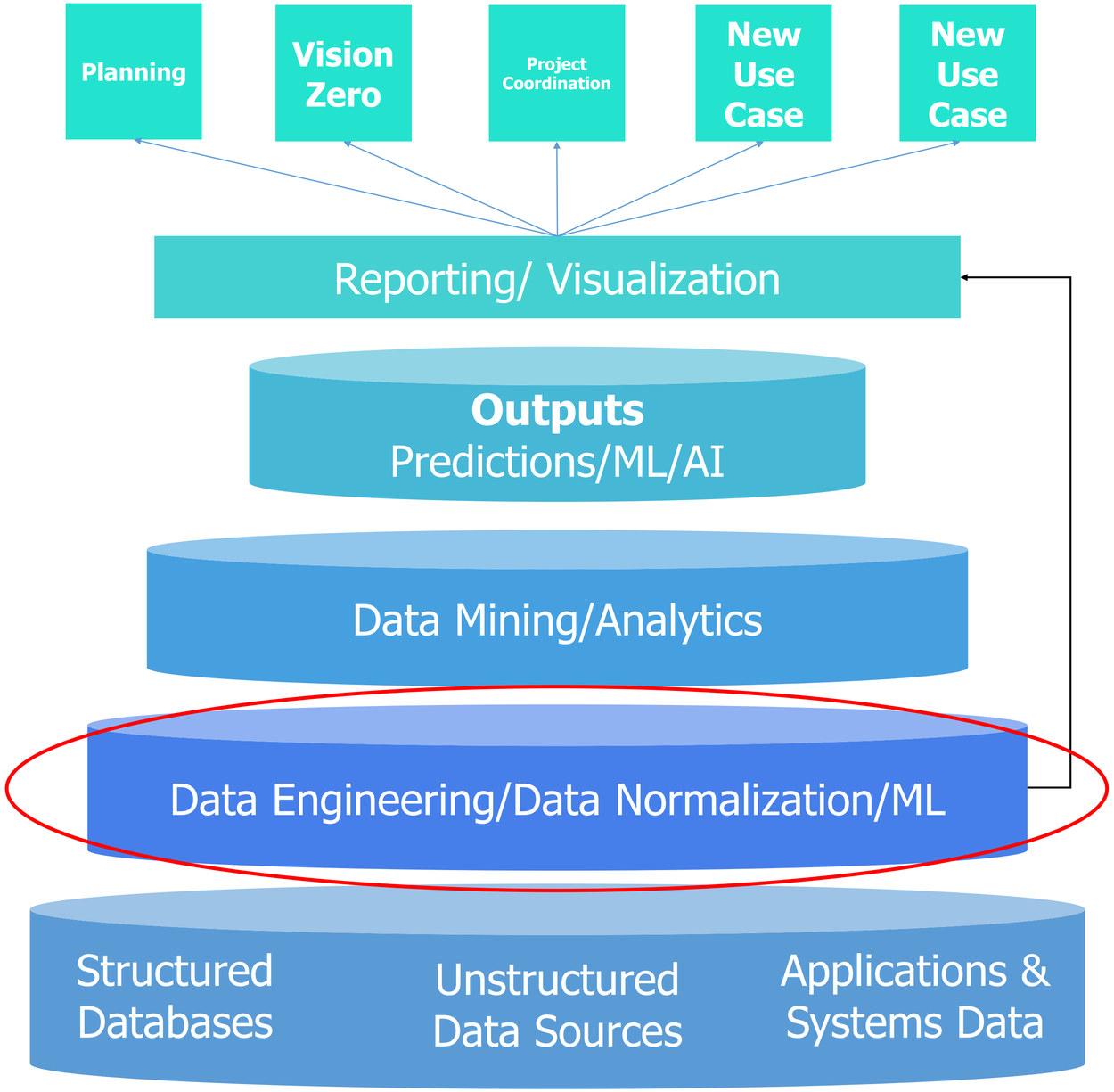
Advanced Analytics - UrbanLogiq (UL)

UL is a full stack data analytics cloud platform, working on Vision Zero and Planning analytics



