Smart City Presentation (iOT)

More Connected Devices Than People

	2003	2010	2015	2020
World Population	6.3 Billion	6.8 Billion	7.2 Billion	7.6 Billion
Connected Devices	500 Million	12.5 Billion	25 Billion	50 Billion
Connected Devices Per Person	0.08	1.84	3.47	6.58

More connected devices than people

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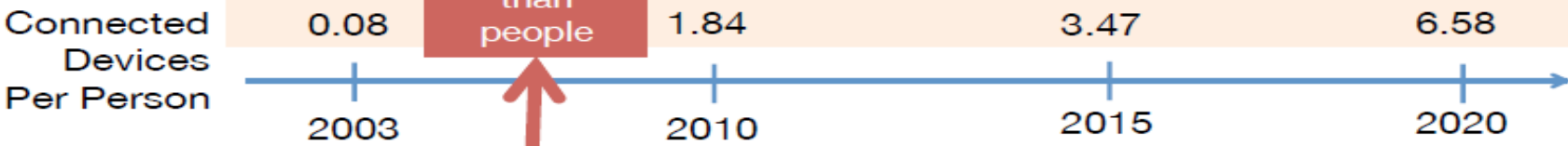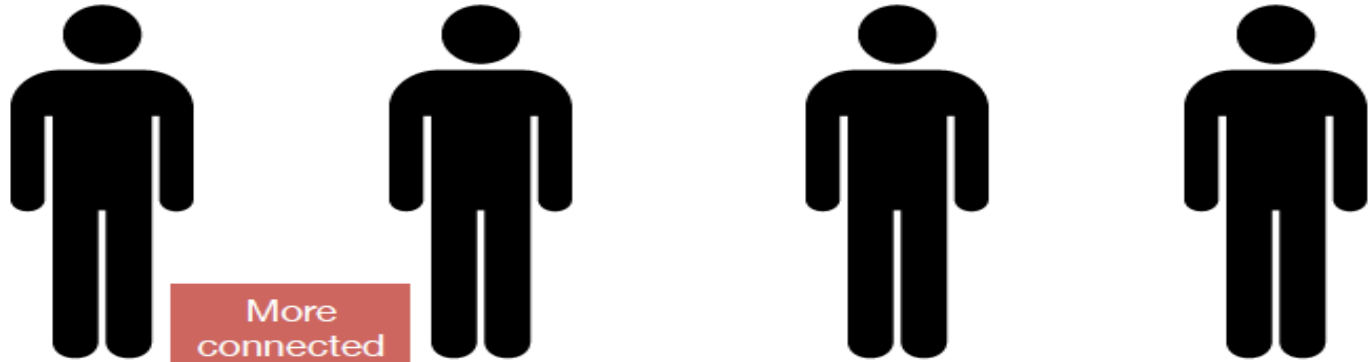
Connectivity in 2020

