



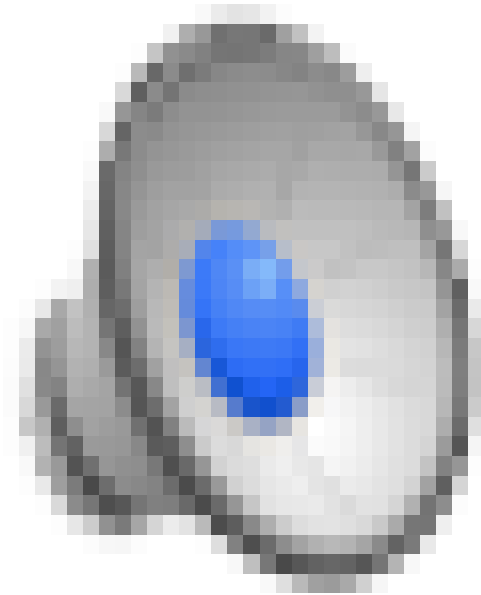
Cities become Digital and Smart with Cisco Solutions NOW

*Nikos Lambrogeorgos
Senior Account Manager,
Public Sector, Greece & Cyprus*



Changing Together!

Changing Together! NOW



Cisco is the worldwide leader in IT that helps customers seize the opportunities of tomorrow



Networking is the essential connective tissue of modern communications, commerce and life's experiences.



A worldwide company



- 73,000+ employee count in 165 countries
- 380+ offices
- Appx \$50B / year, \$6.3B in R&D

What is Smart city

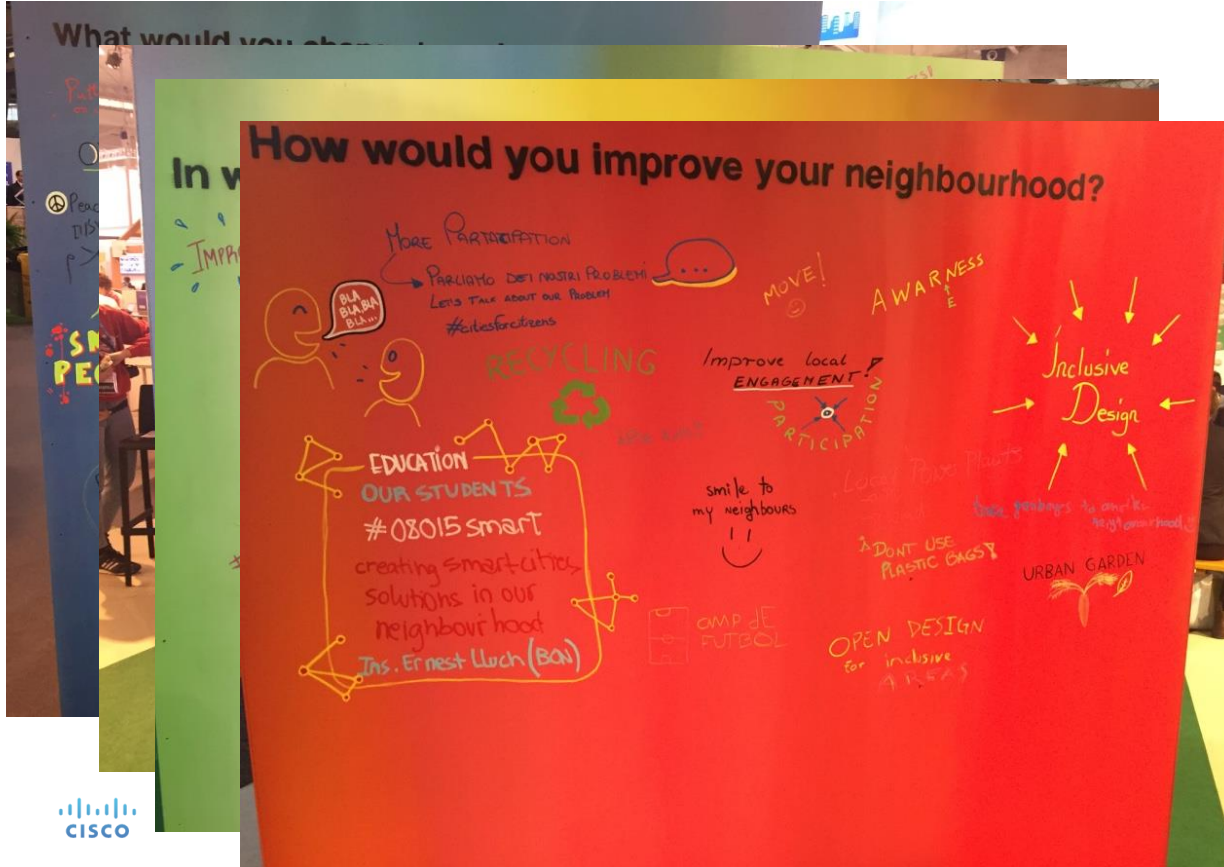
A **smart city** is an urban development **vision** to integrate multiple information and communication technology (**ICT**) and Internet of Things (IoT) solutions in a secure fashion to manage a **city's assets** – the city's assets include, but are not limited to, local departments' information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services . . .

https://en.wikipedia.org/wiki/Smart_city

. . . there is no universally accepted definition of a smart city. It means different things to different people. The conceptualization of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents.

 Smart Cities Mission - <http://smartcities.gov.in>

Smart City World Conference 2016 - Barcelona



Open data
Environment
People centric
Citizen engagement
Participation
...

City Issues

Rapid Urbanization, Economic Constraints, and Environmental Sustainability



Rapid Growth Puts Pressure on City Infrastructure, Making it Harder to Maintain Citizen Quality of Life



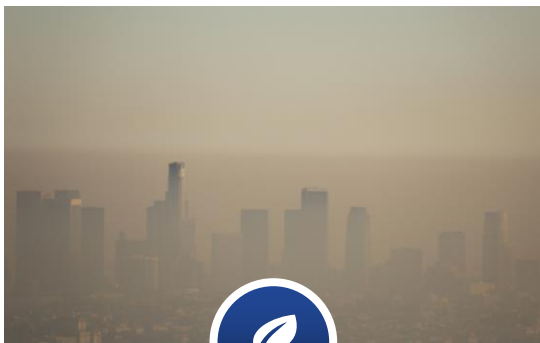
Greater Need to Manage Carbon Footprint and Improve Sustainability



Boosting Livability Index Is More Crucial than Ever To Retain and Attract Trade, Commerce, and Talent

The Ability to Improve City Infrastructure Management Is Increasingly Defining Social, Environmental, and Economic Success

