Smart+Connected Communities

Nikos Lambrogeorgos

nlambrog@cisco.com

Senior Account Manager

Public Sector, Greece & Cyprus

SUSTAINABLE ENERGY WEEK

Agenda

Citizen Engagement Drives City Growth and Prosperity

Smart+Connected City Solutions

Wi-Fi: A shared infrastructure for urban services, Smart+Connected Parking

Smart+Connected Lighting, Smart+Connected Traffic,

Smart+Connected Enviroment, Data Analysis

Case Studies

Smart City

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

Open data, Environment, People centric, Citizen engagement, Participation

CISCO

Smart city behind technology

- **Recognition**

Allowing personalized recognition between people and systems

- **Location**

Providing context-aware, location-based information for efficient and engaged movement

- **Sensing**

Observing, understanding and anticipating the world around us, from the movement of people to the quality of our environment

- **Transactions**

Creating secure, convenient methods to pay for goods and services
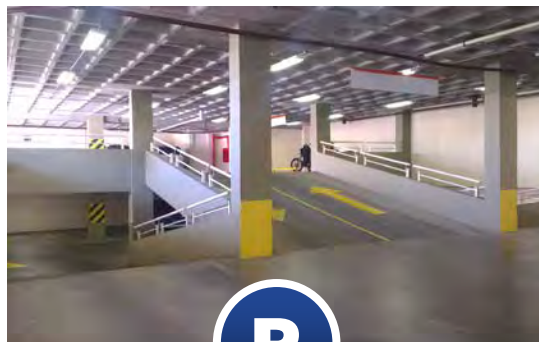
- **Connectivity**

Linking people to services, resources, amenities and each other

- **Integration**

Enabling different systems, information sources and data types to work togeth

http://www.labcities.com/6-technologies-redefining-smart-city/

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

Parking & Traffic

Utilities

Smart+Connected Digital Platform (CDP)

Safety and Security

Environment

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

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

City WiFi

More on your bottom line

It's been proven time and time again, people will spend **more time and more money** in a venue that offers reliable, free WiFi.
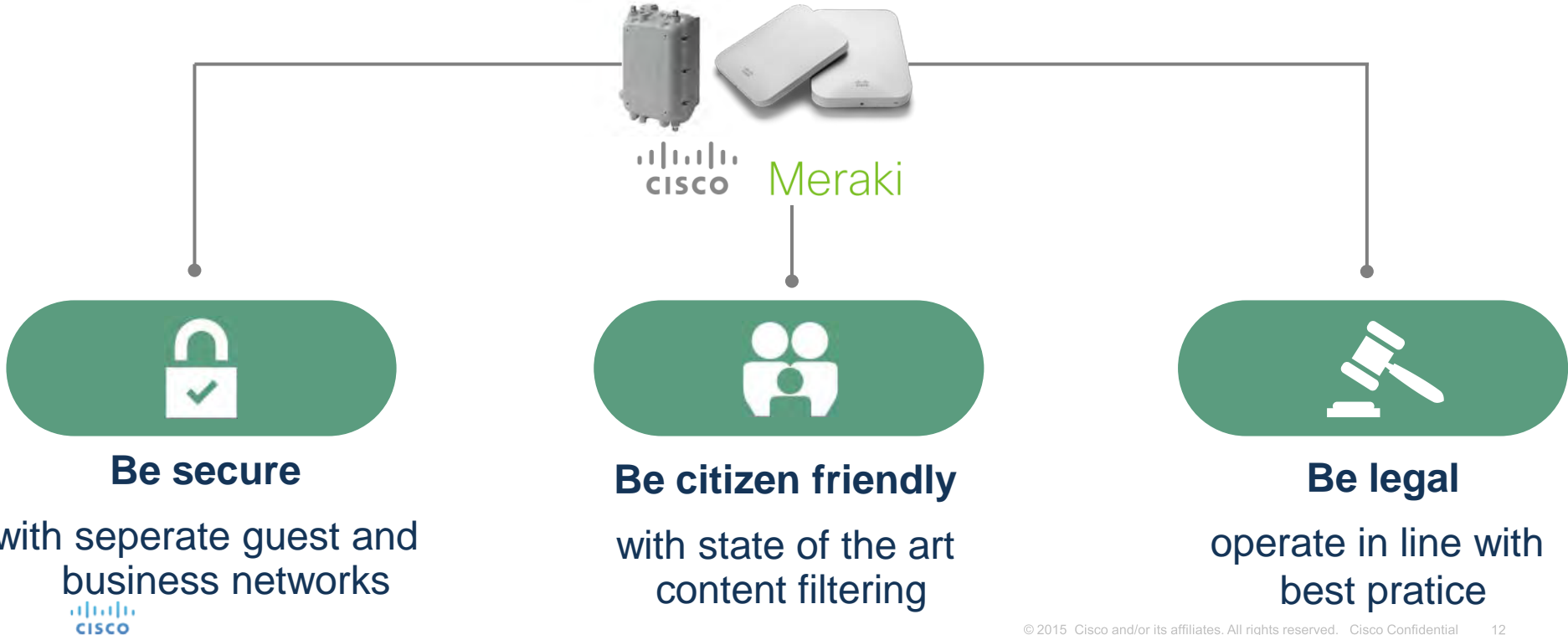
78% preferred venues that offered free guest WiFi

77% would stay longer in a location that provided WiFi
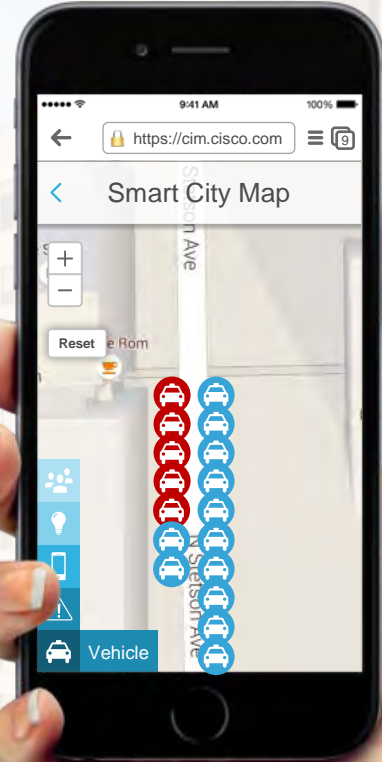
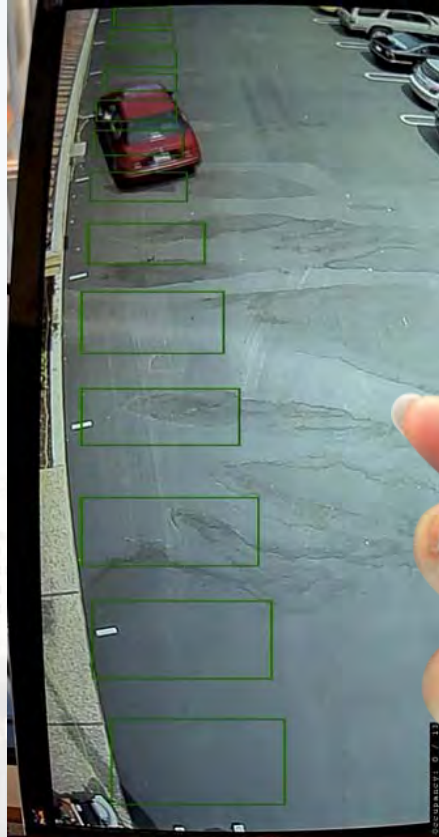**63%** said they are more likely to spend additional money there

