



# Smart+Connected Digital Platform

Technical Overview  
February 2017

# City Challenges

# Cities Needs to Find New Ways to Enable Citizen Interaction and Deliver Services



Traffic  
Management



Public Safety



City Lighting



Pollution/  
Environment



Waste  
Management



Parking  
Optimization

**Cities traditionally address these challenges in silos.  
This Fragmented Approach Is Inefficient.  
Citizens are uninspired. The challenges are not solved.**

# Current State of Urban Services Technology

## Multi Vendor System

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While enables competitive environment for vendors, creates fragmented operations

Each vendor brings their own device to cloud offering leading to lack of single, common operations capability

## No Standardization on Data Models and APIs for City Infrastructure Devices

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Parking solution can be based on sensors or video analytics. No common data model

Multiple Lighting vendors bring in different interfaces for Adaptive LED lighting management and operations

## Lack of Common Data Infrastructure and Information Sharing

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City Safety Operations does not have real time view of Outdoor Lighting

Parking Operations can benefit from real time traffic information and location services

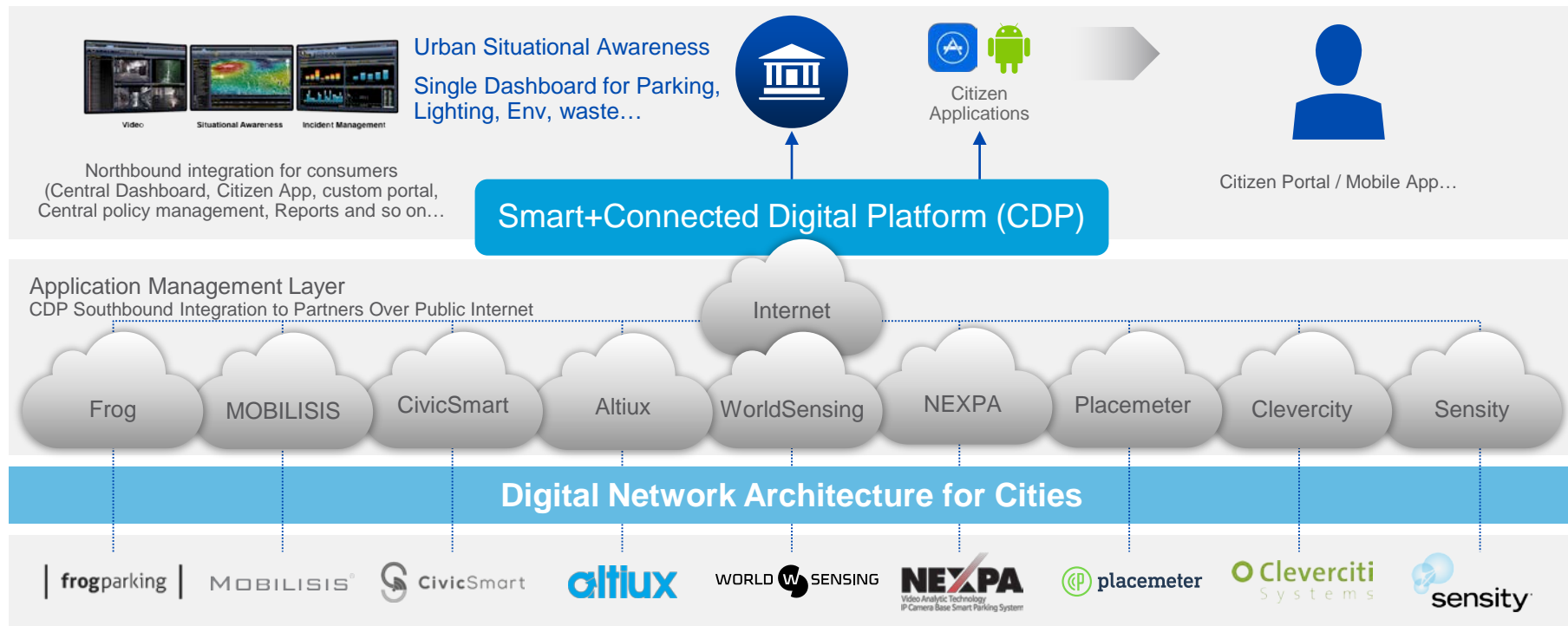
## Fragmented Application Eco System

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Different Applications leveraging different data sources and models.

