



The Benefits of Smart Building Technology

NTIA Webinar Series

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Conference Line: 800-593-7190 Passcode: 984-4951#

January 15, 2020

Participants

Presenters

- Limor Schafman, Senior Director, Smart Buildings Program, Telecommunications Industry Association
- Jiri Skopek, Board of Governors Vice-Chair, 2030 Districts Network
- Benny Lee, Director of SMC Public Wi-Fi, San Mateo County and Councilman, San Leandro, CA

Moderator

- Jean Rice, Senior Broadband Analyst, NTIA, BroadbandUSA

Helpful Information

Questions

- Please type questions and comments in the question box on the right hand side of the screen. Questions will be taken after the final presenter.

Presentation

- The presentation along with a transcript and an audio recording will be available on the BroadbandUSA website within 7 days of this webinar under Events/Past Events.
- <https://broadbandusa.ntia.doc.gov/past-event>

Technical Assistance

- Guides, products, publications, and other tools are available to assist you with the planning, funding and implementation of your broadband project.
- <https://broadbandusa.ntia.doc.gov>

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GLOBAL CITY
TEAMS CHALLENGE

Smart Buildings Defined

Limor Schafman

*Co-chair, Smart Buildings Super Cluster, GCTC
Executive Director, Smart Buildings Program, TIA*

BROADBAND USA Webinar – January 15, 2020

Global Cities Team Challenge



- GCTC brings together
 - industry
 - universities
 - nonprofits
 - local and state government
 to work on projects to share knowledge and best practices on smart community technologies
- National Institute of Standards and Technology leads GCTC, in partnership with
- NTIA, Dept. of Homeland Security, National Science Foundation, International Trade Administration and others



GCTC – Work Being Done and Participants a

Participant Cities/Countries Worldwide:

US

- Portland, OR; Denton, TX; Ammon, ID; Washington, DC; Columbus, OH; New York, NY

Europe

- Amsterdam, NL; Genoa, Italy; Valencia, Spain; Others

Asia

- Shirahama, JP; Busan, KR; Daegu, KR

Africa, South America, Australia

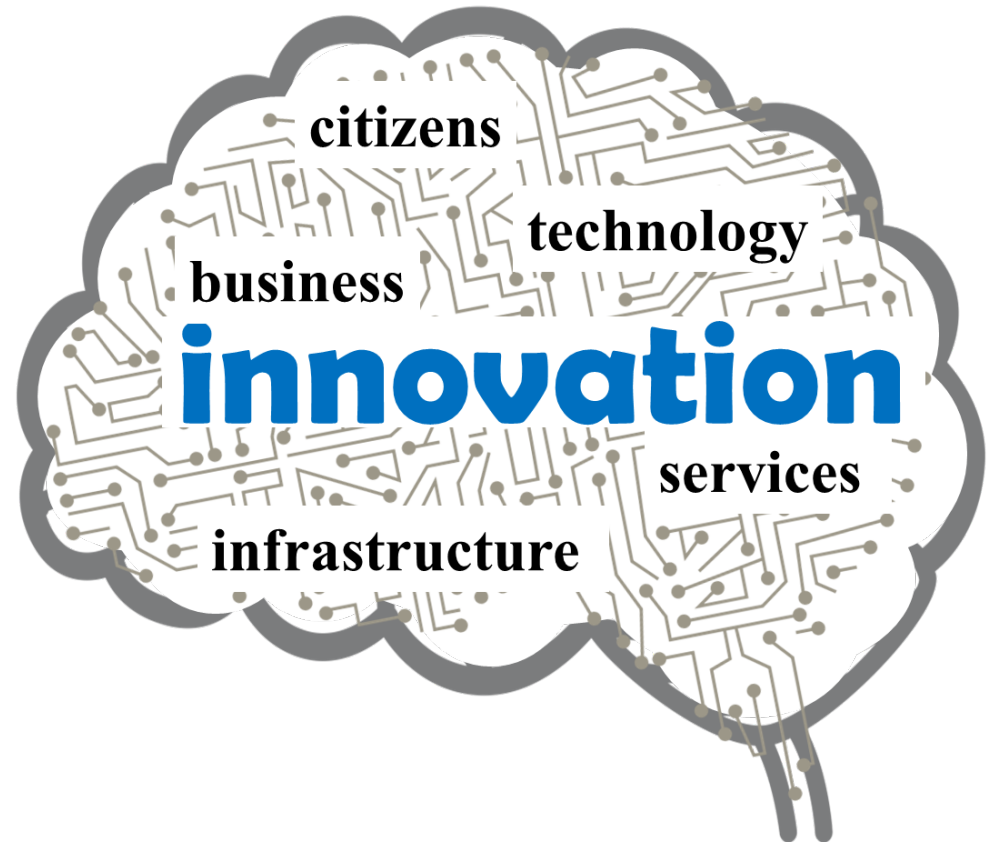
Blueprint & Framework topics:

- Data
- Energy/Water
- Healthcare
- Multi-sector integration and building automation
- Public Safety
- Rural and Agriculture
- Smart Buildings
- Transportation
- Wireless Connectivity



