The Future of FM

ABRAFAC
ASSOCIAÇÃO BRASILEIRA DE *FACILITIES*

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What is Cloud Processing & Data Analytics

"The future in now! The information age of technology and IOT (Internet of things) will forever change every aspect of Facilities Management / Corporate Real Estate."

What is Cloud Computing

The sharing of resources, software, and information via a network – Internet. The information is stored on physical servers maintained and controlled by a cloud computing provider. Cloud computing is nothing but a host of remote servers to manage and process such huge volumes of data.

Big Data Analytics

Big data simply represents huge sets of data, that can be further processed to extract information. Huge volumes of data in all kinds of formats over the internet every second. Businesses store that data to be analyzed later using tools increase the outcome and performance.

IOT (Internet of Things)

IOT generates massive amounts of data and cloud computing provided a pathway for that data to travel to it's destination. Deployment of 5G would bring wireless speeds capable of streaming 4K videos at once without buffering or any lag.

Future Technology

Smart Cities

Internet of Things

Super Smart Buildings

Artificial Intelligence

Block Chain/Edge Computing

Robotic Process Automation

Climate Event Preparedness

Mobile/Creative Work Environment

The Future is Now – Office Work Space

Office Workplace Transformation

1950's	1970's	1980's/1990's	2000's/2010's	Future is now
Open Bull Pen	Modular Furniture Systems	Open Office Architecture	Collaborative & interactive space	Creative space
		Hoteling	Reduce S.F. per person	Mobile work environment
		Tele - commuting	Major consolidations & Bldg. lease expirations	Rent a space
				Rent temp. office

"Boss mentality"

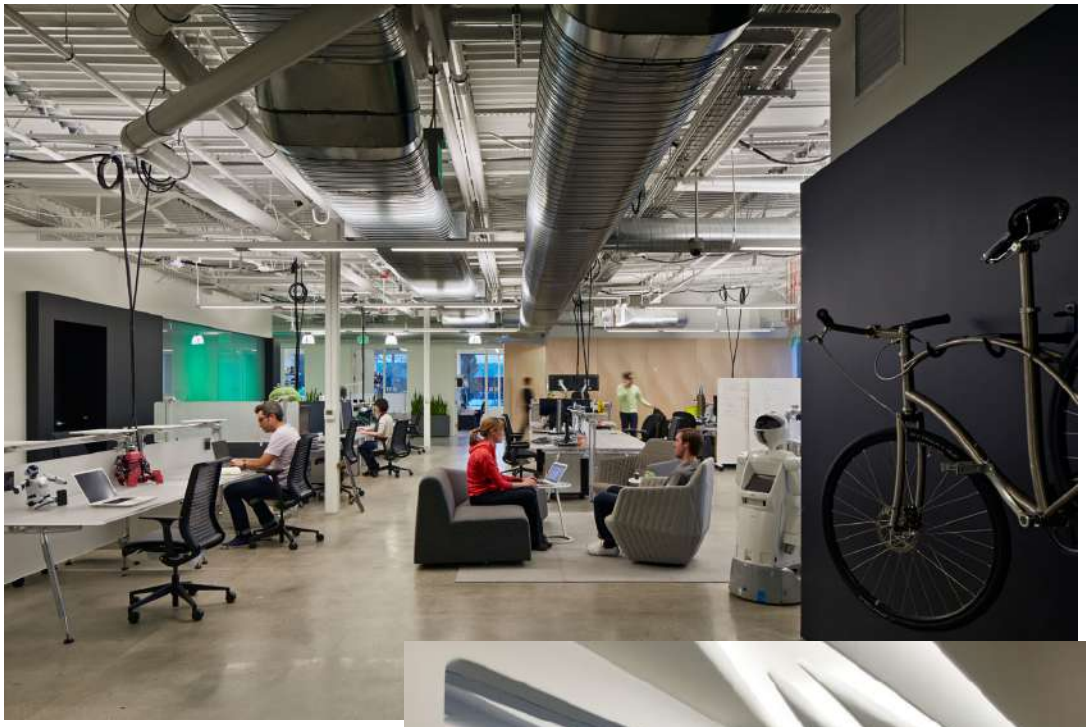
"Modern & productive environment"