4 BILLION — Connected People

$4 TRILLION — Revenue Opportunity

25+ MILLION — Apps

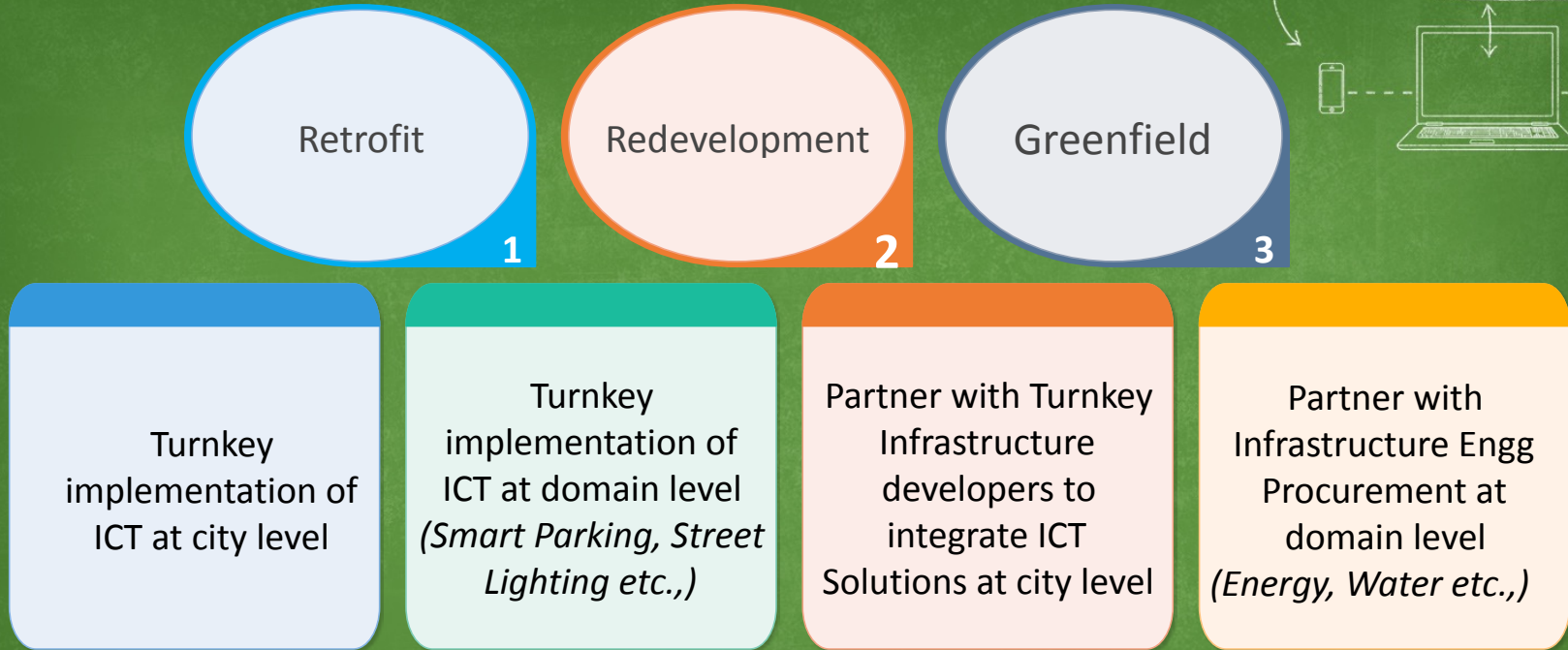25+ BILLION — Embedded and Intelligent Systems