Cisco WiFi solutions

CISCO Meraki
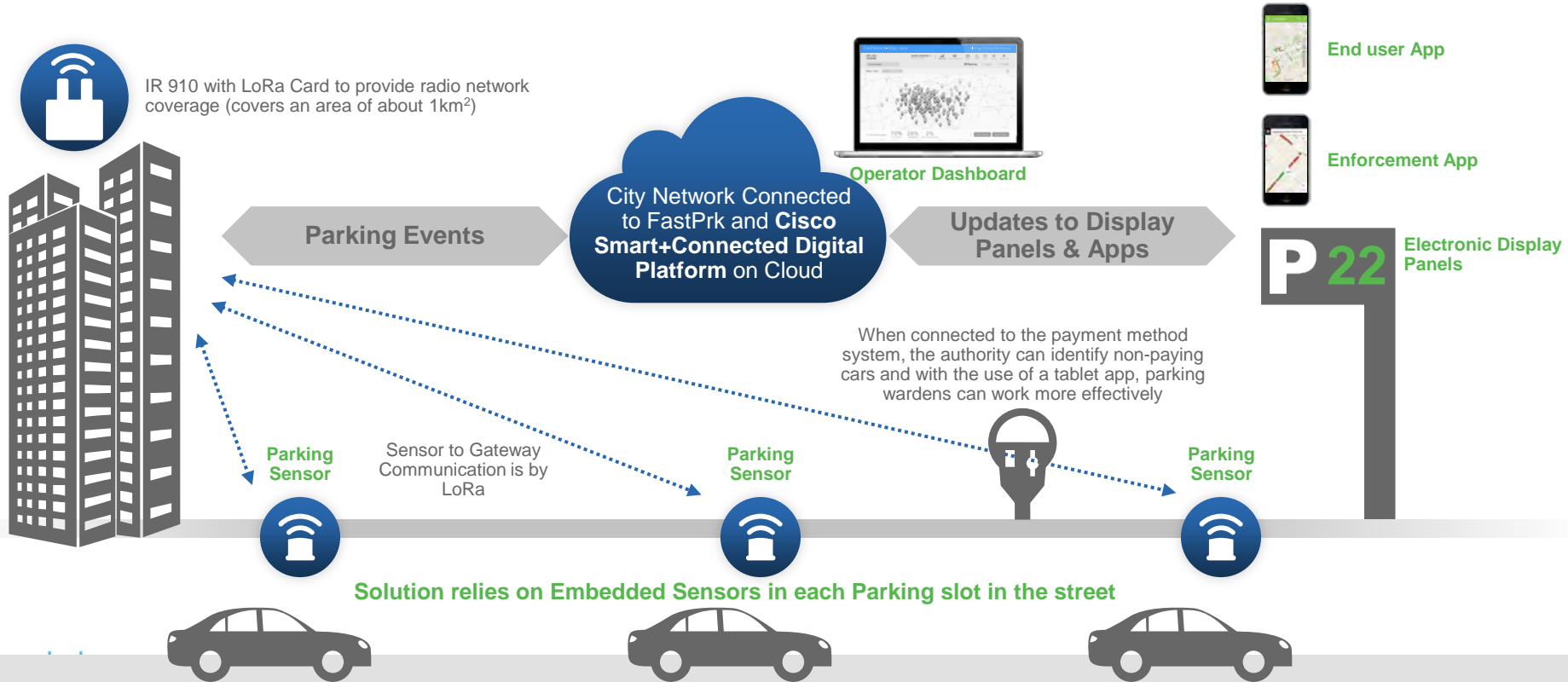
Be secure

with seperate guest and business networks

Be citizen friendly

with state of the art content filtering

Be legal

operate in line with best pratice

Parking Applications for Citizens

Parking Applications for Operators

In-ground sensor based Solution: How It Works?

IR 910 with LoRa Card to provide radio network coverage (covers an area of about 1km^2)

Operator Dashboard

End user App

Enforcement App

Parking Events

City Network Connected to FastPrk and **Cisco Smart+Connected Digital Platform** on Cloud

Updates to Display Panels & Apps

Electronic Display Panels

P 22

When connected to the payment method system, the authority can identify non-paying cars and with the use of a tablet app, parking wardens can work more effectively

Parking Sensor

Sensor to Gateway Communication is by LoRa

Parking Sensor

Parking Sensor

Solution relies on Embedded Sensors in each Parking slot in the street

Parking Sensor details

fastprk
SURFACE SENSOR

fastprk
FLUSH-MOUNTED SENSOR

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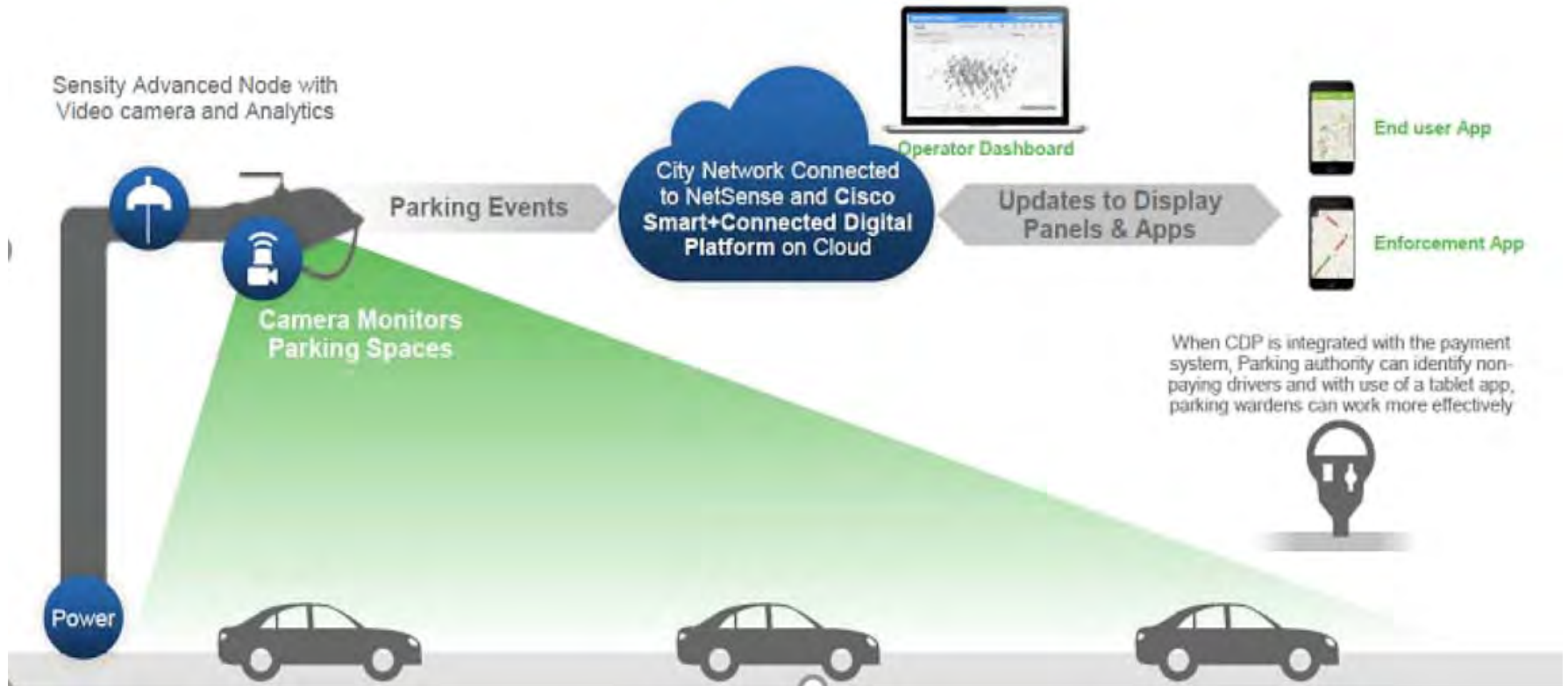
Key Features:
- High reliability of 98%
- No repeaters needed
- 5 to 10 years battery life
- Easy installation and deployment

