An Innovative Outdoor IIOT Edge Platform for Smart Cities' Digital Transformation

30 October 2019|16:35H – 17:20H EU-08|Room 2

CIMCON – SMART CITY TECHNOLOGY PROVIDER

FOUNDED
2012

TEAM OF
100+

CUSTOMERS
150+ CITIES
24 COUNTRIES

GO TO MARKET:
PARTNERSHIPS

SMART GRID COMPANIES –
Cisco, Trilliant, Itron
ENERGY SERVICE COMPANIES -
Ameresco, Honeywell, Siemens

To help cities experience **greater outcomes**, and have the ability to connect with its citizens in ways it never has before

Agenda:

- What is a Smart City?
- Edge-Based Outdoor IIOT

  Smart and Connected Lighting System:

  - Typical Configurations
  - Installations
  - The Business Case
- Edge-Based Outdoor IIOT

  Smart City Use Cases:

  - Applications
  - The Business Case

What is a Smart City?

Smart City Applications

Many varied applications and use cases for

- Efficiencies and cost savings
- Improved citizen and road safety
- New services and citizen engagement
- Data and metrics for planning

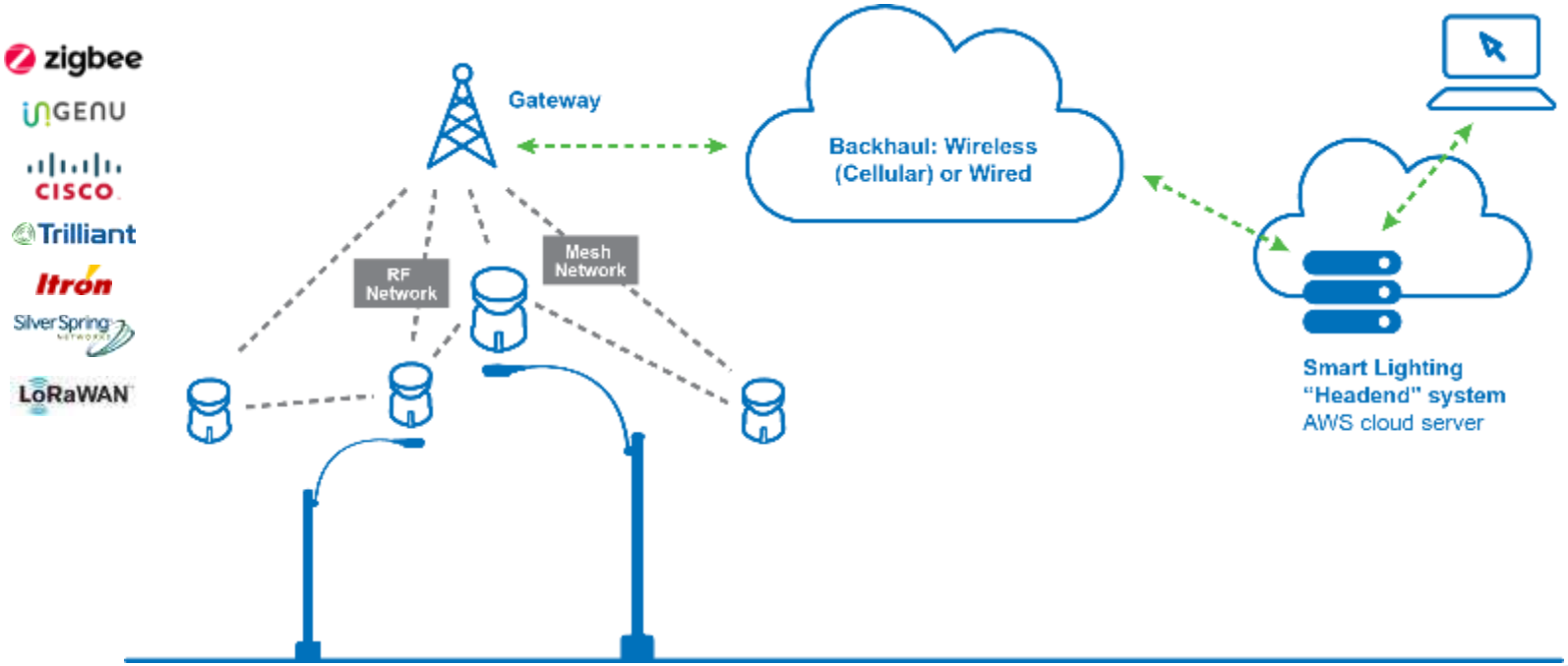
What are the 'Top of the Mind' Concerns for City Mayors?

- Resident services and quality of life
- Operational efficiencies, energy savings and sustainability
- New revenue sources
- Opportunities for rapid economic growth
- Conversion of smart city pilots into full scale citywide deployments
- Monetization of city data for future economic sustainability

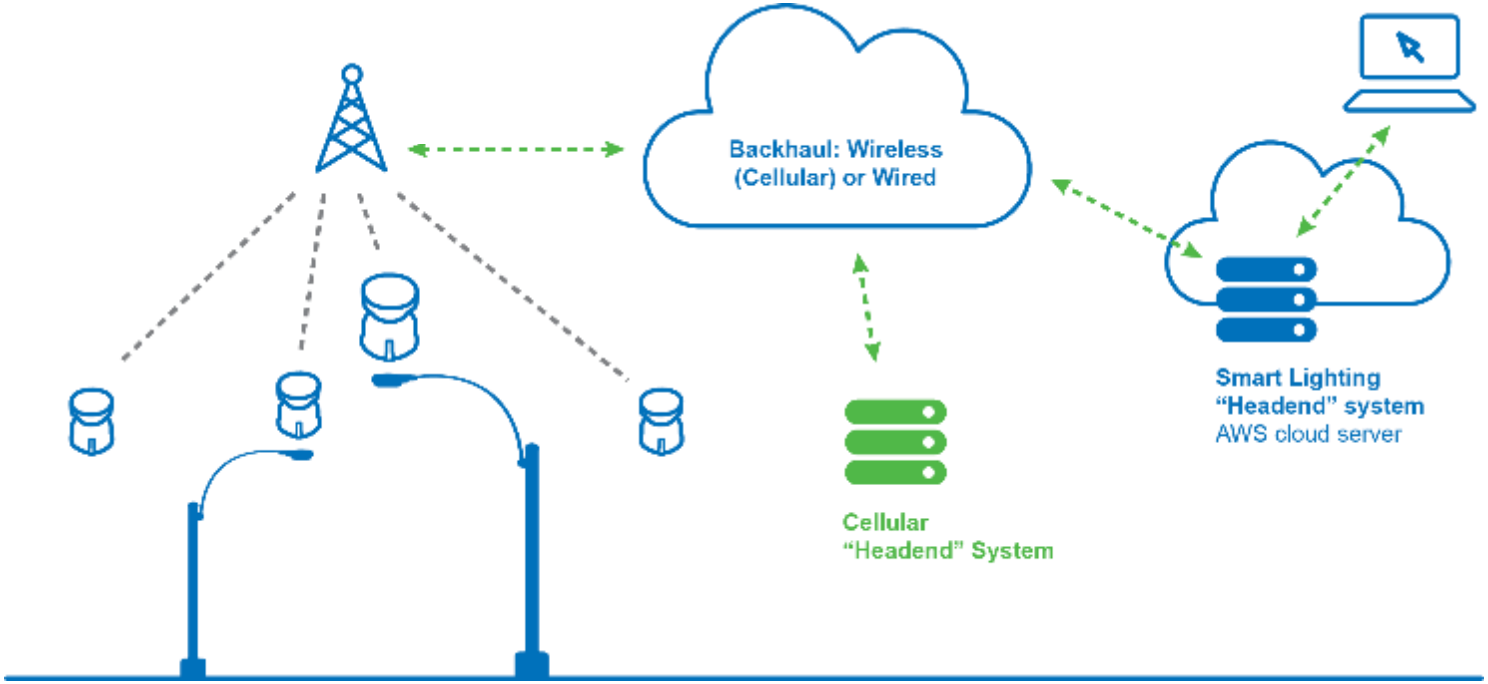
…and how can they do all this in a capital constrained environment?