50 TRILLION — GBs of Data

Source: Mario Morales, IDC

Smart City Vision of the Future

Types of Opportunities

Retrofit	Redevelopment	Greenfield
1	**2**	**3**

|			
Turnkey implementation of ICT at city level	Turnkey implementation of ICT at domain level *(Smart Parking, Street Lighting etc.,)*	Partner with Turnkey Infrastructure developers to integrate ICT Solutions at city level	Partner with Infrastructure Engg Procurement at domain level *(Energy, Water etc.,)*
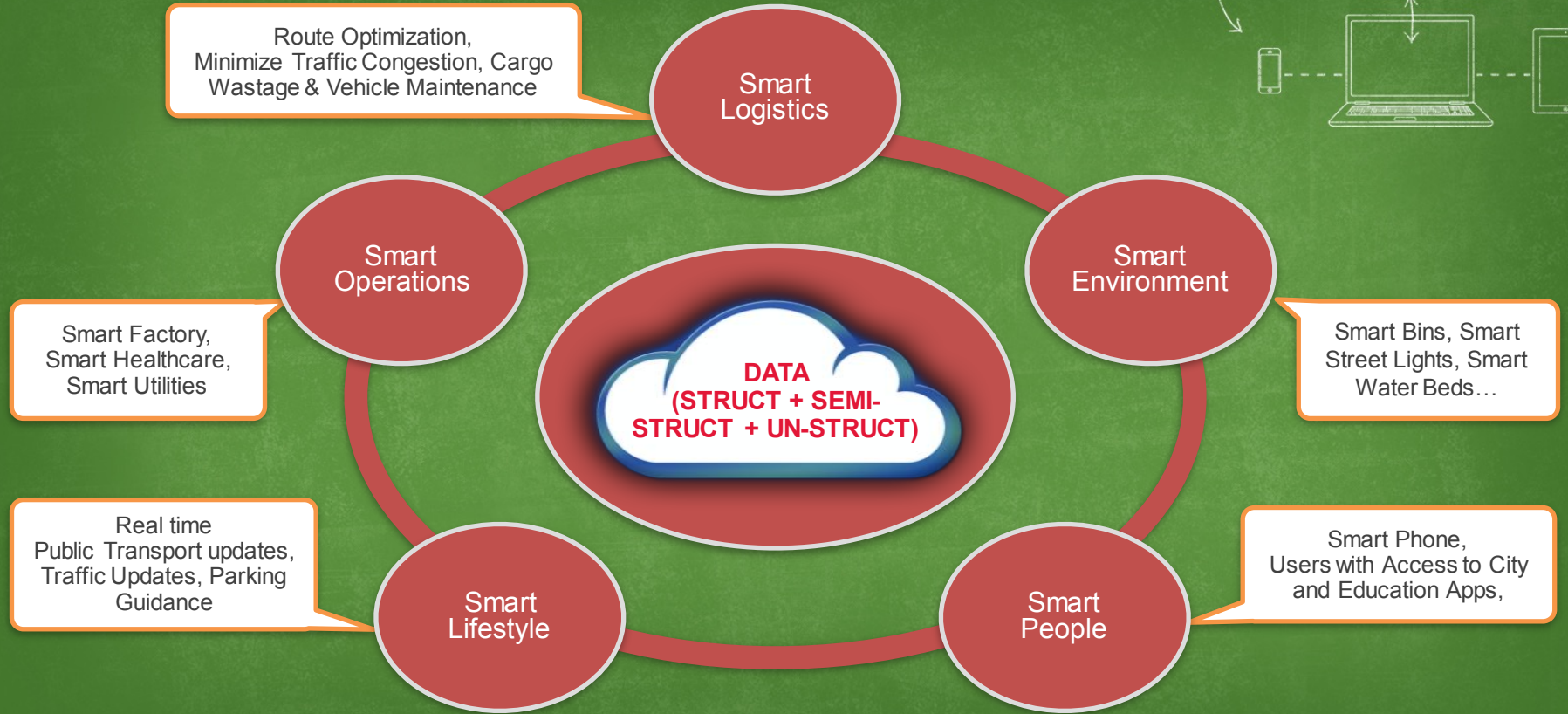
- Government Allocation for SC Development Rs 48,000 Crores
- Total ICT spending for Smart Cities can account for 10-15% of the overall budget.
- This would translate into as much as USD 30-40 billion over the next 10 years.

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Benefits from IOT based Technologies
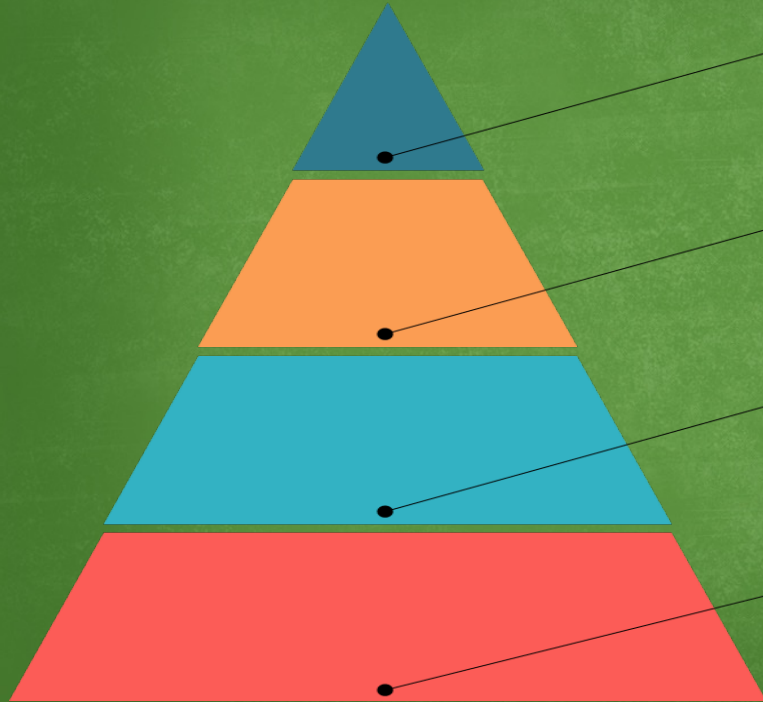
WATER MANAGEMENT
Could generate USD 39Billion by connecting the household water meter over an IP network to provide remote information on use and status