UrbanLogiq

Arup



UL Prediction Algorithms

UL Data Science/ Analytics

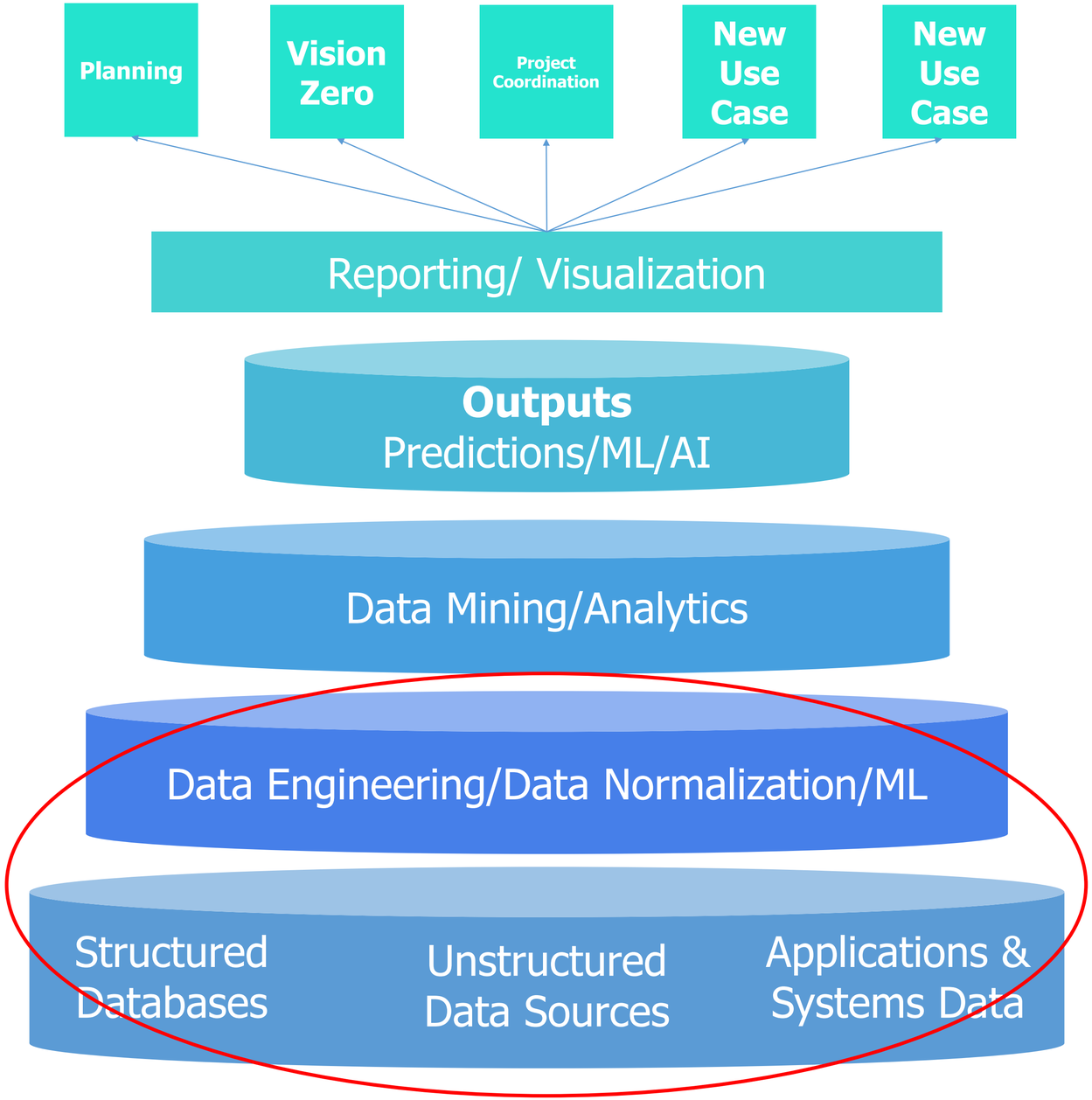
UL Data Engineering

DOT Data Structure

Arup Decision Tools/ML Processing

Arup Scripting/ Mining

DOT Data Structure



If the two bottom layers are clean, more accurate analytics can be achieved

Important layers:
Clean: 20% of your time
Not Clean: 80% of your time

Mature and accurate data analytics produces more precise Predictive Modeling

Quick Victories with MOTI + Department Partners …

Data Equity at a glance

6 projects with City departments completed in 6 months (Parks, Recreation & Neighborhood Services (PRNS); San Jose Downtown Association, San Jose 311; Housing; Open Data)

A diverse team of career changers, local students and residents, and individuals with nontraditional pathways into the public sector—most of the team is historically underrepresented in the field.