Smart and Connected Lighting

Edge IIOT – Smart Lighting Network

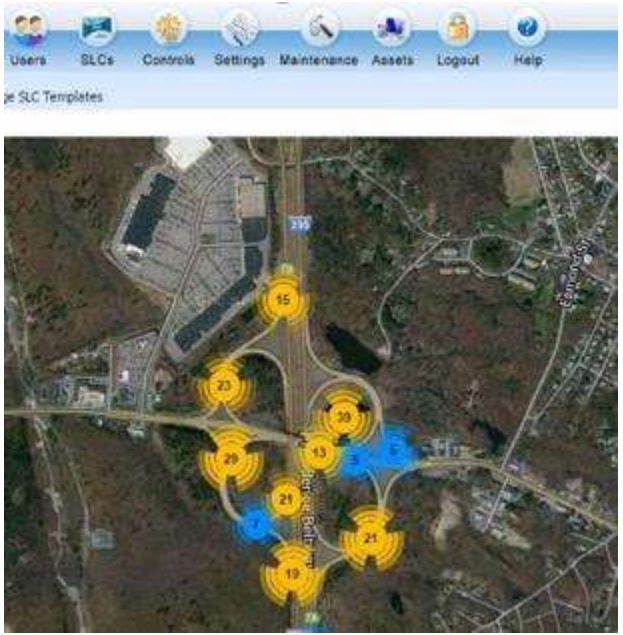


Edge IIOT – Smart Lighting Network



Central Management System (CMS)

Web-based, Easy-to-use CMS; Fault Management, Energy Management and Asset Management.



Google Maps Interface

Intuitive Google Maps interface for on/off/dimming, grouping and reporting.

API Integration

A full suite of APIs enable integration with third-party applications.

Reports & Dashboards

Customizable reports and dashboards can be setup to run autonomously.

Fault Management

Alerts can be routed to the appropriate persons via email and texts.

Operations Management

Extensive scheduling capabilities enable complex adaptive dimming strategies to drive additional energy savings.

Asset Management

A complete, customizable asset management module keeps track of all fixture and pole attributes and assets.

Smart Lighting — The Business Case

Asset life cycle costs

Initial capital vs ongoing energy and operations

Up to **20%**
of the lifecycle cost
is capital, financing

Up to **80%**
of the lifecycle cost
is energy and operational

Case Study: Chicago

Chicago has a population of 2.705 million in an area of 234 square miles, connecting 270k street lights.

Key Benefits

- **Energy Savings**: Expected to save $10 million a year in utility costs by reducing energy consumption
- **Improved Safety**: Higher quality light improves visibility and reliability
- **Carbon Reduction:** Avoids 11,230 metric tons of carbon emissions into the atmosphere
- **Improved Service**: Automatic work orders through a Smart management system
- **Reduced Light Pollution**: Designed to ensure the light is focused where needed
- **Local Workforce**: 50% of the installation will be performed by City residents

"The Chicago **Smart Lighting** Program .....delivering **modern**, **reliable**, **energy-efficient** lighting that is already **improving quality of life** in Chicago neighborhoods....This program is a great example of how we are **building** a new Chicago **for the 21st Century**."

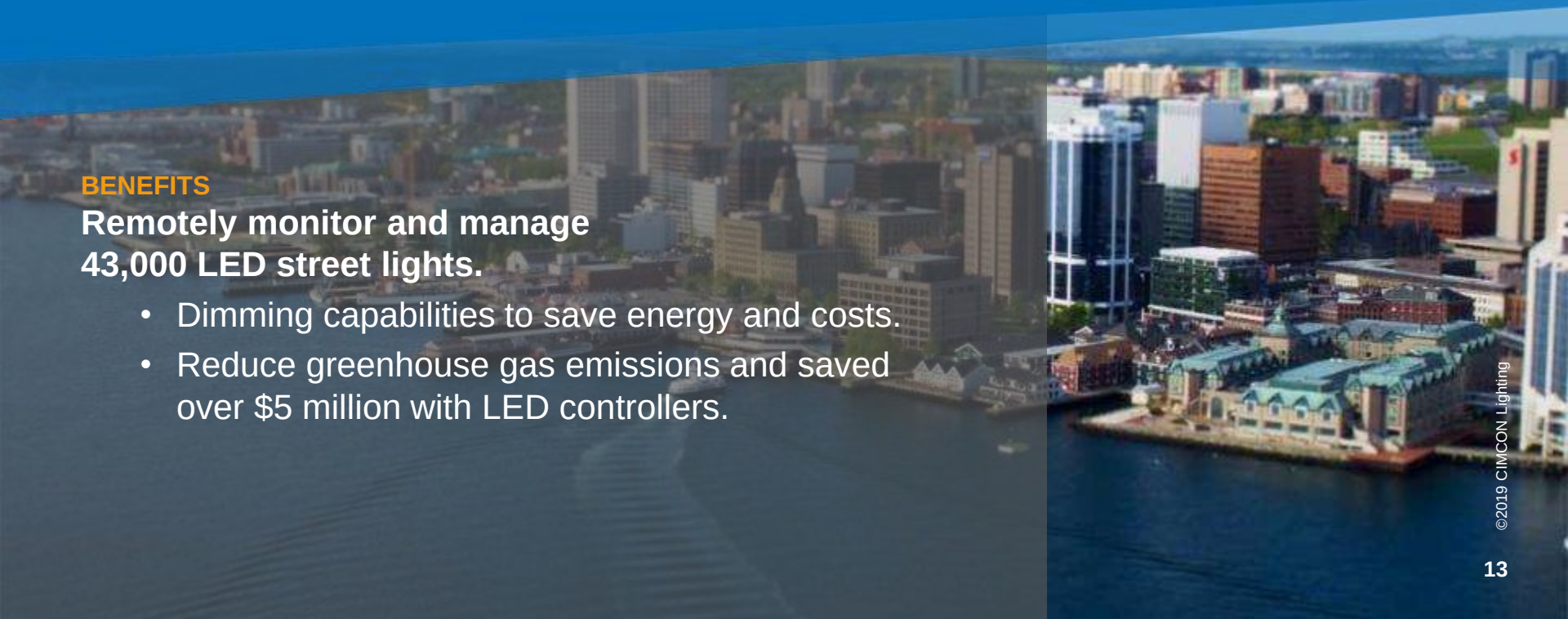
Rahm Emanuel, Mayor, City of Chicago

For more information:

Smart Led Street Lighting Solutions Video
Chicago Smart Lighting Program

Case Study: Halifax

Halifax is the capital of Nova Scotia, Canada with ~400,000 residents in an area of 100 square miles.



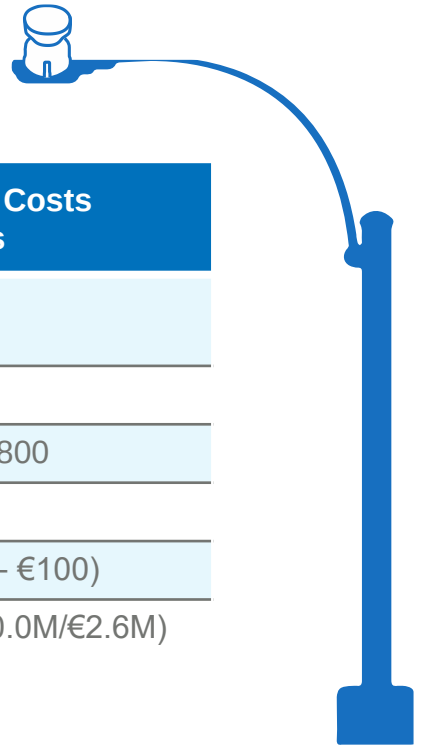
BENEFITS

Remotely monitor and manage 43,000 LED street lights.