SMART PARKING
Create USD 41Billion by providing visibility into the availability of parking spaces across the city

GAS MONITORING
Generate USD 69Billion by reducing meter-reading costs and increasing the accuracy of readings for citizens and municipal utility agencies

SMART BUILDING
Poised to generate $100Billion by lowering operating costs by reducing energy consumption through the integration of HVAC and other systems

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Our iOT based Solutions for Smart Cities

Transportation

- Smart Parking Systems
- Vehicle Tracking System; Smart Fleet management

Energy, Utilities, Water

- Smart Metering Systems
- Smart Distribution and Monitoring Systems

Building/Infrastructure

- Building Energy Efficiency and Facility Management
- Smart Street Lighting Solutions

Healthcare

- Remote Diagnosis and Treatment
- Wearables and mHealth

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Our Expertise in IOT

Devices

Hardware Components

Sensors

Embedded Hardware

Gateways

Connectivity

Data Link Protocols
RFID, USB Bluetooth, WiFi, Ethernet, ZigBee Wireless Hart

Network Protocols
iPV4, iPV6, 6LoWPAN

Platforms

Real Time Operating Systems

System Hardware Middleware

Data Visualization & Presentation

Applications

Buildings

Transportation

Energy

Manufacturing

Healthcare

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Smart City Requirements of 20 Cities

City	Smart Parking	Smart LED Street Light	Smart Solar Street Light	Solid Waste Management	Medical Health	e-Governance	Smart Energy Meters	Transit Management	Safety and Security (CCTV)	Wi-Fi Hot spot	Sewerage Management	Solar Farm	Smart Water Supply	Smart Water Drainage
Kakinada		✓	✓	✓					✓		✓		✓	✓
Vizag				✓		✓	✓		✓			✓		
Guwahati	✓		✓					✓						✓
Ahmedabad	✓	✓			✓		✓						✓	✓
Surat		✓		✓					✓					✓
Belagavi		✓				✓			✓		✓			
Davangere	✓						✓		✓					
Kochi	✓		✓				✓		✓		✓			
Bhopal	✓						✓		✓				✓	
Indore	✓						✓	✓	✓					✓
Jabalpur				✓				✓			✓		✓	
Pune	✓		✓	✓			✓		✓				✓	
Solapur	✓		✓		✓	✓			✓	✓			✓	
NDMC	✓	✓				✓						✓	✓	
Bhubaneswar	✓						✓				✓		✓	
Ludhiana	✓	✓		✓			✓		✓			✓		
Jaipur	✓	✓		✓			✓		✓		✓		✓	
Udaipur	✓	✓		✓			✓			✓				
Chennai	✓	✓		✓		✓			✓				✓	
Coimbatore				✓					✓	✓				

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# Bisquare IoT Core Controller - The Brain

- Tiny Ultra-Low Power IoT Controller based on Configurable Wireless for Smart Home/ Infra

- Integrated Sensors/ Sensor Interfaces

- Embedded Security Framework

- Embedded Analytics Engine

- API for User App Integration

- Dimmable LED Driver

- Logging of Key performance parameters

- Configurable Network Config.

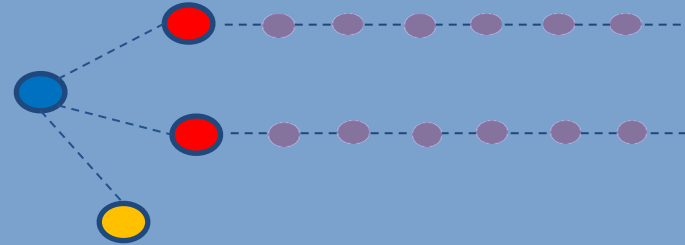- Energy metering

- Solar ready

- Remote Diagnostics

Smart Street Lighting Solution

Mesh
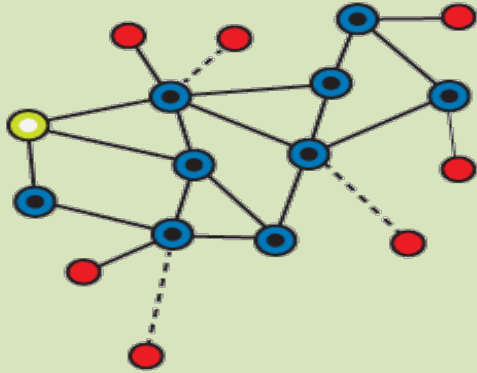
- Individual dimming and ON/OFF possible
- Precise failure detection
- Lighting cluster not affected by individual failure

