



GETTING STARTED GUIDE: CURB DATA SPECIFICATION

GUIDE

LEARN ABOUT:

This guide will help organizations structure a successful curb program by providing a list of key questions and recommendations that should be addressed during each phase of the program's development.

OVERVIEW

The OMF's Curb Data Specification (CDS) is a standardized framework designed to help manage curb space effectively. CDS APIs are used to share static and dynamic curb regulations, measure activity at the curb, and provide analysis for curb managers and users. As cities face pressure to provide access to curb space for parking, delivery services, ride-sharing, and other evolving needs, CDS offers a structured approach to collect, manage, and analyze curb space data, ensuring more efficient and equitable use of these valuable urban assets.

This guide will help organizations structure a successful curb program by providing a list of key questions and recommendations that should be addressed during each program development phase. The guide emphasizes the use of CDS as a consistent data standard which the OMF recommends mandating through RFPs and permits when working with commercial curb users and tech companies. It outlines the fundamental concepts of CDS, including its data model, core components, and use cases.



HOW TO USE THIS GUIDE

This guide is a practical, step-by-step resource for planning and implementing projects using the Curb Data Specification (CDS). **It is for public sector applications of CDS and is intended to be used by professionals who are familiar with basic concepts of the Curb Data Specification.**

Whether you are a city planner, data analyst, or urban mobility professional, this guide provides clear, actionable insights to help you navigate the complexities of curb space management.

This resource will help organizations structure a successful curb program by providing a list of key questions and recommendations that should be addressed during each program development phase.

You can follow the guide sequentially for a comprehensive overview or jump to specific sections based on your immediate needs. For newcomers, we recommend starting with the About CDS section to understand its core principles and objectives.

THE SMART CURB COLLABORATIVE

The Open Mobility Foundation's [SMART Curb Collaborative](#) is a group of cities that are recipients of the USDOT's SMART Grant with a focus on curb management. Each of these cities are piloting projects that utilize CDS. The feedback and experience from these pilots will be key to the development of future versions of CDS.

CURB PROJECT PHASES

Phase #1 - Goal Setting and Planning

What is your city or agency trying to achieve and how do you plan to achieve it? For example, cities may choose to implement CDS to more easily communicate dynamic curb policies and regulations or provide an opportunity to manage zero-emissions delivery zones. For specific examples of how to use CDS within your agency's curb program, please reference this [CDS Use Cases Page](#).

Identify Requirements

- Understand and outline your city's and/ or agency's internal process for a program including vendor selection and RFP process.
- Identify any seasonal, legal, regulatory, or other unique challenges that need to be considered.
 - Are there data privacy regulations that your municipality has in place? Cameras, sensors, and event data storage may have legal implications. It is highly encouraged to consult with your legal department before developing your project plan.

Define and Prioritize Goals

- Describe the curb management problems that your agency is trying to solve and how to measure success.
- Gather feedback on existing curb usage challenges and expectations.
- Align objectives with broader city goals (e.g., reducing emissions, efficient deliveries, improved pedestrian safety).
- Use data to prioritize the most pressing issues (e.g., areas with high congestion, streets with safety concerns).
- Determine which goals are most urgent and achievable based on available resources, time, and expected impact.

Make the Pitch Internally

- Identify the needed resources for the program within your agency.
- Identify any challenges related to resources and technical support
- A successful curb management project typically involves any combination of signage, paint, IT support, coordination with enforcement officers, and public outreach specialists. It can often be challenging to identify all of the required resources but it is a crucial step towards a successful pitch.
- Identify other teams/departments that this program may help. One of the benefits of CDS is that it helps other divisions or programs within city governments such as enforcement, permitting, public transportation, etc.
- Highlight the benefits of the program. Explain how the program will align with broader organizational goals (transportation, economic, or environmental).

Secure Funding

- Identify internal funding sources.
- Identify any potential external funding sources, including possible grants.

Potential funding sources:

- MPO funding with flexible state dollars.
- Federal grants are hard for operational services/procurement rules, foundation grants are more flexible.
- New/existing metering and pricing parking districts and using revenues.
- Bundle with existing vendor agreements.
- Enforcement revenue in some locations.
- Revenue-positive programs with vendors (fee splits, per event).