- Dimming capabilities to save energy and costs.
- Reduce greenhouse gas emissions and saved over $5 million with LED controllers.

Smart Lighting – The Business Case

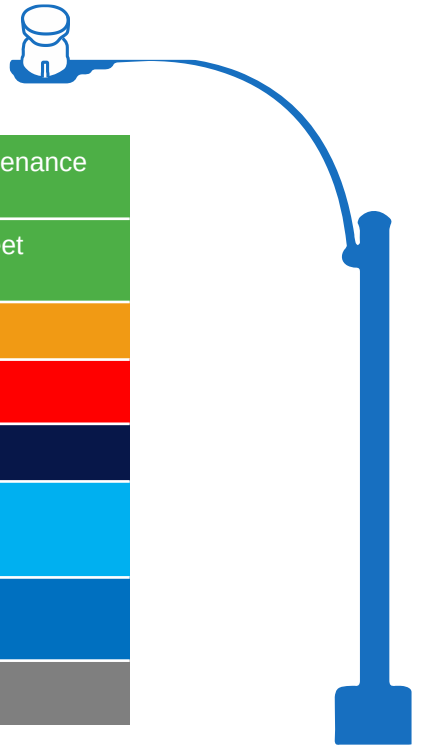
MRO and Asset Management



100K Street Lights	Maintenance Costs without Controls	Maintenance Costs with Controls
Lights Requiring Annual Maintenance (A)	10k	10k
Trunk Rolls Per Repair (B)	2.6 trips	1.3 trips
Cost per Trunk Roll (C)	€200 – 400 – 800	€200 – 400 – 800
Annual Repair Costs: A x B x C	€5.2M	€2.6M
Cost	€2.5M (Photocell - $25)	€10.0M (SLC - €100)
ROI with Controls	€2.5M throwaway cost	3.8 years (€10.0M/€2.6M)

Smart Lighting – Soft "ROI"

Employee productivity	Fewer calls handled by call center; Efficient personnel maintenance scheduling and routing
Reduced costs	Energy; Asset management: routing/truck rolls, fleet size, fleet maintenance, fuel; police traffic details.
Increased revenues	Foundation for smart city applications
Resident experience	City presentation, localized lighting control and reporting
Resident time savings	
Resident economic impact	Goal of environmental sustainability
Public safety	Illumination levels: When and Where Needed Localized outages – Citizen Shut-ins
Other	Smart City N/W Connectivity, Resiliency, Metcalf's Law



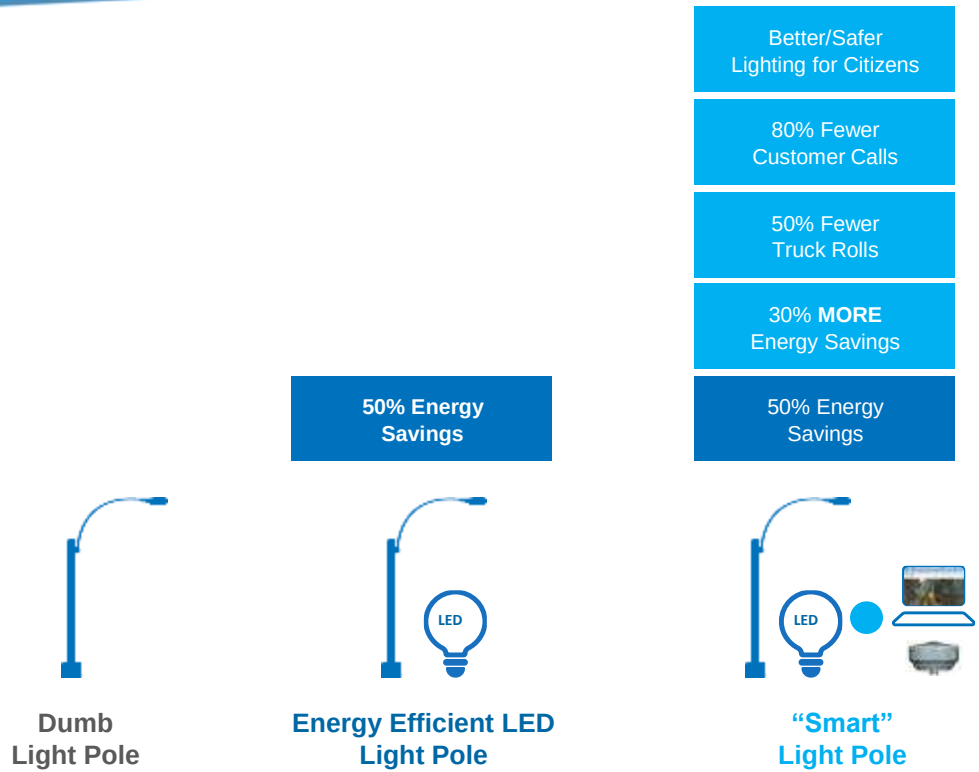
Resiliency after Hurricanes

Street Light Restoration Before and After Smart Nodes

	Matthew w/o Smart Nodes	Irma w/ Smart Nodes
Impacted Area	110k lights 4 of 16 management areas	615k lights (480k w/ smart nodes) 16 of 16 management areas
Number of Tickets	53.5k (6.5k patrols + 47k from customer calls)	92k (45k smart lights + 47k from customer calls)
Number of Patrollers	200	0
Patrol Time	5 days	0 days
Ticket Package Time	28 days	2 days

Source: David R. Blary, Florida Power & Light Company, SALC September 30 – October 3, 2018 Orlando, FL

Smart Lighting Value Proposition



Smart Lighting — Beyond

Asset life cycle costs

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The Smart Streetlight Pole: Not Just Lighting

- The streetlight pole provides:
  - A city-wide IoT/communications network
  - A sensory point for instrumenting the physical world, gathering “street data”
  - A processing point for data
    - Artificial Intelligence (e.g., video analytics)
    - Machine learning algorithms
    - IoT device orchestration of sensors (e.g., capture video when gunshot detected)
  - Site for deployment of 5G small cells

What's at Stake

What's at Stake

Cities can realize $2.3 trillion in potential benefits from digital transformation by 2024