Our work centers rigorous data analysis as an effective tool for creating choices, but it cannot exist as only an intellectual exercise—we must drive equitable outcomes for our residents.

Our Partners

Data Equity Speakers

Christine Keung
Team Lead

Kevin Shaw
Service Designer

Kin-Yip Chien
Data Scientist

Data Equity Framework

Developed by Matthew Finney (SEAS'20) & Christine Keung (HBS'20)

1 Equity Objective — *What is an equitable outcome for your department and programs?*

2 Equity Metric — *How will we measure this?* Derived from the objective

3 Monitoring & Evaluation — *How do we ensure this long-term?* Supported by City Manager's Office

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Who we spoke to

We gathered SJ311 service owners **to co-create and shape a common equity objective.**

ITD

German Sedano
Jerry Driessen
Arti Tangri

Residential Garbage & Recycling

Jeff Anderson

Graffiti

Xochitl Montes

Other Issues

Kia O'Hara

Abandoned Vehicles

Heather Hoshii

Illegal Dumping

Olympia Williams

Streetlight Outages

Eric Hon

Potholes

Kaile Vierra

Forming an equity objective

PHASE 1

Ideating equity objectives

PHASE 2

Discussing options

PHASE 3

Narrowing & refining

SJ311 Equity Objective

Empower **all who live, work, and play in San Jose**, especially **underreporting and heavily impacted communities**, to **submit reports via SJ311** and ensure that Services are **delivered per committed turnaround times**.

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Metrics considerations for SJ311

Proactive + Reactive

Some services combine proactive street surveys with reactive response to report.

Closing Times

The meaning of closing times can differ greatly per service area and problem.

Need vs. Volume

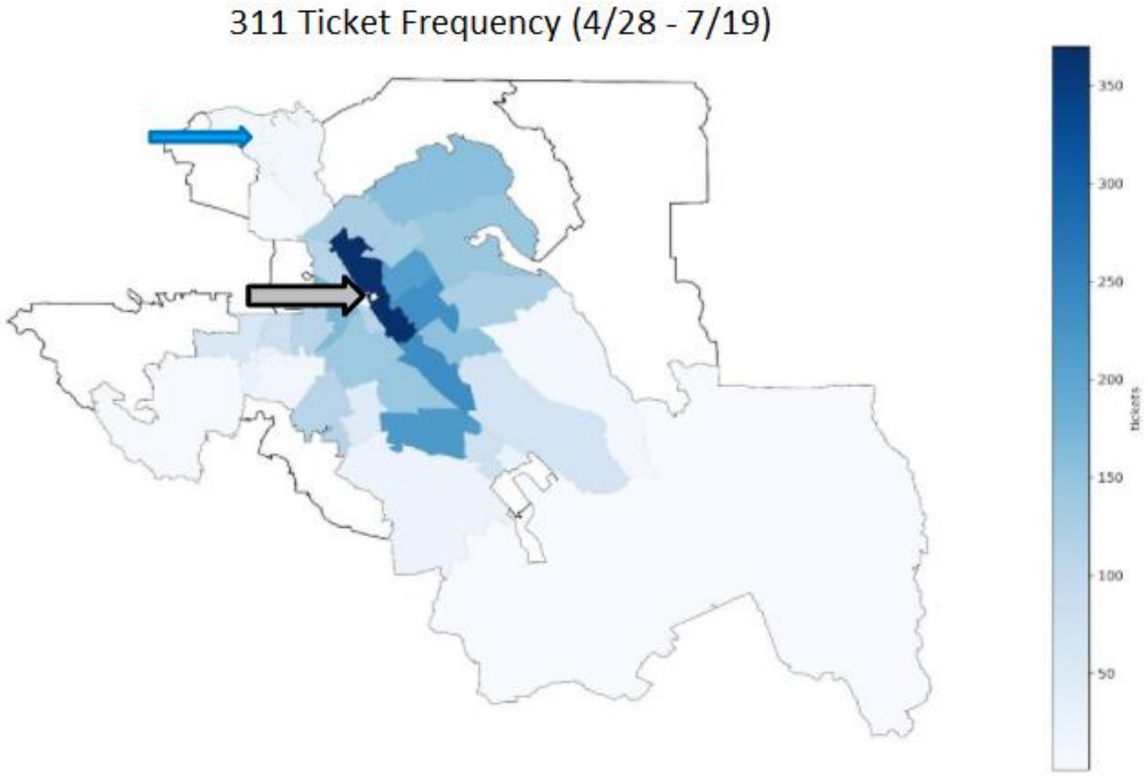
How can we ensure that we are reaching all places of need and not only "squeaky wheels"?