To learn more visit: <https://pages.nist.gov/GCTC/super-clusters/>

SMART Cities drive innovation



Buildings are building blocks of cities

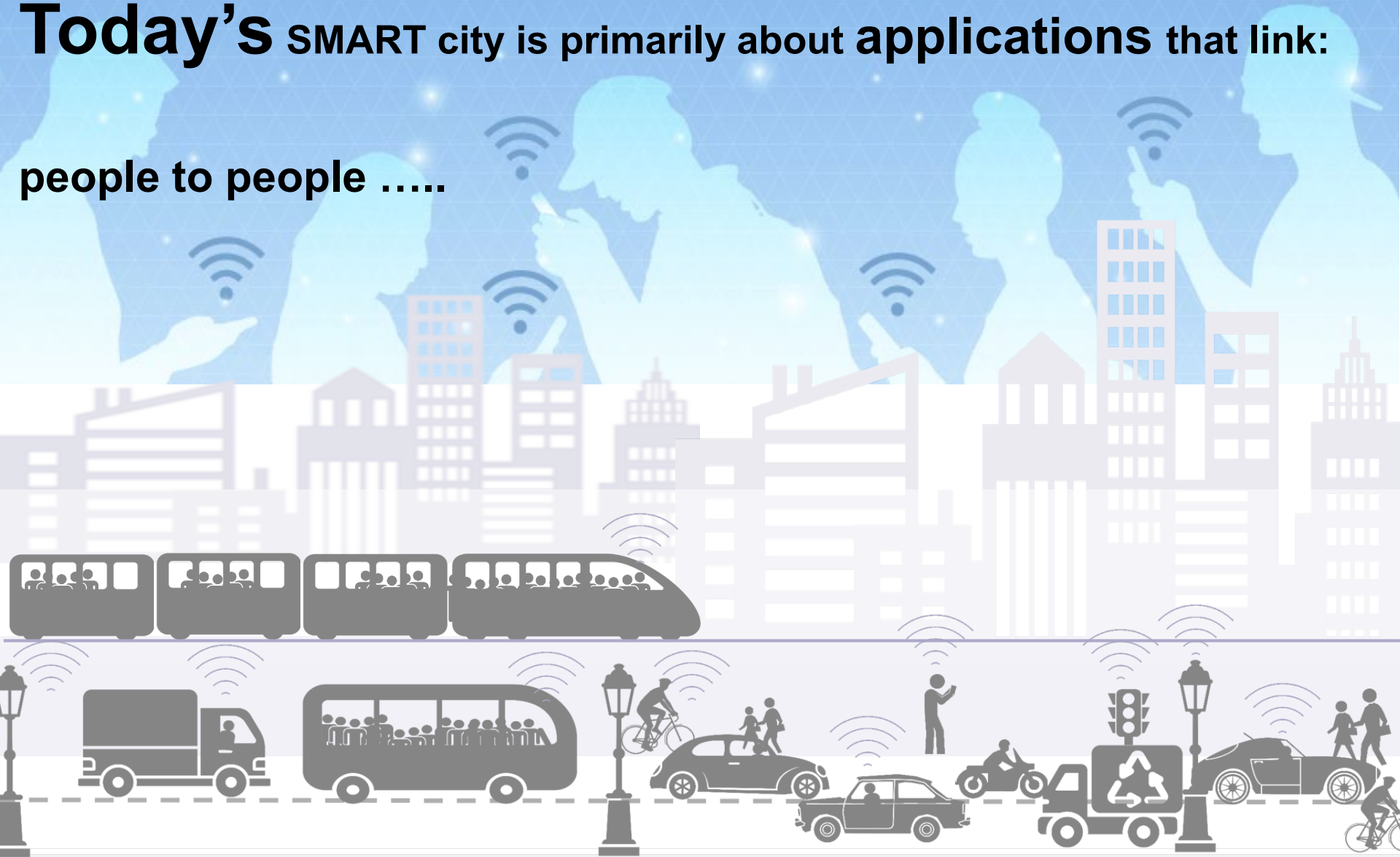


Traditional city and infrastructure



Today's SMART city is primarily about applications that link:

people to people



Today's SMART city is primarily about **applications** that link:

people to people

and to services – including (especially) transportation



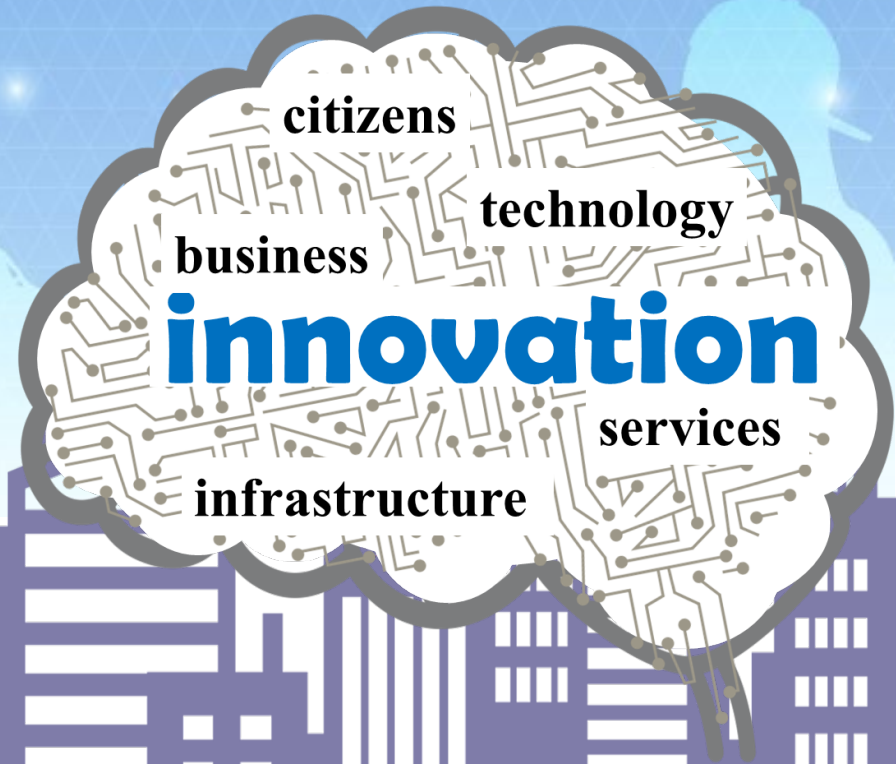
There's a missing piece



What about buildings?



Human Experience & Innovation



TIA's Definition of a Smart Building

*A Smart Building uses an integrated set of
technology, systems and infrastructure
to optimize building performance and occupant experience.*

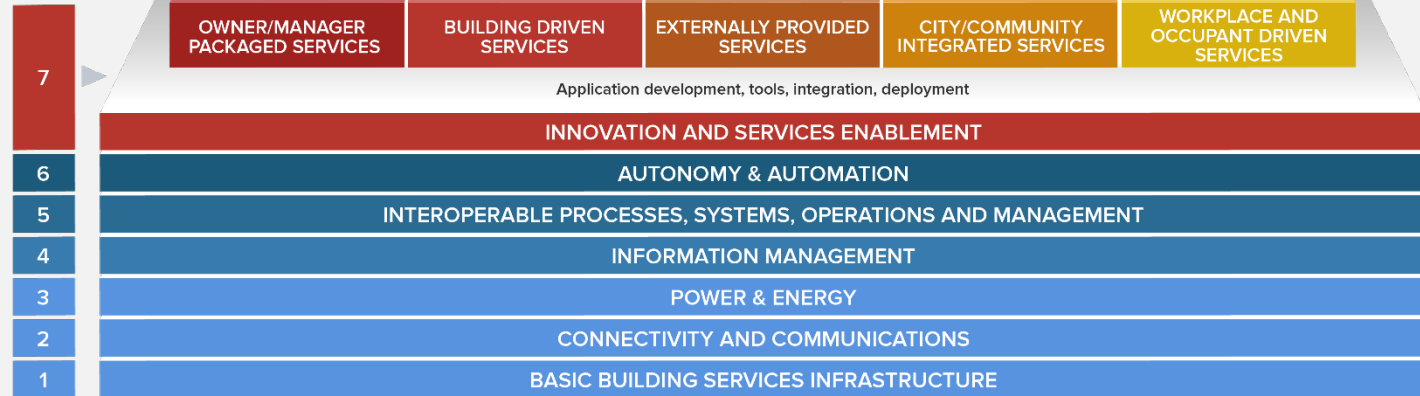


A System of Systems Supporting BAAS

SMART BUILDING INTEGRATED ECOSYSTEM

VALUE GENERATION
BUILDING AS A SERVICE

Quality of Visitor/Tenant Experience
Productivity and Efficiency
Economic Development
Visitor/Tenant Safety
Health & Wellness
Security
Resilience
Sustainability
Mobility



▲ SELECT A LEVEL TO LEARN MORE



INTERCONNECTED SYSTEMS
& IOT CAPABILITIES

Foundation 1: Basic Infrastructure

SMART BUILDING INTEGRATED ECOSYSTEM

VALUE GENERATION
BUILDING AS A SERVICE

- 7
- 6
- 5
- 4
- 3
- 2
- 1

INTERCONNECTED SYSTEMS
& IOT CAPABILITIES



Plumbing, cabling, ducting, HVAC, AV, lighting, security, safety, sensors, building automation and management systems