Map Stakeholders

- Identify any internal stakeholders with decision-making authority. For example:
 - Department of Transportation or equivalent body.
 - City Council or equivalent body of other agencies.
 - Finance Department
 - IT Department
 - Public Works
- Identify any internal stakeholders that are considered influencers on the decision.
- Identify any external stakeholders that have an advisory role or can influence the decision or have approval power. Examples are:
 - Business Improvement Districts / Associations
 - Downtown partnerships / Chambers of Commerce
 - Parking Board / Authority
 - Arena owners
 - Convention center / cultural facilities
 - Neighborhood associations (may be interested in facilitating deliveries to their residences)
- Identify opportunities for collaboration with other agencies, the private sector, and service providers.
 - Research service providers that provide technologies or services that align with your project goals and desired outcomes.
 - Consult local curb users and businesses to see if there is an opportunity to collaborate. If your project is looking to improve curb access and reduce congestion, they may wish to participate and share data.
 - Identify potential consumers of curb regulation and occupancy data.
 - Consumers with a business interest in curb data may include logistics or e-commerce companies, ride-hailing or ride-sharing platforms, transportation services, and parking service providers.

- Internal data consumers within your city may include parking and transportation agencies, city planners and, other policy makers.

Create a Project Plan

- Secure commitment of resources.
- Understand what data you require to achieve your program goals.
 - There may be many different data sources required to answer your program's questions. A good resource for understanding what data you might need can be found at the University of Washington Urban Freight Lab's Urban Goods Delivery Toolkit [here](#).
 - Is a digital curb inventory required? If your agency does not have a curb inventory, there are several ways to collect one. The Institute of Transportation Engineers (ITE) recently released a [free Curbside Management Tool](#) which gives professionals with GIS experience the tools to collect data, conduct analysis, and provide curb treatment recommendations.
- Map data to be collected from commercial curb users or sensors.
- Make a plan to provide curb regulation data in CDS -- working from existing datasets or creating new ones.
- Define a clear timeline and ensure it is sufficient to establish whether the program is successful or not.
- Establish evaluation measures that are transparent to your stakeholders.

Create a Communication Plan

- Establish target audiences (internal and external) and plan accordingly.
- See the OMF guide on [curb stakeholder engagement](#) for guidance and talking points on the benefits of curb management.
- Establish communication methods and plan accordingly.
 - If your agency is creating new curbside zones that will restrict access for certain curb users, it is highly encouraged to engage with public outreach specialists to reduce non-compliant parking throughout the program.

- Establish a communication timeline that aligns with each of the project phases.

Develop a Preliminary Post Program plan

- Plan for what your agency will do when the program is over.
- Think about what the program must provide in order for it to continue or expand in the future.

Phase 2: Implementation

After establishing your agency's project goals and planning how to achieve those goals, implementation is the time to turn your agency's plans into action. The steps below outline how your agency can implement a curb zone program that utilizes CDS as the primary data format.

Establish CDS as your Agency's Data Standard

- Include CDS by name in your permit language, RFPs, or existing contract renewals. See our [Policy Language Guidance](#) document for sample language.
 - If entering into agreements with curb users, specify and link to CDS in your program rules as a requirement for participation.
 - Meet with each department that uses or maintains curb data to socialize the idea of CDS as your agency's curb data standard within your organization.

Execute Vendor/Consultant Selection Process if Needed

- Depending on your agency's program needs identified in the planning phase, procuring service providers or consultants may be necessary.
- There may be several options available for a public agency such as RFP's, RFEI's, and direct selections.
- To streamline the procurement process, the OMF SMART Curb Collaborative developed a collaborative RFP using [Sourcewell](#), which you can [read about here](#).

- Consult with your agency's contract office for the best available options.
- Score vendors who are responding to RFPs higher if they:
 - Currently use CDS
 - Currently use any open source data standards
 - Currently participate in open source communities like the OMF Curb Working Group

Evaluate what your sources of CDS data are

- Identify potential sources of data for conversion to CDS, these may include:
 - curb regulations
 - asset management systems
 - sign or paint shops
 - transaction and parking data
 - cameras and sensors
 - GIS and others.
- If your curb asset data is stored in a GIS system or another format, have a plan to convert that to data to CDS.
- You may consider researching what vendor curb data sets are already available for your city.

Identify appropriate technology for your use cases.

- If your project has a hardware component, you will need to determine which vendors offer hardware solutions that will meet your project goals.
- If you're using a vendor platform for data management or analytics, determine whether or not it delivers the functionality required for your project.

Audit your data

- Develop a plan to validate a subset of your data.
 - Data collected from cameras and sensors should be verified to confirm it accurately reflects what is happening on the street.
 - Internal sources of data from asset management systems or GIS may also need validation to confirm that it is up to date and matches actual curb assets.

- The achieved level of accuracy must be sufficient to meet project requirements.

Keep your project on track

- Monitor progress regularly.
- Be flexible and adjust the plan if needed to re-align with goals.
- Provide feedback to the [OMF Curb Working Group](#) about challenges or recommendations for improvements or ask questions.
- Keep lines of communication open with stakeholders and collect feedback.
- Maintain lessons learned list for post- program evaluation.