# Intro to CDP

# Simplified City Management with Layered Architecture and CDP



# A Services Catalog for Certified Partners

Citizens



Consumer

Cities



Provider

Business



Buyer

**CDP**

**URBAN  
SERVICES  
CATALOG**

Bridging the Supply and Demand  
of City Assets and Services

CITY INFRASTRUCTURE



# Solution Architecture for Smart+Connected Cities

## MOBILE APPS



## PARTNER APPLICATIONS AND URBAN SERVICES



Transport Management



Water Management



Parking Management



Lighting Management



Waste Management



Environment



Safety and Security



Traffic Management



Monitoring/Command Control Centers

## Smart+Connected Digital Platform

Wireless WAN  
(2G/3G/4G/ Wimax)  
DSRC/LMR

Public/Private  
WAN

Internet

## Digital Network Architecture for Cities

PARTNER  
SENSORS



### VEHICLES



Vehicles

### BUILDINGS



Residential



Industrial



Commercial

### STREET



Water



Parking



Street Lighting



Waste



Environment



People



Street Furniture



Safety and Security



Traffic



# What Is CDP?

# Smart+Connected Digital Platform for cities is consumed as a cloud service

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Is a Service Catalog for Urban Services by developing an open ecosystem

CDP enables a federated model for all infrastructure assets onto through an extensible operations real time platform

Collects, federates, stores, and provides access to data generated from 'Connected' City infrastructure assets using common data models

Exposes device control and data using a standardized application programming interface for northbound application ecosystem in a vendor-agnostic way

Provides an ability to onboard device vendors onto the platform using adaptors

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# Smart+Connected Digital Platform Capabilities

## Event Centric

Based on Event Response Paradigm Which Scales Much Better than a Synchronous System for the Scale Cities Require

## Model Driven

Instead of Traditional API Approach, CDP Takes a Declarative Languages to Model Device

## Distributed

As Events Originate From Different Devices at Different Times, Workload Can be Distributed From Cloud to Edge Leveraging the Fog Computing Paradigm

## Vendor Agnostic Device Model

CDP Provides, Generic, Vendor Agnostic Device Models so that any Device Vendor can Integrate into Cisco CDP