Mapping + Predicting

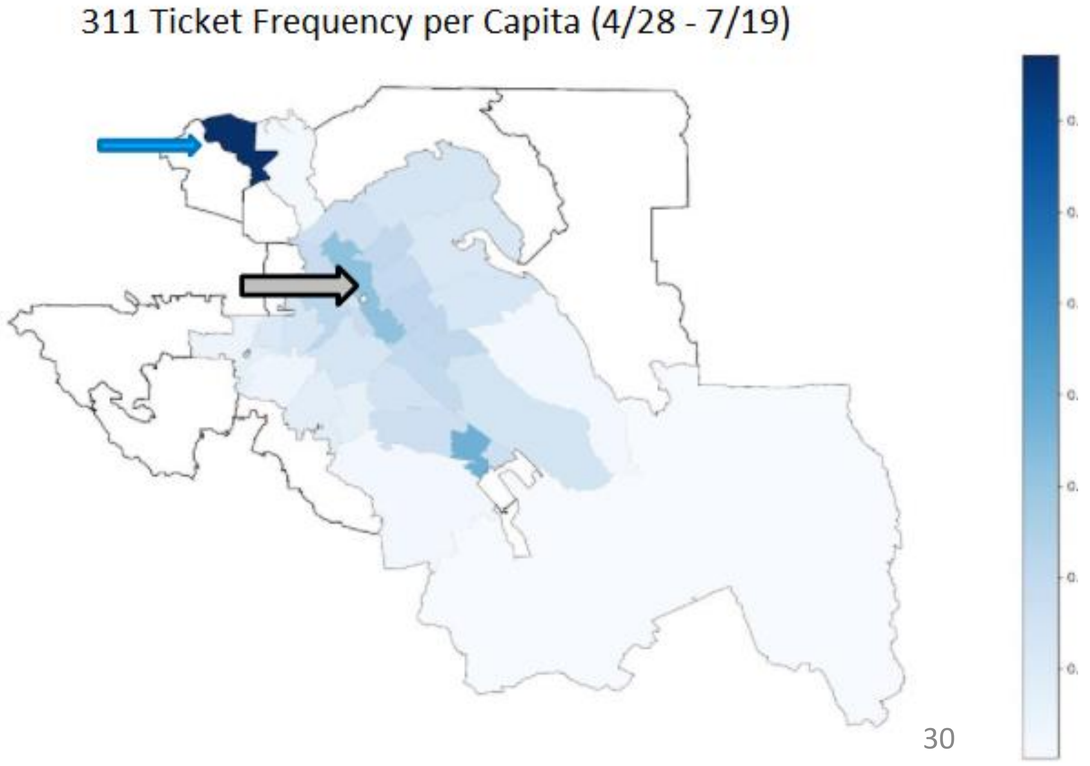
Services vary in their capacity to map hotspots and anticipate areas of need.

SJ311 Equity Project Update

A map of Raw 311 data colored based on number of service ticket requests coming from each zip code—one way to visualize need in the city.

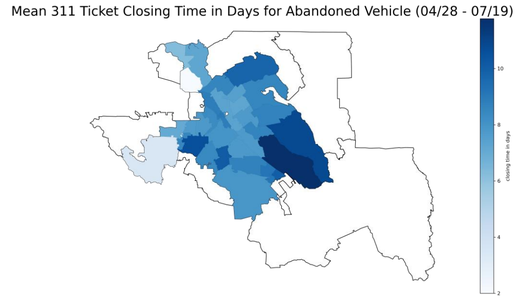


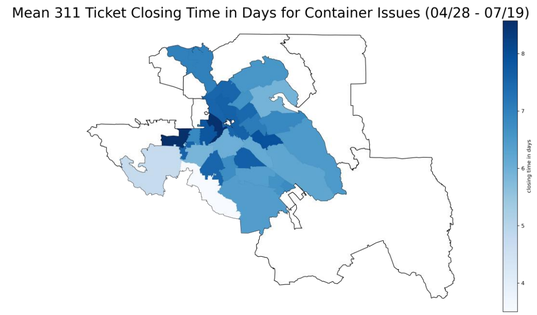
Number of tickets / number of people living in a given zip code, based on census data = tickets submitted per capita. This helps to identify where there are many requests relative to the size of the population.