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

WORLD SENSING

Video Analytics bases Solution: How It Works?

Sensity Advanced Node with Video camera and Analytics

Parking Events

City Network Connected to NetSense and Cisco **Smart+Connected Digital Platform** on Cloud

Operator Dashboard

Camera Monitors Parking Spaces

Updates to Display Panels & Apps

End user App

Enforcement App

Power

When CDP is integrated with the payment system, Parking authority can identify non-paying drivers and with use of a tablet app, parking wardens can work more effectively

Video Node

Advanced Node

Dual 720p video camera support

1.2 Mega pixel, 1280x720 resolution, 30 FPS

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

Video storage (64–256 GB)

Legacy Lighting

Waste of Real Estate

Bad for the Environment

Hard to Maintain

Inefficient

Expensive
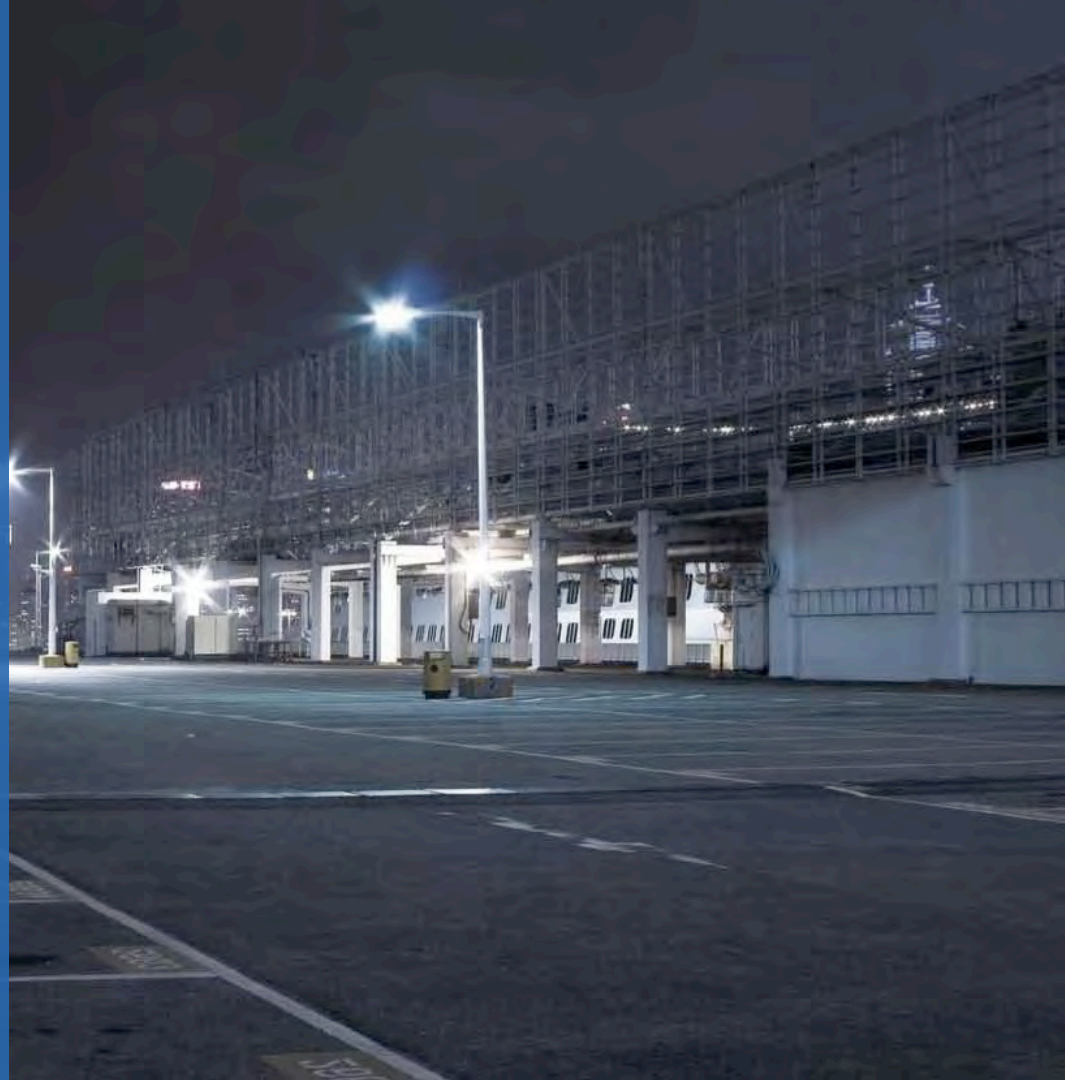
Different Types of Lights:
Based on IOT World Forum Chicago Live Pilot Network

	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	✗	✗	✗	✓

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

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)
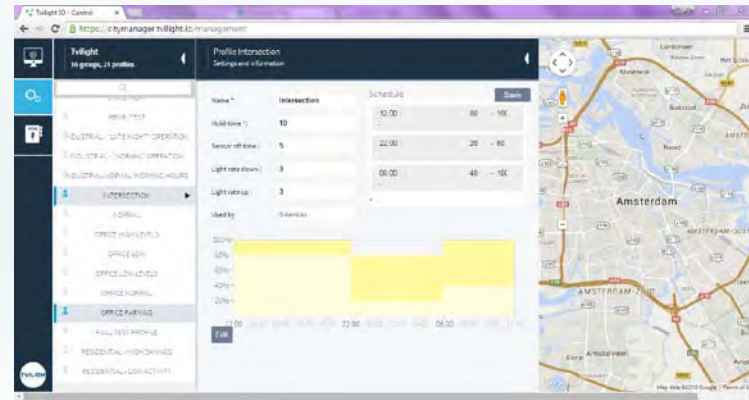
Cisco Smart+Connected Traffic