## Vendor Agnostic Data and Info Models

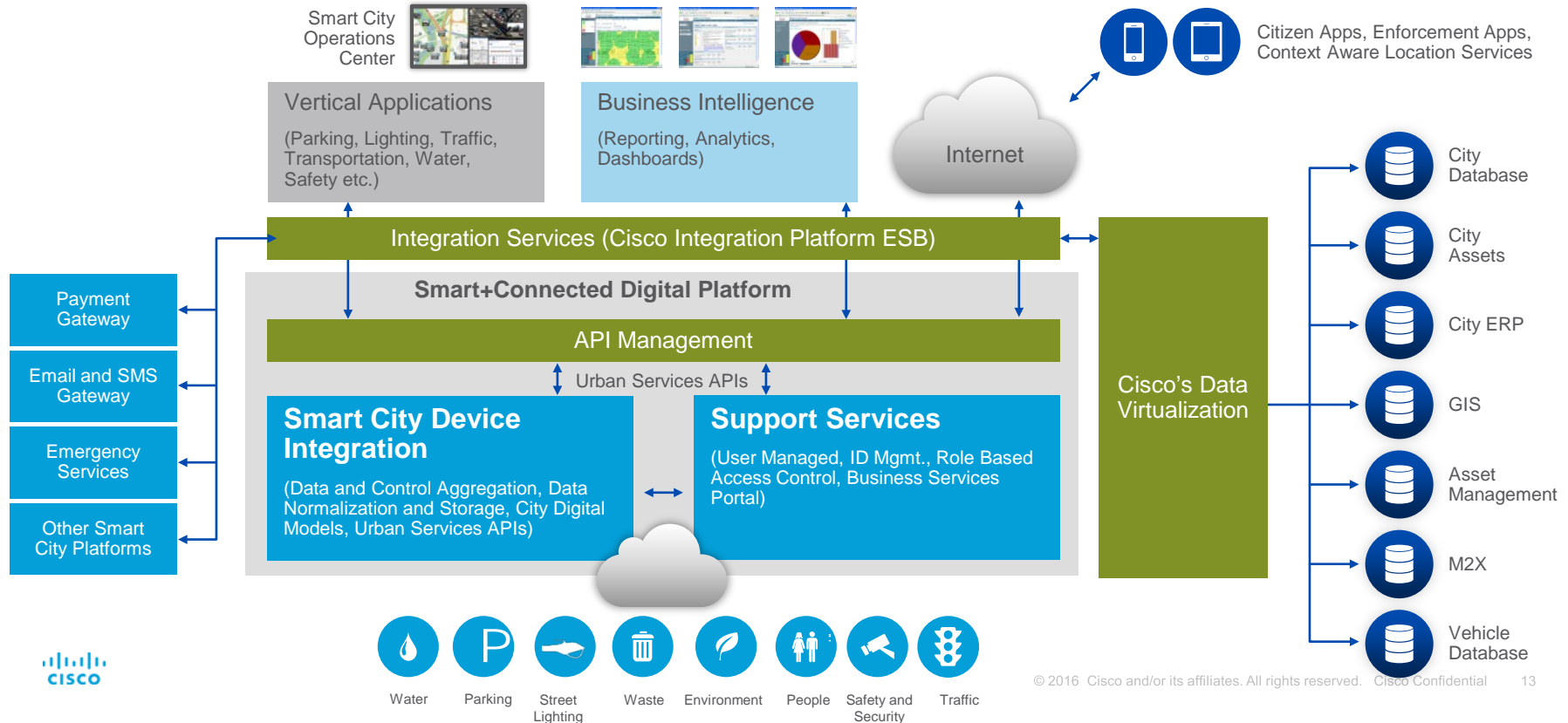
Generic, Vendor Agnostic Data and Information Models for Various Device Types Like Lighting, Parking, Traffic Sensors, Kiosks etc.

## Composite APIs

A Set of Composite APIs that can be Used to Develop Application that Delivers Differentiated Urban Services Experiences for Cities and Citizens