Phase 3: Evaluation and Outcomes

After the completion of your curb zone program, it is important to evaluate and summarize your findings. The steps below provide a basic outline for evaluating your program.

Evaluate any data that was collected during the program

- Use the events and metrics data you collected to evaluate your successes, failures, and learnings.

Create reports and summaries highlighting the successes and challenges

- Describe how your curb project met or failed to meet your project goals and expectations.
 - Summarize the project goals and demonstrate their impact on stakeholders.
- Detail the ways in which the project could have been improved.
 - Document how CDS was able to meet your project's requirements, as well as any areas where it fell short.

Develop a storyline that reflects how the program benefited stakeholders including residents, curb users, city planners, or parking managers.

- Report on project successes and challenges to stakeholders (internal and external) identified in your communications plan.

Develop a post-program proposal that capitalizes on the learned lessons and experiences of the program.

- Think about how you would do the program again, and what you would change or do differently to improve the program.
- Use the the information supplied by your program -to seek additional support, roll it out to more locations or make it permanent.

Bring your findings back to OMF.

- Consider what learnings could be applied to other cities.
- Identify gaps or inadequacies you've identified in CDS that could be addressed by the OMF Curb Working Group.



CURB PROJECTS IN ACTION

To get inspiration for your own curb project, look to these cities and their applications of CDS. You can also see curb projects implemented at the [SMART Curb Collaborative's Resource Hub](#).

Seattle

Seattle is developing a prototype digital permit system for loading zones in the North Downtown area. While there are over 5,000 curbside loading zones within the City of Seattle, delivery drivers often struggle to find a zone near their destination. This can lead to double parking and blocked bus or travel lanes, along with increased congestion, lower air quality, and other negative impacts. Seattle's digital permit prototype aims to make more efficient use of commercial vehicle loading zones, streamline payments for users, and provide loading zone usage data for City and public use. Project findings will be used to scale the program city-wide in the future.

- [Seattle SMART Grant Digital Commercial Vehicle Permit Project](#)
- [Curb rules blog post](#)
- [CDS project](#) with Populus



Omaha

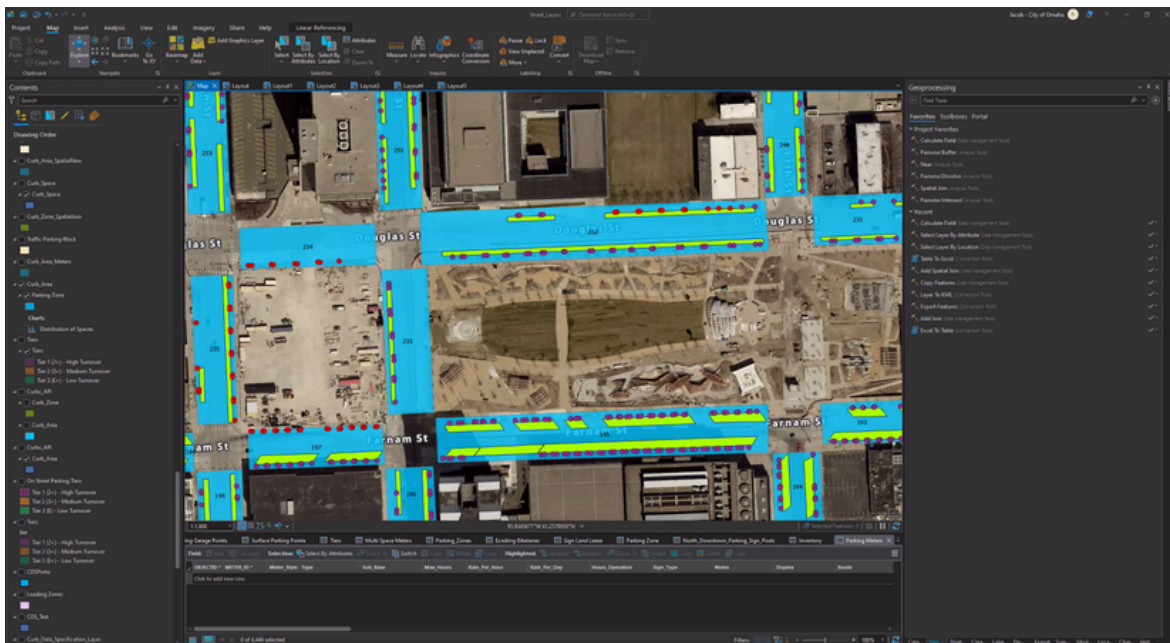
The [Automated Loading Zones](#) program in Omaha, Nebraska, is designed to increase parking turnover, improve the efficiency of curbside pickups, and decrease congestion. Using on-street hardware such as sensors and computer vision, the program allows delivery drivers to reserve loading zones in advance, reducing double-parking and traffic disruptions. The project focuses on streamlining commercial deliveries and enhancing overall street management in the city's busiest areas. The program aims to create a more organized, efficient, and safe environment for both businesses and residents.