City Challenges



Cities Have Traditionally Addressed These Issues in Silos



Traffic
Management



Public Safety



City Lighting



Pollution/
Environment

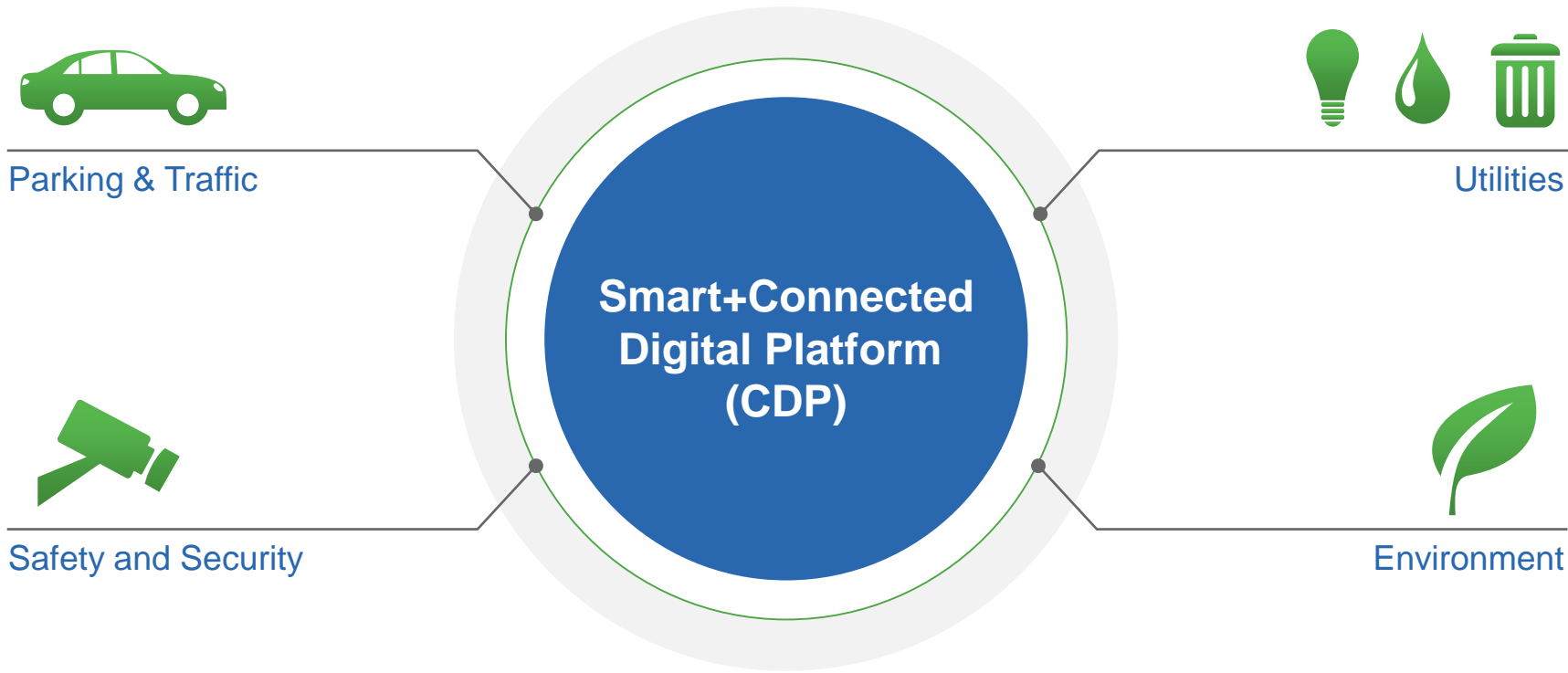


Waste
Management



Parking
Optimization

**This fragmented approach is inefficient,
has limited effectiveness, and is not economical**



**Cities Can Improve Operational Effectiveness, Productivity,
Cost Efficiency and Overall Citizen Quality of Life**

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

Smart+Connected Wi-Fi and Multi Sensor Network

SENSORS



VEHICLES



Vehicles

BUILDINGS



Residential



Industrial



Commercial

STREET



Water



Parking



Street Lighting



Waste



Environment



People



Street Furniture



Safety and Security



Traffic

Cisco Smart+Connected Communities Solutions

6

Cisco Smart+Connected™
Data analytics



7

Cisco Smart+Connected™
Operations Center



1

Cisco Smart+Connected
Parking



2

Cisco Smart+Connected
Traffic



3

Cisco Smart+Connected
Safety and Security



4

Cisco Smart+Connected
Urban Mobility



5

Cisco Smart+Connected
Lighting

COMMON DATA LAYER: Smart+Connected Digital Platform

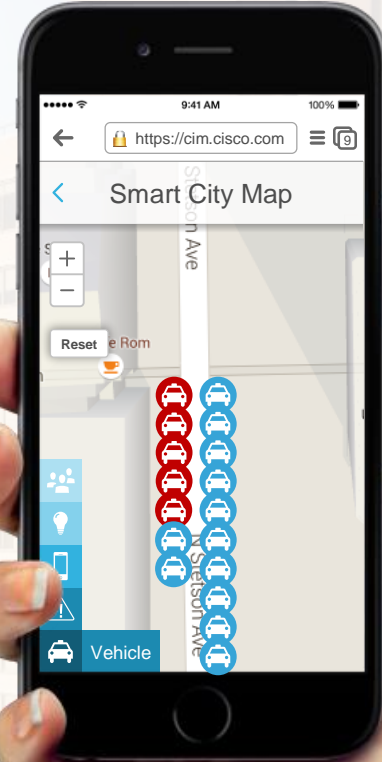
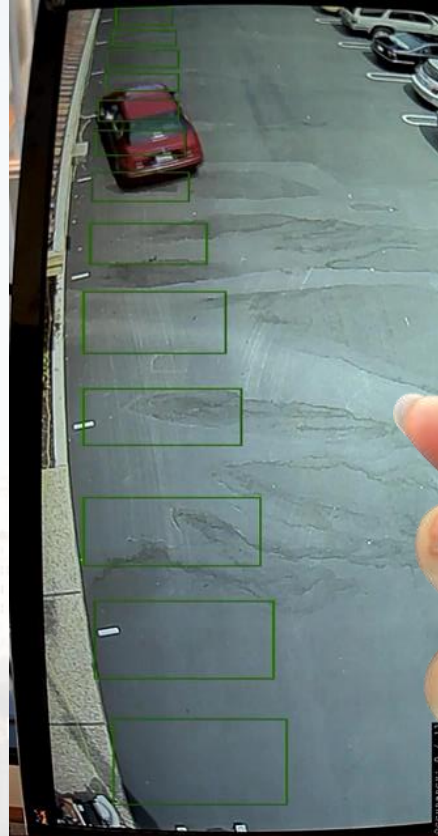
SHARED INFRASTRUCTURE: Digital Network Architecture for Cities

Parking Applications for Citizens

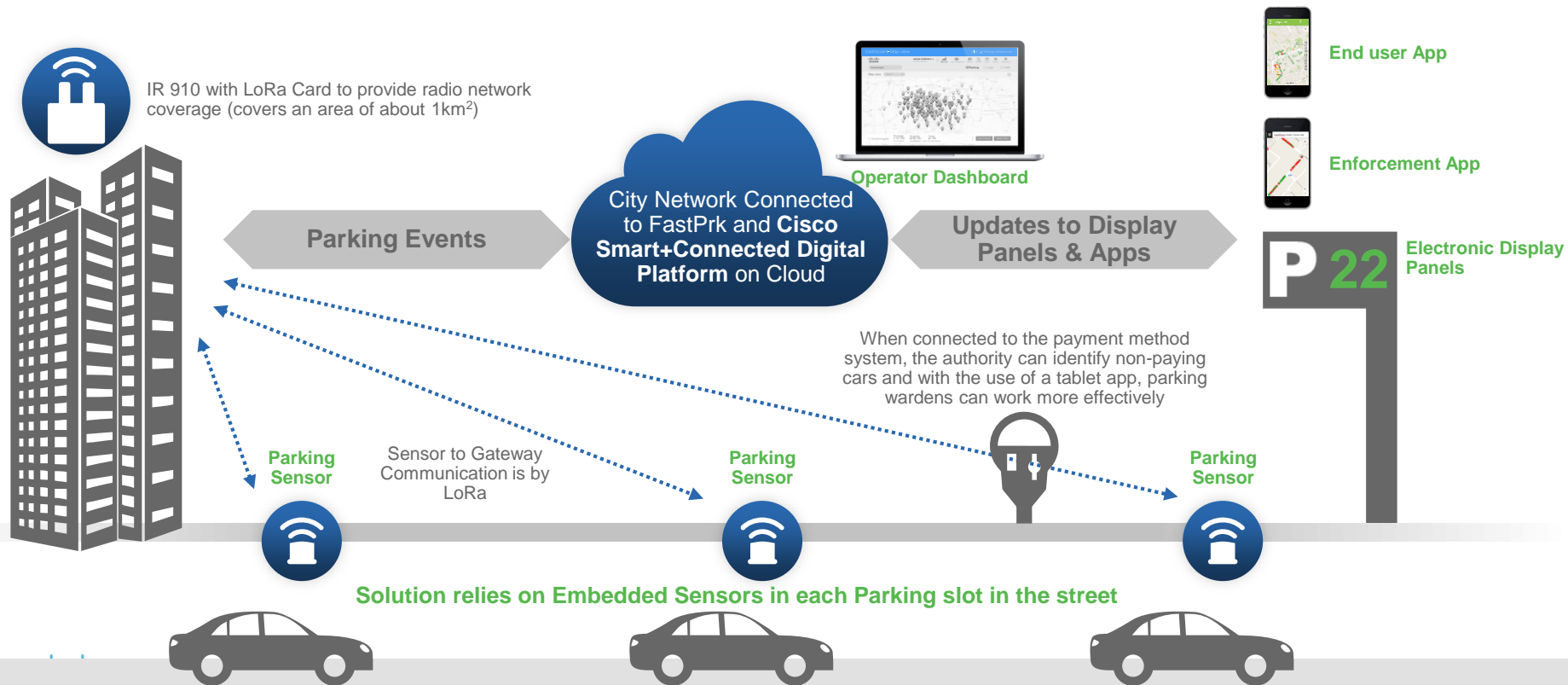


Available Parking
Landing Screen
Screenshot

Parking Applications for Operators



In-ground sensor based Solution: How It Works?