BASIC BUILDING SERVICES INFRASTRUCTURE

▲ SELECT A LEVEL TO LEARN MORE

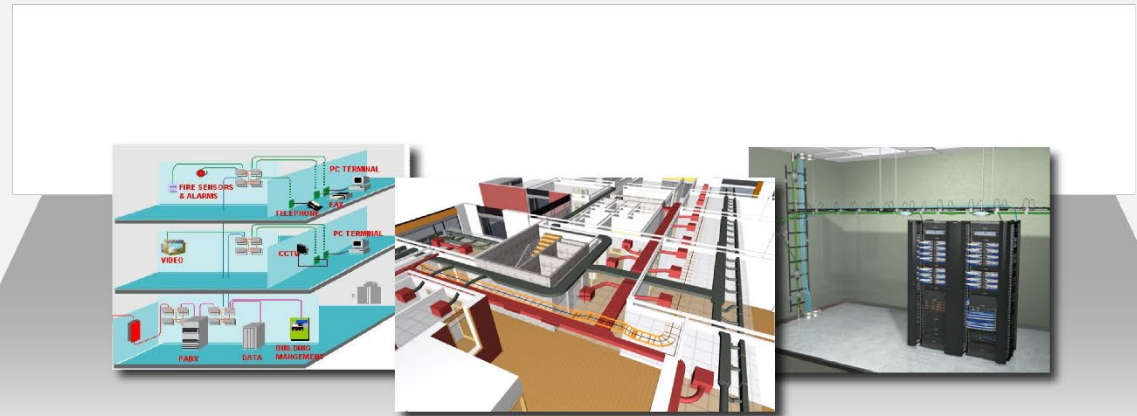


Foundation 2: Connectivity

SMART BUILDING INTEGRATED ECOSYSTEM

VALUE GENERATION
BUILDING AS A SERVICE

- 7
- 6
- 5
- 4
- 3
- 2
- 1



Wired, Wireless (Cellular & Other), WiFi, Public Safety, Internal/External

CONNECTIVITY AND COMMUNICATIONS

BASIC BUILDING SERVICES INFRASTRUCTURE

▲ SELECT A LEVEL TO LEARN MORE

INTERCONNECTED SYSTEMS
& IOT CAPABILITIES

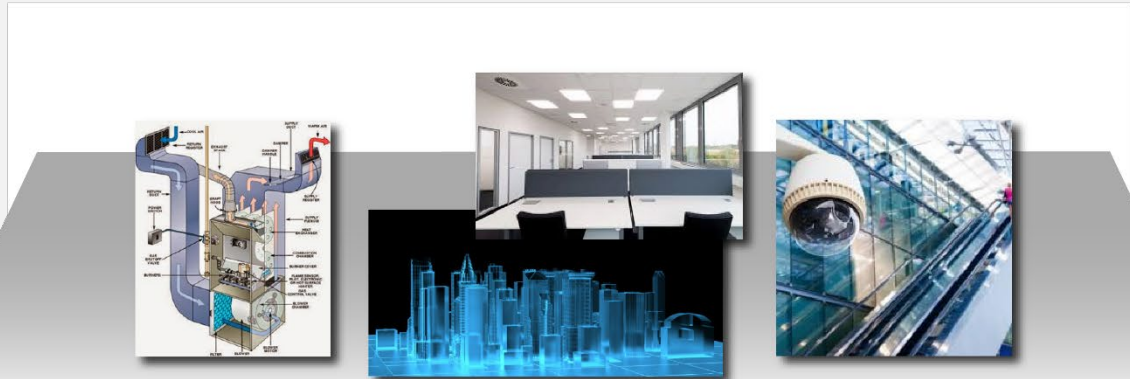


Foundation 4: Data

SMART BUILDING INTEGRATED ECOSYSTEM

VALUE GENERATION
BUILDING AS A SERVICE

- 7
- 6
- 5
- 4
- 3
- 2
- 1



Data capture, analytics, utilization, cross-system sharing, management (including privacy and security), edge computing

INFORMATION MANAGEMENT

POWER & ENERGY

CONNECTIVITY AND COMMUNICATIONS

BASIC BUILDING SERVICES INFRASTRUCTURE

▲ SELECT A LEVEL TO LEARN MORE

INTERCONNECTED SYSTEMS
& IOT CAPABILITIES



Foundation 5: Interoperable Systems

SMART BUILDING INTEGRATED ECOSYSTEM

VALUE GENERATION
BUILDING AS A SERVICE



▲ SELECT A LEVEL TO LEARN MORE



INTERCONNECTED SYSTEMS
& IOT CAPABILITIES

Foundation 6: Intelligence & Cognition

SMART BUILDING INTEGRATED ECOSYSTEM

VALUE GENERATION
BUILDING AS A SERVICE

7



Machine learning, predictive analytics, automated response, cross-system actuation

6

AUTONOMY & AUTOMATION

5

INTEROPERABLE PROCESSES, SYSTEMS, OPERATIONS AND MANAGEMENT

4

INFORMATION MANAGEMENT

3

POWER & ENERGY

2

CONNECTIVITY AND COMMUNICATIONS

1

BASIC BUILDING SERVICES INFRASTRUCTURE

▲ SELECT A LEVEL TO LEARN MORE

INTERCONNECTED SYSTEMS
& IOT CAPABILITIES

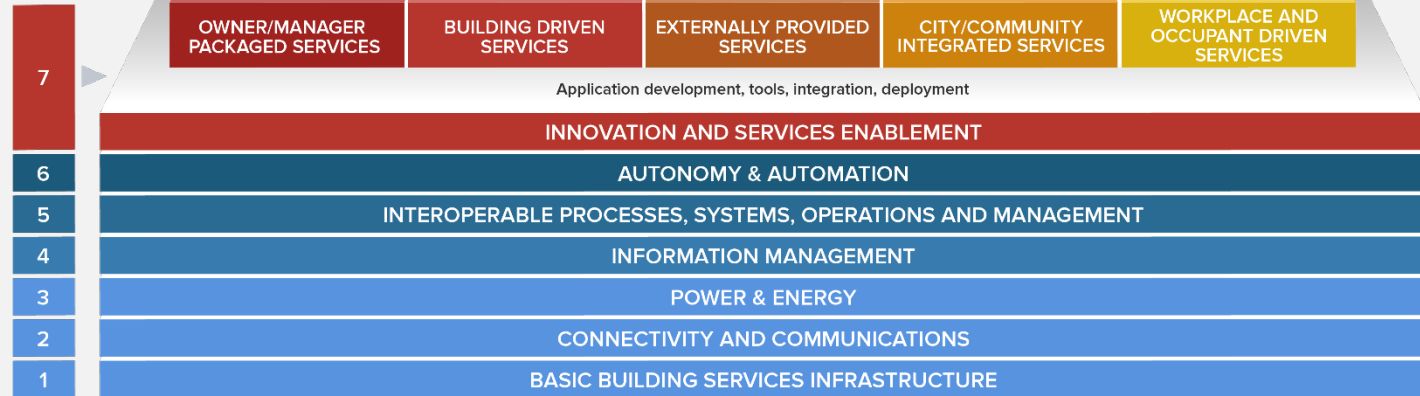


A System of Systems Supporting BAAS

SMART BUILDING INTEGRATED ECOSYSTEM

VALUE GENERATION
BUILDING AS A SERVICE

Quality of Visitor/Tenant Experience
Productivity and Efficiency
Economic Development
Visitor/Tenant Safety
Health & Wellness
Security
Resilience
Sustainability
Mobility



▲ SELECT A LEVEL TO LEARN MORE



INTERCONNECTED SYSTEMS
& IOT CAPABILITIES



GLOBAL CITY
TEAMS CHALLENGE

Thank you!