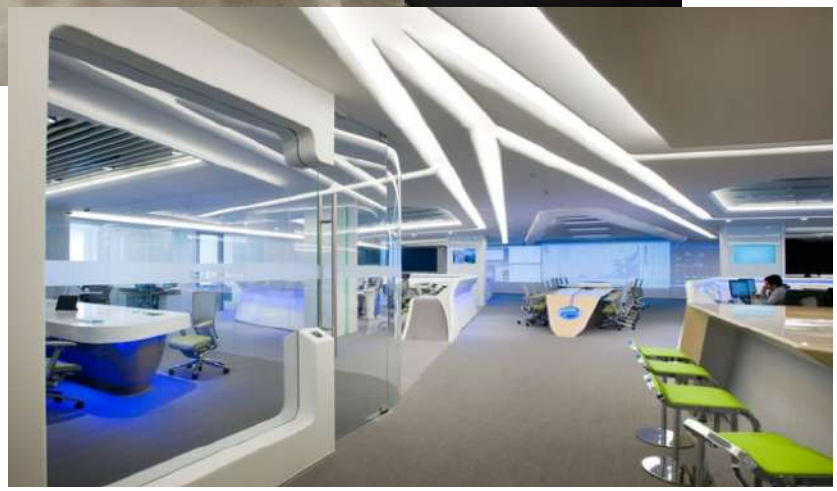
" Collaboration & reduce buildout cost"

"Reduce ops cost, attract talent, happy workforce"

"Recreational facilities, excess commercial space, mobile flexible balance family life"

Hi-Tech Rent a Space



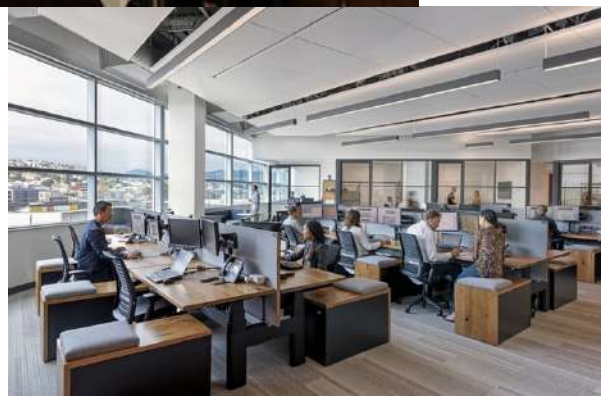


- **Rent by the day, hour, week, month, year**
- **Fully furnished**
- **IT/Wi-fi/Fiber ready**
- **Wellness centers**
- **Fitness centers**
- **Coffee bar / cafeteria**
- **Day care**
- **Rent individual space @ Marriott**

Creative Space – Silicon Valley, CA

- **Tech collaboration tools**
- **Wellness pool**
- **Roof gardens**
- **Climbing walls**
- **Athletic field**
- **Day Care**

Mobile Worker & Home Office Collaboration



- **Tech collaboration rooms & telepresence**
- **Coffee bar & impromptu meeting nooks**
- **Web base cloud software programs on IOT**
- **Balance family/work**
- **Flexible**
- **Increase creativity**

AT&T Cloud EBMS (Enterprise Building Management System)

Project ICON (Intelligent Connection of Facilities Networks) uses our network to acquire valuable performance data from facility equipment across the U.S. We manage the data from a centralized point that allows us to create performance baselines, monitor equipment status and identifies required maintenance actions in real time

Why Smart EBMS ?