Parking Sensor details



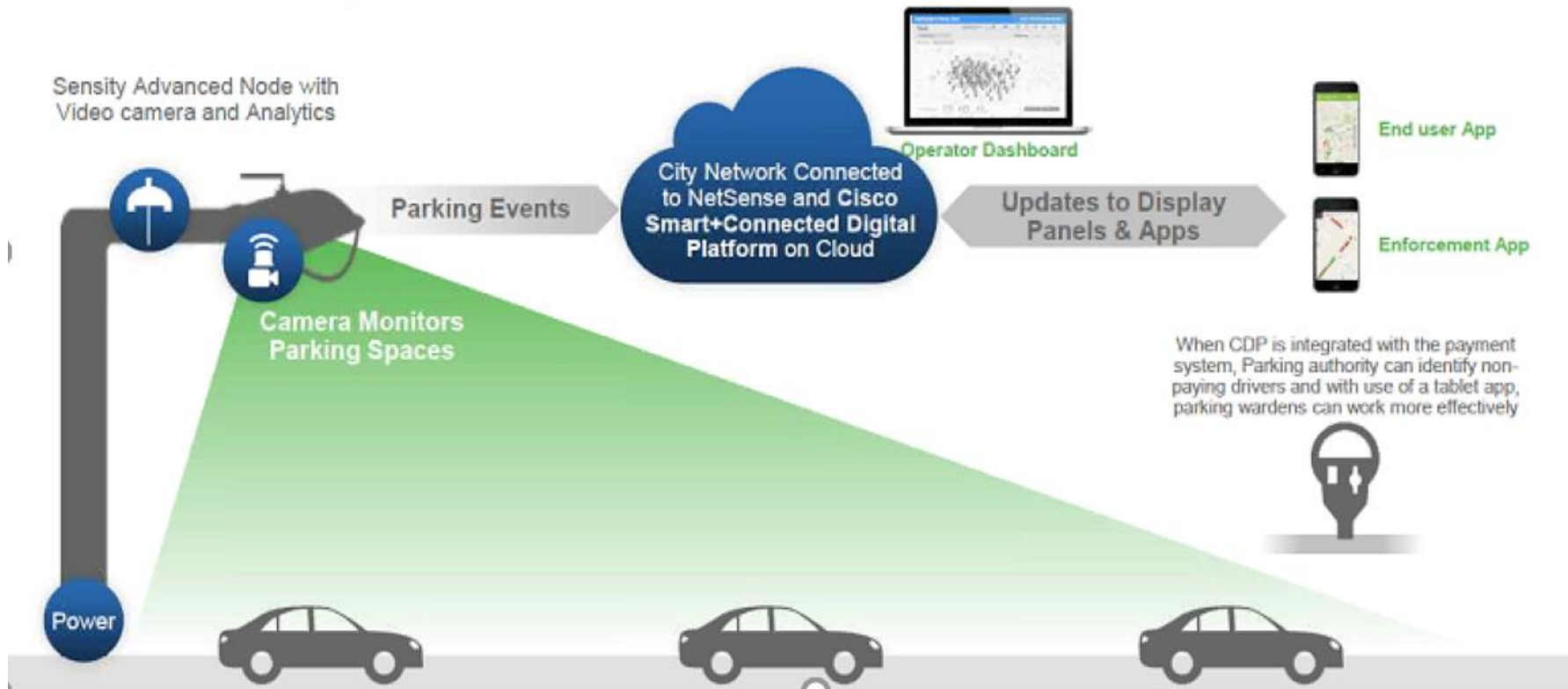
- Advanced magnetic sensor to detect occupancy of on-street and off-street parking spaces.
- Can be easily mounted on the surface or embedded in the center of parking slots.
- Its wireless design and battery operation ensures low-cost installation with fast and flexible deployments.

Key Features:

- High reliability of 98%
- No repeaters needed
- 5 to 10 years battery life
- Easy installation and deployment

TYPE OF DETECTION:	Magnetic detection
OPERATING FREQUENCY:	ISM sub-GHz bands
SENSOR DIMENSIONS:	Flush: 110x60mm Surface: 186x28mm
ANTENNA CONNECTION:	Internal antenna included
WEIGHT:	Flush: 376 g Surface: 452 g
PROTECTION:	IP67, completely sealed; polycarbonate housing
OPERATING TEMPERATURE:	-30 +70°C
STORAGE TEMPERATURE:	-30 +70°C
HUMIDITY:	0-100%
COMMUNICATION RANGE:	From Sensor to Gateway up to 500m depending on line-of-sight

Video Analytics based Solution: How It Works?



Video Node



Dual 720p video
camera support

1.2 Mega pixel, 1280x720
resolution, 30 FPS



Advanced Node



Dedicated video analytics
processor (equivalent
processing power to quad core
ARM)

Video storage (64–256 GB)



Cleverciti
Systems

Legacy Lighting

Waste of Real Estate

Bad for the Environment

Hard to Maintain

Inefficient

Expensive



Different Types of Lights:

Based on IOT World Forum Chicago Live Pilot Network

CISCO LIGHTING OFFER

	Legacy Light	LED	Networked LED	Converged Lighting Infrastructure
Annual energy consumption per light*	\$377	\$145	\$115	\$115
Lifespan of lighting hardware (years)	2	10	10	10
10 year maintenance per light	\$375	\$75	\$75	\$75
Scheduled lighting control, dimming, management	✗	✗	✓	✓
Occupancy based real time control	✗	✗	✗	✓
Visual sensors, onboard analytics	✗	✗	✗	✓
Multiple sensors, data, application enablement	✗	✗	✗	✓

City Lighting Solution

LIGHTING CONTROL NODE

LED Driver

DALI / 0-10 V

Mounting

Internal - Inside the luminaire
External – On the Pole (on request)
External - NEMA Connector (in development)

Communication

2.4 Ghz IEEE 802.15.4
Self-Forming Wireless Mesh Network

Controller Ratio

1 Gateway for 250 Controllers (250:1)

Compatibility

Seamless Communication with Adaptive Light Node
Seamless Multi-Sensing Hub Integration



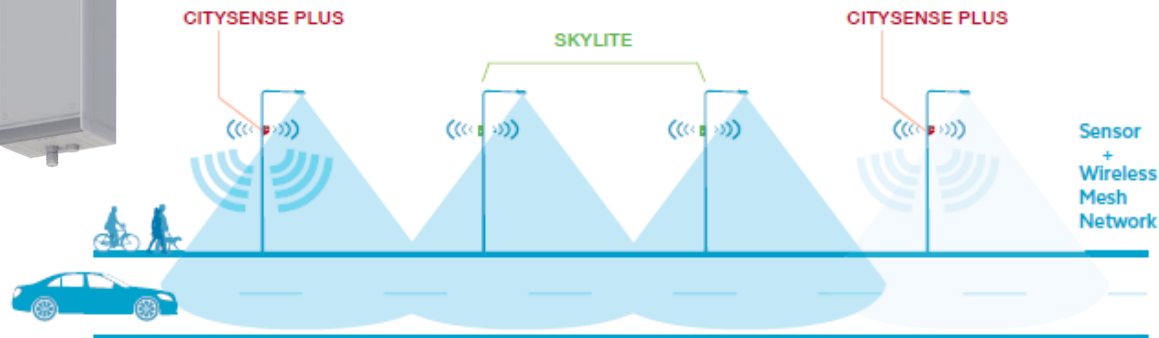
ADAPTIVE LIGHTING NODE

Presence Detection

Advanced Motion-Sensing
Detection - Pedestrian, Bicycles, Cars

Safety Circle of Light

Each Node can trigger 2-20 neighboring
Light Points upon detection





Cisco Smart+Connected Traffic

Solution

1. Gather real-time data from any sensing source (Video, Wi-Fi, Bluetooth, vehicle sensors, others)
2. Analyze traffic data
3. Provide finished applications (which utilize the data) to key stakeholders to improve decision making

For Citizens: A smartphone application to view real-time traffic information, along with predicting the time to their destination

For City Officials: Real-time data on

- Travel times between two points and vehicles' average speed
- Traffic intensity and passage time through toll gates
- Alarms for detection of incidents and congestion
- Information to design origin-destination matrixes and traffic density predictions



Cisco Smart+Connected Traffic – Use Cases

Core Traffic



1. Congestion

- i) Flow
- ii) Congestion
- iii) Bottlenecks



2. Events & Incidents

- i) Breakdowns
- ii) Accidents
- iii) Road Works



3. Violations

- i) Lane
- ii) Speed
- iii) Wrong Way

Cross-Domain



1. Parking

- i) Enable/Disable
- ii) Violations



2. Lighting

- i) Schedules
- ii) Maintenance



3. Safety & Security

- i) Stolen Vehicles
- ii) Unattended Bag

Other solutions

- Environmental sensing
- Video analytics
 - Safety and Security
 - Traffic Analyzer
- Open Data analytics
- Social Media data analytics

Environmental sensing

- Industrial gas sensors like :NO₂, NO, CO, CO₂, SO₂ etc
- Noise
- Temperature
- Humidity
- etc



KiwiVision® Video Analytics



Video Control Center





USE CASES



City Infrastructure



Safety Security



Urban Mobility



Citizen Engagement

SAMPLE ANALYTICAL SCENARIOS



Crime rate

Find out the correlation of crime rate in an ally with the lighting condition at the time of crime.



Energy

Measure and monitor the consumption of energy in buildings to better manage the consumption.



Environment

Understand how atmospheric conditions like humidity, light etc. affect consumption of a resource.



Parking

Determine wait time to get a parking spot along with the peak and non-peak hours for overall parking lot.