$1.1T
Next-Gen Workforce

$401B
City Utilities

$240B
Safety and Security

$188B
Transportation

$147B
Citizen Experience

$66B
Digital Infrastructure

$58B
Public WiFi

$51B
Open Data

$29B
Cyber Security

Cities Are Already Collecting Data…

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Outdoor IIOT Edge

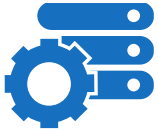
Simplify Outdoor IIOT Deployment

Add Capabilities to Leverage Lighting Infrastructure

Controller/ Network Agnostic

Multi-sensor

Power / Connectivity



Edge Processing Reduces Data / Network Demands

Plug and Play Installs / Moves; Minimum Labor

Streetlight Install Offers Street-level Resolution

Data Visualization / Outcomes from a Single Console

Syndication / Integration

City Wide Digital Canopy for Outdoor IIOT

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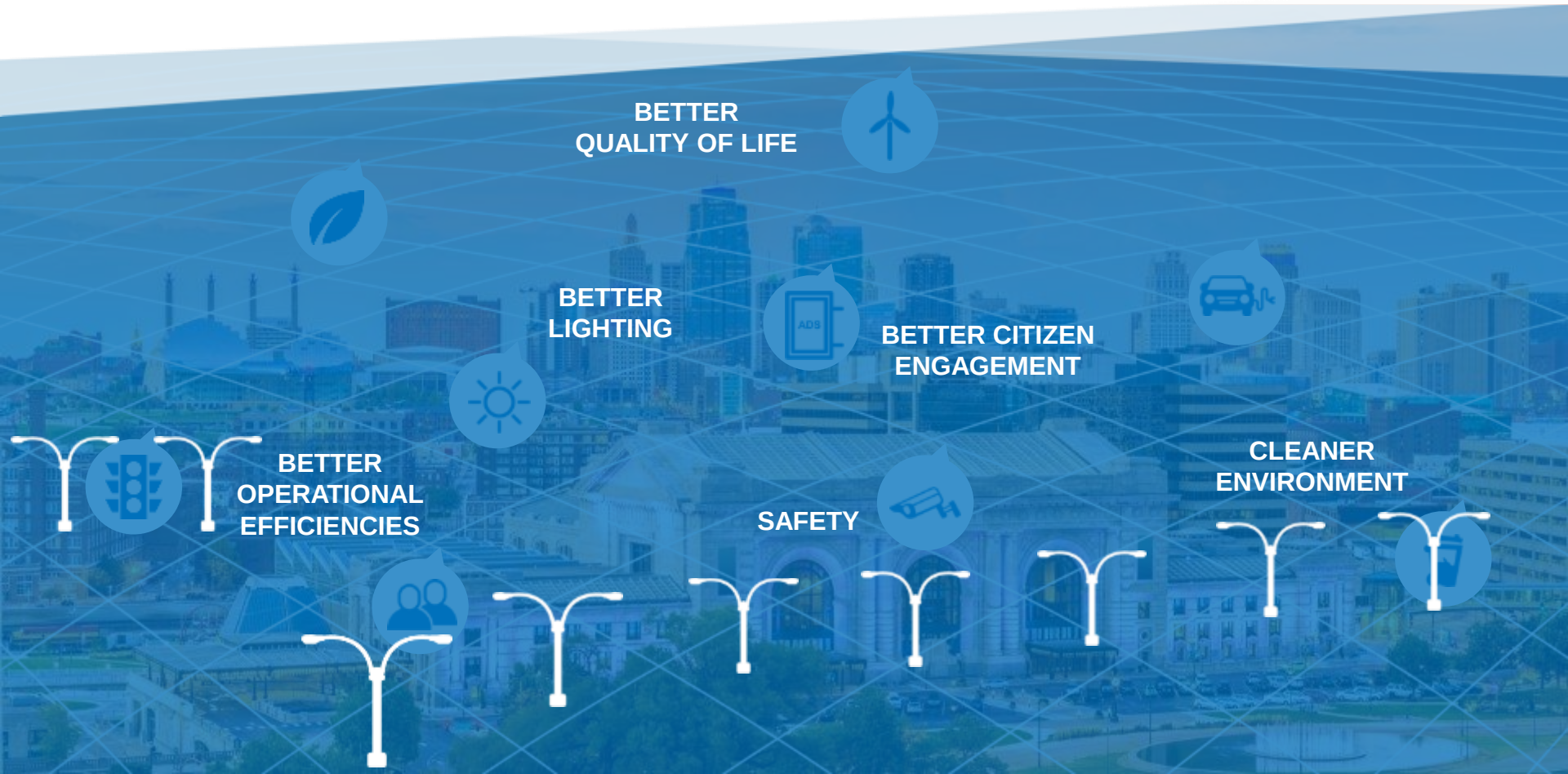
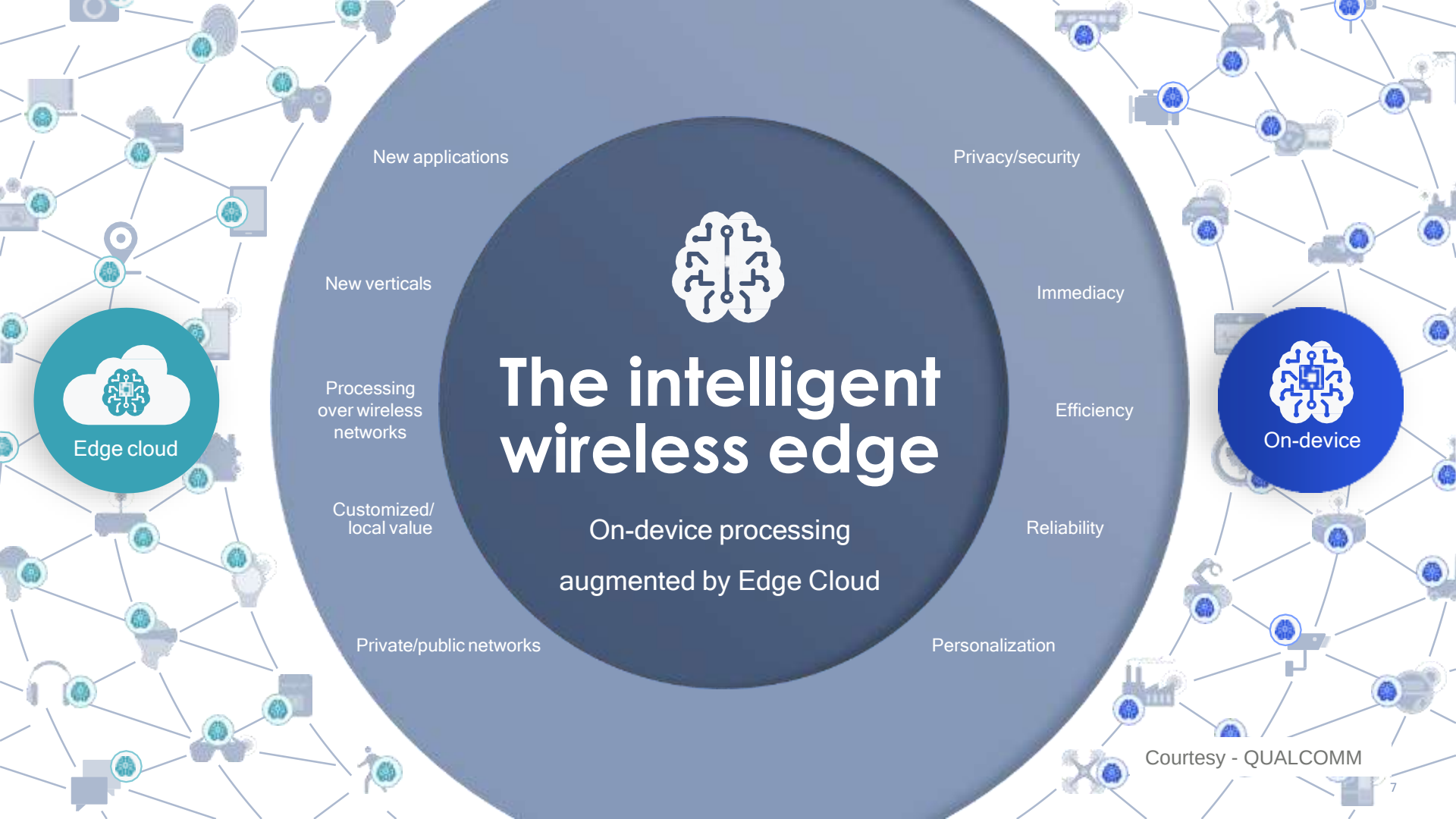