- Collate building data across multiple facilities, equipped to flag and prioritize system response & repairs on one common platform/dashboard
- Incorporate existing BMS / BAS systems on common platform
- Fault diagnostic sensors are installed, increase delta T, minimize start/stop cycles, predictive maintenance
- Incorporate utility company live/hourly smart meter data and weather data to measure anomalies/patterns
- Capital expenditure avoidance, right size equipment, capital life extension
- Program can include preventative, predictive & corrective maintenance inventory and work frequencies per schedule

AT&T Cloud EBMS Overview

WHY

1M+ Equipment Work Orders & Hours

Internet of Things

WHAT

Custom Dashboards
Prioritized Faults/Alerts

Custom Reports

Facility Optimization

HOW (Large Sites)

BMS/Sensors/Meters/Smart Controllers

FINANCIAL

Capital Avoidance

Capital Life Extend

Maintenance $

Energy $

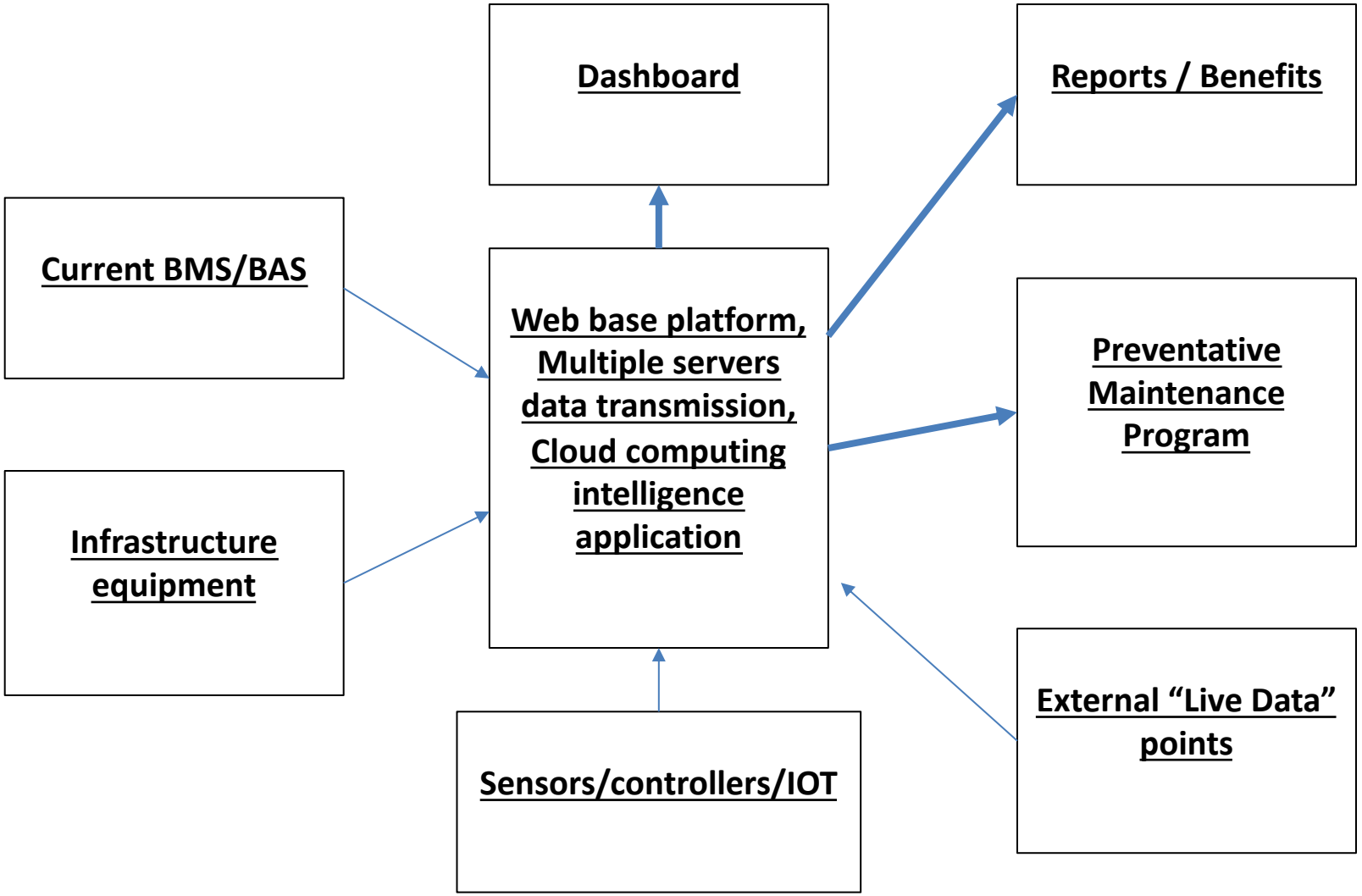
Maximize benefits

SIGNIFICANT EVENTS

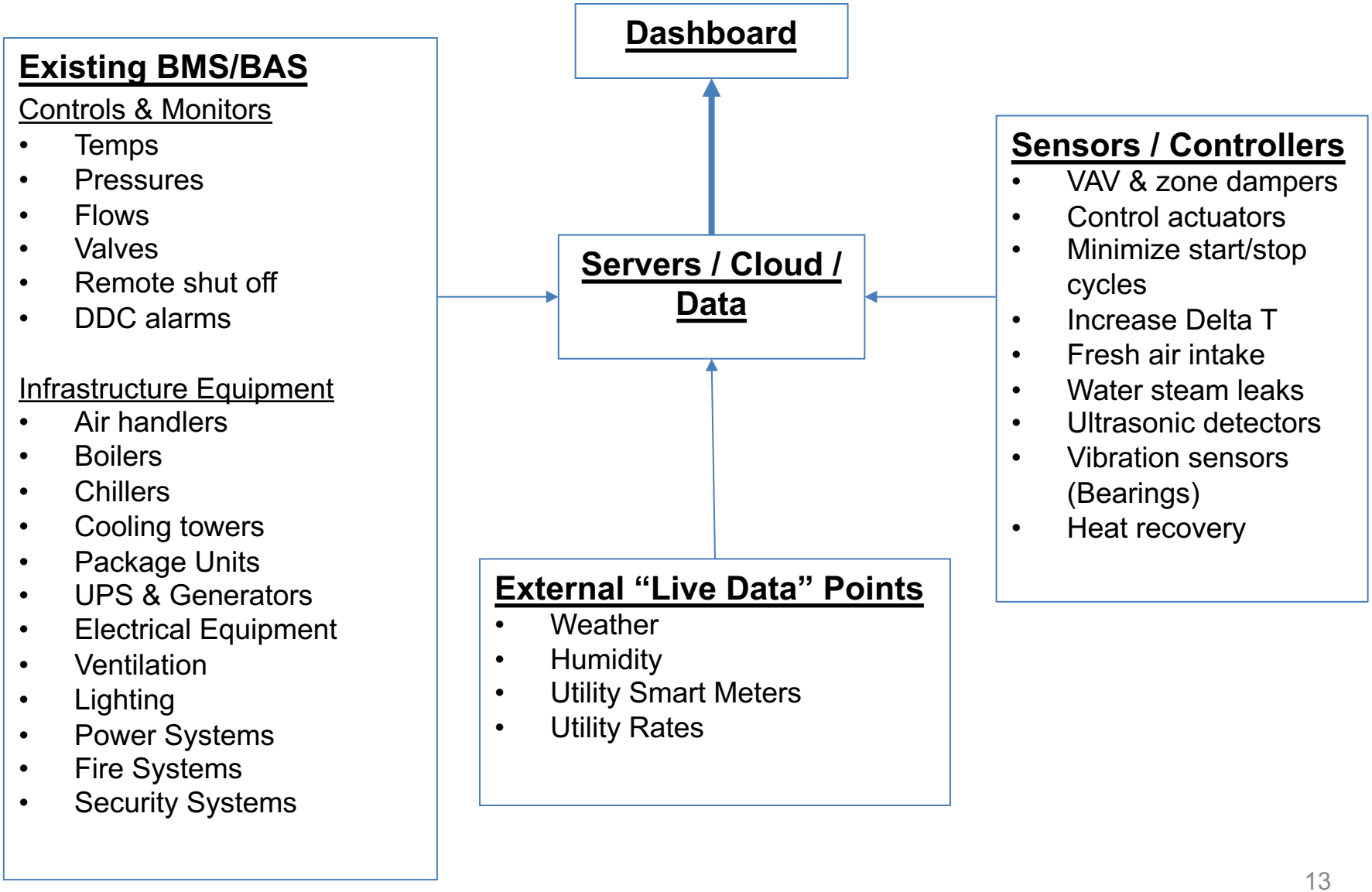
2015 – 2018 Deployed

2014 – Pilot Initiated
2016 – PUE Developed
2017 – Deployed to EDCs (Enterprise Data Centers)
2018 – Reports Expanded

Cloud EBMS Input / Output Process



Cloud Data Process



Cloud EBMS Benefits / Capabilities

Capabilities

- Single web base platform for multiple sites/locations