ATLANTIS ANALYTICS

mtuity
A PARADIGM COMPANY

mail: info@mtuity.com

Health: 83% - Average
All systems running optimally

Environment

Health: 100% - Excellent
All systems running optimally

Mobility

Health: 18% - Poor
All systems running optimally

Waste Management

https://cdp-doll.cisco.com/app/?landingview



*Initial Set of Certified Domains and Partners

PARKING	LIGHTING	ENVIRONMENTAL	WASTE	ENGAGEMENT	URBAN MOBILITY	
					TRAFFIC	TRANSIT
Worldsensing	Sensity Lighting	Worldsensing	SamTech	Elevate Digital*	Sensity Traffic	Placemeters
Sensity Parking	ICE Gateway	PAQs	Smart Bin*	SAP	Worldsensing (bitcarrier)	Cisco CMX
Frog	Flashnet	Smart Sense	Enovo*	Map Unity	Inrix	CMX Meraki
Mobilisis	MindTek	Auriga			Rhythm Engineering*	MSC
CivicSmart	Acuity	Bruitparif (Noise)*			3M*	TCS Insights
Altuix	Tvilight*	Breezometer*			Esri*	Davra Networks
Nexpa	Cimcon*	Libelium*			PTV*	
Kiunsys	Namoo*	Leapcraft*			Graphmasters*	
Metro Infrasy		Bosch*				
Cleverciti*						
Paradox						
eSmart21						
pParkE						



- * Initial set of certified partners, subject to change
- *Certification WIP



10 Smart+Connected Digital Platform Global Deployments

Kansas City, Missouri

Improving production with communications and Insights

April 14, 2016

Business Objectives

- Deliver a new generation of urban services for city agencies, citizens, and businesses
- Create scalable, repeatable, and self-sustainable framework

Solutions

- **Smart+Connected DCI, Smart+Connected Lighting** with Smart+Connected Nodes, interactive digital kiosks, smart water initiatives
- An open data portal that gathers and shares information across a network of sensors and services.
- Partners: Sprint, Sensity, Mark One, Black and Veatch

Business Outcomes

- Thought leadership position as a smart city - Shortlisted for USDOT's Smart City challenge
- Target energy savings of 50% in lighting



“The Smart+Connected Digital Platform will improve the livability, connectivity, efficiency and economic vitality of Kansas City in ways we cannot yet even imagine, and for generations to come”

Sly James, Mayor
Kansas City, MO

Adelaide, Australia

Improving production with communications and Insights

April 14, 2016

Business Objectives

- Stimulate local economy by attracting people to City Center businesses
- Lower connectivity costs for mobile government employees
- Improve government efficiency; provide a foundation for smart city solution; City Digitization

Solutions

- **Smart+Connected DCI, Smart+Connected Parking, Smart+Connected Lighting**
- Partners: IINET, Sensity, eSmart21

Business Outcomes

- Smart parking operations with a citizen mobile app and city-wide free Wi-Fi
- Visibility to revenue stream and protection of parking revenue
- Foundational network and CDP in place, city can scale to additional use cases through partnership with local SP



“Adelaide City Council is committed to increasing the number of people who come to live, work, study, do business, relax and enjoy our City. Our Smart City pilots will help us demonstrate the value of a sensor-connected infrastructure to deliver new and improved citizen experiences. We want to empower and engage our residents, to deliver new City experiences, to share and optimize our City data to support new business development and entrepreneurs and to attract new investment into the City. Becoming a smart, connected and networked city will deliver this ambition.”

Jane Booth, General Manager City and Organisational Development Adelaide City Council

Jaipur Development Authority

Jaipur Relies on IoE Capabilities to Enhance Management of Environment, Traffic, Safety and Security

April 14, 2016

Business Objectives

- Bridge Digital Divide
- Enable Citizen Engagement
- Improve Public Safety

Solutions

- CDP with Smart+Connected DCI network infrastructure, Smart+Connected Lighting and Environmental monitoring
- City surveillance (Smart+Connected Operations Center)
- Kiosks and REGS
- Partners: L&T, Sterlite, DVois

Business Outcomes

- 2000 citizens on Wi-Fi everyday
- Improved government service delivery
- 30% less footfall into government due to REGS



“My vision for the state is to digitally empower every citizen to enhance the quality of life, enable ease of doing business in the state and become an innovation and knowledge hub of the country. ‘Digital Rajasthan’ is a powerful platform to realise that vision. We envision Rajasthan as a role model for digital transformation for other states to follow. The state of Rajasthan recognises the effort of Cisco to help us lead in this transformation.”

Vasundhara Raje
Honorable Chief Minister of Rajasthan

Chalkida Smart City pilot

- Smart Lighting
- Smart Parking
- Cisco CDP
- Environmental (phase II)







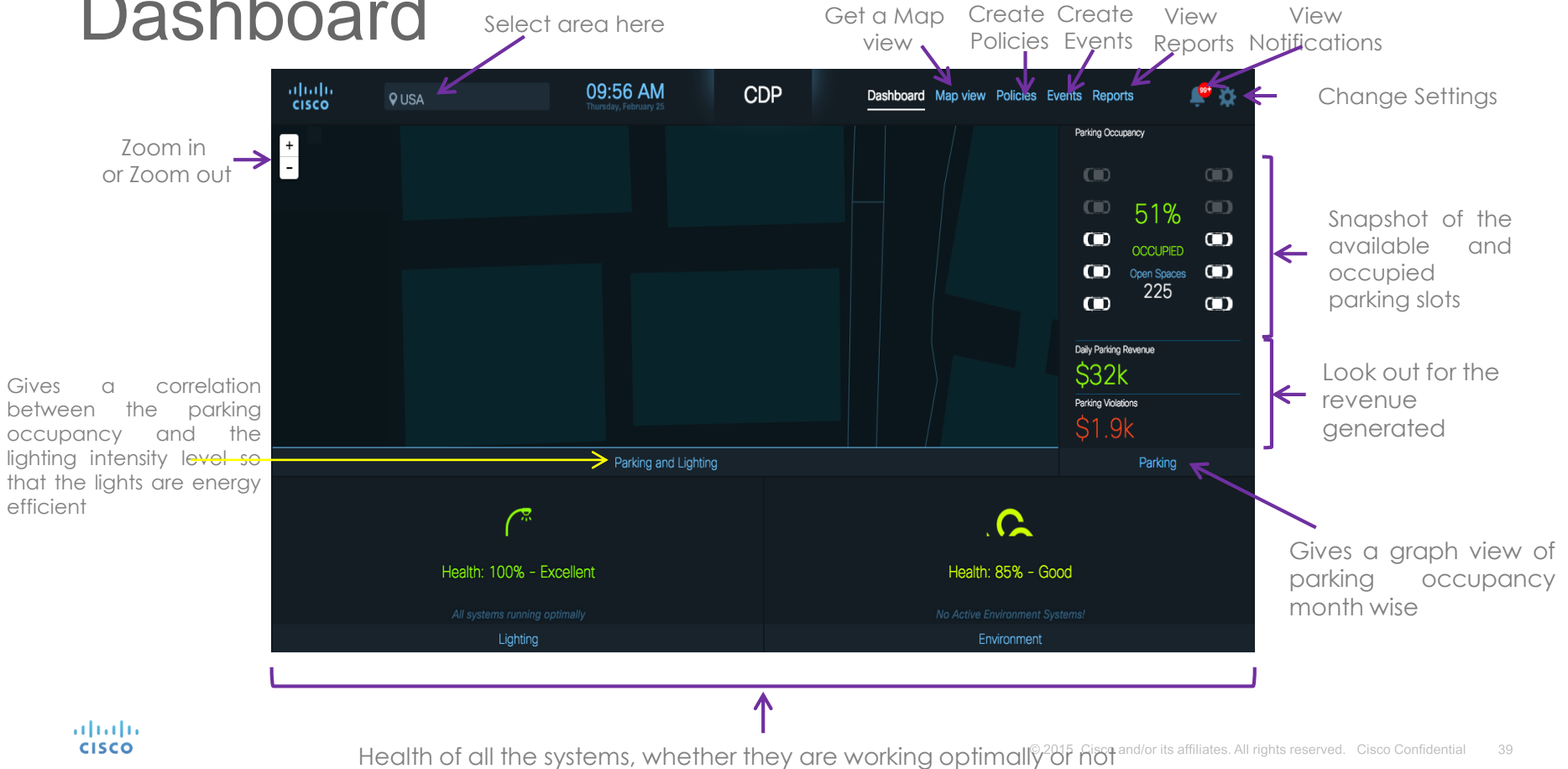
CISCO

TOMORROW starts here.



Backup slides

Dashboard



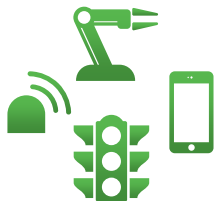
Pay-as-You-Grow, As-a-Service Offering Models