Delivering on the Smart City Vision

Where outdoor assets are intelligently connected



Courtesy - QUALCOMM

Process data at the source to scale and make sense of a digitized world

Past

Cloud-centric

Processing in the cloud

Today

Partially-distributed

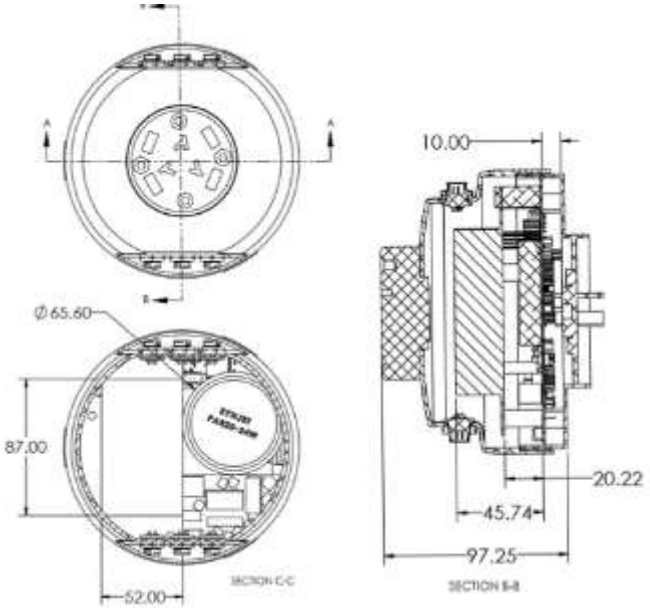
Power efficient on-device edge processing

Future

Fully-distributed

Smart City Edge Hub

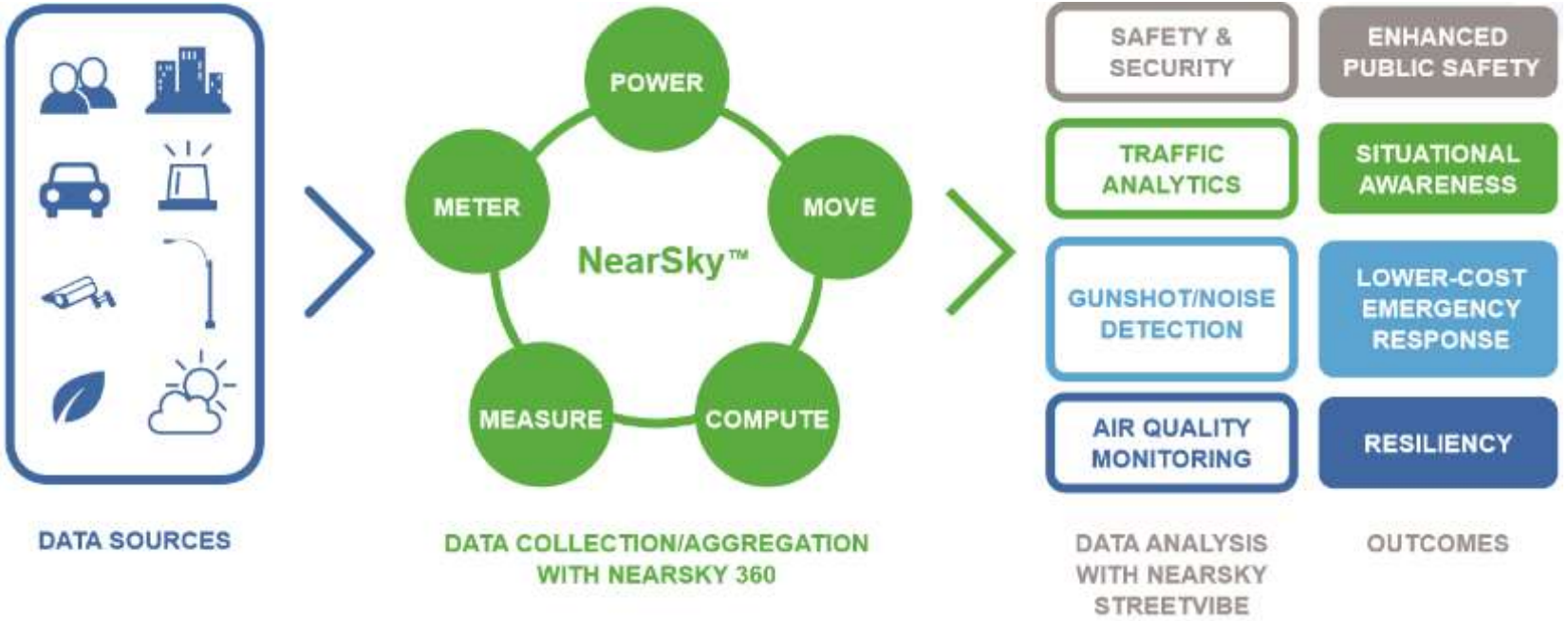
Multiple Sensory Interfaces, Edge Computing, Ruggedized, APIs and App Programming



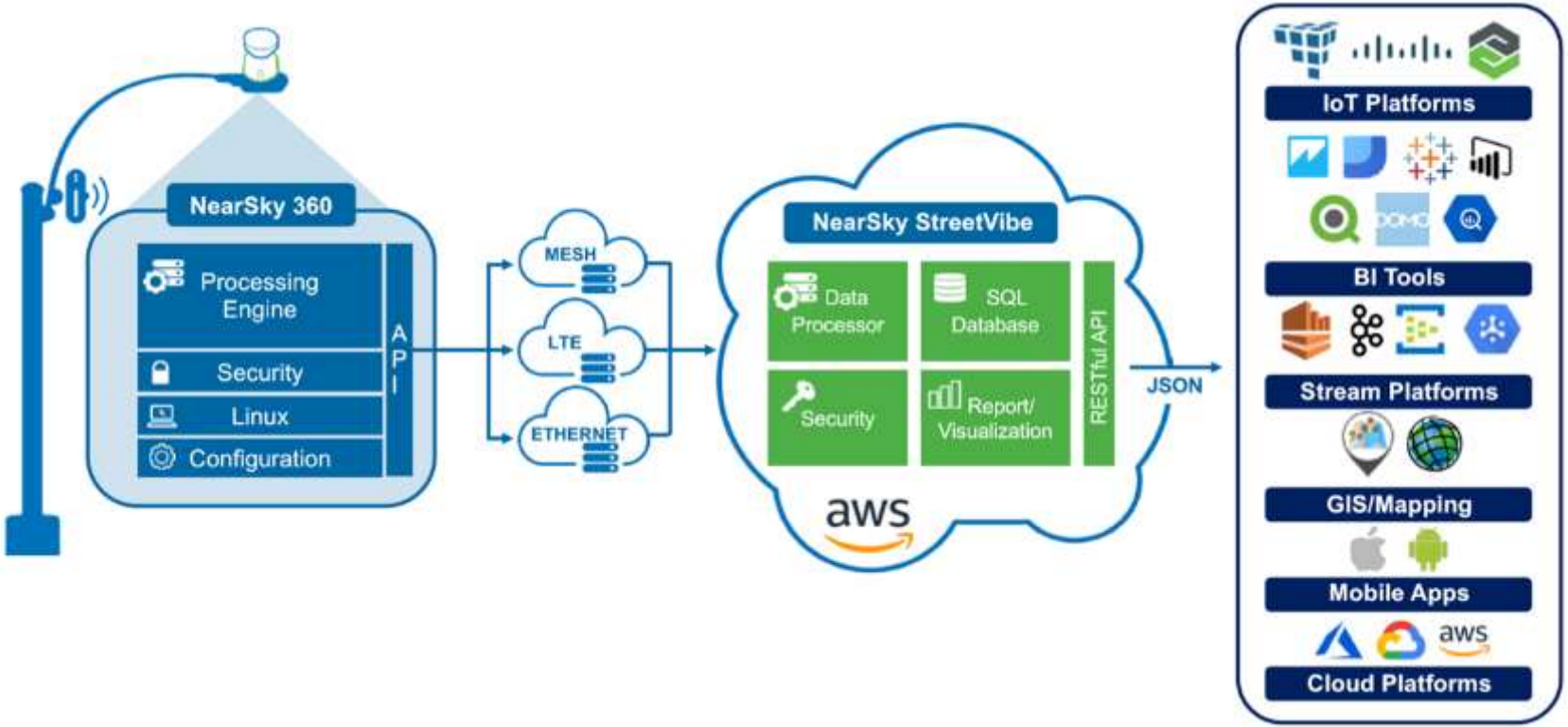
Features

- Quad-Core Processor
- CAT-1 LTE Modem
- 110v – 277v AC
- 2x PoE+
- Micro-USB
- GPIO