- Continual trending data & financial savings recommendations
- Live data/fault monitoring/reports
- Visual performance metrics dashboard
- Repairs identified
- Preventative, predictive & corrective maintenance frequency models

Benefits

- Extend useful life cycle
- Capital avoidance
- Reduce maintenance cost
- Reduce energy consumption
- Reduce carbon footprint
- Properly size equipment replacements
- Lower work orders and optimize maintenance routines

Tracking Capacities

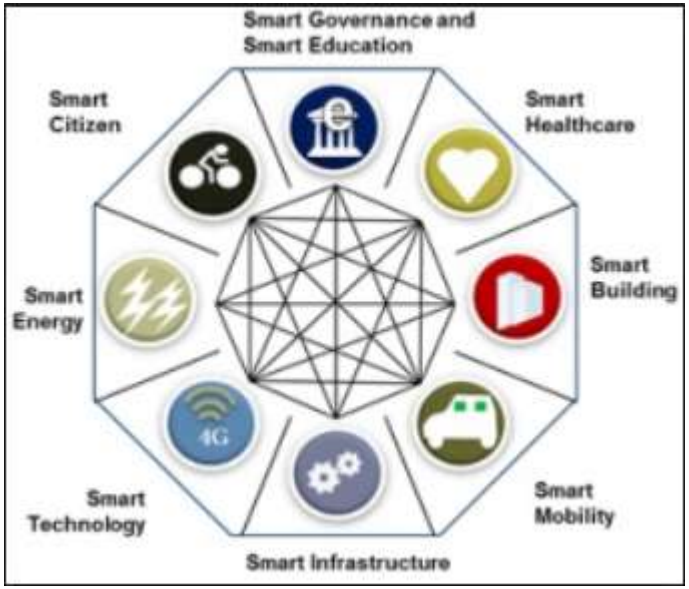
- Total space: 4.6 M m²
- Locations/cities: 250 plus
- Buildings: 500 plus
- Size of bldgs. 1.9 K m²
- Pieces of Equip: 30,000 plus
- Points monitored: 1M plus

