



The Data Economy: Digital Twins

Bruno Schroder
National Technology Officer
Microsoft BeLux



DIGITAL TWINS

Transforming with Cloud, IoT, AI

Bellevue Leverages Big Data to Get to Vision Zero

June 1, 2017 at 6:00 am By Frank Chiachiere



Figure 1.



Figure 2.

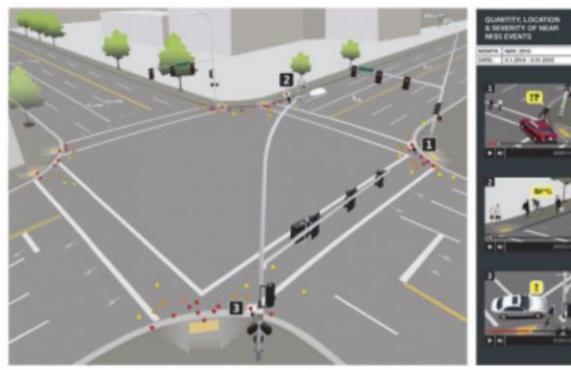


Figure 3.

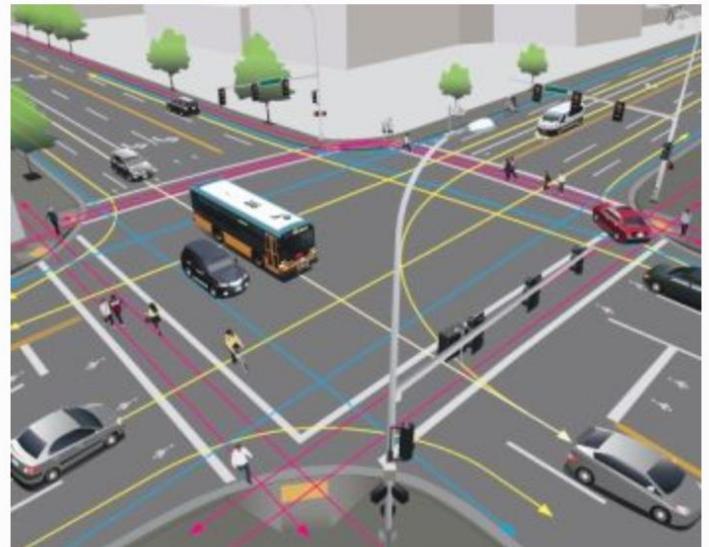


Figure 4.

Video Analytics

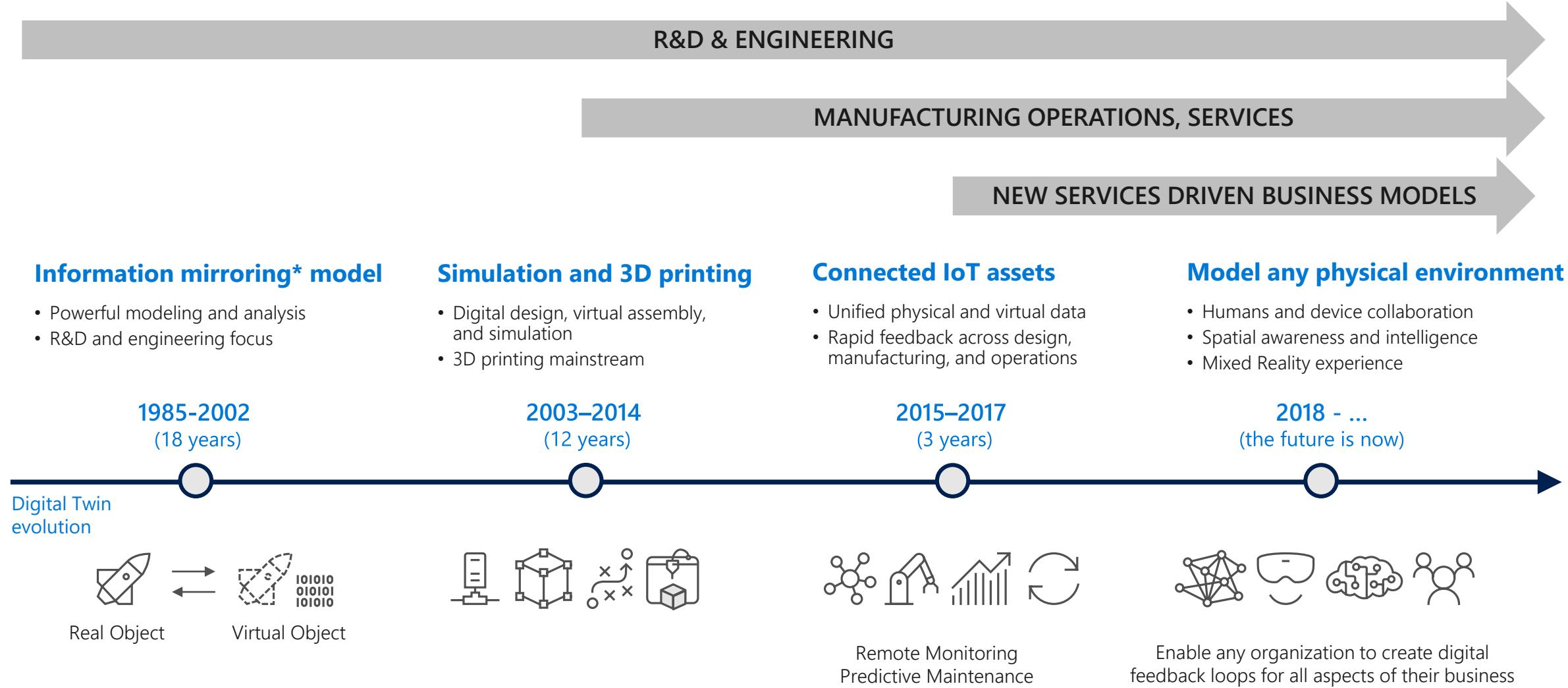
The Video Analytics Towards Vision Zero project is a collaboration between the City of Bellevue, Microsoft, the University of Washington and organizations across North America.