Edge Enables Better Outcomes



NearSky Architecture



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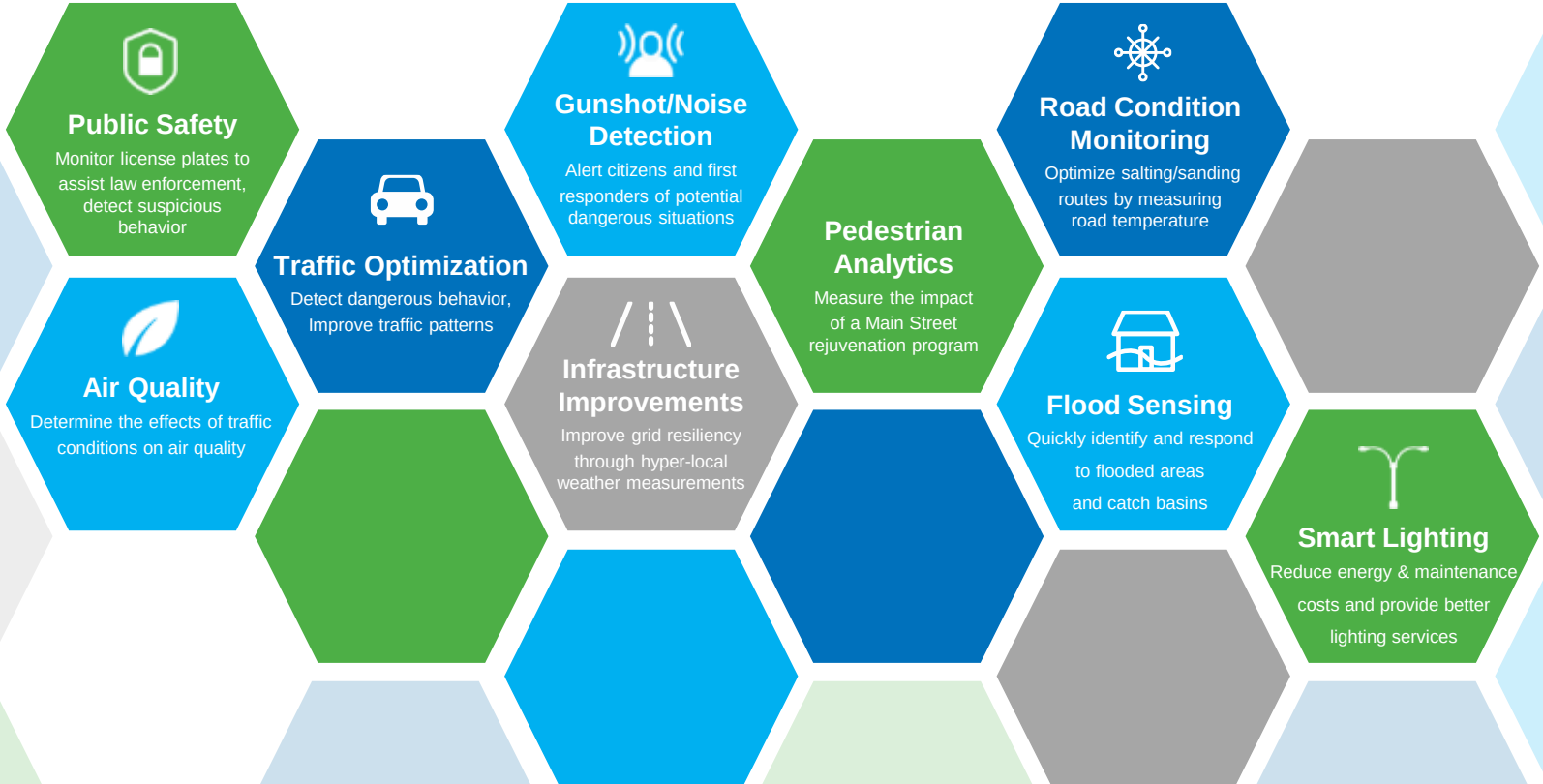
Smart City Use Cases

Smart City Applications



Kitchener – Data Driven Cycling Plan

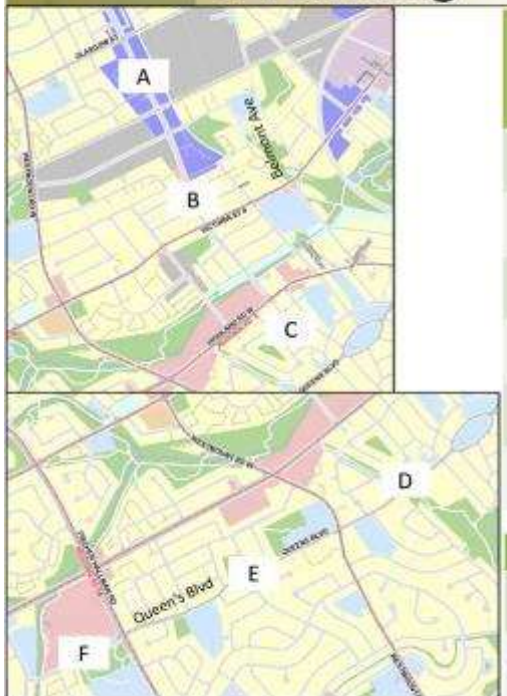
- Problem
  - Population growth, diversify transportation modes to prevent gridlock
  - Reimagine travel options due population growth and density.

- Solution
  - NearSky platform, camera, and video analytics software to count traffic, bicycles on streets/sidewalks.
  - City of Kitchener, Cimcon, CDW

- Results
  - New insights into demand for cycling within 1 week
    - 122 – 180 cyclists per day on busy/dangerous road
    - 60-70% of cyclists ride on sidewalks for safety
  - Data helped move transportation plans forward, increased citizen confidence.