String

- Lower cost per light
- String ON/OFF control
- Lighting cluster affected by individual failure

🔴 ZigBee Sleepy End Device   ⬤ ZigBee Router (ZR)   🟢 Coordinator

Smart Lighting System & Energy Efficiency

- Street lights are highly expensive.

- Typically consume about 40% of a city's overall electricity costs.

- Large Maintenance costs

- Street lighting using programmable controls (Zigbee, 6LowPan) & dimming help conserve energy.

- Western Cities are saving around 10-15 million kWh annually with smart street lighting.

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Goals & Design principles of Smart Street Lighting

- Maximum visual safety for drivers and pedestrians

- Improved visibility of people and objects

- Best light quality and highest colour rendering

- Enhanced street furniture appearance

- Energy efficient

- Reliable and safe

- Technically advanced

- Low Operational costs

- Ease of maintenance

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Advantages of Smart Street Lighting

- Reduced maintenance costs

- Reduced energy consumption

- Performance and energy-consumption data at consumer's fingertips

- Reduced greenhouse gas emissions

- Greater citizen satisfaction

Intelligent Street Lighting Solution

- Based on Bisquare Secure IoT platform with Analytics

- Secure mesh using Zigbee nodes with integrated metering & Smart dimmable LED Drivers

- 500 Zigbee nodes per Gateway

- 300 Gateways per server

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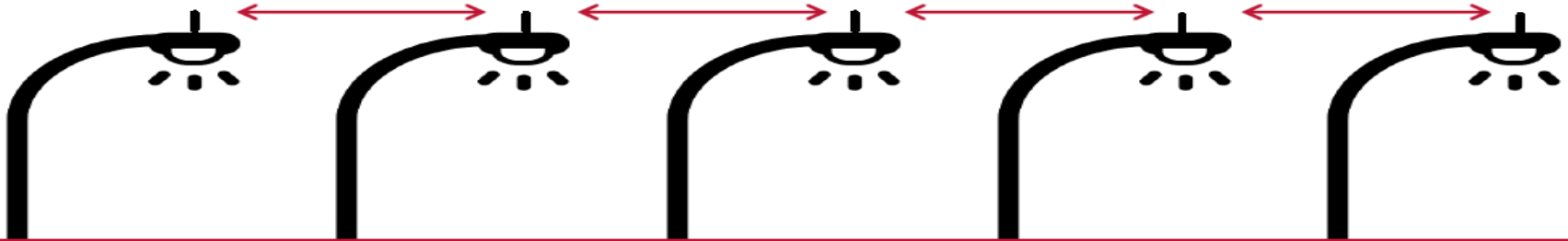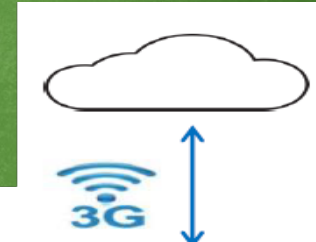
Components Designed

Node
ZigBee node
Ballast independent
light sensors
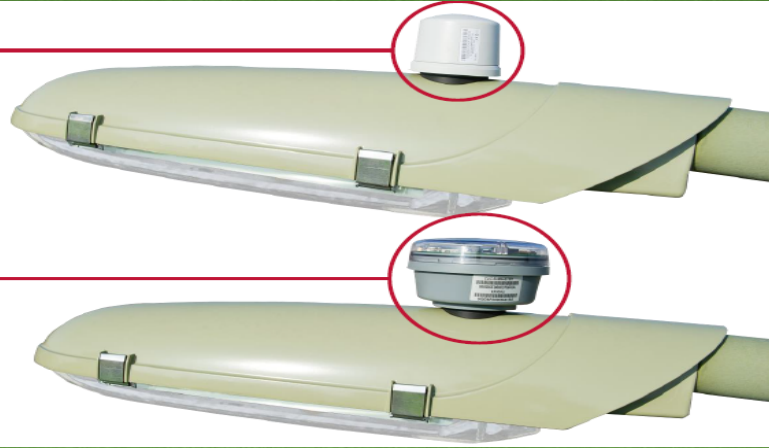
Gateway
coordinator
3G modem
light sensors
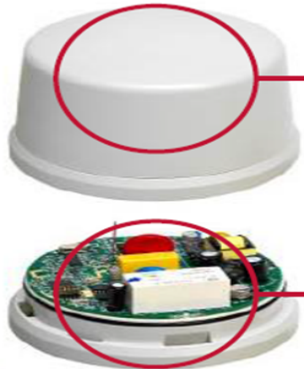
case
IP67 sealed