The project taps new technologies to analyze traffic camera video footage available in many cities, and use near-miss collisions to predict where future crashes are likely to occur. Traffic engineers could then take corrective action to prevent them.



Bellevue has a new ally in the battle to reduce pedestrian fatalities to zero: big data. The city, along with Seattle and several others, are piloting a new program that uses machine learning to proactively improve bike and pedestrian safety. The hope is that the machines, trained by a crowdsourced group of humans to recognize bikes and people, can figure out where crashes are likely to occur.

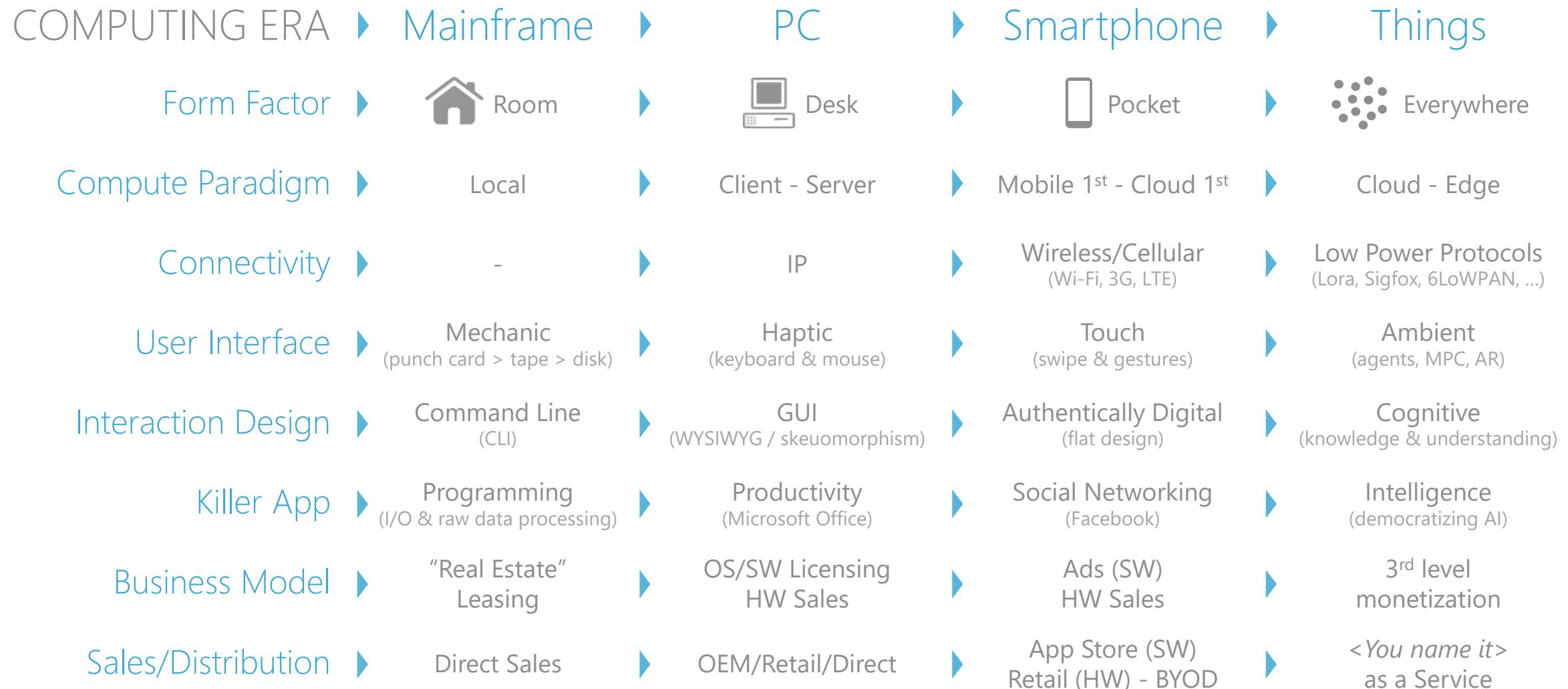
A HISTORY OF DIGITAL TWINS