- [Interactive GIS map using CDS Curbs data](#)

Public Curbs API data feeds

- <https://api.parkomaha.com/cds/v1/curbs/policies>
- <https://api.parkomaha.com/cds/v1/curbs/zones>
- <https://api.parkomaha.com/cds/v1/curbs/areas>

Curb and parking digitization with [ESRI CDS plugin](#) and tools



Pittsburgh

The City of Pittsburgh's [Smart Loading Zone program](#) is designed to improve the management of curbside space for commercial deliveries in high-traffic areas. Using technology like LPR and real-time data, the program allows delivery drivers to reserve designated loading zones via a mobile app, reducing illegal parking and traffic congestion.

This initiative aims to boost the efficiency of deliveries, improve safety for pedestrians and drivers, and optimize curb space usage to support local businesses and city logistics.

- [Legislation](#) and authorization
- [Dynamic loading zones with Automotus](#)



Philadelphia

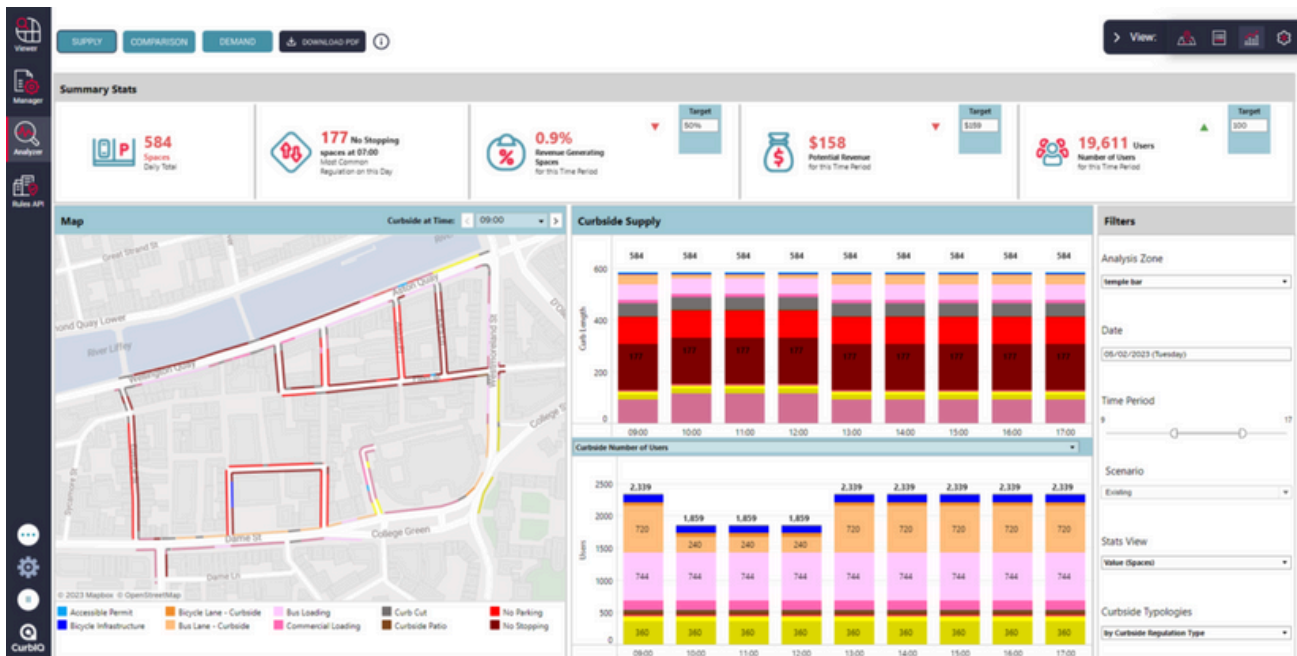
The city of Philadelphia conducted a [Smart Loading Zones pilot project](#) consisting of 20 curbside loading spaces for delivery drivers in Center City. Using a smartphone app, delivery companies were able to reserve spaces and times for loading or unloading. Vehicle fleets could be registered via license plate numbers, which were then read using LPR and used to bill for use of loading zones.



Dublin

CurbiQ in collaboration with SENATOR mapped 30km of curbside in the Temple Bar area of Dublin. All relevant data including signage, curb cuts, and parking meter locations were captured and translated into CDS to create a digital curb inventory. These data were used in visualization tools to help city planners identify logistics and delivery issues throughout the study area. The CDS Curbs API was implemented to provide curb information to third parties accessing the curb for use in route planning and deliveries.