Limor Schafman
Co-chair Smart Buildings Super Cluster, GCTC
Senior Director, Smart Buildings, TIA
Lschafman@TIAOnline.org

GCTC TechJam SBSC 2019



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NexGen Smart Buildings: Improving Organizational Productivity and Quality of Life

Jiri Skopek

Board of Governors Vice-Chair, 2030
Districts Network

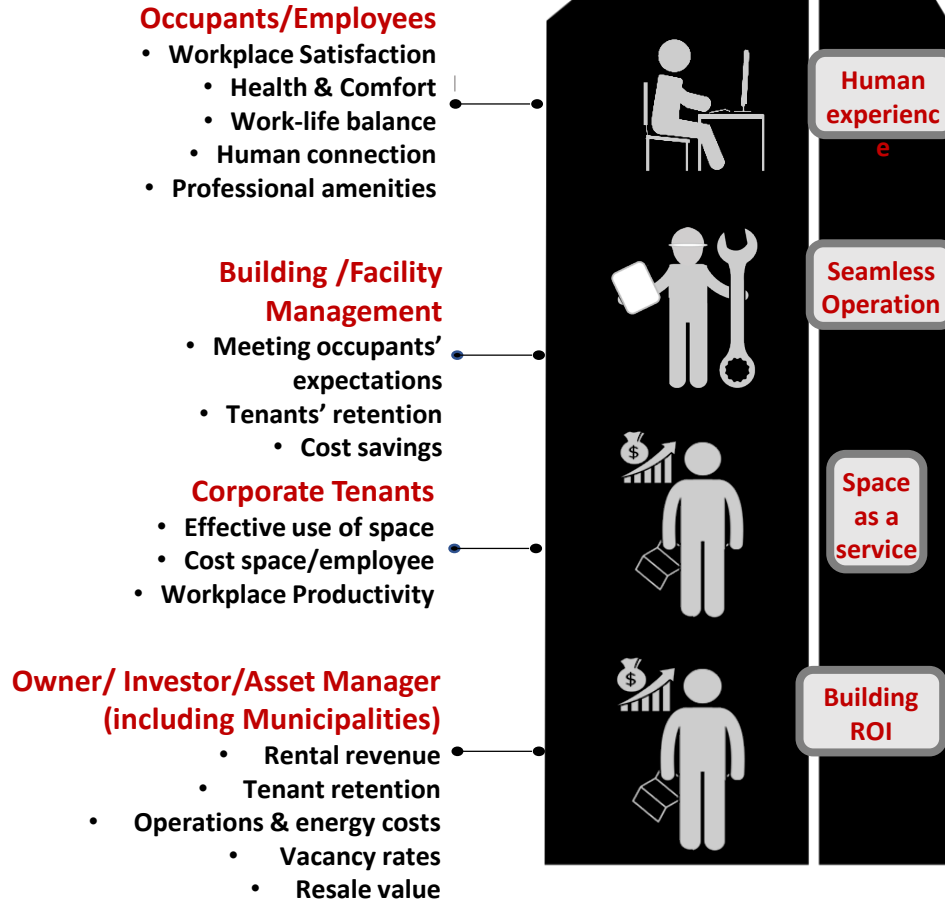
Digital Ecosystem - It's all about the user's experience



Source: Copenhagen Institute for Future Studies

Smart building means different things to different people

Each stakeholder has different objectives and ways of measuring organizational productivity (different KPIs)



Owner/ Investor/Asset Manager



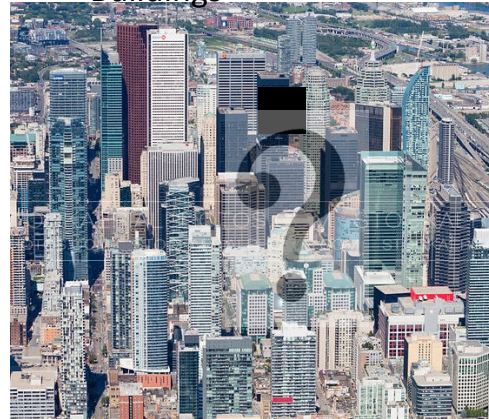
The “Marker” Smart Buildings:
Edge-the Smartest, Net-Zero in
Amsterdam



Energy Academy Europe (EAE)



Bulk of the Existing
Large Commercial
Buildings

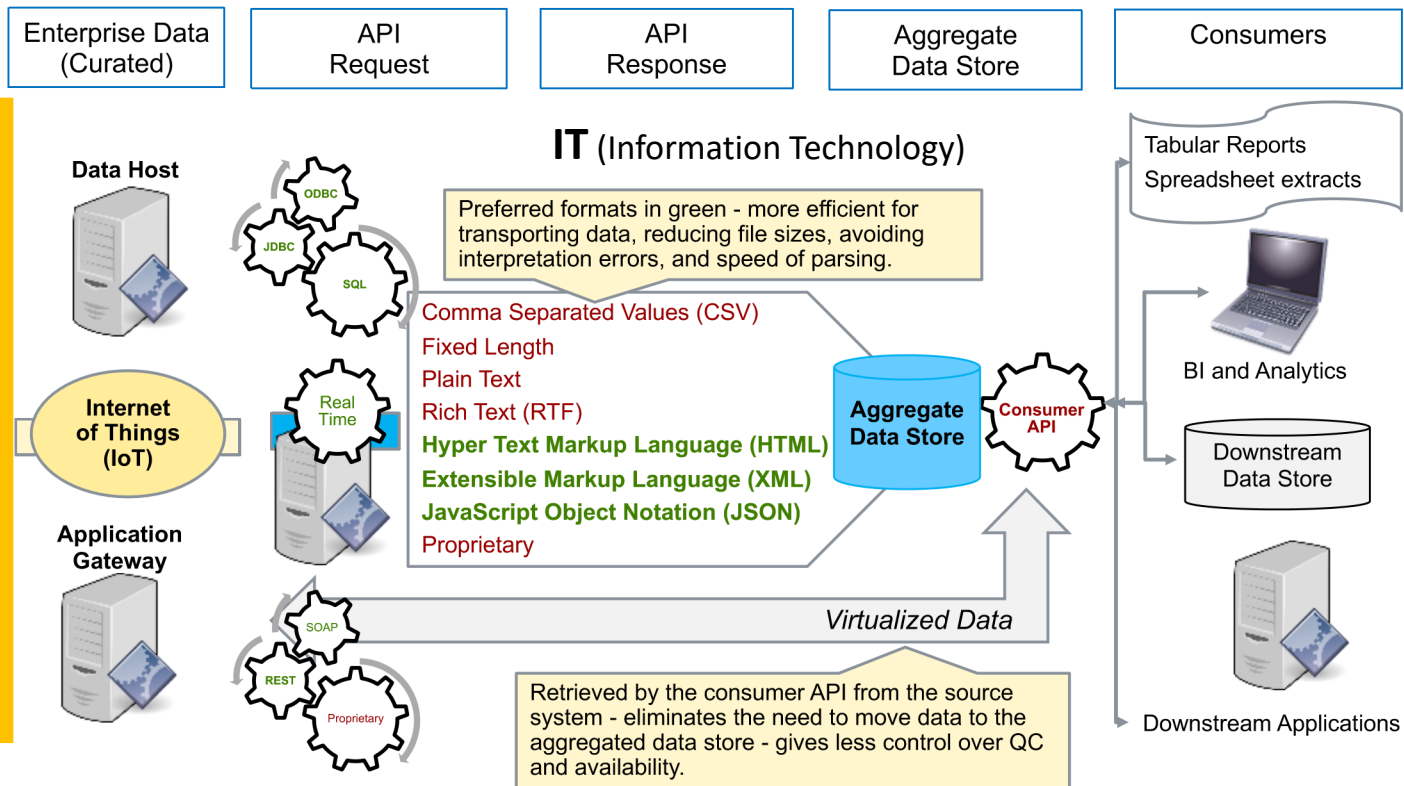


Bulk of the Existing Light
Commercial Buildings



*“show me the value without
associated risks”...*

Corporate Tenants- building data becoming part of enterprise data management strategy



Occupants/ tenants – human experience



The smart system greets me, helps me to book a desk and find my way. What a time saver!