*Dr. Michael Grieves and John Vickers – University of Michigan



DIGITAL TRANSFORMATION



BROAD APPLICABILITY

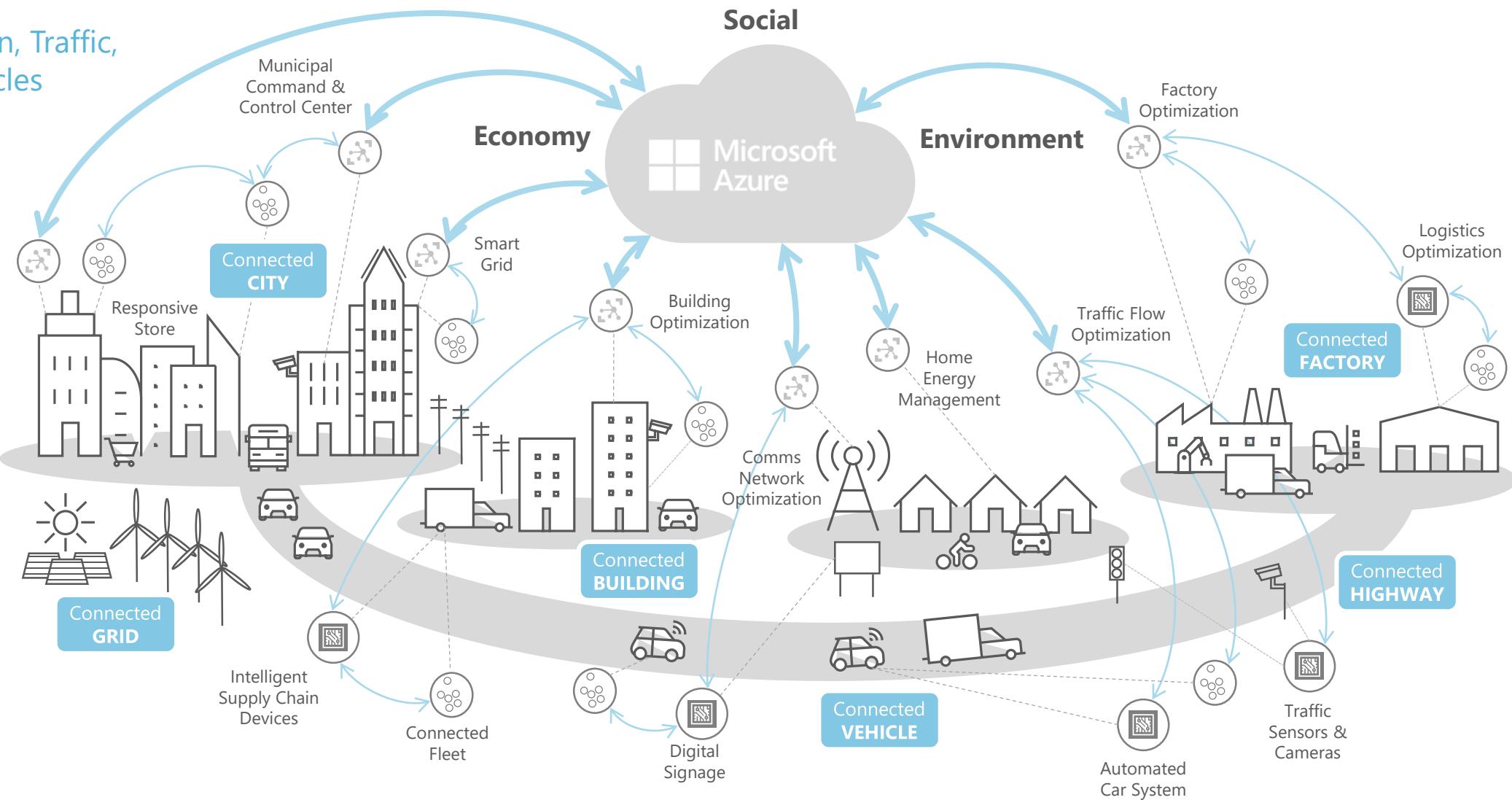
Transportation, Traffic,
Parking, Vehicles

Housing,
Buildings

Energy,
Water
& Utilities

Citizen
Engagement

Public Safety
& Security



THE DIGITAL FEEDBACK LOOPS

Our vision: to enable any organization to create digital feedback loops for all aspects of their business



A comprehensive digital model that includes products & operations

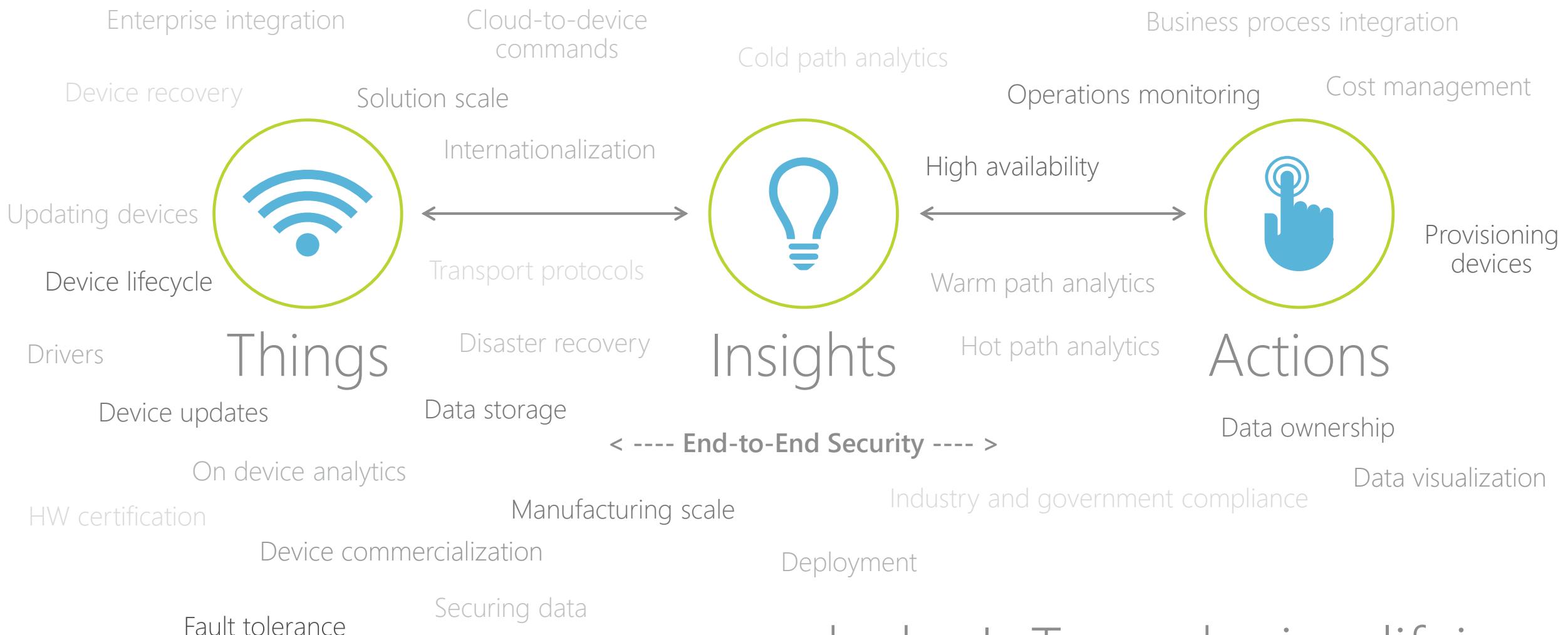
- Including people, places, things and processes
- The ability to track, optimize, simulate and predict the future



A SIMPLE VIEW OF AN IOT SOLUTION

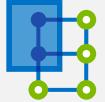


A MORE REALISTIC VIEW...