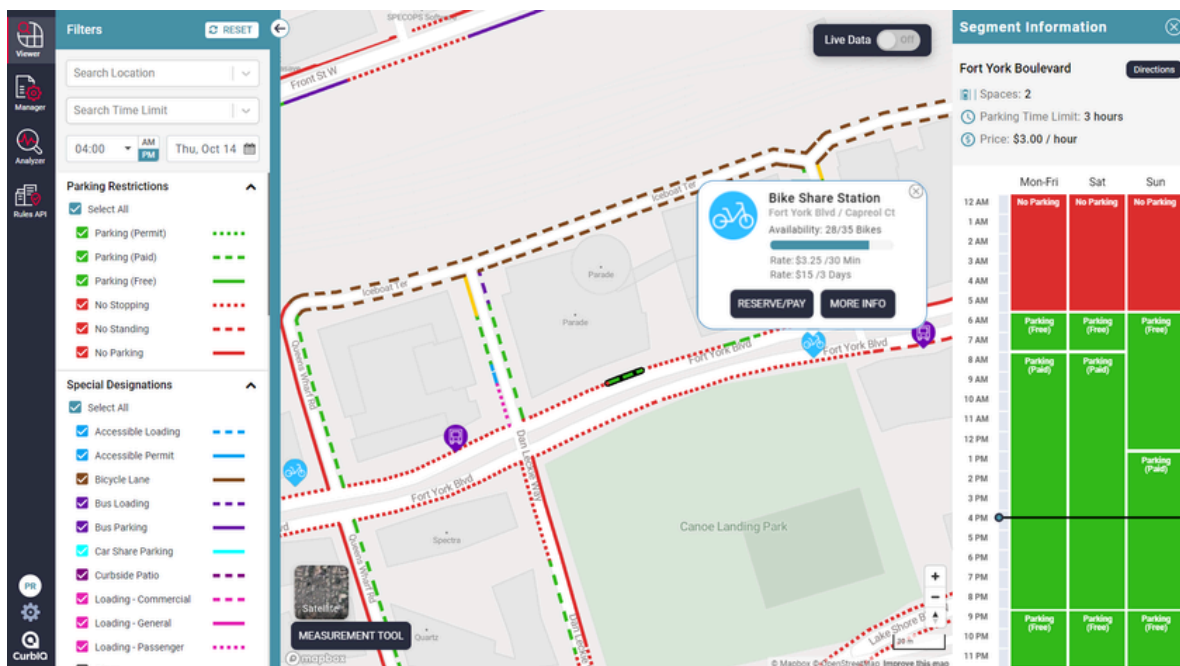
- [Digital mapping and curbside management](#) with CurbiQ



Toronto

The City of Toronto in partnership with CurbiQ developed a digital curb inventory using CDS to help the city analyze curb sites for city programs. Data collected in the inventory was used to identify sites in the curb lane suitable for curbside dining locations during COVID-19. City staff used the digital curb data to identify potential areas of conflict and determine impacts on parking revenue. The program resulted in over 12,000 meters of curbside designated for use by more than 1,000 Toronto restaurants. Curb data captured in the inventory was also used in the redesign of a major Toronto thoroughfare.

- Citywide [Curbside Inventory Digitization](#) with CurbiQ for various use cases
 - [Curbside Patios](#)
 - [Bike lane Redesign](#)



New York City

[CDS Metrics](#) were used to produce this report by [Numina](#) showing parking space utilization and other measures in an area of New York City.

- [Curb utilization](#) and CDS Metrics report

Aggregate Metrics

Number of unique sessions for the specified time period.

Total Sessions: 1381 sessions

Average Time spent by dwelling object.

Average Dwell: 24.08 minutes

Number of unique sessions per hour

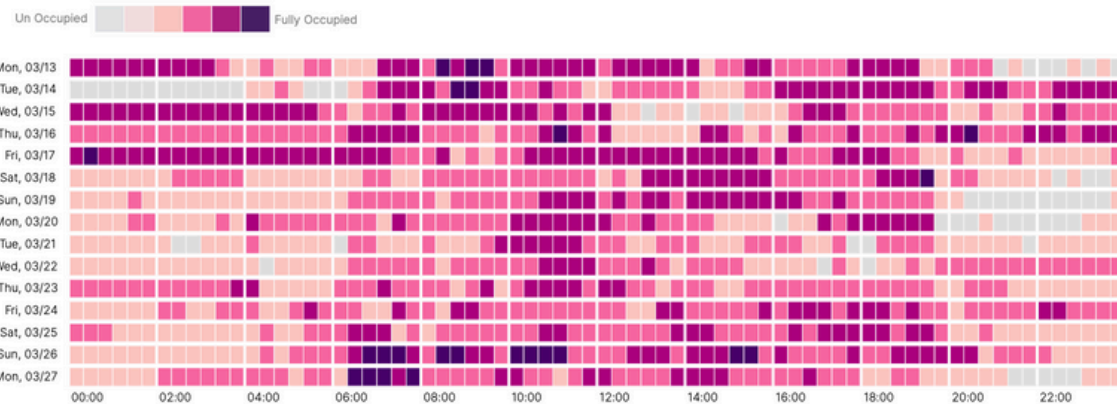
Turnover: 3.84 sessions/hr

Percentage of time the behaviour zone was occupied by at least one vehicle.