Smart Cities

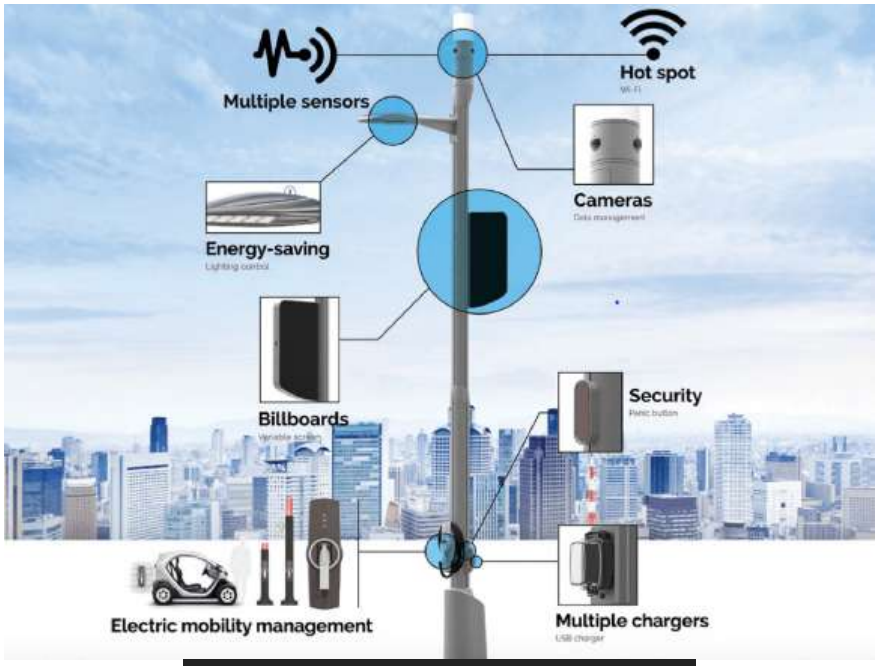
A *smart city* is a municipality that uses information and communication technologies to increase operational efficiency, share information with the public and improve both the quality of government services and citizen welfare

Smart Cities Next Generation 5G Networks

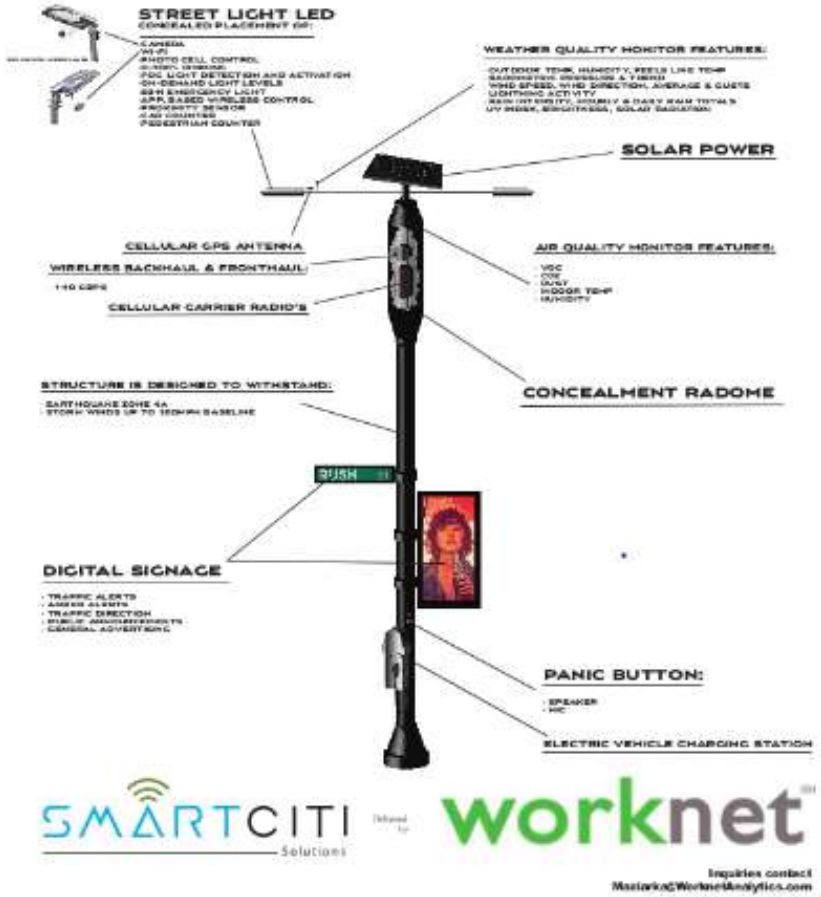
- Smart environmental control (Air quality, water quality, noise pollution, energy consumption & efficiency)
- Remote smart signals
- Smart intersections data gathering
- Smart parking
- Fleet management diagnostic maintenance
- Connective vehicles
- Neighborhood perspectives & real time traffic
- Smart street lighting & monitors when repairs are needed
- Smart analytics for transportation systems (Wi-fi connectivity)
- Smart transit screens for bus, bridges & train (Public transportation applications)
- Security & smart light fixtures