... and why IoT needs simplifying

DIGITAL TWINS



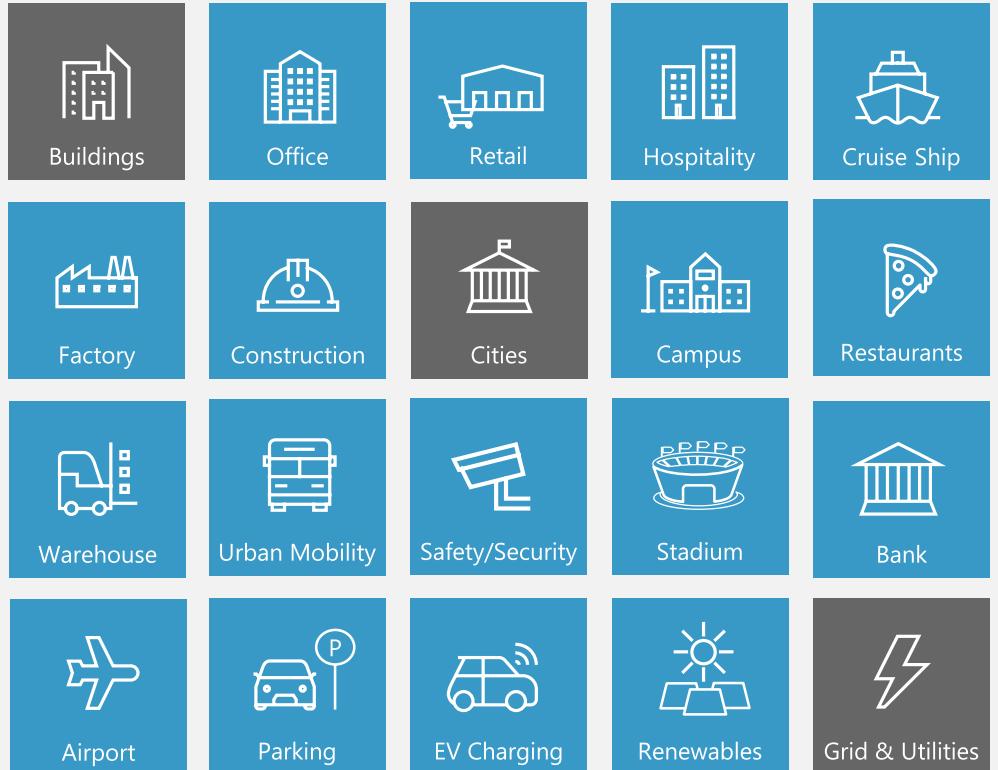
Enables customers and partners to create a comprehensive digital model of any physical environment, including the people, and places, things, and the relationships that bind them.

Virtually represent the physical world with a digital twin that models the relationships between people, places and devices.

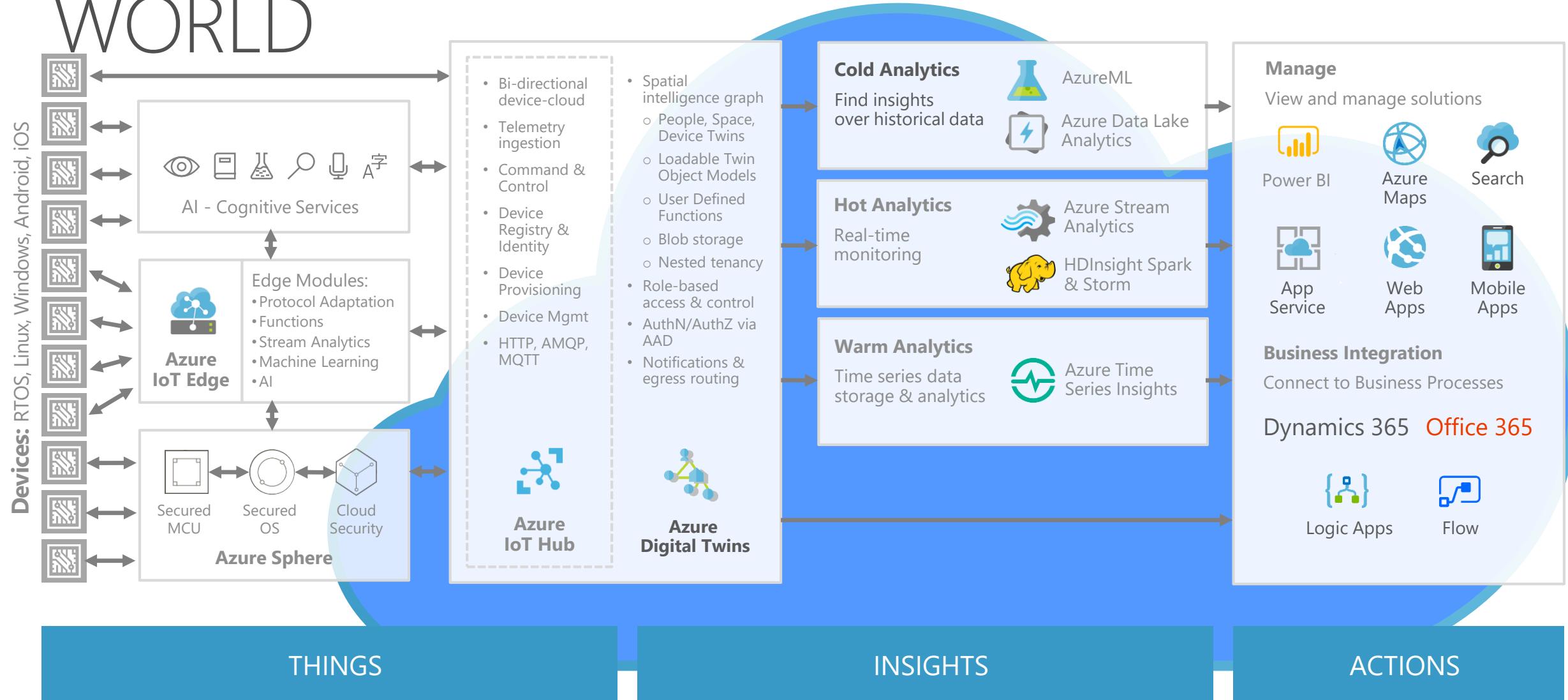
Leverage predefined and extensible Twin Object Models to build contextually-aware solutions uniquely attuned to your industry domain.