Kitchener, Ontario – Data Board

Daily Volumes, Speeds, & Parking

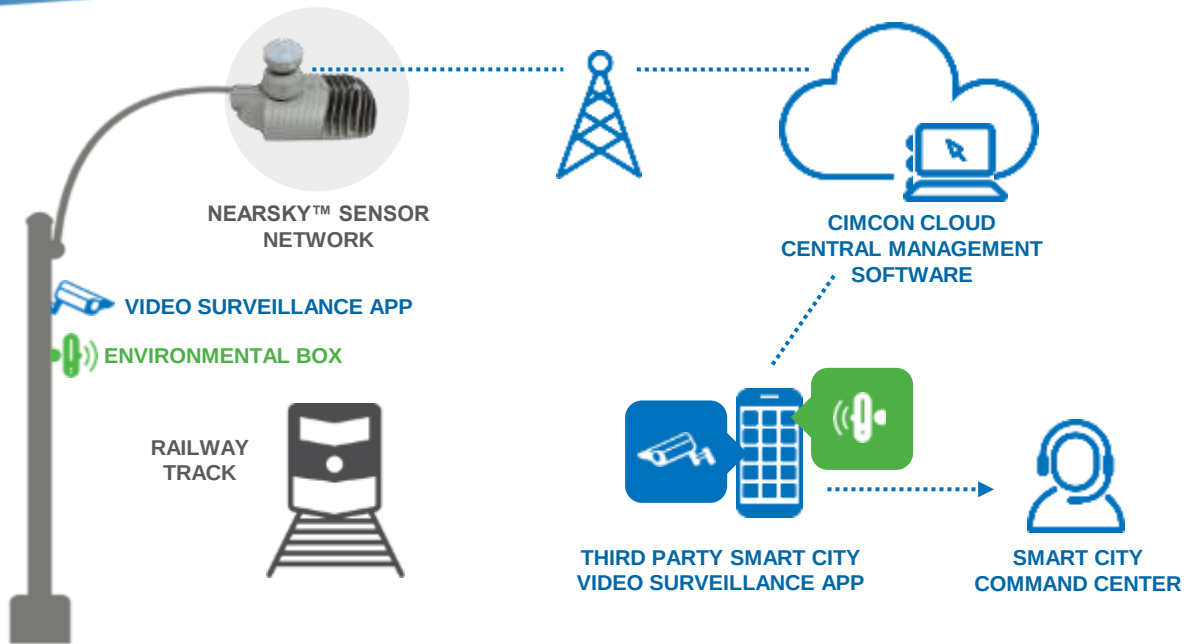


Location	85th percentile Speeds	Average Daily Traffic Volumes
A (Belmont Ave)	65 km/h	10,127 veh/day
B (Belmont Ave)	59 km/h	9,373 veh/day
C (Belmont Ave)	56 km/h	4,135 veh/day
D (Queen's Blvd)	66 km/h	11,439 veh/day
E (Queen's Blvd)	62 km/h	7,246 veh/day
F (Queen's Blvd)	54 km/h	7,057 veh/day

Location	Available Parking	Amount used
Belmont Ave	Approximately 50 spaces	Weekday Average: 6 (12%) Weekend Average: 1 (2%)
Queen's Blvd	Approximately 200 spaces	Weekday Average: 21 (10%) Weekend Average: 16 (8%)

Smart City – Opelika, AL

Toxic Gas Monitoring - deploy a wide area toxic gas sensing network to provide better situational awareness for first responders



Air Quality (AQ) ROI

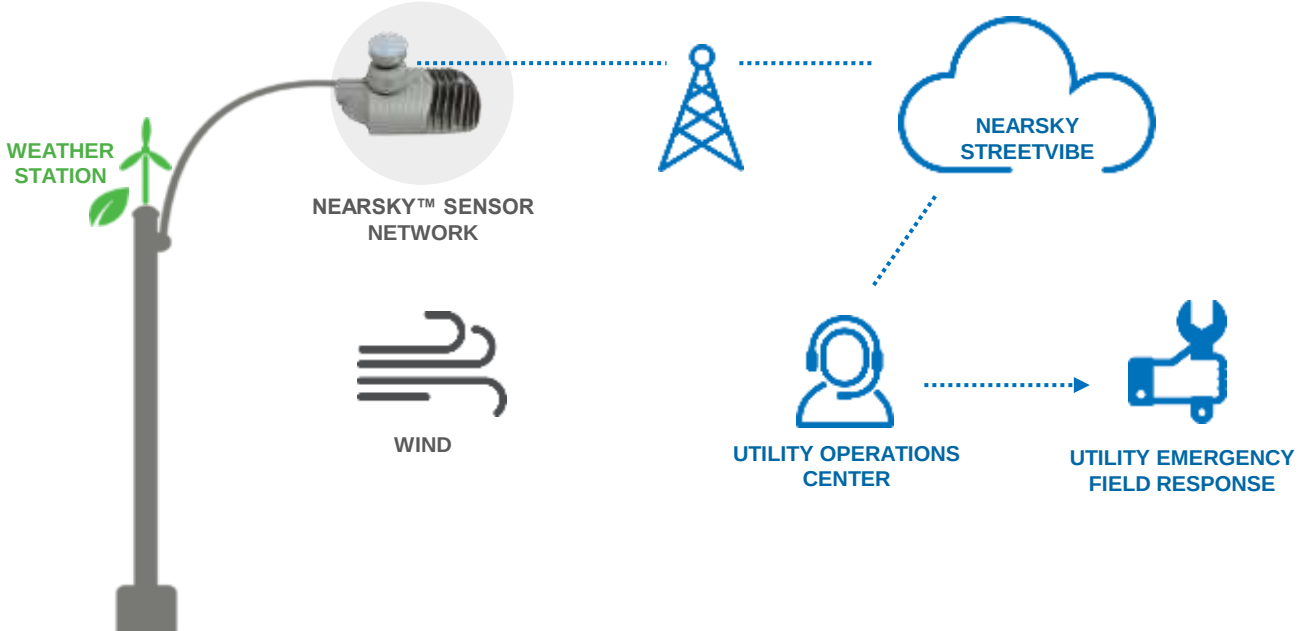
Install Community Sensor-Based Monitors:

- Temp, RH
- PM 2.5
- O3, NO2
- SO2

Employee productivity	Health managers who need to provide a safe environment
Reduced costs	Researchers who develop AQ models with limited budgets
Increased revenues	Improving tourism
Resident experience	Air quality data to show city is a healthy place. AQI alarms for poor air quality.
Resident time savings	
Resident economic impact	Goal of environmental sustainability
Public safety	Localized AQ Index support decision making. Insights into air pollution and its movements. Health warnings to citizens with pulmonary diseases – asthma, COPD, LAM.
Other	To educate STEM students about air pollution and to promote environmental awareness

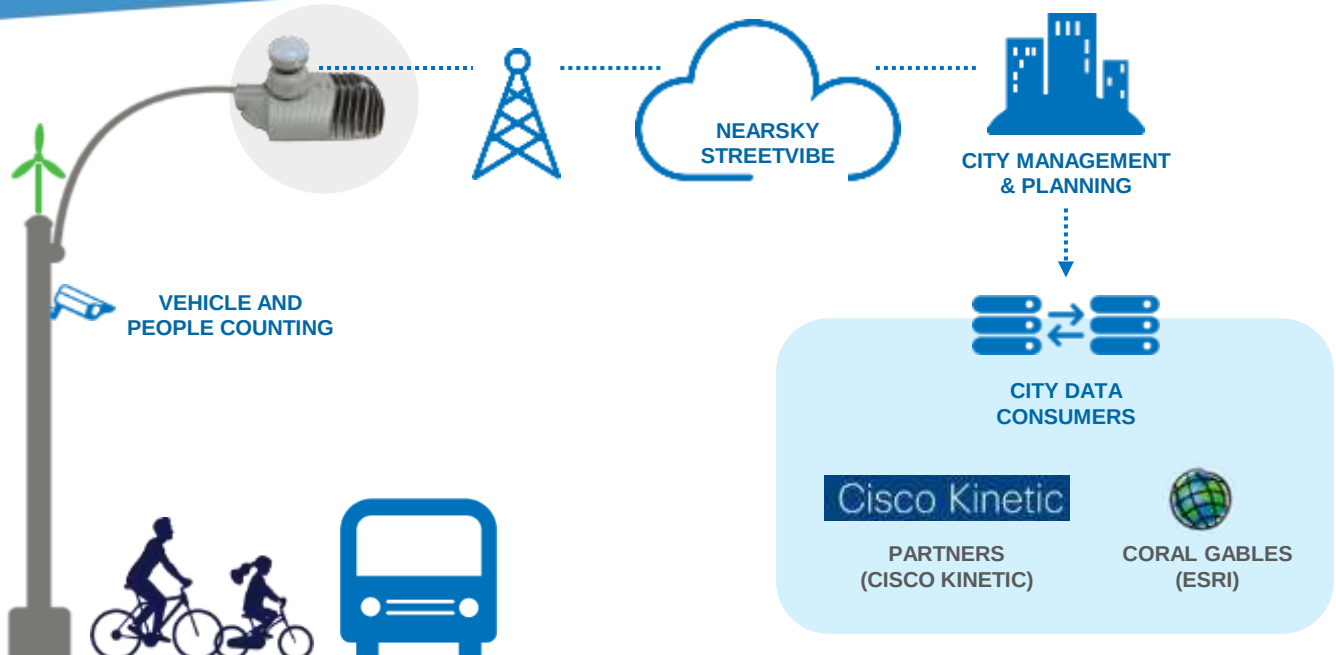
Smart Utility – Central Electric Corp.