# CDP Architecture

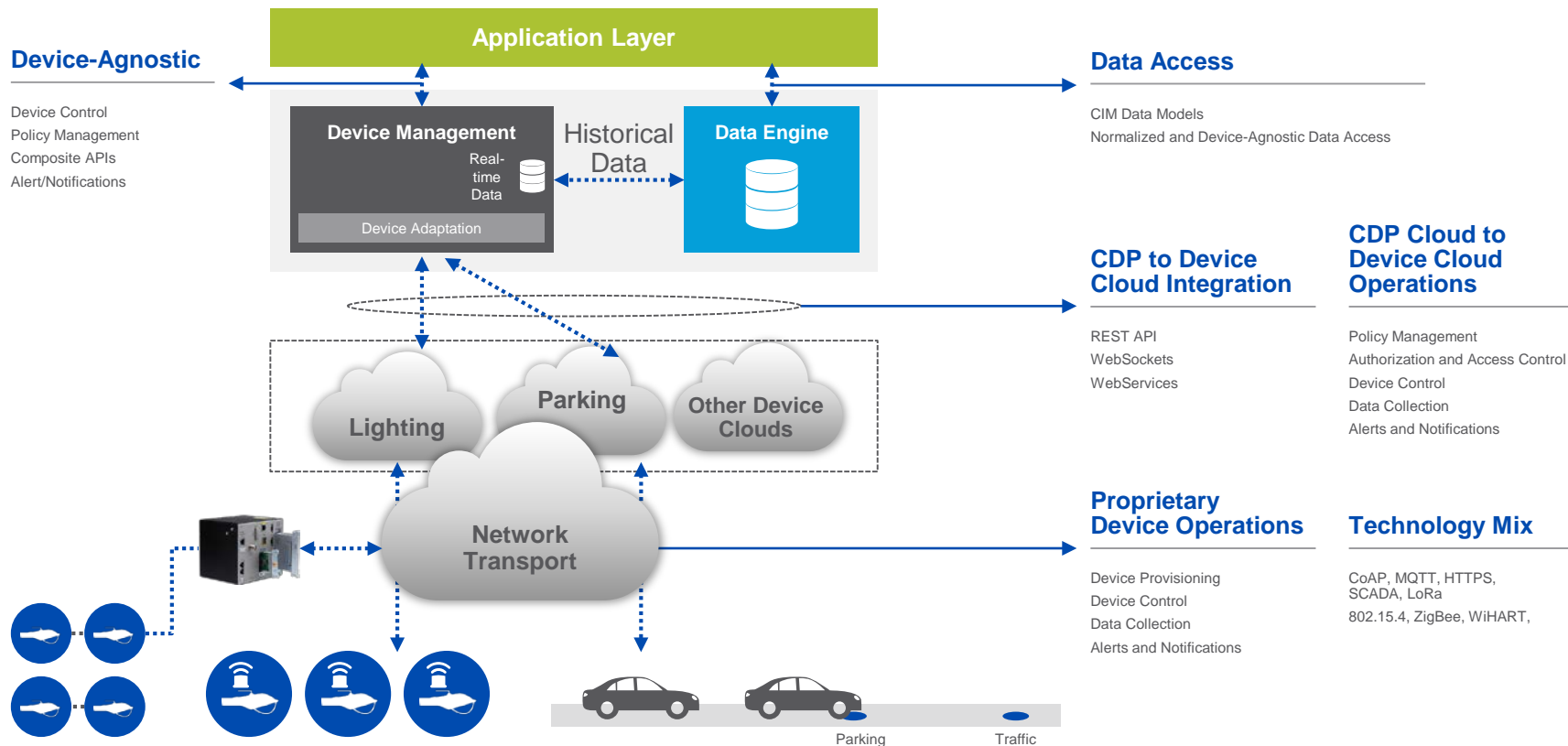
# Smart+Connected Digital Platform Solution Architecture



# CDP

## Software Architecture and Platforms

# CDP Control and Data Flows





# CDP Domains

# CDP 3.1 – Features and Capabilities

- Enhanced CDP Dashboard
  - New Themes
  - Simplified Look and Feel (LaF)
  - Dashboard view (Real Time and Historical playback)
  - Map View
  - Enhanced Reporting
- API Management
  - API Lifecycle management
  - Quality of Service (QoS), Metering & Security
  - Fine grained Authorization using Security Tokens
- Key Management
  - Secure Tokens (OAUTH2 support)
  - App Key for Developers
  - Data Key for Customers
- Platform Capabilities
  - Domain Simulators for simulating sensors
  - Domain Simulators for Scale Testing
  - Scale and Performance Testing for Parking, Lighting, Traffic domains
  - Clustered Deployment and HA of CDP Components
- Enhanced Mobile Reference Apps
  - Citizen App with support for Zone level parking
  - Improved Enforcement App
- User Documentation
  - API Guide
  - User Guide; Installation Guide; Release Notes

# CDP Domain Capabilities

## Enhanced Domains



### Parking 2.0

Non-Demarcated  
Parking  
Multi Level Parking  
Parking Violation  
Popup on  
Dashboard  
Spot Level Report