Smart Poles



Lumca Smart Pole Solution
Digi International



Top 10 Smartest Cities in the World (Michael Luciano)

10) Seoul, South Korea 2014 – All residents provided with tablets/smart phones for medical attention

9) Vienna, Austria – Worlds green leader installing 300K solar panels & has largest biomass plant

8) Boston MA, USA 2015 – One of the biggest Wi-fi network in the U.S.

7) Amsterdam, Netherlands 2016 – Energy efficiency city & ranks high in citizen participation & government digitization

6) Tokyo Japan 2011 – Produces zero carbon emissions & powered completely by renewables. Ranks high in smart parking & Wi-Fi spots

5) Stockholm, Sweden 2009 – First city to introduce 4G/LTE mobile services. Most public transportation vehicles receive their fuel from wastewater treatment plants (Bio-diesel)

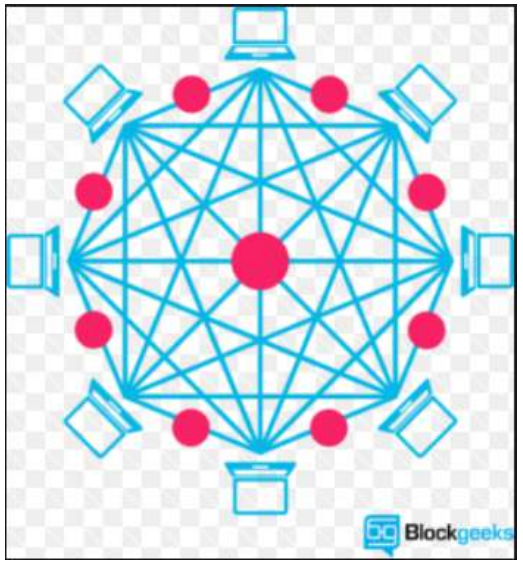
4) Paris, France – Big player in utilizing green & renewable energy

3) London, UK – Europe's largest free Wi-Fi network and has an institution called smart cities research center

2) San Francisco, CA. USA – Leader in smart parking/vehicle sharing, has 100 public charging stations for electric vehicles & apps for visually impaired citizens to navigate public transportation

1) New York, NY, USA 2009 – Partnered with IBM to launch business analytics solution center migrating toward having all citizens with internet access/Wi-Fi capabilities

Block Chain / Edge Computing



A *blockchain* is a data structure that makes it possible to create a digital ledger of data and share it among a network of independent parties. Transactions are maintained by its users rather than by a third party.

Edge computing provides a way to gather and process data at local computing devices instead of in the cloud or at a remote Data Center

Block Chain Computing Benefits

Self Performing Benefits

- Streamline FM processes
- Minimize dispute resolutions
- Eliminate the middle guy
- Execute Supply Chain contracts, key standards & metrics and track all work orders, bill payment, change management and performance metrics
- Digital records & signatures for all contracts mentioned above
- Paper free
- Centralize to one contracts systems
- Financial analysis tool

Potential FM Applications

- Space management/occupancy of cubicles
- Regulatory compliance
- Supply chain contracts
- Life cycle cost & analysis
- Security access
- Real property transactions
- Preventative maintenance programs (Billing, warranties, occupancy tracking)

Note: Allows digital information to be distributed but not opened

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