Multiple Domains
Multiple Vendor and Sensor Types



Single Domain
Multiple Vendors and Sensor Types



Single Domain
Single Vendor and Sensor Type

Solution Components



3 3rd Party
Sensors



2 Cisco Data Plan



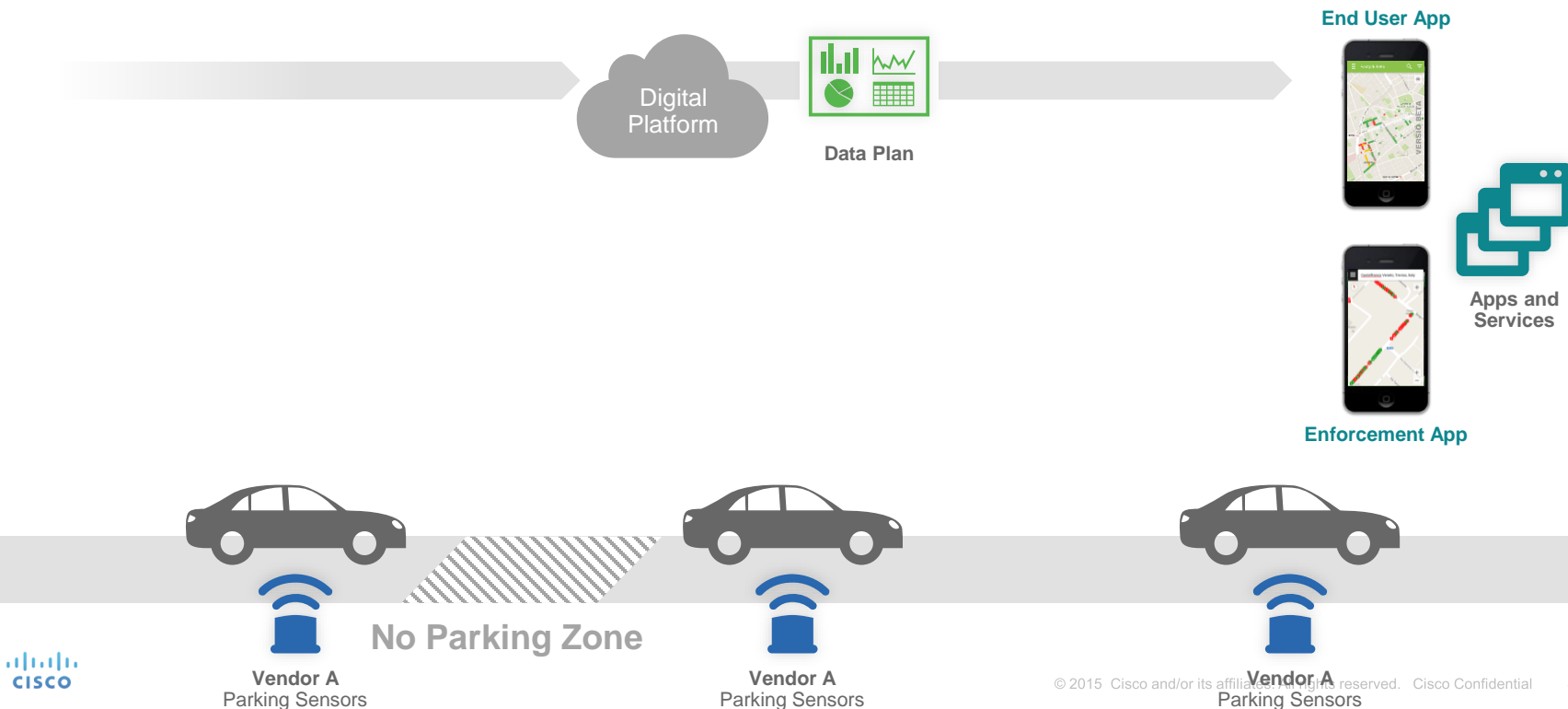
4 3rd Party
Apps and Services



1 Cisco Infrastructure/Core Networking

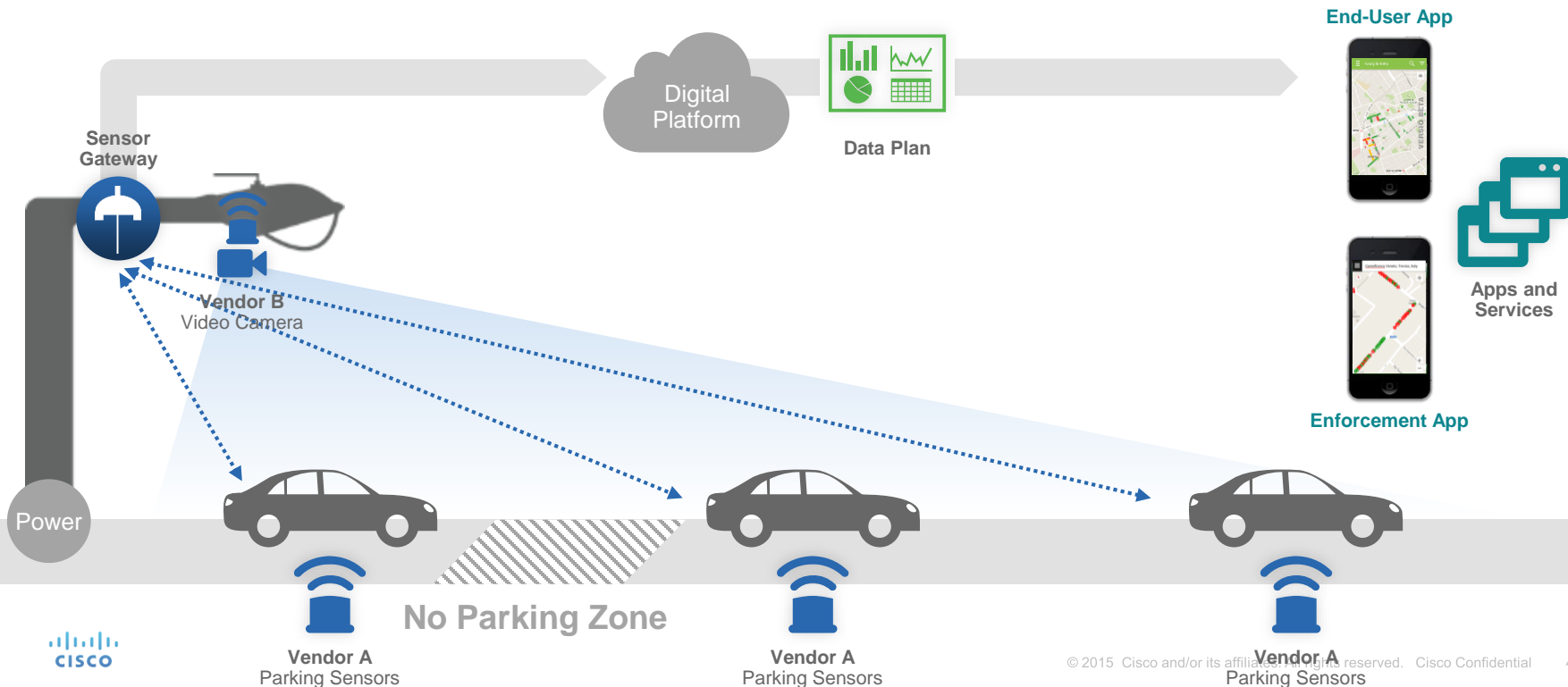
Things “as-a-service”

Base Offering Providing Data as-a-Service for a Single Domain



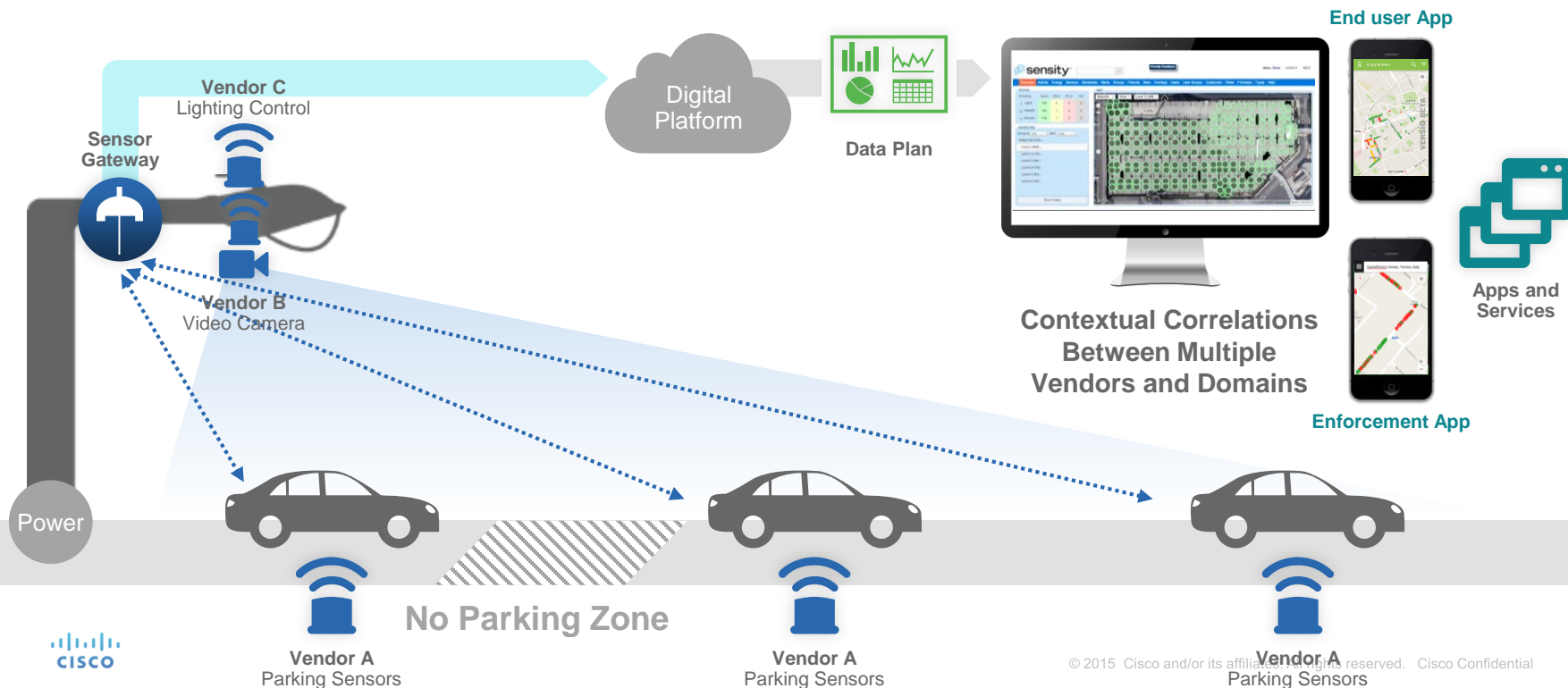
Domain “as-a-service”