The environmental system adjusts conditions to my liking

My computer connects easily, and the building is well maintained.

I LOVE THIS BUILDING!



Productivity of occupants - healthier environment

- CLEAN OXYGENATED AIR
- THERMAL CONDITIONS
- LIGHT CONDITIONS
- ACOUSTIC
- HYDRATION
- NUTRITION
- SPACE TO MOVE
- RELAX AND REST

White Noise Control

Dimmable lighting

Occupancy Sensing

IAQ controls

Daylighting

Shade Control

Temperature Control

Human Experience



SMART BUILDING



Productivity of occupants - greater convenience and time savings



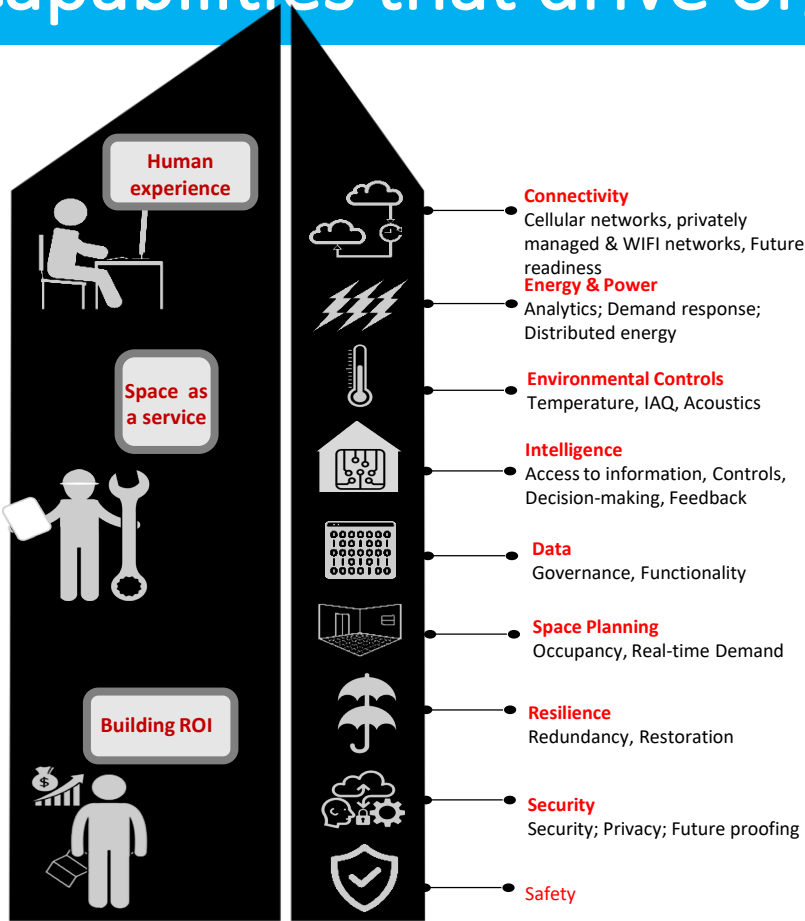
Digital signage & Wayfinding

- Security Access
- "Follow Me" printing
- Work Station identification
- Find my co-worker

- Conference room booking
- Help on transportation
- Healthy food selection/order

- **SPACE MANAGEMENT**
- **WAYFINDING**
- **MOBILITY OPTIONS**
- **COLLABORATIVE SPACE**
- **AMENITIES**

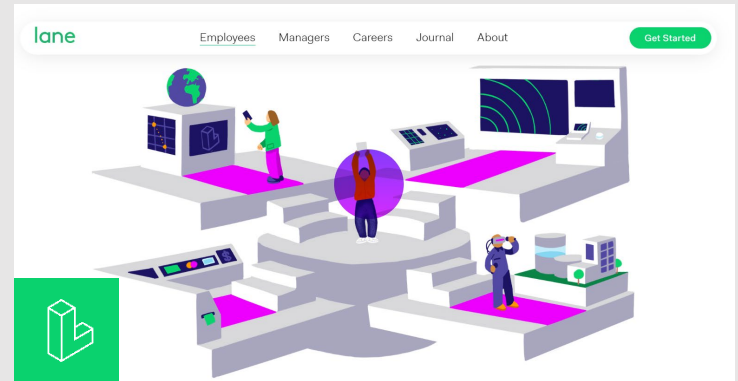
TECHNICAL attributes to achieve desired smart capabilities that drive organizational productivity



PropTech

Example:

The **LANE** platform makes user interaction with the building and the community intuitive.