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

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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	2. Events & Incidents	3. Violations
i) Flow ii) Congestion iii) Bottlenecks	i) Breakdowns ii) Accidents iii) Road Works	i) Lane ii) Speed iii) Wrong Way

Cross-Domain		

1. Parking	2. Lighting	3. Safety & Security
i) Enable/Disable ii) Violations	i) Schedules ii) Maintenance	i) Stolen Vehicles ii) Unattended Bag

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

Other solutions

- Environmental sensoring

- Video analytics
  - Safety and Security
  - Traffic Analyzer

- Open Data analytics

- Social Media data analytics

Environmental sensoring

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

KiwiVision® Video Analytics

Video Control Center
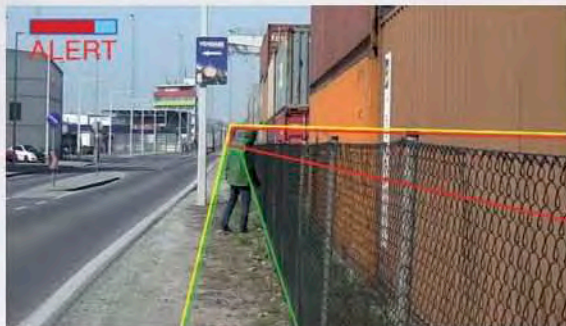
Security
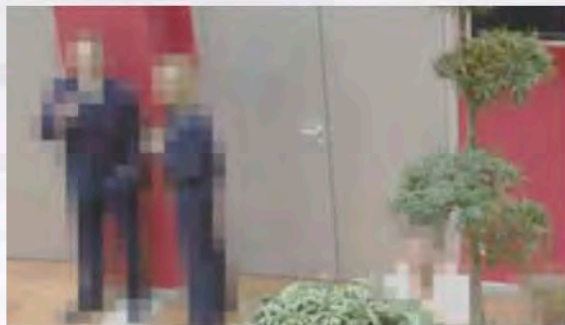
Privacy Protection

Remote Video Monitoring
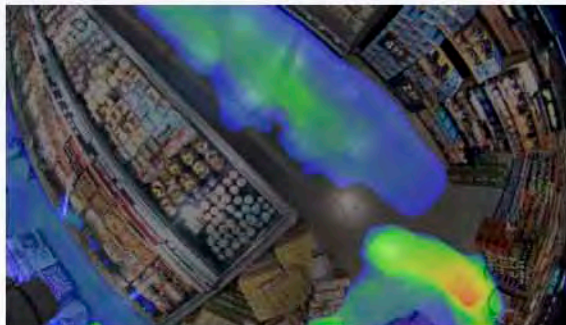
Business Intelligence
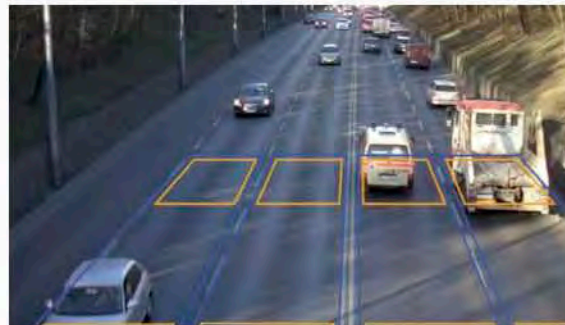
Traffic Intelligence

Alert Verification

Data analytics - Visitor's profile and behavior

Activity visualized in a pedestrian zone
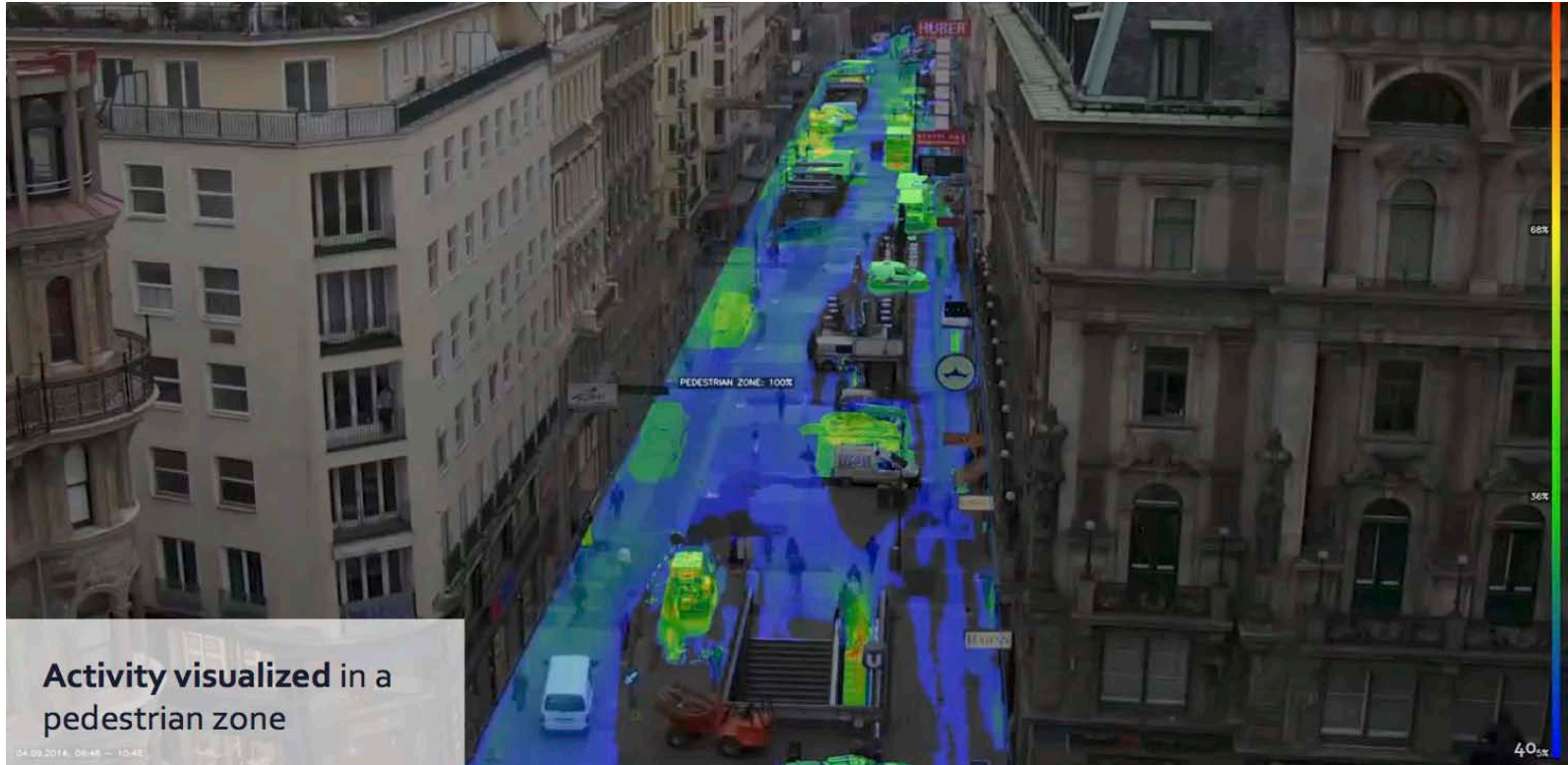
User login process