Identify weather conditions that cause “Galloping Lines”.
Localized “outage” reporting, improve resiliency.



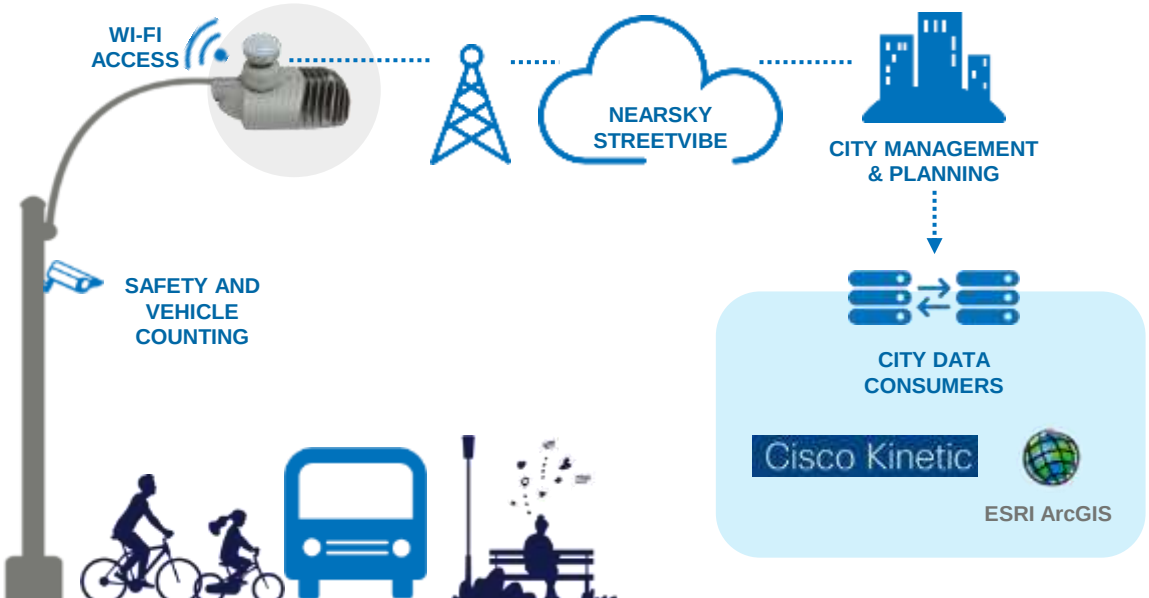
Smart City – Coral Gables, FL

Measure the impact of a rejuvenation program – gather "street data" to determine how people utilize their main streets.



Smart City – Schenectady, NY

National Grid and the City of Schenectady pilots "*to demonstrate options for overcoming the barriers to municipal adoption of smart-city technology*".

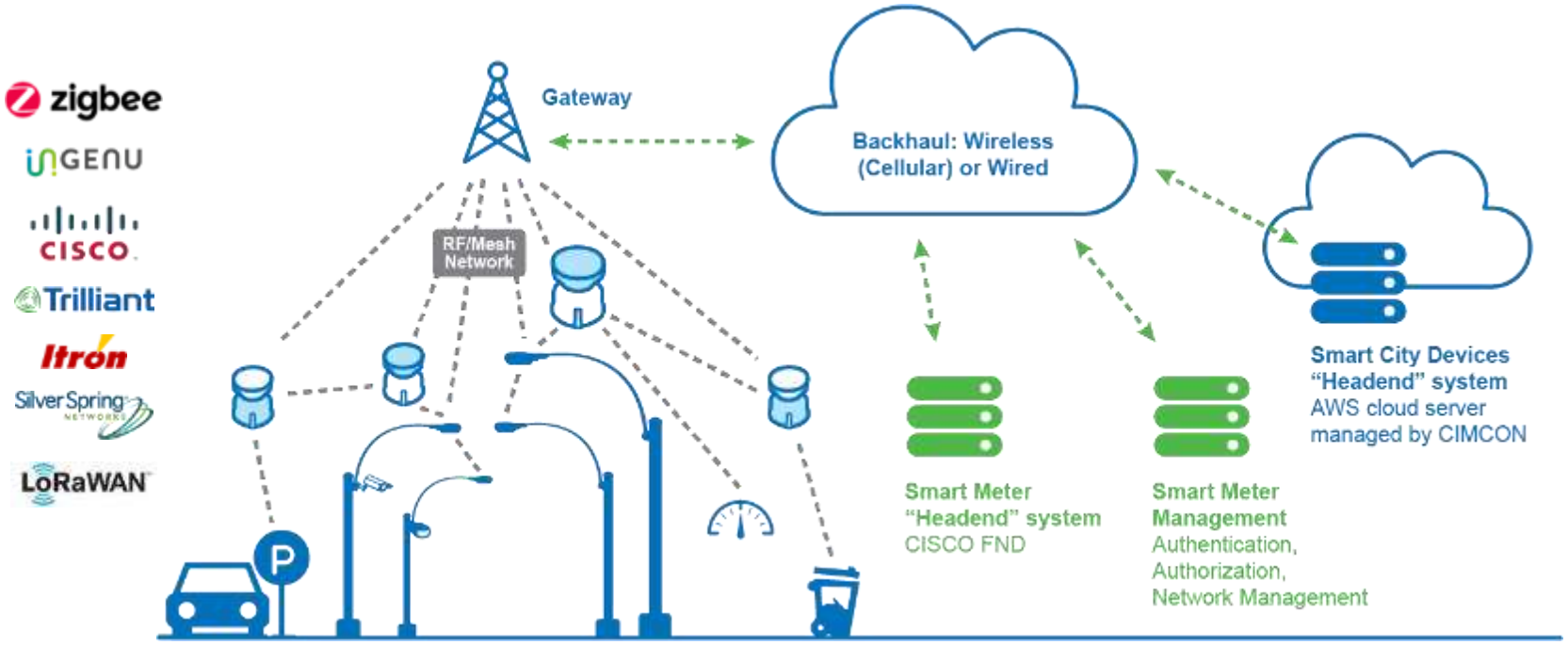


nationalgrid

Reforming the Energy Vision

- Upgrade city LEDs
- Install IoT Mesh Network
- Deploy Smart City Solutions
  - Safety as a Service
  - Wi-Fi Access Points
  - Street Usage Analysis
  - Air Quality Monitoring

Smart City Network – IIoT Edge Devices



Outcomes and Impacts

City operations

Cross-agency collaboration
Modernize critical infrastructure
Digital readiness

Public safety and security

Physical safety and security
Network segmentation and access control
IoT endpoint visibility

Economic sustainability

Smart lighting
Public Wi-Fi
Open IoT data

Citizen services

Smart metering
Water quality monitoring
Mobility

soofa

The neighborhood news feed lets people share and connect with their neighbors by promoting their art, events, and local business updates.

Thank You

For more information, please contact:

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