Normalizing Data from Different Vendors within a Single Domain



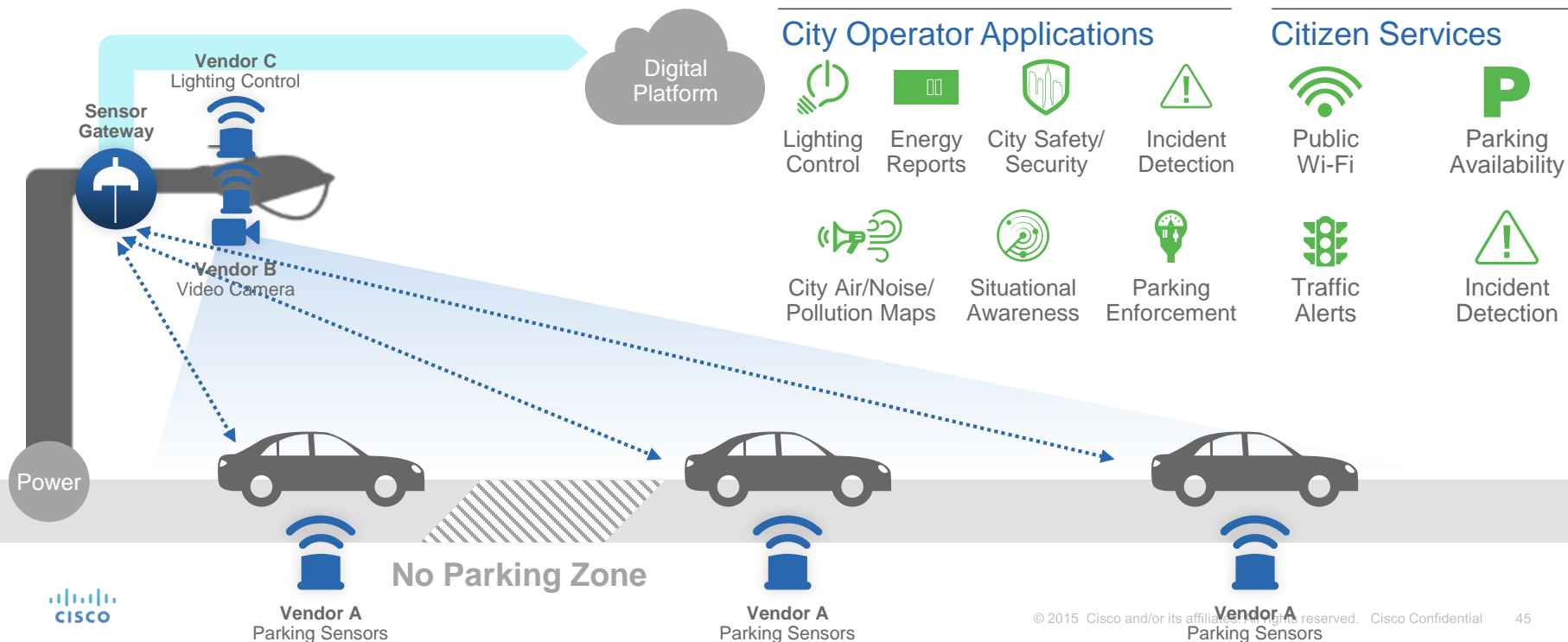
Business APIs “as-a-service”

Enabling Contextual Correlations Between Domains

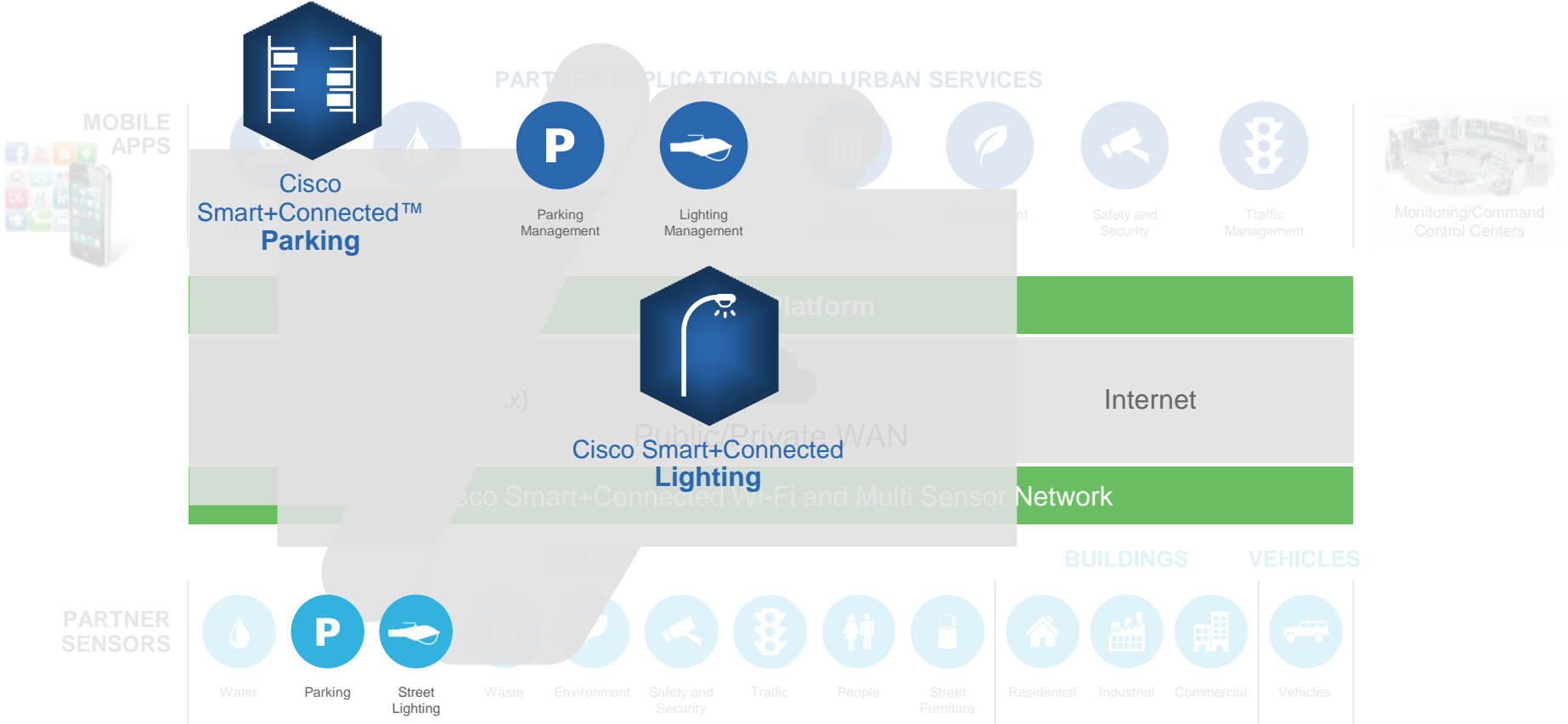


Business APIs “as-a-service”

Enabling Contextual Correlations Between Domains

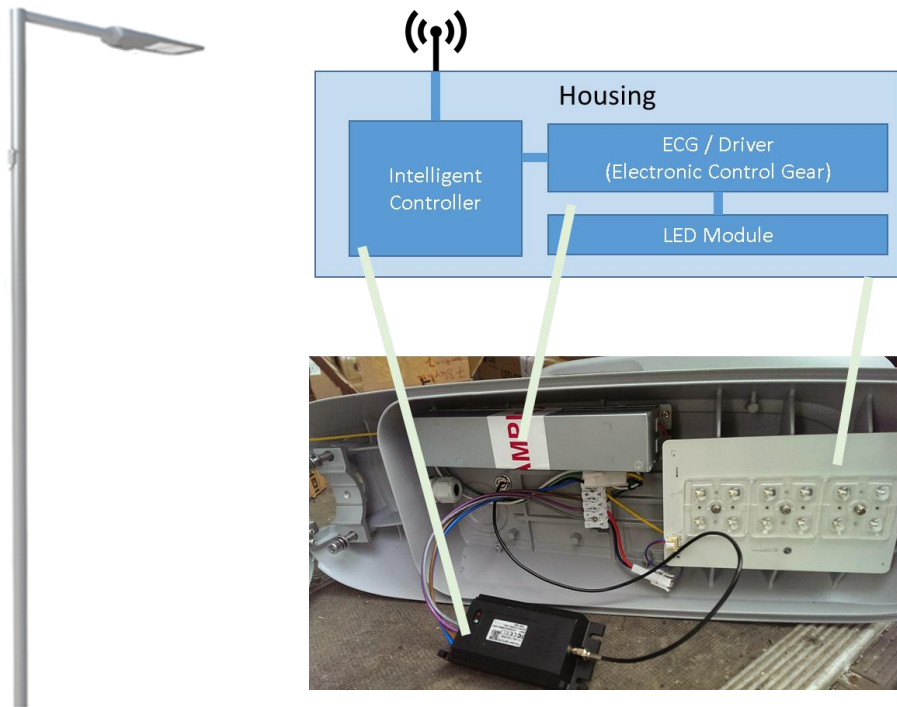


Cisco's end-to-end value proposition through an integrated, extensible platform



Smart Connected Lighting Solution Components

Lighting Components



Housing

Often die-cast aluminum or steel.
The primary product of luminaire manuf.