node
ZigBee radio (l
0.5% metering
DALI/1-10V dimming

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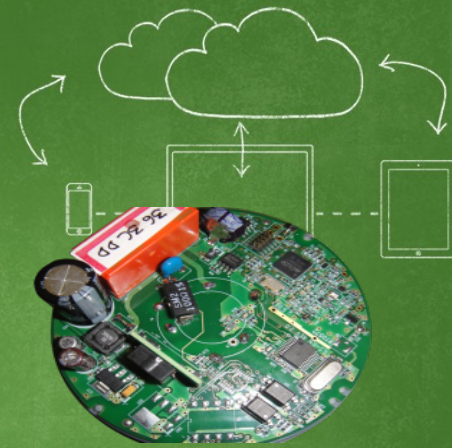
Smart Parking Solutions – Sensors Comparison

Type of Sensor	Dual mode of Detection (optical and magnetometer)	Non-intrusive Sensors
Technology	ZigBee-based	Ultrasonic-based
Placement	Ruggedly grounded	Celling-mounted
Connectivity	Router connects with the sensors	Cloud/App Gateway connects with the routers
Battery Life	5 years	3 years
Suitability	Indoor, multi-level and street side parking	Indoor, multi-level parking
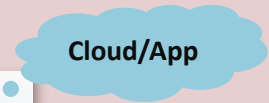
Wi-Fi Camera-based Smart Parking
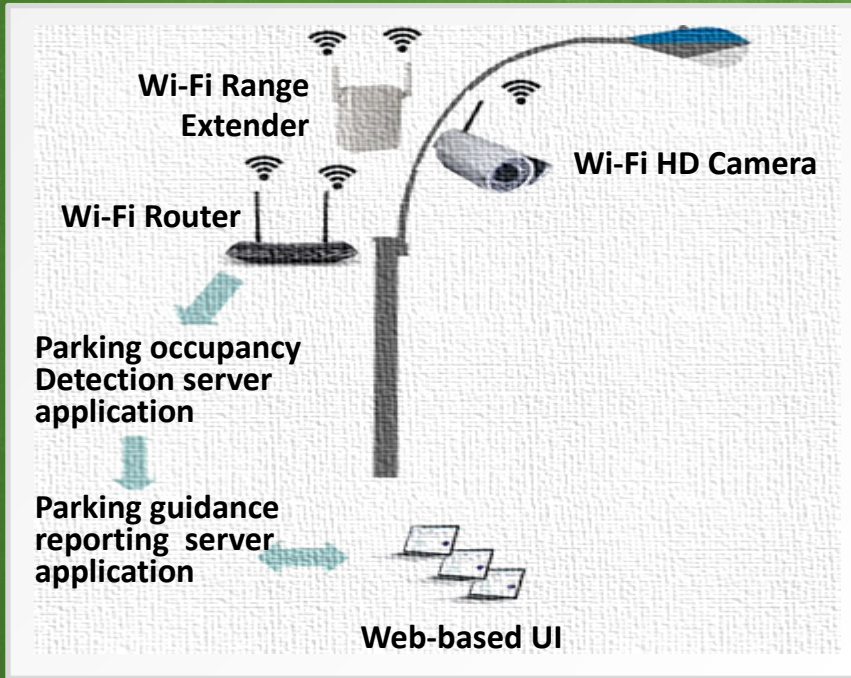
- Each camera aligned to maximize the visibility of available parking slots in its field of view.

- Video analytics application is appropriately calibrated to align with the parking lot.