### Lighting 2.0

Node Level Report  
Energy Savings  
Report



### Traffic 2.0

Vehicle Count  
Incident Distribution

## New Domains



### Environment 1.0

Air Quality Index (AQI)  
Relative Humidity  
Noise (Laeq),  
Harmonica Index  
Temperature



### Crowd 1.0

Pedestrian Count  
Vehicle Count  
Dwell Time  
Crowd Heat Map  
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# Programming with CDP

# Northbound Applications

**Applications Communicate with CDP via Rest APIs and WebSockets**

**CDP Provides Application Services Necessary to Create Applications**

**CDP Dev Mgmt API, CIM  
Core Services API, CIM Data  
API**

## **Authentication**

- User Information

## **CDP Information**

- Location Information
- Device Information  
(Real-time and historical)
- Policies
- Events
- Reports
- Analytics

## **CDP Actions**

- Device Management
  - Update Device(s)
  - Enable/Disable  
Device(s)
  - Apply/Remove Policies
- Create/Edit Policies
- Create/Edit Reports

# Southbound Integrations

Southbound Integration with CDP Allows Interaction with the CDP Ecosystem

GUI Tools Facilitate the Definition and Integration of new Southbound Devices and Services

- **API Definition**
  - API endpoints and functionality are defined in the tool
- **Model Mapping**
  - Custom Device Data/API responses are mapped to CDP Data Models
  - Devices can now interact with CDP systems and applications (device management, policies, northbound applications, etc.)
- **Query Definitions**
  - Custom queries can be created to allow deeper, more meaningful integrations
- **Automated Deployment/Exporting**
  - Do we need to talk about certification
  - Something about the export process to make the integration available in CDP
- **Sandbox Environment available for development and testing**

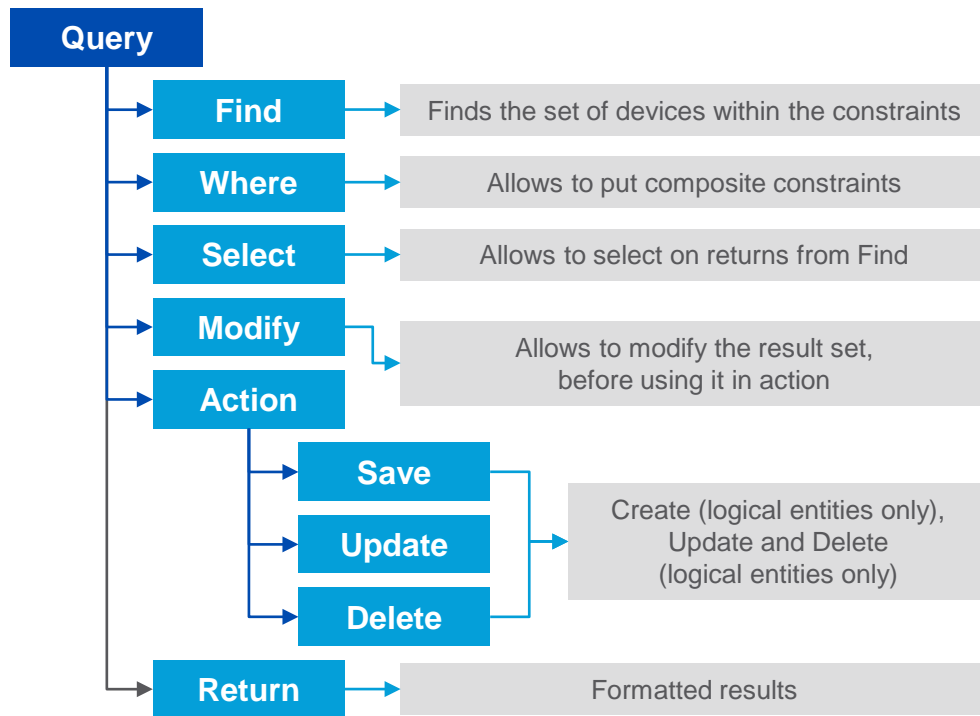
# Southbound Integration Steps

## Straightforward Process to Integrate a New System or Device

- API Definition
  - Identify functionality and corresponding API endpoints required
  - Identify API properties necessary for integration (API keys, tokens, etc.)
- Model Mapping
  - Create mappings to/from CDP Models
  - Define actions for any attribute, which can be modified by query or device
- Define Queries
  - Define queries needed to allow desired interactions