Occupancy: 87%

Total Utilization of the Parking Spaces

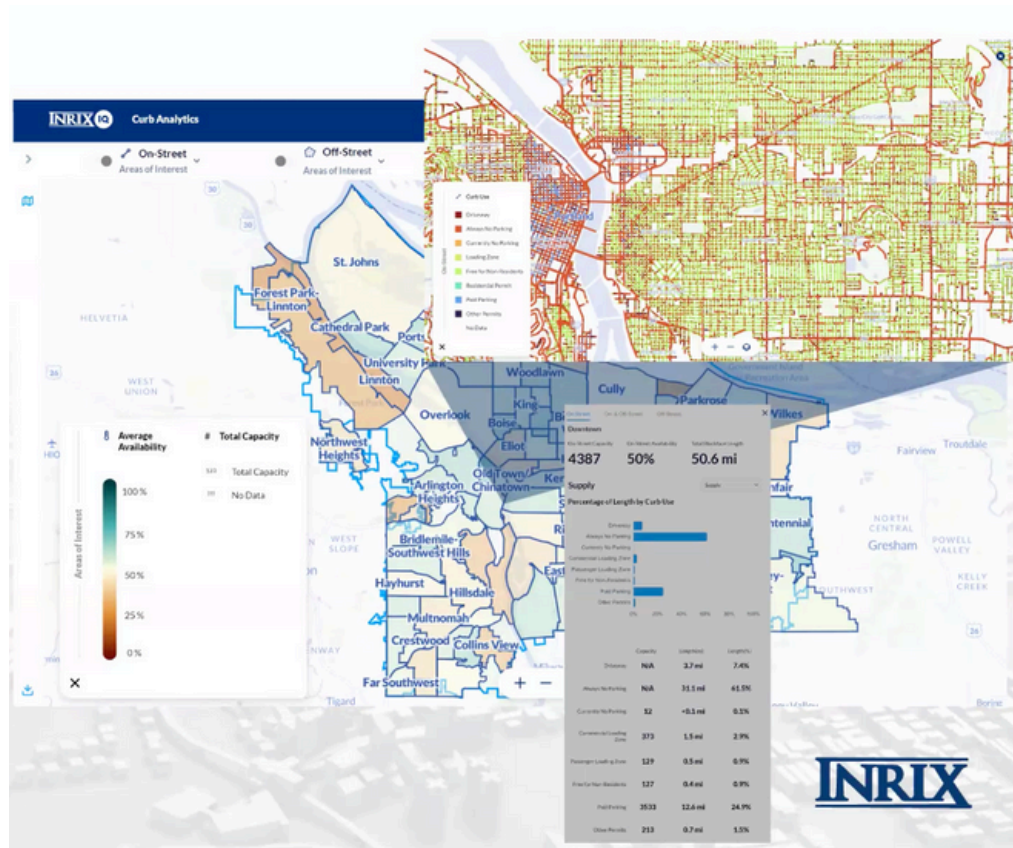
What % of the time the behavior zone was utilized by at least a single object.



Portland

The City of Portland's Bureau of Transportation (PBOT), in partnership with [INRIX](#), has developed a digital inventory of over 4,000 miles of curb. Data from the inventory is being used to pilot a [Zero Emissions Delivery Zone](#) in downtown Portland. The focus of the pilot is on testing how regulations, incentives, and partnerships can change the types of vehicles making urban deliveries to decrease pollutants from freight vehicles.