Automate actions in a space with custom functions that send events and /or notifications to endpoints based on incoming telemetry.

Securely replicate solutions across multiple tenants through built-in multi- and nested-tenancy.



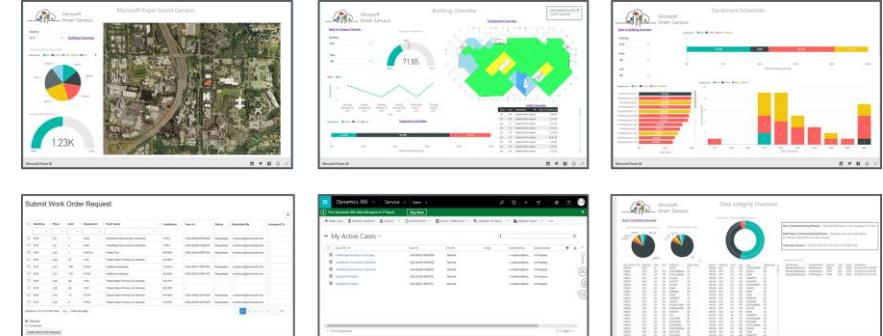
MODEL & INTERACT WITH THE REAL WORLD



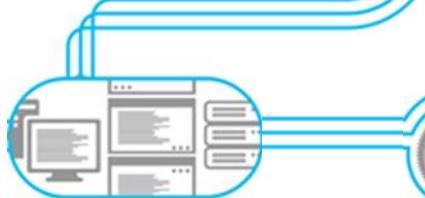


Energy
Operational Efficiency

MICROSOFT SMART CAMPUS



164 Buildings
2,000,000 data points collected every 5 minutes



Communicated through an array of different **Protocols, Hardware, & Interfaces**

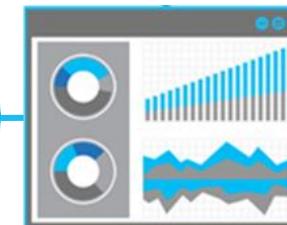
3 Decades of construction
4 Generations of controllers
500,000,000 transactions added daily to event database



Transforming raw data into **Actionable Information**

7 BAS & BMS solutions

Analyzed and compiled through



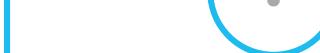
Assimilating information from 30,000 pieces of equipment

Advanced Analytics Dashboards

30,000

faults surfaced per day

48% of faults corrected within 60 seconds



Energy savings of **6-10% per year** with implementation payback in less than 18 months