# Thing Interaction Language



## <Documentation>

This query finds all pairs of illuminated street lights next to vacant (or about to become vacant) parking meters operated by the same business outside of 1000 feet radius of a Chevron gas station if any. For each such light a notification e-mail is sent to the business owner and light is switched off after 10 minutes delay.

## <Documentation>

```
<Find using="Sensify.City.Business">
  <light operatedBy="some Business" state="not(OutOfOrder)" as="MyLight">
    <brightness gt="80%">
    <location>
      <Latitude between="1 234,0.98767">
    </location>
  </light>
  <Parking.Meter operatedBy="some Business" as="MyParkingMeter">
    <or>
      <eq target="state">vacant</eq>
      <and>
        <eq target="state" value="occupied"/>
        <le target="remainingTime" value="PT10M"/>
      </and>
    </or>
  </Parking.Meter>
  <Entity type="Business" as="some Business">
    <not>
      <Business name="Chevron" as="Chevron"/>
      <GasStation operatedBy="Chevron">
        <le target="distance(this, MyLight)" value="1000ft">
      </GasStation>
    </not>
  </Entity>
</Find>
```

```
<Where target="MyLight Location Longitude" ge="2.345">
```

# Data Sovereignty & Security

# Data Sovereignty

## Rights and Disclaimer

- Any customer contextual data will be strictly confidential to Customer and will not be used, shared by Cisco CDP under any circumstances
- CDP does not aggregate, store or process PII (Personally Identifiable Information) data from any of the ecosystem partner sensors, data sources

## Storage

- Cisco can retain real-time sensor data, transactional data for 1 year only. After 1 year real-time data will be overridden -> Cisco is not liable for data loss or incorrect data values

## Integrity

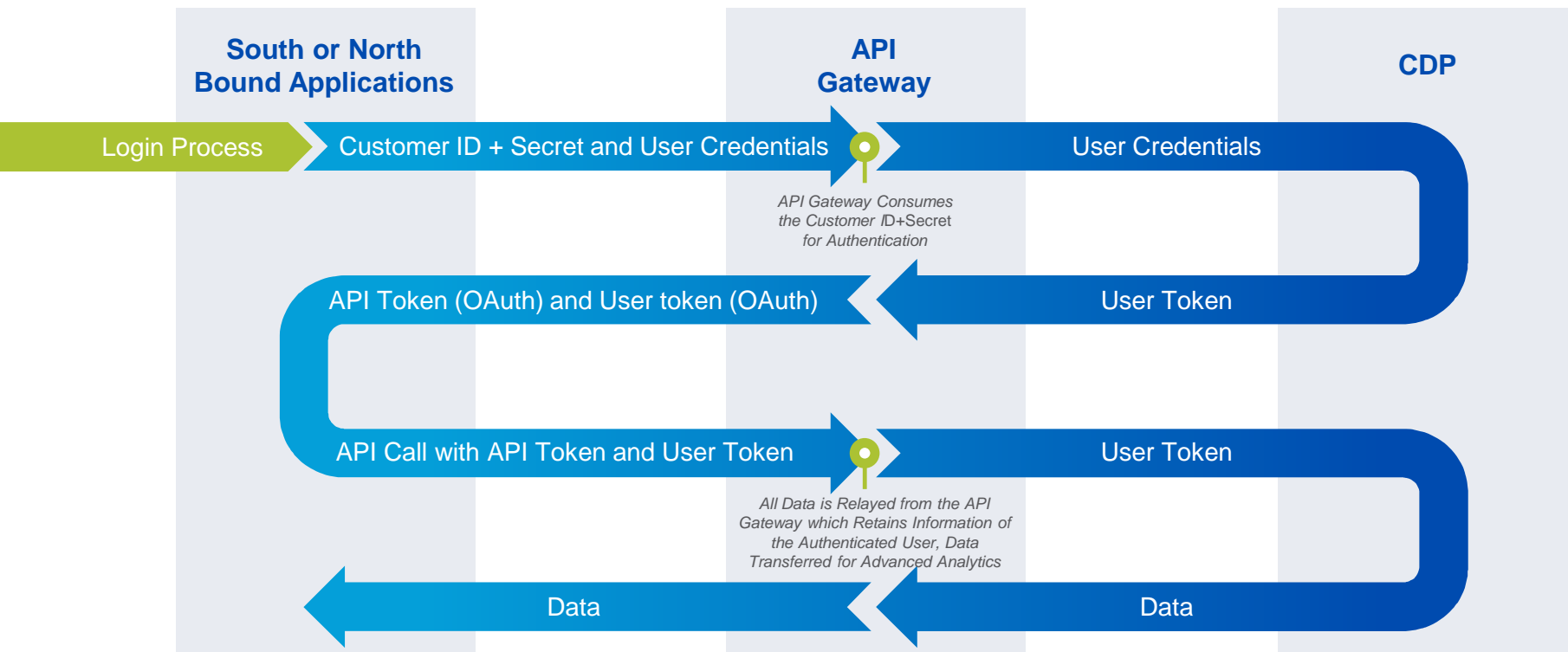
- End-to-end security enables buyers of CDP Platform to access and collaborate ecosystem partner data safely and securely
- Data integrity is assured by OAuth 2.0 framework: role based access, identity & authentication management mechanism