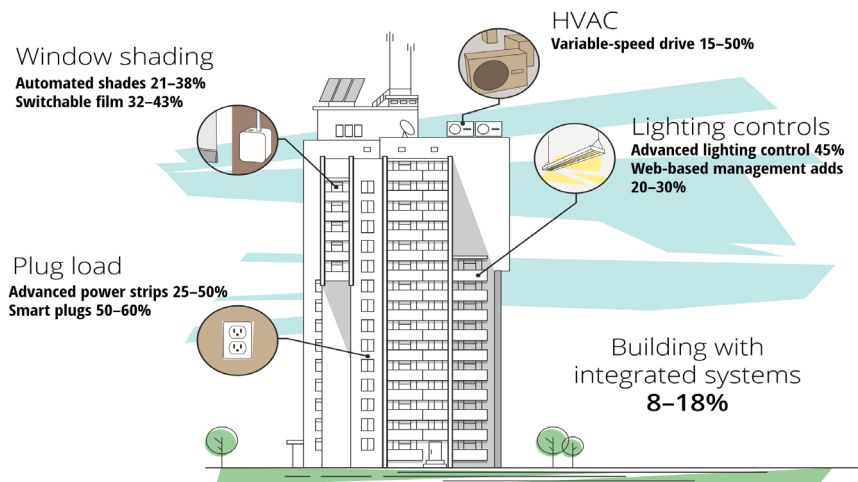


Building / Facility Management and Operations

Energy savings

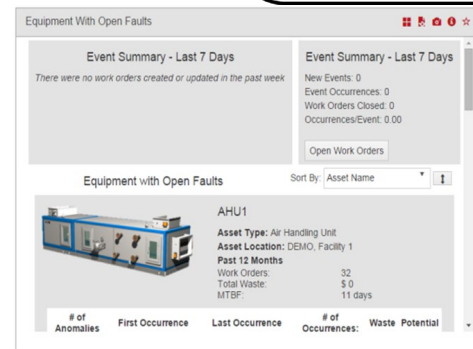
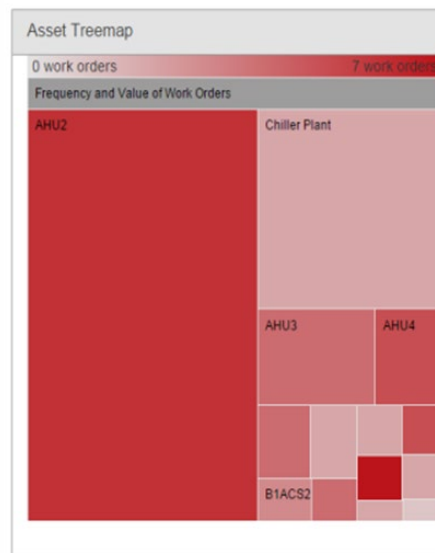
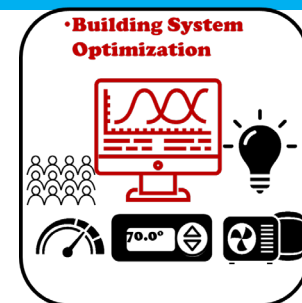
- Energy Monitoring , Measurement and Verification (M&V),
- Demand Management
- HVAC Optimization

Savings from individual and integrated building systems



Operational savings

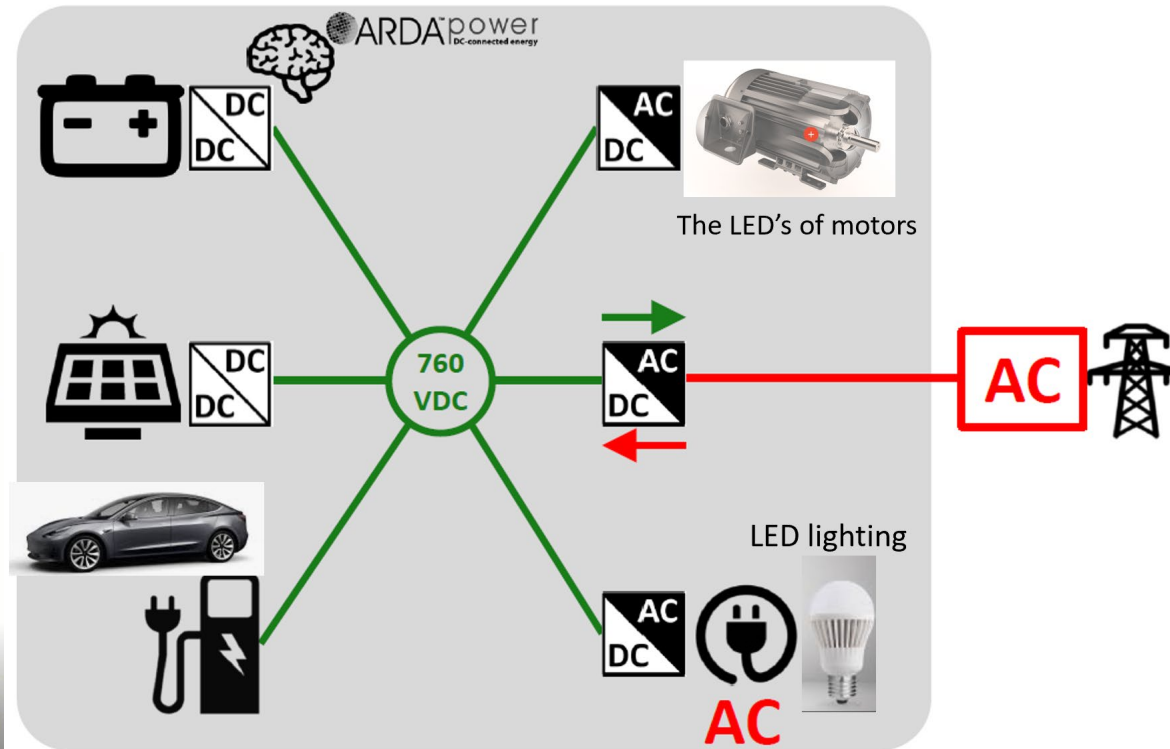
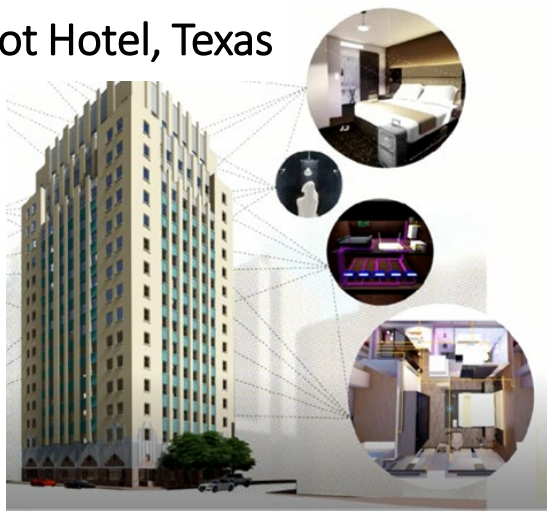
- Fault Detection
- Equipment Predictive Analysis
- Asset Monitoring (using Digital Twin)
-50-70% efficiency gains
- Predictive cleaning



Smart Restroom Monitoring

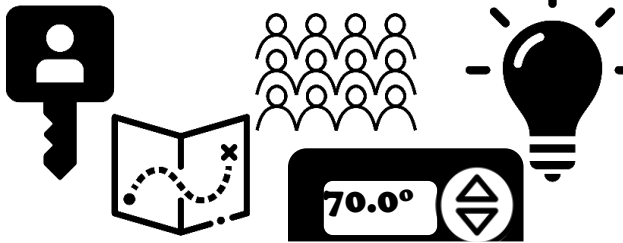
DC/AC microgrids-part of smart buildings and smart city

PoE Marriot Hotel, Texas

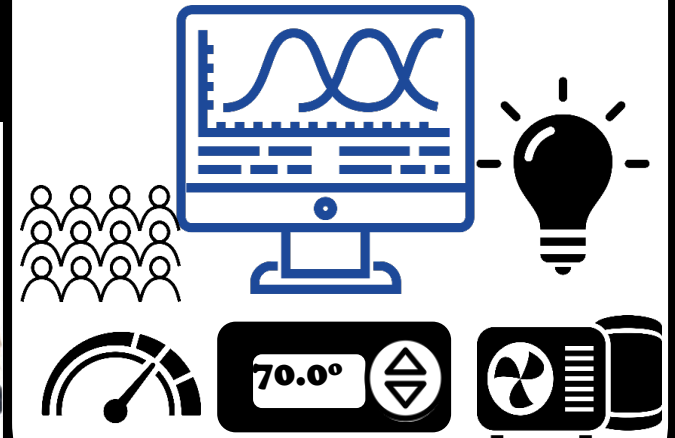


Improving Organizational Productivity and Quality of Life

• Human Experience



• Building System Optimization





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Thank you!