Improves technician efficiency with

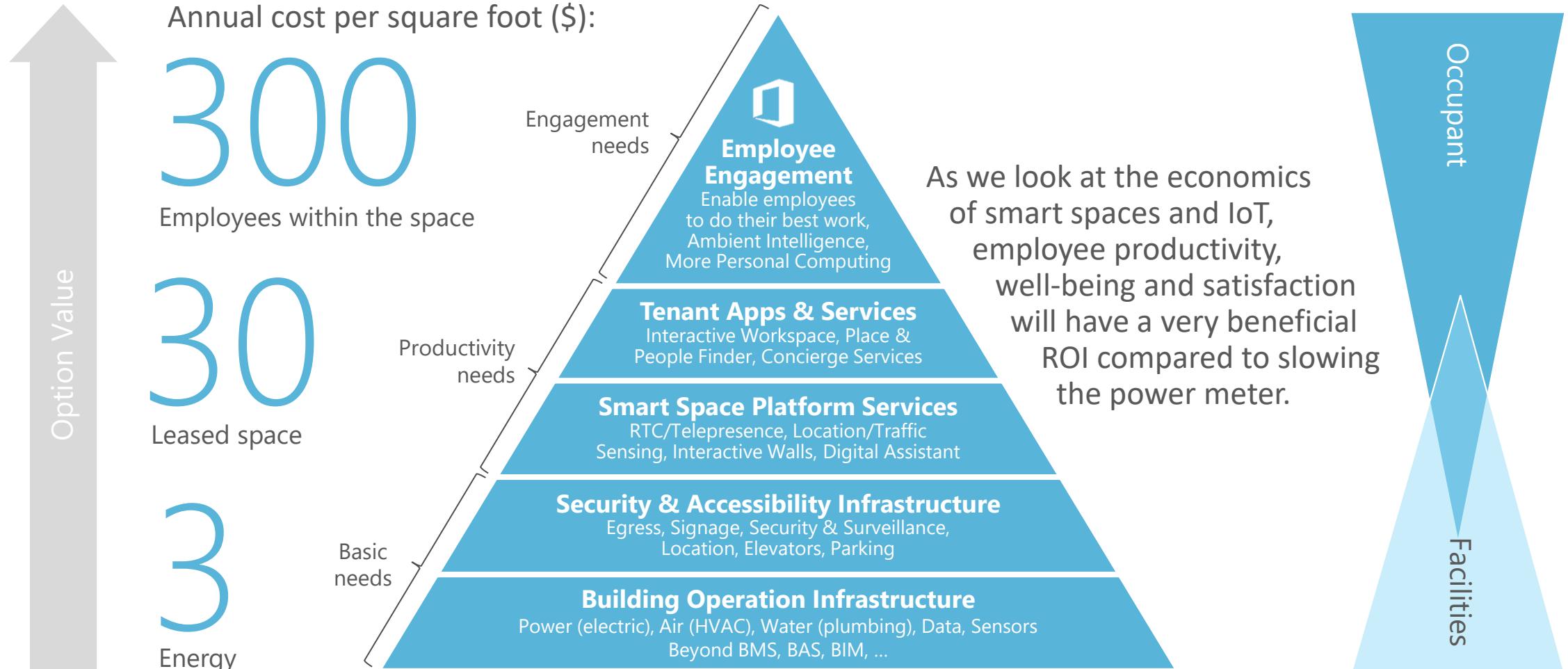
32,300 work orders per quarter





Digital Twins for Smart Spaces

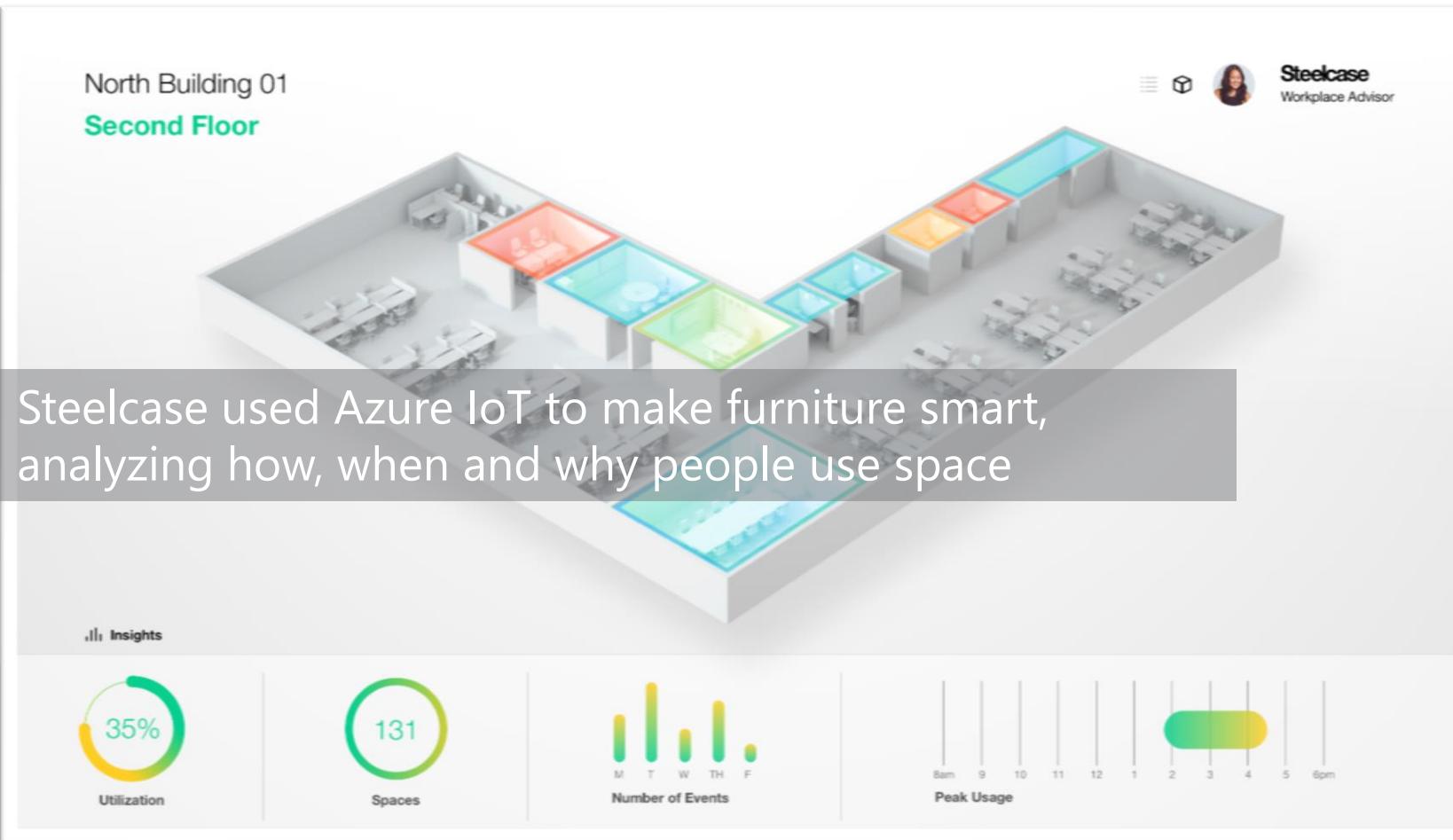
WORKSPACE → SPACE WORKING





SPACE OCCUPANCY AND USAGE

Generate insights to optimize the use of spaces and reduce costs through usage analytics