## Aggregation and Normalization

- Data aggregation from diverse sensors data sources, data normalization and data sharing with administrators and/or urban service operators  
Platform partitions data and delivers data to applicable departments

# CDP Key Management

# Functional Representation of Key Management



# CDP Partner Ecosystem and Customer Support

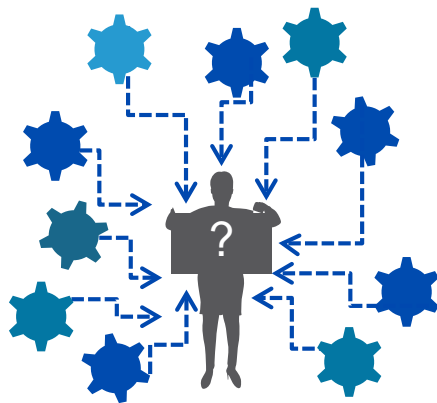
# S+CC Partner Ecosystem

## 50 integrated partners

3M	Cimcon	Frog	Mapunity	ParkAssist	SmartBin
Acuity	Cisco CMX	Geo Shield	Metro Infrasy	ParkEagle	SparkBit
Bajaj	Cisco VSOM	GraphMasters	Metro Park	Parking Enforcement App	T2
BH Technologies	CivicSmart	ICE Gateway	MindTek	ParQuery	TCS
Big Belly	Civiq	Inrix	Mobilisis	Placemeter	Telensa
BitCarrier	Cleverciti	iOmniscient	N3N	PTV	Tvilight
Breezometer	CMX Meraki	Kiunsys	Namoo	Rhythm	Urbiotica
BruitParif	Communithings	Kiwi	Nexpa	Samsung	Vian Tech
CDP Citizen Reference App	Cubic	Leapcraft	Nipun	Sensity	Welink
CDP Enforcement App	Enevo	LED Roadways	Pango	Serenity SQL Stream	WorldSensing
CDP Enforcement Reference App	eSmart21	Libelium	PAQS	ShotSpotter	
Cellint	Esri	Lighting SoS App	Paradox	Smart Sense	
	Flashnet	M2M Telemetry	pParke		