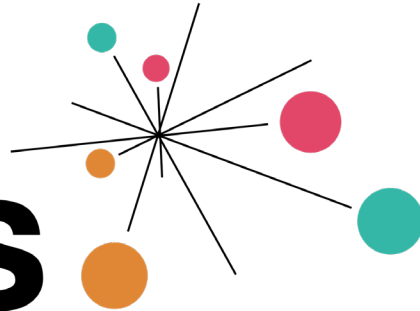
Jiri Skopek

Board of Governors Vice-Chair, 2030

Districts Network

jiri@skopek.ca

**smc
labs**



San Mateo County

**Smart Buildings
Wireless Innovation**

Benny Lee
SMC Labs - Director of Public Wi-Fi

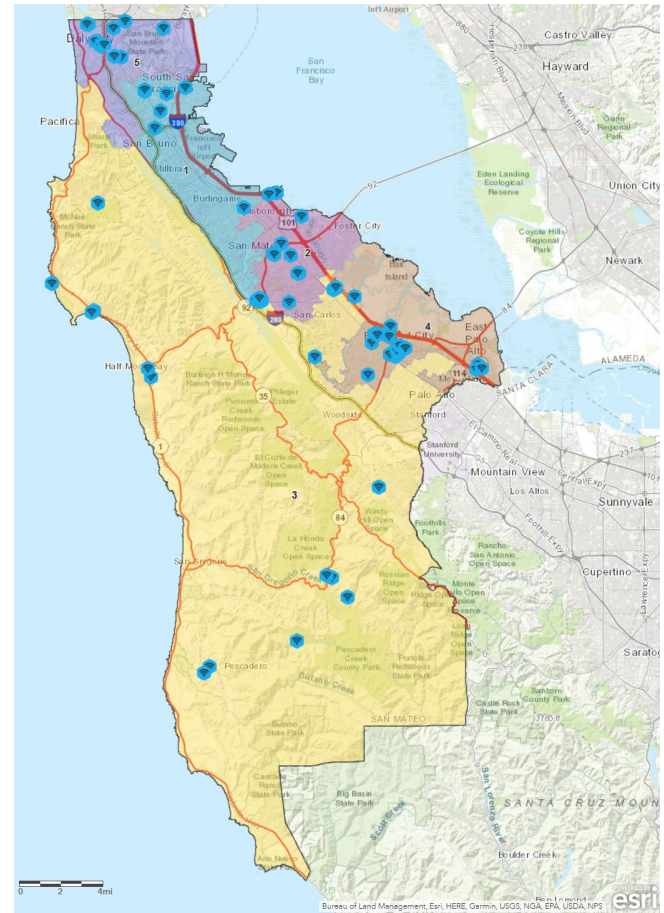
Today's Discussion

- **About SMC Labs and Public Wi-Fi**
- **Instant Communications Evolution**
- **How it fits in with Smart Buildings**
- **Benefits of Wireless Smart Buildings**
- **Future of Wi-Fi and Wireless for Smart Buildings**
- **Next Steps for County of San Mateo**

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County of San Mateo

About SMC Labs and Public Wi-Fi

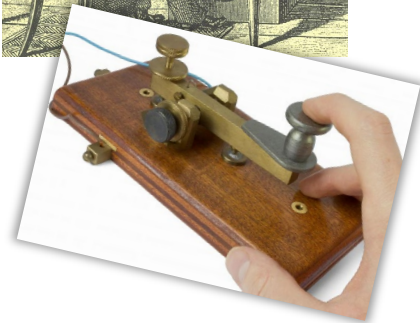
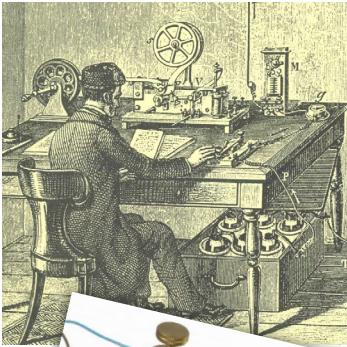
- SMC Public Wi-Fi started in 2014
- Nearly 100 locations with free public wi-fi
- Averaging a million hours usage per month
- Part of SMC Labs Innovation Programs



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Instant Communications Evolution

- Started with telegraph until the invention of phone
- Phones remain unchanged for nearly a century



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Instant Communications Evolution

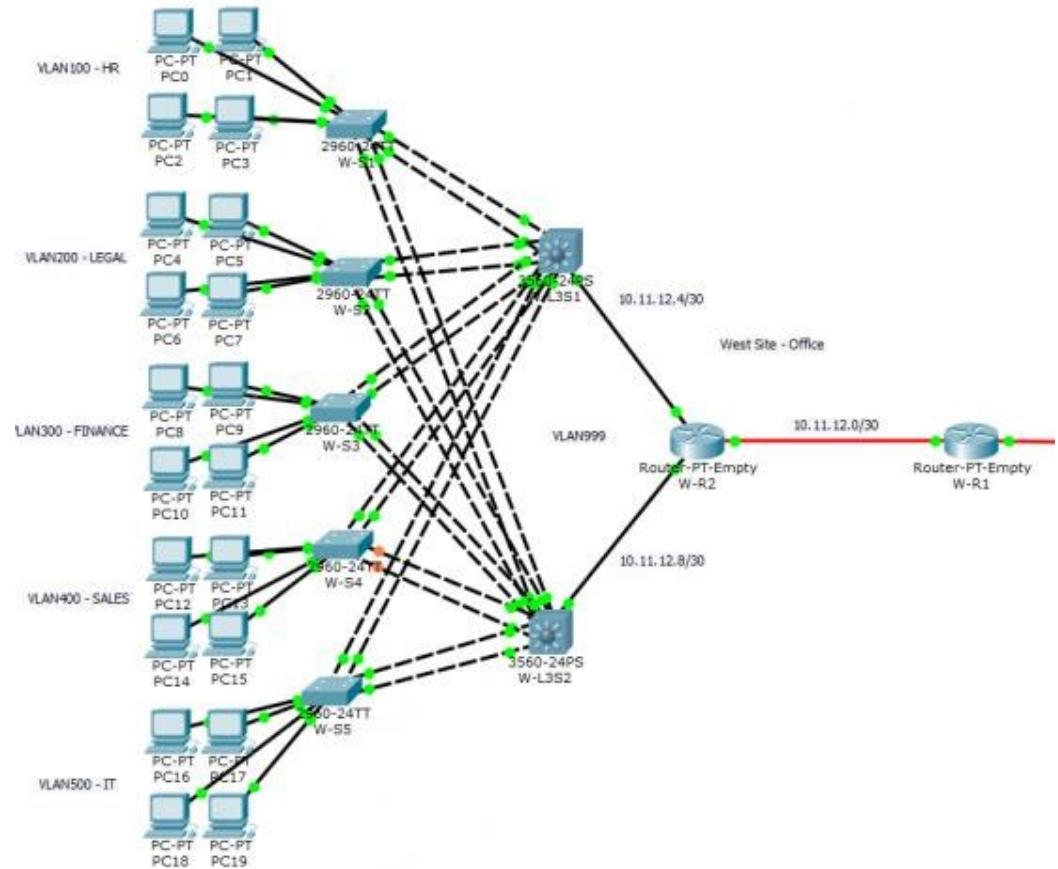
- Cell phones came about in last 50 years and have become more than just phones connecting us to services and the Internet; hence, the term ‘smart phones’.
- However, other devices that are not phones are evolving in wireless communications usage; hence, the term “Internet of Things” (IoT).