ECG / Driver

Drives the current into the LED module.
Either purchased or manufactured

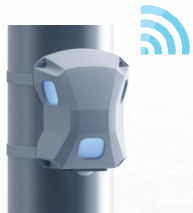
LED Module

Direct-current semi-conductor.
Either purchased or manufactured

Intelligent Control

Remote dimming control, fault monitoring.
Can be inside luminaire, or on the pole.

Cisco's Smart+Connected City Light Control Nodes



CitySense

Outdoor occupancy sensor

Wireless node

Lighting controller

Enables dynamic lighting
("Light on Demand")



SkyLite

Wireless node

Lighting controller

Mounting Options:

Internal

External (Pole Mount, NEMA)



Gateway

Easy mounting on pole

WiFi, 3G or Ethernet

200:1 node-gateway ratio

Cisco CitySense Node



CitySense Node (External)

Advanced Detection
Technology

Light on Demand –
Presence Based Adaptive
Lighting

Inbuilt Astronomical Clock
with Backup Battery

Universal Lamp
Compatibility

2.4 GHz IEEE 802.15.4 self-
forming, self-healing wireless
network

DALI or 0–10v Driver

IP 65

Pole Mount

Wireless Compatibility with
SkyLite

Cisco SkyLite Node



Parameter	Internal	External	NEMA
			
Antenna	External	Built-in	Built-in
Product Mounting	Inside luminaire	On-the-Pole	NEMA Socket
Dimming Control	0-10V or DALI; software switchable		
IP Rating	IP20	IP 65	IP 65
Product Compatibility	Wireless compatibility with CitySense		
Wireless communication	2.4 GHz, IEEE 802.15.4 self-forming self-healing wireless network		

Cisco Twilight Gateway



Twilight Gateway

2/3/4G (GSM), WiFi or
Ethernet Backhaul

Class II: Overload, Short-
circuit and Over-temperature
protection

200:1 Node to Gateway
Ratio

Pole Mount

2.4 GHz IEEE 802.15.4 self-
forming, self-healing wireless
network

IP 65

Wireless Compatibility with
all Twilight Products

Applications



City Manager

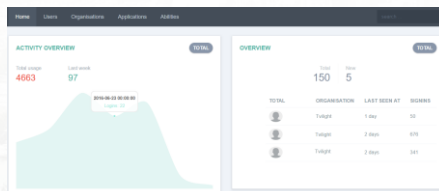
Configuration, management and monitoring of lighting infrastructure.

Report on energy savings, maintenance status and system health.

Online provisioning of system



Passport



Passport

Create users & organizations.

Manage access policies per user, role, organization.

API & application access control



Scan and Go

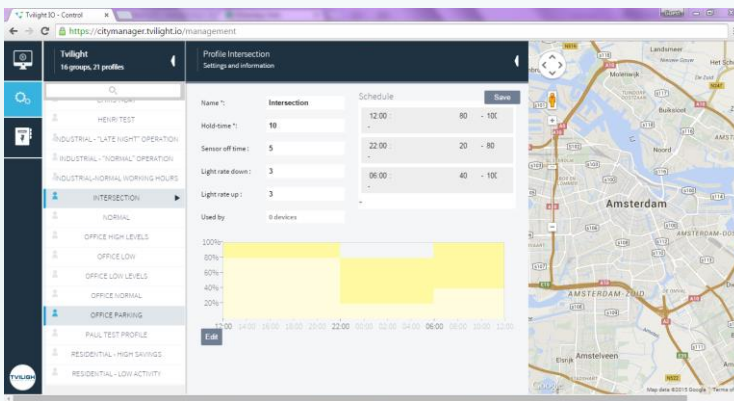
In-field acquisition of device location

Simple and intuitive, usable by hard-hat workers.

Available for IOS

City Manager

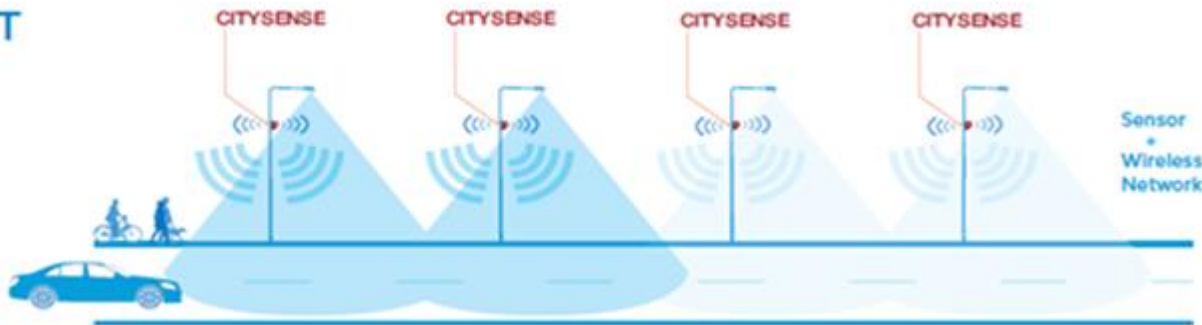
- ✓ User-friendly (Google Maps)
- ✓ Individual generation and management of dimming profiles
- ✓ Automatic failure reports
- ✓ Precise power usage and savings
- ✓ Statistics and analysis of the entire lighting infrastructure
- ✓ Different user profiles and logging of changes
- ✓ 'Heatmap' to indicate traffic-density (under development)



Solution Architecture

FULLY INTELLIGENT

Only CitySense



Target locations

- Low-traffic areas
- Parking lots
- Residential areas
- Bicycle roads
- Highway ramps
- Train stations
- Campuses

Benefits

- Maximum possible energy savings. Typical between 65-75%
- Best possible coverage; use where traffic patterns are unpredictable (such as parking lot).
- Collect high-resolution occupancy data.

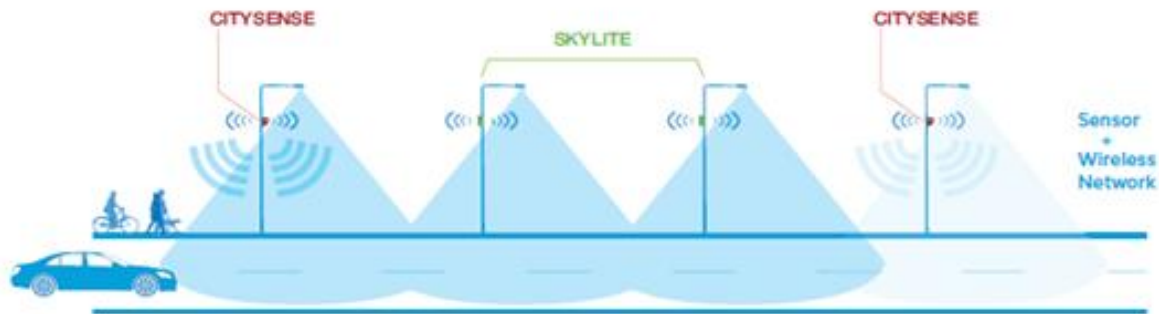
Installation

- Requires some upfront planning.

Solution Architecture

STANDARD

CitySense + SkyLite



Target locations

- Low/medium-traffic areas
- Secondary roads
- Residential areas
- Bicycle roads
- Highway ramps
- Industrial areas

Benefits

- Great possible energy savings. Typical between 60-70%
- Balance between functionality & savings
- Best-case for straight roads.

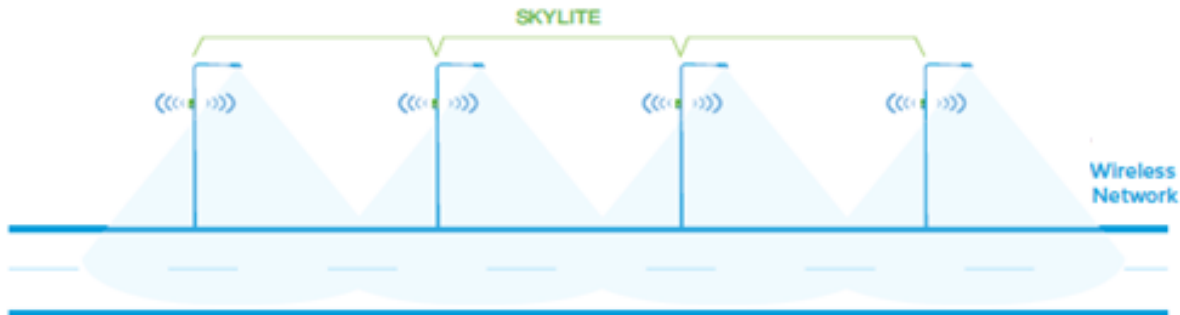
Installation

- Cooperation required between SI municipality & supplier

Solution Architecture

BASIC

Only SkyLite



Target locations

- High-traffic areas
- City Centre
- Secondary roads
- Residential areas
- Highway ramps
- Industrial areas

Benefits

- Typical energy savings 40-50%
- Most economic solution
- Great value for investment proposition
- Best-case for straight roads.