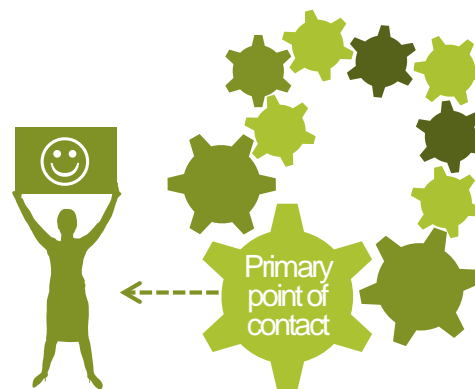
# Cisco Defines New Support for Multivendor Environments



## Product Support in Multivendor Environment

Multiple Points of Accountability  
Customer Coordinates Vendor Discussions  
No Solution Expert  
Complex Issues May Result in Delayed Resolution

**Optimal for Product-Level Issues**

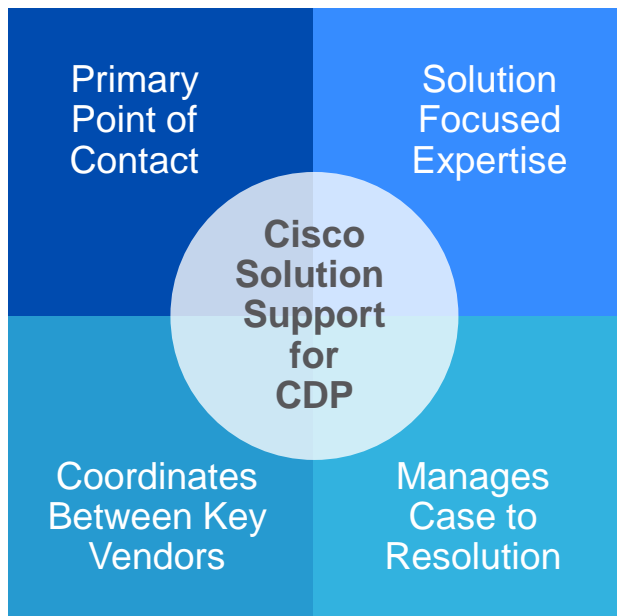


## Solution-Level Support in Multivendor Environment

Primary Point of Accountability  
Centralized, Coordinated Vendor Discussions  
Solution-Level Expert  
Faster Time to Complex Issue Resolution

**Optimal for Solution-Level Issues**

# Centralized Support for Today's Multivendor Environments



- Cisco® solution expertise and accountability for centralized issue management and resolution among Cisco and solution partner products in Smart+Connected CDP
- Includes Cisco product support and solution-level support in a single service, making it simple to quote, book, invoice and renew
- Find details about Cisco Solution Support on [Jive](#) and [Cisco.com](#)

# How It Works

1

Customer Contacts  
Cisco® Solution Support  
at our Toll-free Number



2

A Cisco Solution Expert  
Assesses Their Issue and Determines the  
Right Course of Action:  
Immediate Resolution or  
Engaging One or More  
Product Support Teams



3

Cisco Solution Expert  
Coordinates With  
Product Support Teams  
as Needed to Manage  
Issue Resolution



4

Cisco Stays With the  
Customer Until the  
Issue Is Resolved, Then  
They Are on Their Way



An aerial photograph of a coastal city, likely Vancouver, showing a large harbor with several ships, a dense urban area with many skyscrapers, and mountains in the background. The image is slightly hazy and serves as a background for the text overlay.

✓ For more details, visit:

- Website: [cisco.com/go/smartconnectedcommunities](https://cisco.com/go/smartconnectedcommunities)
- Blogs: [blogs.cisco.com/government](https://blogs.cisco.com/government)
- Public Sector IoE Deployment Map: [cs.co/IoEPSImpact](https://cs.co/IoEPSImpact)

✓ Questions? Contact [SmartConnectedCity@Cisco.com](mailto:SmartConnectedCity@Cisco.com).

# Thank You