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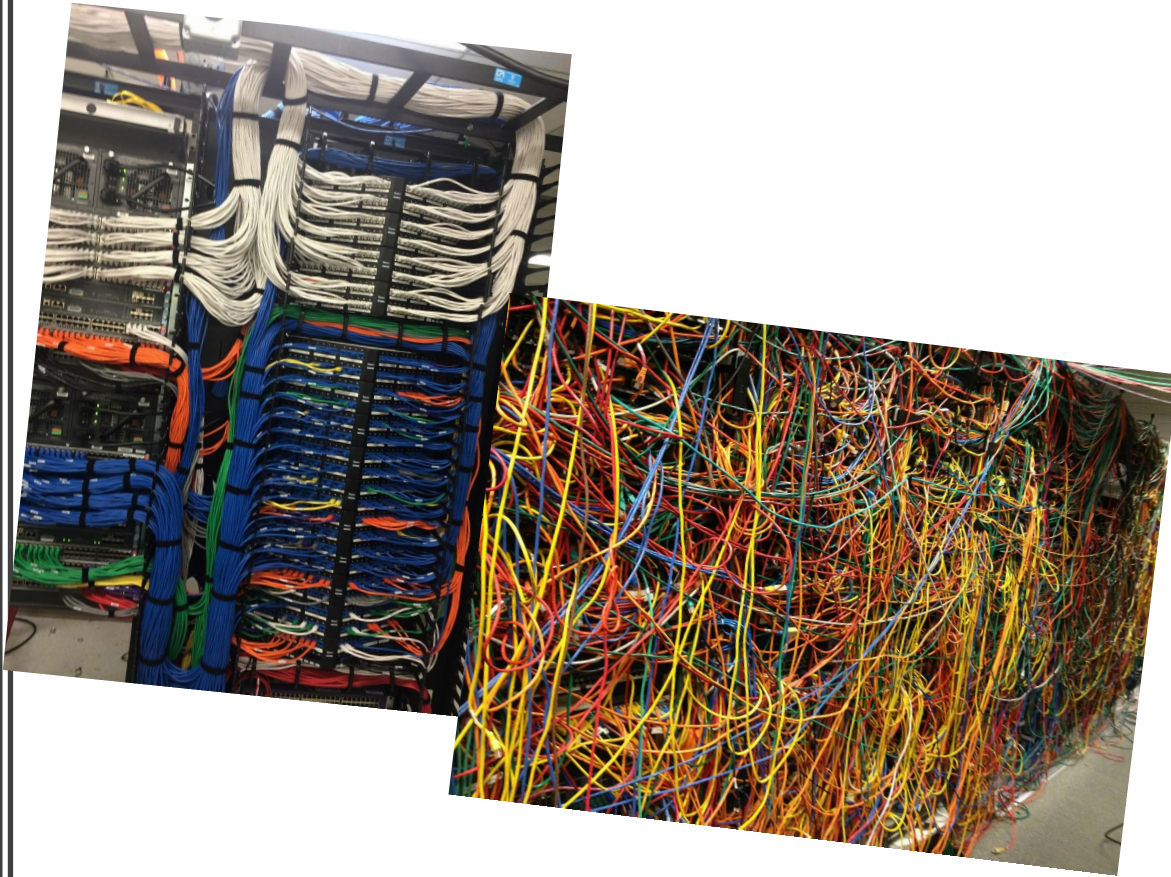
How it fits in with Smart Buildings

- Network environments are pre-designed with limited scale.
- Adding devices the more difficult to scale.
- More switches and network drops are needed to expand.



How it fits in with Smart Buildings

- Good control policies practice results in good wiring outcomes but takes dedicated time and effort.
- Spaghetti wiring results from lack of allocating the appropriate amount of resources to maintain control – this spells risks!



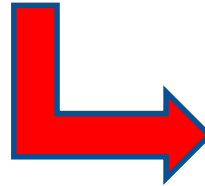
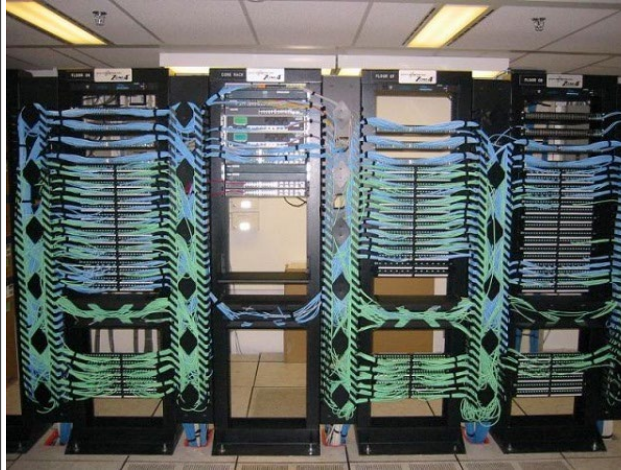
How it fits in with Smart Buildings

- Wireless technologies and solutions exist today but many designs are still **business as usual**.
- Desktops and laptop docking stations are **still connected via cables**.



How it fits in with Smart Buildings

- Wired infrastructure requires **dozens of switches per floor.**
- Wireless infrastructure requires **one or two switches per floor.**



Benefits of Wireless Smart Buildings

- Quick deployment with fewer wire drops.
- Virtual network management – employees versus guest.
- Control device access – segregate wireless networks (eg IoT).
- Leverage more IoT devices – everything will be wireless.
- Leverage other wireless uses – asset tracking and management.



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Future of Wi-Fi and Wireless for Smart Buildings

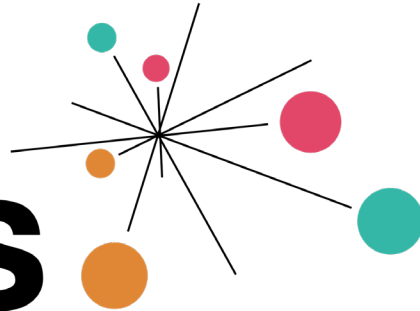
- **5g is around the corner but:**
 - Requires near proximity to wireless tower.
 - Doesn't penetrate walls or physical structures.
- **Wi-Fi 6 promises wireless connectivity speeds upwards of 1 Gbps**
- **FCC has been discussing adding 6 ghz spectrum to Wi-Fi which promises connectivity speeds upwards of 5 Gbps**
- **More Wireless IoT devices are connecting directly to Wi-Fi**

Next Steps for County of San Mateo

- **SMC Labs chartered to analyze smart building use cases**
 - For construction of new County Office Building
 - Concepts presented today are from actual implementations
- **Seeking to simplify the administrative and user experience by improving wireless mobility**

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County of San Mateo

**smc
labs**



**SMC PUBLIC
WiFi**
www.smcgov.org/wifi

San Mateo County

Thank you!

Benny Lee
SMC Labs - Director of Public Wi-Fi
bklee@smcgov.org

The Benefits of Smart Building Technology

Questions and Answers

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BroadbandUSA

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The Role of States in Expanding Broadband

February 19, 2020

2:00 pm ET

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<https://broadbandusa.ntia.doc.gov/event>

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For General Information:



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<https://broadbandusa.ntia.doc.gov/resources>

To Request Technical Assistance (TA):



Broadband TA Request Form -
<https://broadbandusa.ntia.doc.gov/ntia-common-content/how-we-can-help>

BBUSA Resources

- [Implementing a Broadband Network Vision: A Toolkit for Local and Tribal Governments](#)
- [Community Broadband Roadmap Toolkit](#)
- [Guide to Federal Funding of Broadband Projects](#)
- [Using Partnerships to Power Smart Cities](#)