Steelcase

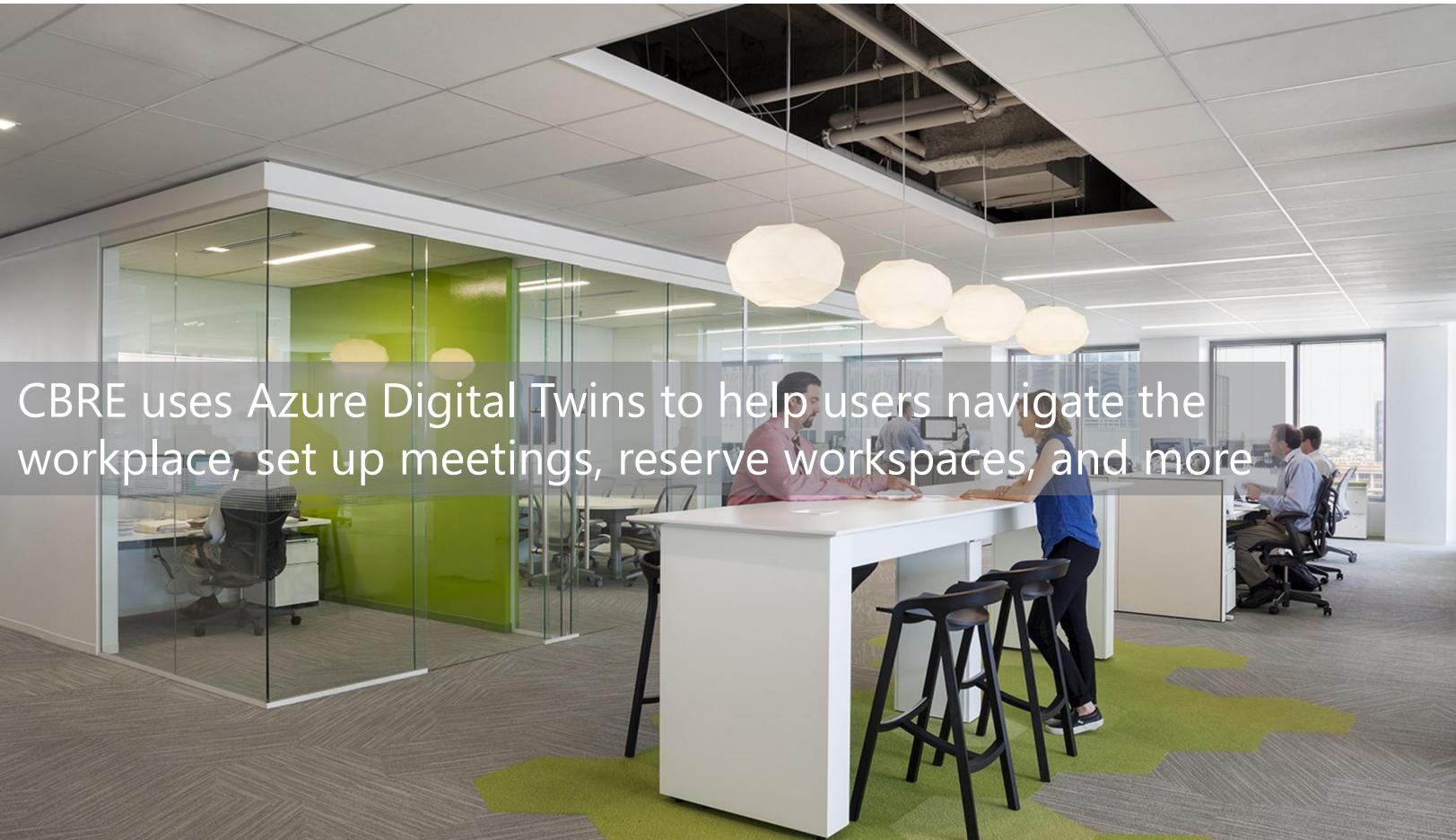
A network of IoT sensors on furniture allowed Steelcase to revolutionize the value their solutions bring to customers through real-time usage statistics and insights

[Learn more](#)

OCCUPANT EXPERIENCE



Improve employee and occupant satisfaction and morale with spatial intelligence solutions that increase productivity and comfort within a space



CBRE uses Azure Digital Twins to help users navigate the workplace, set up meetings, reserve workspaces, and more

CBRE

CBRE, the world's largest commercial real estate services firm, built their CBRE 360 experience platform leveraging Azure Digital Twins for analysis, to see how the space it manages is used and optimize it to better serve people's needs.