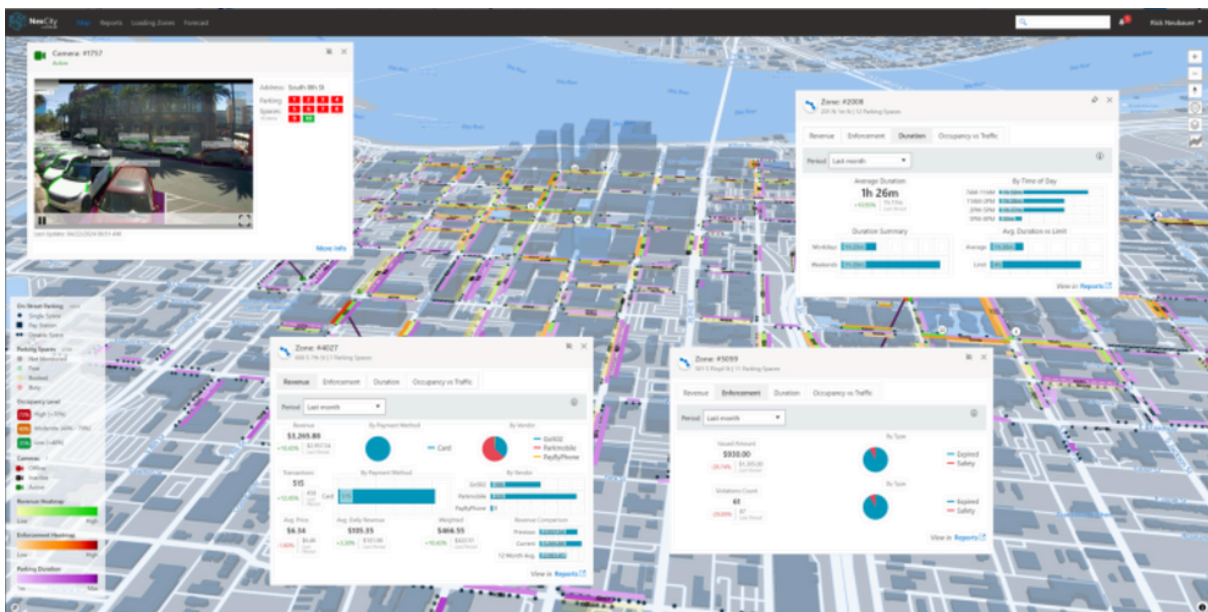
- [Curb digitization](#) across 4,000 miles with Events and Metrics tracking with INRIX



San José

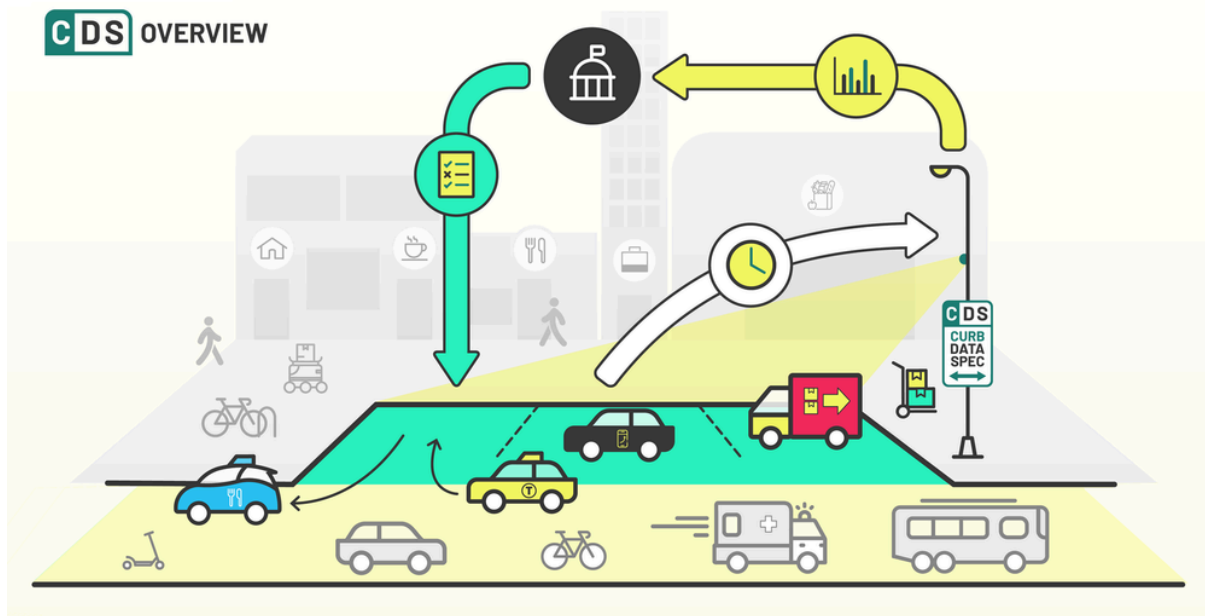
The city of San José, California, working with Umojo has digitized approximately 30 miles of curb in the downtown area as a part of a pilot project in digital curb management. The project includes the installation of sensors and AI-driven cameras to provide real-time usage information for 800 parking spaces in the study area. Umojo has integrated LiDAR scan data with existing city data sets and translated it into CDS to produce the digital curb inventory. The data will be used to identify problem areas and develop strategies to enhance curb use efficiency. Curb data will be made available to curb users via CDS APIs.