Installation

- Minimum engineering effort
- Simple installation and provisioning
- Fast deployment and easy to scale

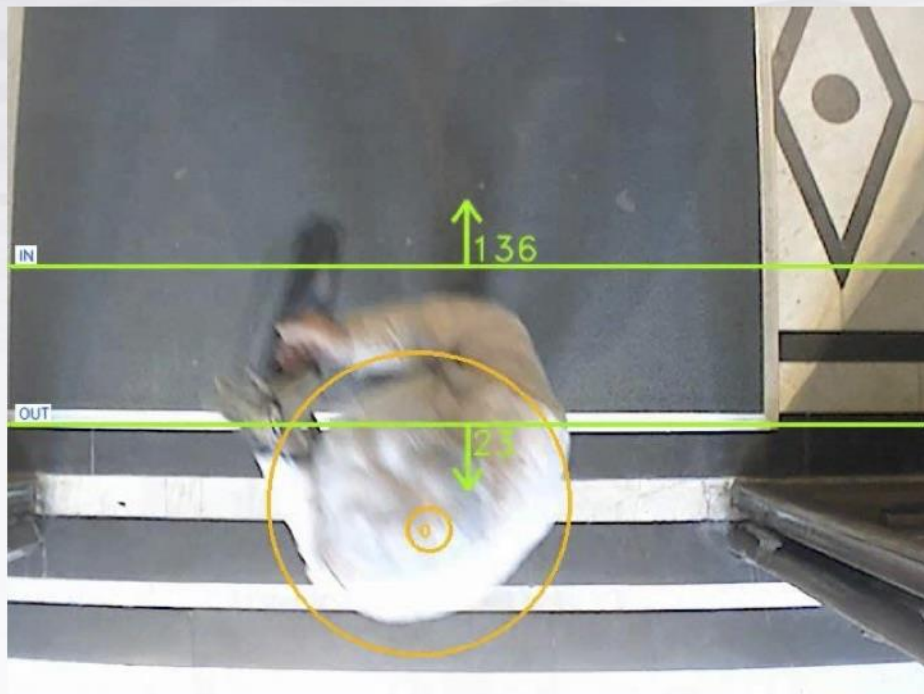


KiwiVision® Queue Detector

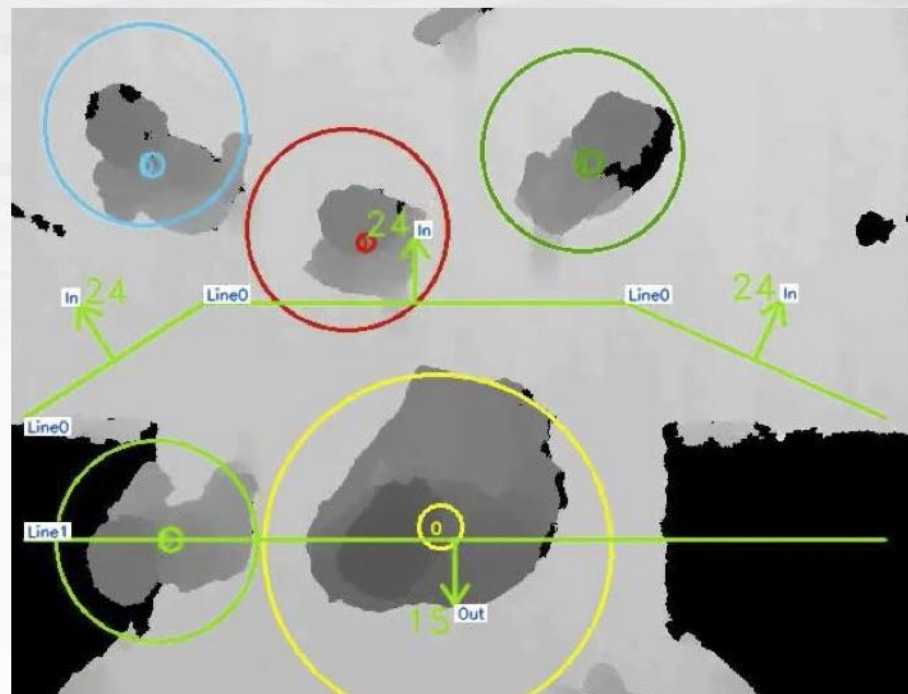
Automatically analyzes queues in order to detect overcrowding.

Fields of Application:

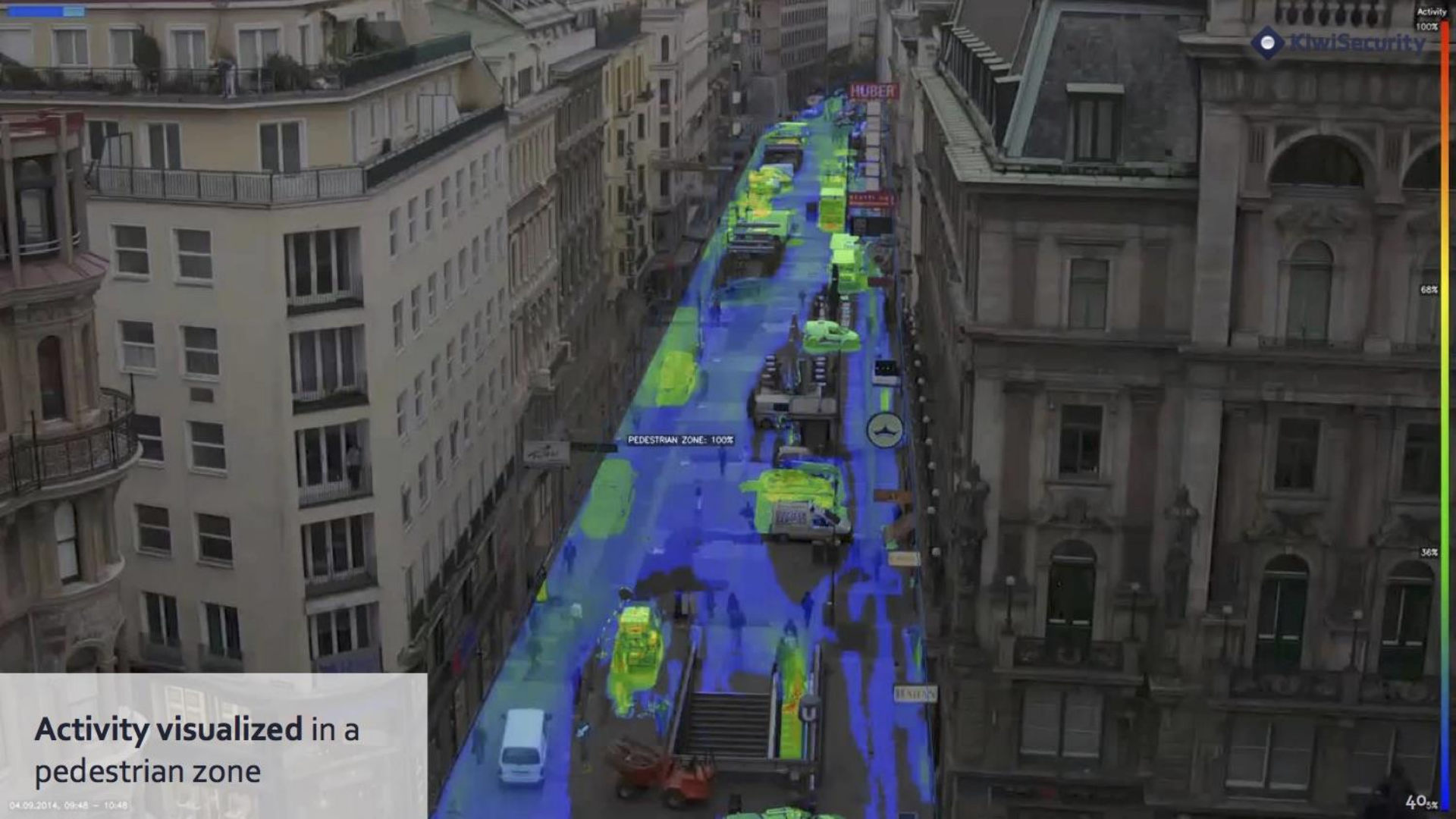
- ◆ Airports: Passport check, check in, boarding
- ◆ Retail: Cash desks, emergency exits
- ◆ Concerts, sports events: entrances, exits



People Counter



People Counter 3D



Activity visualized in a
pedestrian zone



KiwiVision[®] Traffic Analyzer

Automatically counts and classifies vehicles on the road

Fields of Application

- ◆ Freeways, highways, urban traffic
- ◆ Parking lots, garages
- ◆ Commercial premises





Intersection

- ◆ 4 lanes
- ◆ counting
- ◆ classification

Time Range	5 Minutes	1 Hour	1 Day	Classification	Two-Wheeler	Car	Truck/Bus
Lane 1	4	4	4	Lane 1	0	3	1
Lane 2	1	1	1	Lane 2	0	0	1
Lane 3	0	0	0	Lane 3	0	0	0
Lane 4	3	3	3	Lane 4	0	2	1
Total	8	8	8	Total	0	5	3



KiwiVision® Privacy Protector

Worldwide patented solution for privacy-protected video surveillance

Fields of Application:

- ◆ Public video surveillance (schools, universities, public places)
- ◆ Businesses with semi-public areas shopping malls
- ◆ Companies