The user log in process

The splash screen can be completely customised with city branding/messages/etc

- Information about the open mall
- Social feeds
- Advertising and promotions
- Local information
- Company/State/Local government/etc imagery
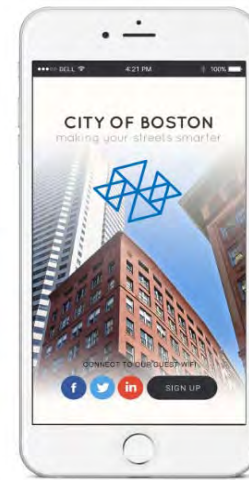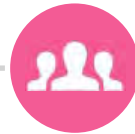

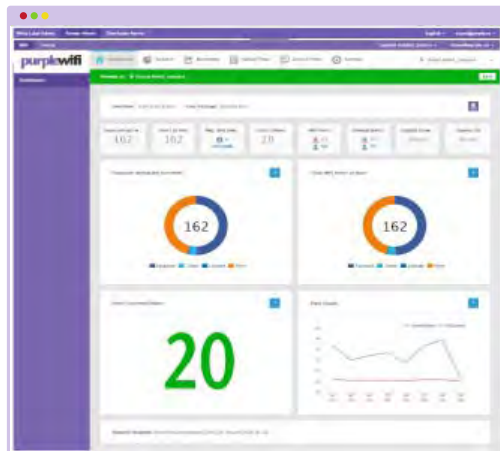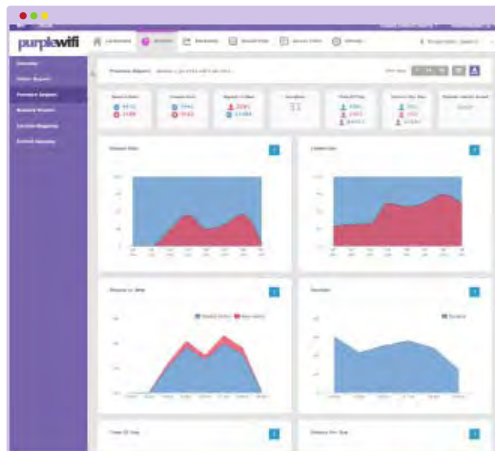Easy log in → Accept terms → Free WiFi → Deliver information → Socially engaged → Email marketing → Increase business
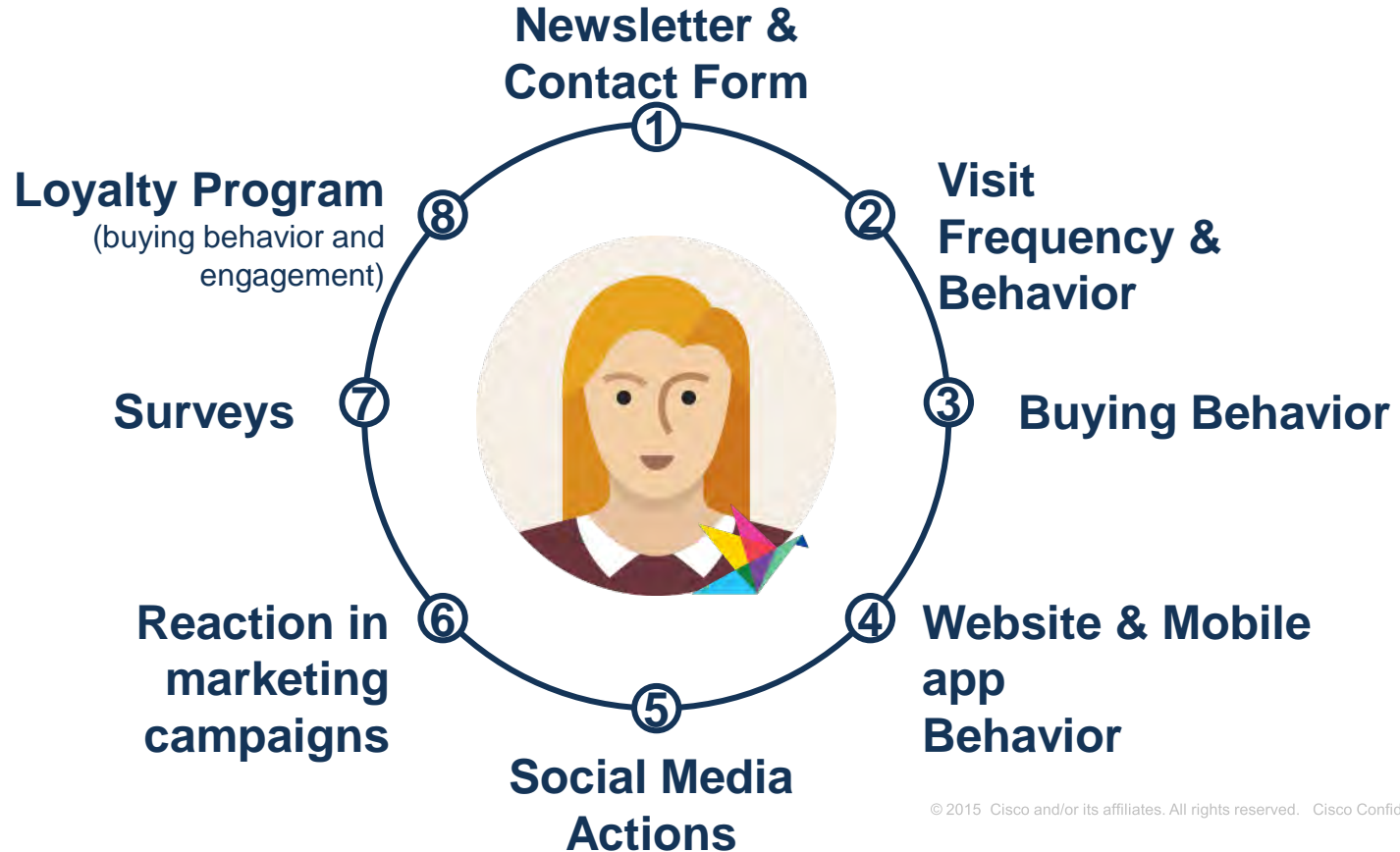
Analyze data