- [Asset management translation](#) and public data feeds with Umojo



ABOUT CDS

CDS is a data specification that provides a blueprint for building APIs to allow cities and curb users to exchange curb related data. APIs (Application Programming Interfaces) are used to share data between software applications. APIs allow applications to communicate using pre-established rules.



We use APIs everyday, often without realizing it. Checking the weather on your phone? You're using an API to send your location to the server, and the server is using the API to return the specific weather information that you requested. Booking a flight? You're using an API to tell the airlines when and where you want to travel. Available flights and other information are returned to you via the API.

CDS currently defines three APIs: Curbs, Events and Metrics. Each of these APIs serves a different purpose and defines a different type of curb related data.

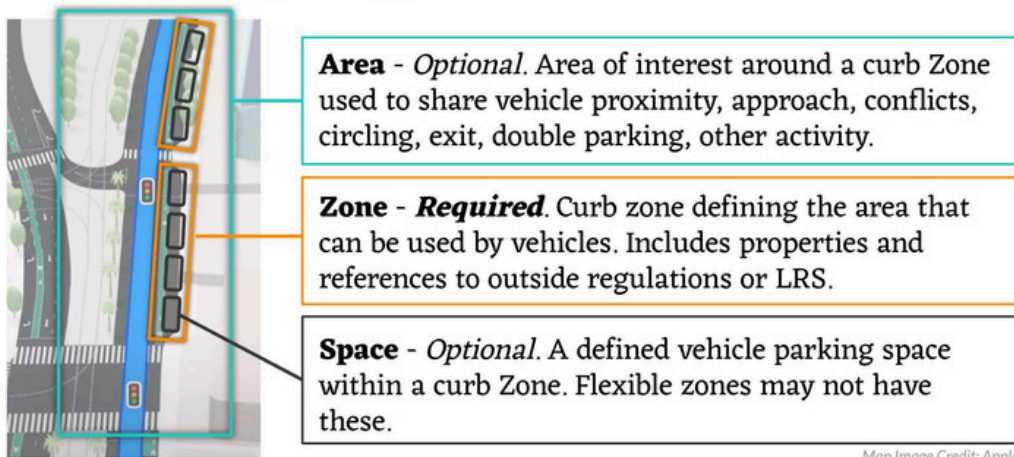
Curbs API

The [Curbs API](#) is the backbone of the Curb Data Specification. While the Events and Metrics APIs are optional, the Curbs API is a required component of any CDS project.

The Curbs API covers curb locations and their associated regulations, which can be shared with the public and with companies using curb space. It defines curb policies, curb zones, spaces within zones, and areas around zones.



Names for polygon geometry **places** used within the CDS Curbs API.



The Curbs API allows cities to specify areas of interest along the curb with the rules for using them: who is allowed to park, load, unload, pick up, drop off, etc., for how long, for what price (if any), at what times, and on which days. Locations defined in the Curbs API can be connected to event and metrics data, and can be shared with companies and the public, for purposes such as routing, finding legal parking, loading, and pick-up/drop-off spots, or analyzing curb utilization over time.

See Curbs API [code examples](#).

Events API

The [Events](#) API is used to transmit real-time and historic information about activities at the curb. A curb event is a record of activity that happens at a specific location along the curb. Event data can be generated by a variety of sources including on street sensors, cameras, parking meters, company check-ins and other city data sources. Events data can tell us who was using the curb, when they were using it, for what duration and for what purpose. Events can tell us about the type of vehicle responsible for an event and the cost incurred by the vehicle for access to the curb. Events can also relay information about the status of sensors, cameras, meters or other devices that generate Events data.

See Events API [code examples](#).



EVENTS

Metrics API

The [Metrics](#) API defines a set of common calculation methodologies to produce aggregated statistics of curb usage. These calculations may be used to track dwell time, occupancy, usage and other measures of curb usage. Each of the calculations defined by Metrics is derived from raw Events API data.

See Metrics API [code examples](#).



METRICS

HOW TO GET INVOLVED

Individuals, cities and companies can get involved and contribute to the development of CDS. For information on how you can play a role, please [visit the OMF website](#). The Curb Management Working Group is public and open to both OMF members and individual contributors. To participate, you can:

- Review our Curb Management [Scope of Work](#) document.
- Visit the [Curb Management Working Group](#) wiki.
- Follow the progress and chime in on our [Curb Data Specification](#) (CDS) repository.
- Join [monthly meetings](#) to discuss issues and hear from other contributors.
- Get announcements from the [Curb Management mailing list](#).
- Start a project and bring back your learnings to the working group.

If you have additional questions about how to get involved, [contact us](#).