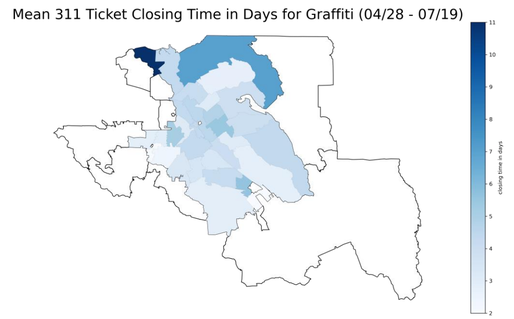


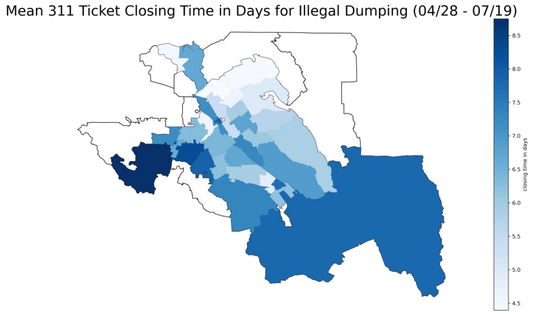
SJ311 Equity Project Update

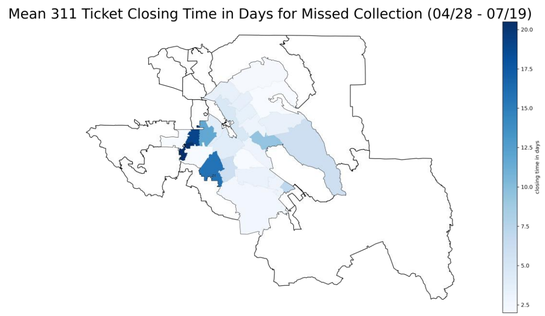
Heat maps showing the average time to close (measured in days) for service requests in different zip codes.

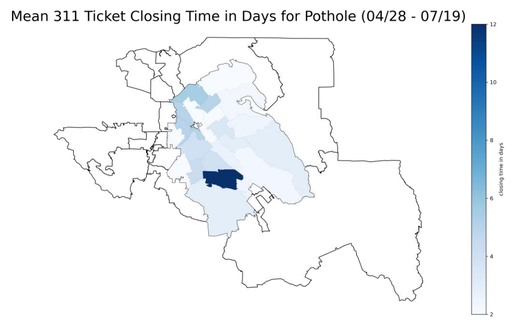


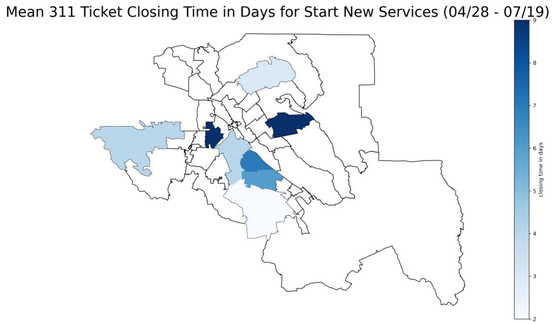


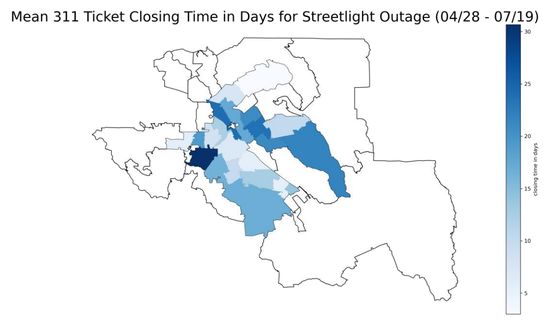












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Connecting data to impact

MOTI is supporting the following workstreams:

CAPACITY

Support DCM in hiring a Data Equity Director for City Manager's Office of Civic Innovation

TRAINING

Support HR in making data analysis training a part of City employee's learning & development

INSIGHTS

Support ITD in integrating 311 heat maps and dashboards into internal tools for monitoring and evaluation

STORY

Support ITD in sharing data stories and encouraging use of open data by community stakeholders

Questions?