Profile your customers

Visit frequency & behavior

Actionable insights
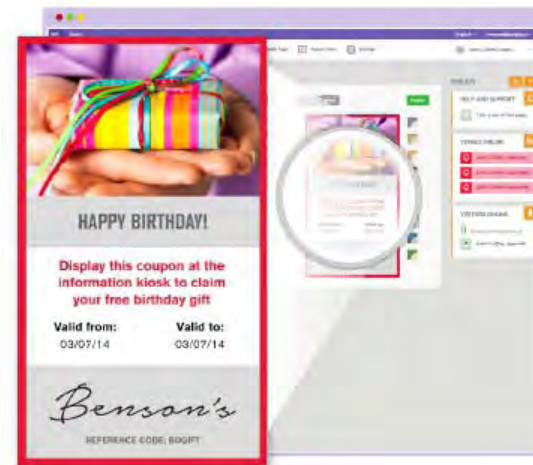
Local companies activities based on City Data

Newsletter & Contact Form
①

Loyalty Program
(buying behavior and engagement)
⑧

Visit Frequency & Behavior
②

Surveys
⑦

Buying Behavior
③

Reaction in marketing campaigns
⑥

Website & Mobile app Behavior
④

Social Media Actions
⑤

Social Media Monitoring Tools

Location based social monitoring is a technology that captures social data produced at a specific location. The concept is to processes social data from multiple social channels like Twitter, Instagram, Facebook, YouTube, and other social networks that have a location attribute embedded in user posts.

Municipalities
Companies (Hotel, Retailers, Cafes etc)
Sports
Events, Conferences, Festivals etc

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

CISCO

VEHICLES | **BUILDINGS** | **STREET**

Vehicles | Residential | Industrial | Commercial | Water | Parking | Street Lighting | Waste | Environment | People | Street Furniture | Safety and Security | Traffic
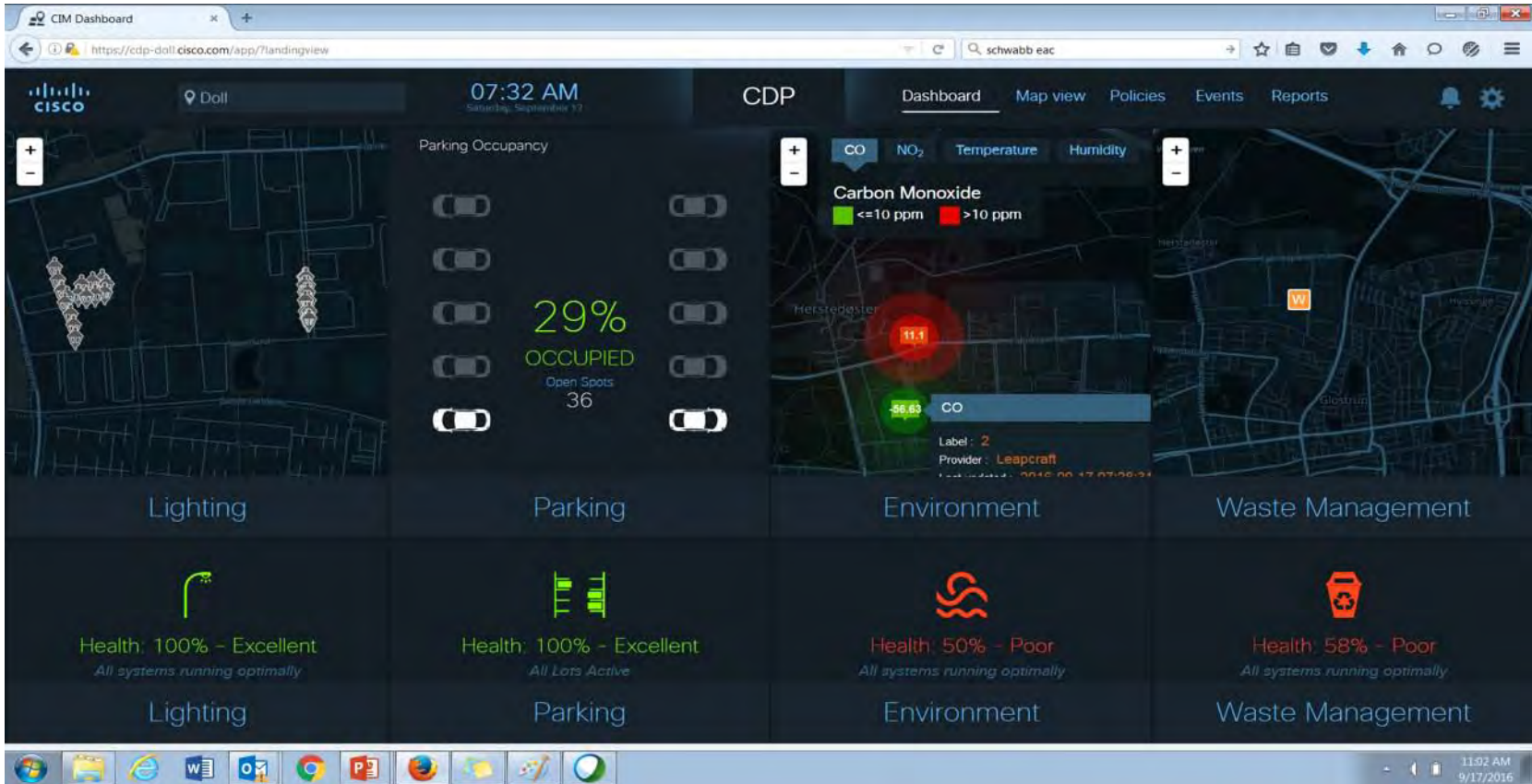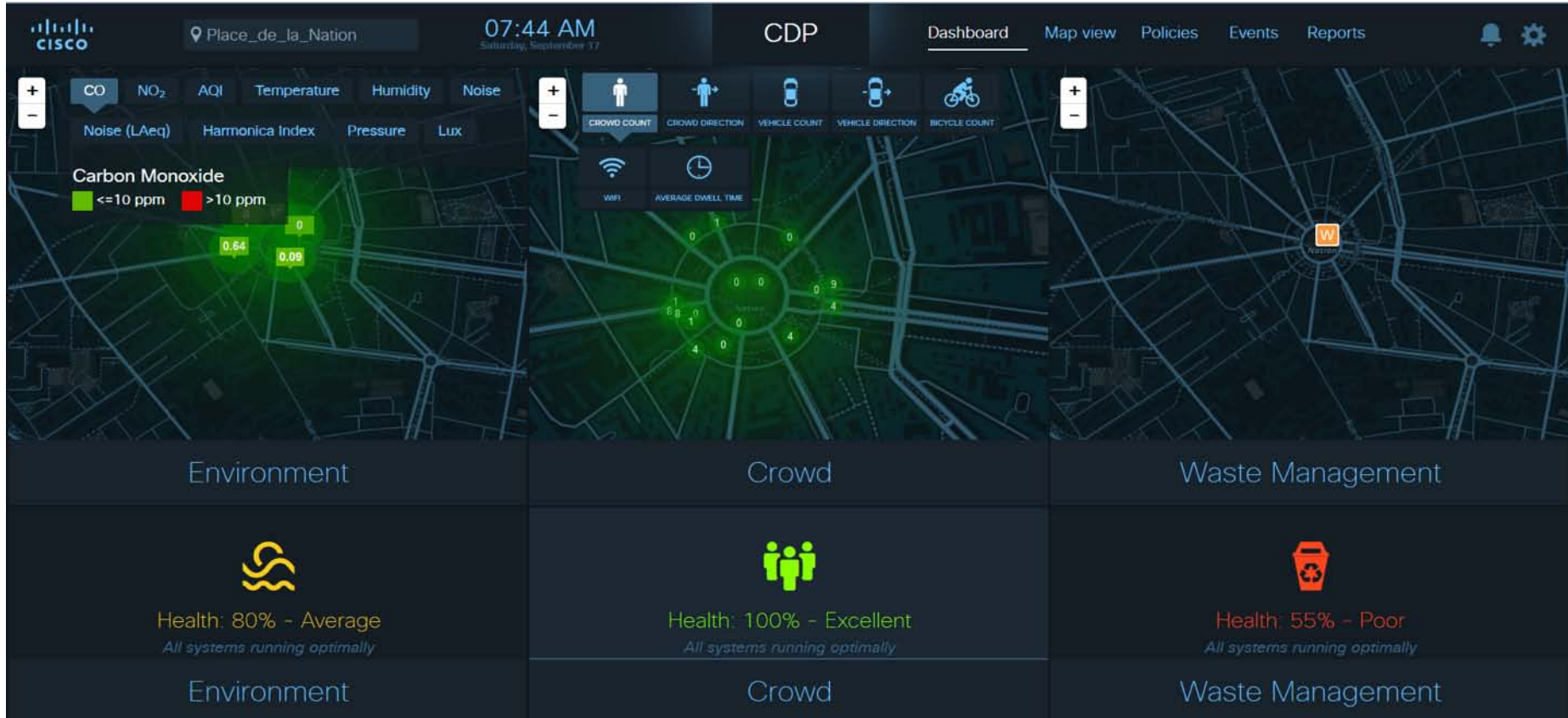
CDP Domains and Dashboard
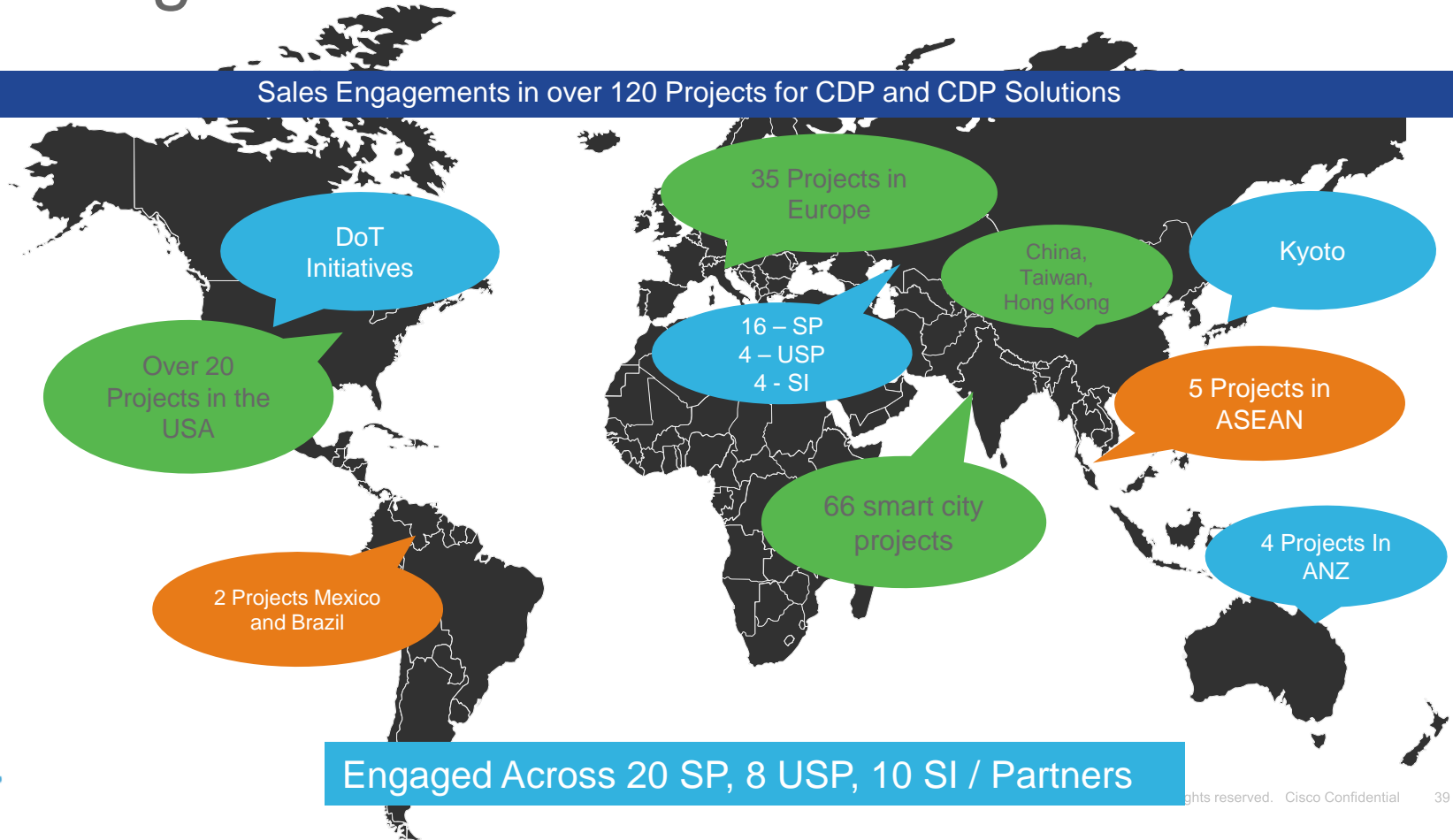
CDP Domains and Dashboard

Partner ecosystem - **64** Integrated | **45** in pipeline

3M (Traffic)	Cisco CMX v10	Gridcomm	MapmyIndia/MMI (NB)*	Philips	TCS*
3M (NB)	Cisco VSOM	Havells	Moba	Placemeter	Telematics Wireless/STE
Aclima	CivicSmart	Infinium (lighting)	Mobi Quest	PParkE (NB)*	Telensa
Acuity	Cleverciti	Infinium (transport)	Mobilisis	PTV (NB)*	Tvilight*
Airly	CMX Meraki	Infinium (waste)	Mobilisis (NB)*	SamTech	Tvilight (traffic)
Altiux	CommuniThings	Inrix	N3N (NB)*	SAP (NB)*	Tvilight (lighting)
Aptus.be	Cubic	Inrix Phase II	Namoo	Sensity*	Urban Engines (NB)*
Asseco*	Cybertech/Geoshield (NB)*	iOmniscient	Nexpa	Sensity Lighting	Urbiotica
Auriga	Davra Networks (NB)*	iSAP	Nipun (transport)	Sensity Undemarcated	V5
Bajaj Intelli	Elevate Digital (NB)*	IT EF	Nipun Net Services Pvt. Ltd	Sensity Demarcated	Videonetics
BH Technologies	Enevo	JC Decaux (NB)*	Pango (NB)*	Sensity Traffic	Welink
Big Belly	EParkomat	Kiunsys	PAQS (AirData)	ShotSpotter	WorldSensing Parking
Bosch	eSMART21(NB)*	Kiwi Security	Paradox	Smart Bin	WorldSensing Traffic*
Breezometer	ESRI (NB)*	Leapcraft (CPH Sense)	Paradox (Lighting) / Minebea	Smart Media	WorldSensing Traf. (NB)
BruitParif	Flashnet (inteliLIGHT)	LED Roadways (NB)*	Paradox (parking)	Smart Parking	
CDP Dashboard (NB)*	Flashnet (NB)*	Libelium (Intrinsic)	Park Assist	SmartSense	
Cimcon	Frog	M2M Telemetria	Parkeagle	Snaptrend	
Cimcon (NB)*	Graphmasters (NB)*	Map Unity*			

Enabling 100s of cities across the world.

Sales Engagements in over 120 Projects for CDP and CDP Solutions

35 Projects in Europe

DoT Initiatives

China, Taiwan, Hong Kong

Kyoto

16 – SP
4 – USP
4 - SI

Over 20 Projects in the USA

5 Projects in ASEAN

66 smart city projects

4 Projects In ANZ

2 Projects Mexico and Brazil

Engaged Across 20 SP, 8 USP, 10 SI / Partners

Kansas City, Missouri

Improving production with communications and Insights

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

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

Chalkida
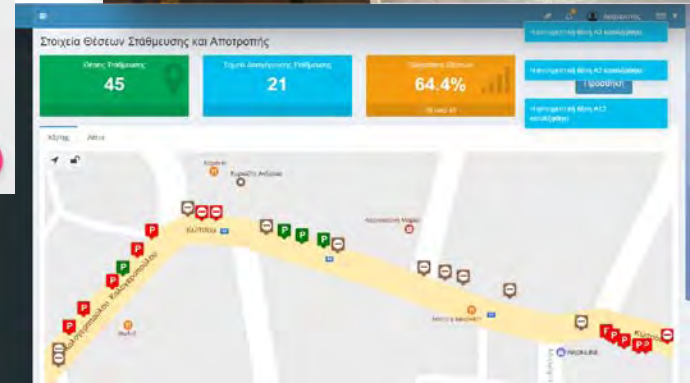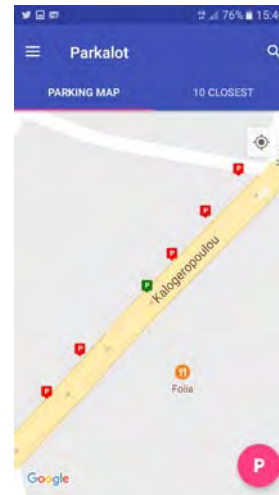## First pilot in Greece

Business Objectives

- Improve Parking experience
- Lower Lighting costs
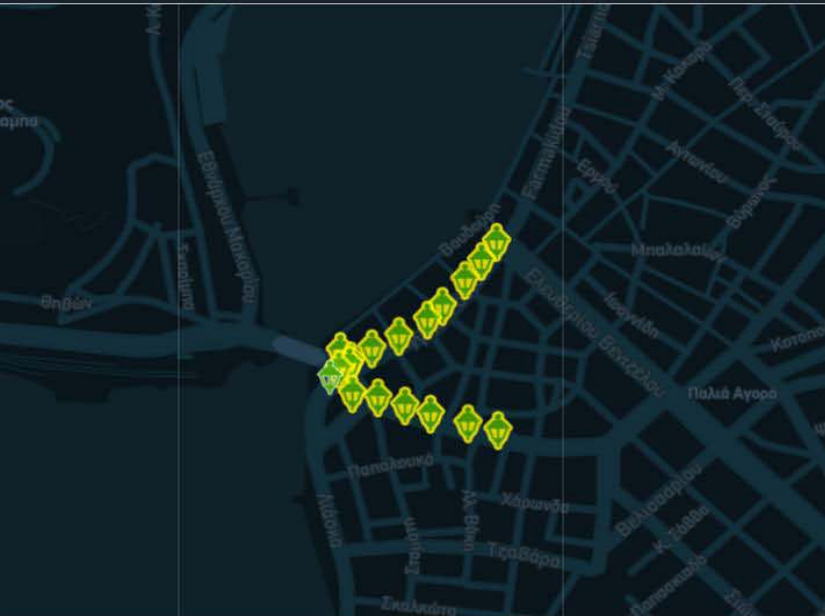- Control environmental conditions

Solutions

- CDP with Smart+Connected Parking, Smart+Connected Lighting and Environmental monitoring
- Partners: OTE, Kafkas, OTS

Business Outcomes

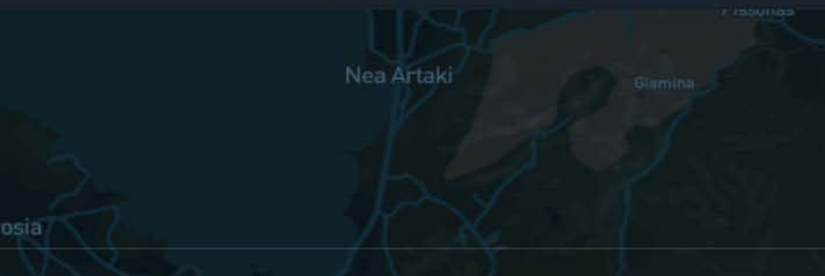- 60% decrease lighting costs
- Under evaluation parking solution

cisco

Lighting Map ✕

Parking ✕

Parking Occupancy

50%
OCCUPIED

Total Spots
66

Lighting ✕

Lighting Status

100%
CONNECTED

Lights On
18

Open Spots
33

Active Lots
3

Total Lights
18

Light Groups
0

Parking Map ✕

Lighting ✕

Parking ✕

Health: 100% - Excellent
All systems running optimally

Health: 100% - Excellent
All Lots Active

Trikala
Smart City and Smart Open Mall

Business Objectives

- Smart city solutions (parking, lighting, environmental)

- Smart Open Mall (City WiFi, Data analytics, Targeting marketing

Solutions

- CDP with Smart+Connected Parking, Smart+Connected Lighting and Environmental monitoring

- Cisco WiFi, Purple, Marera

- Partners: Space Hellas, Kafkas, Sieben, ParkGuru, VivaWallet

Under construction (28/2/2017)

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