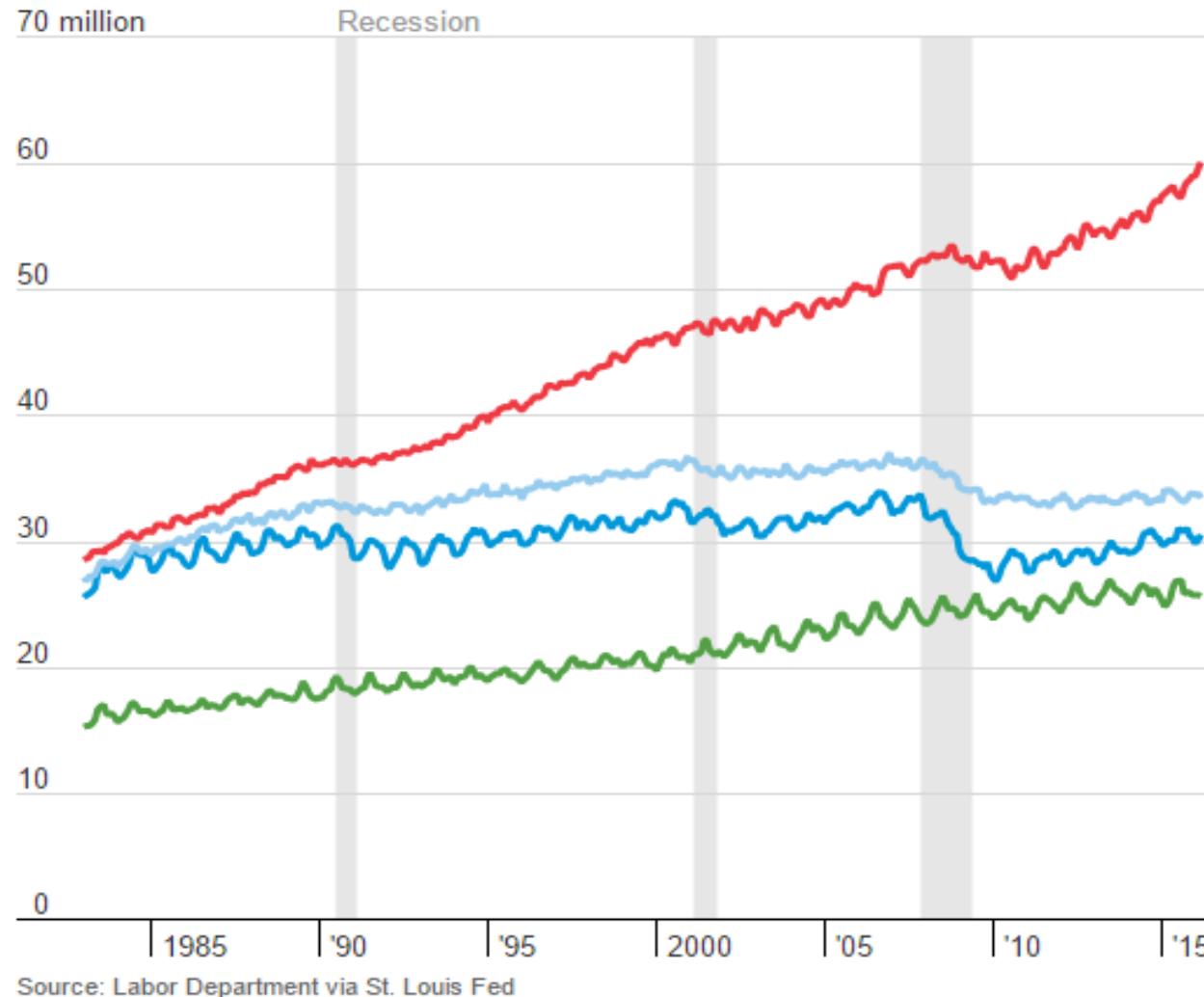
[Learn more](#)



Productivity

Employee Experience & Analytics

RISE OF THE KNOWLEDGE WORKER



knowledge worker

noun

an occupation characterized by
non-routine cognitive work

Routine cognitive workers

Routine manual workers

Nonroutine manual workers

Many businesses, and the global economy,
are increasingly dependent on knowledge
worker productivity

WORK TODAY



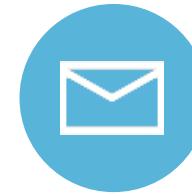
13%

of employees
engaged at work



47%

of meeting time
is unproductive



28%

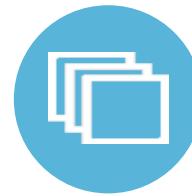
spent managing
email

Empower every person and every organization on the planet to achieve more



3 min

in between
Interruptions



8

windows open
on average



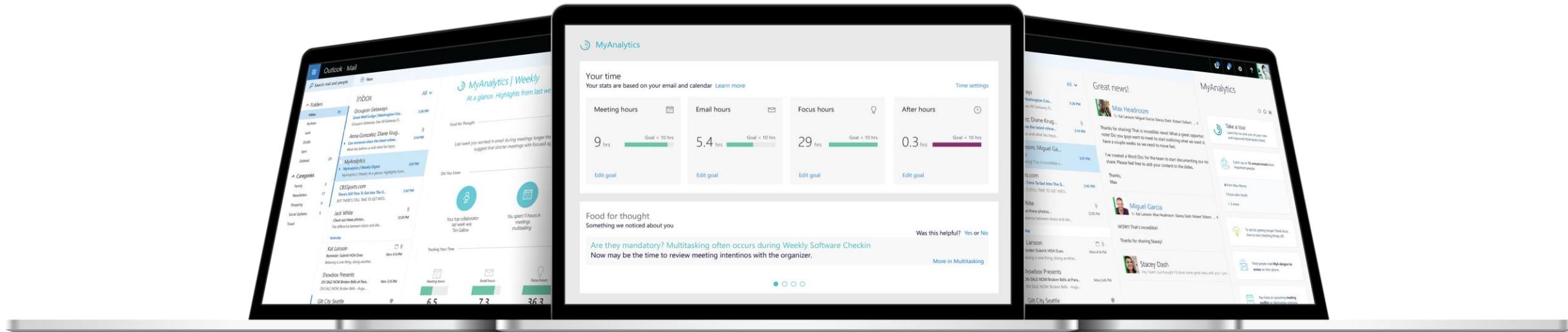
30x

check inbox
per hour

OFFICE INTELLIGENCE



OFFICE 365 – MY ANALYTICS



Weekly Digest

Weekly digest to keep your use of time top of mind

Feedback on goals

Suggestions on how to improve your time

Personal Dashboard

Gain insights into how you spend your time at work

Understand your top connections and recent interactions

Set and track goals to improve how you use your time

Add your important contacts to stay up to date

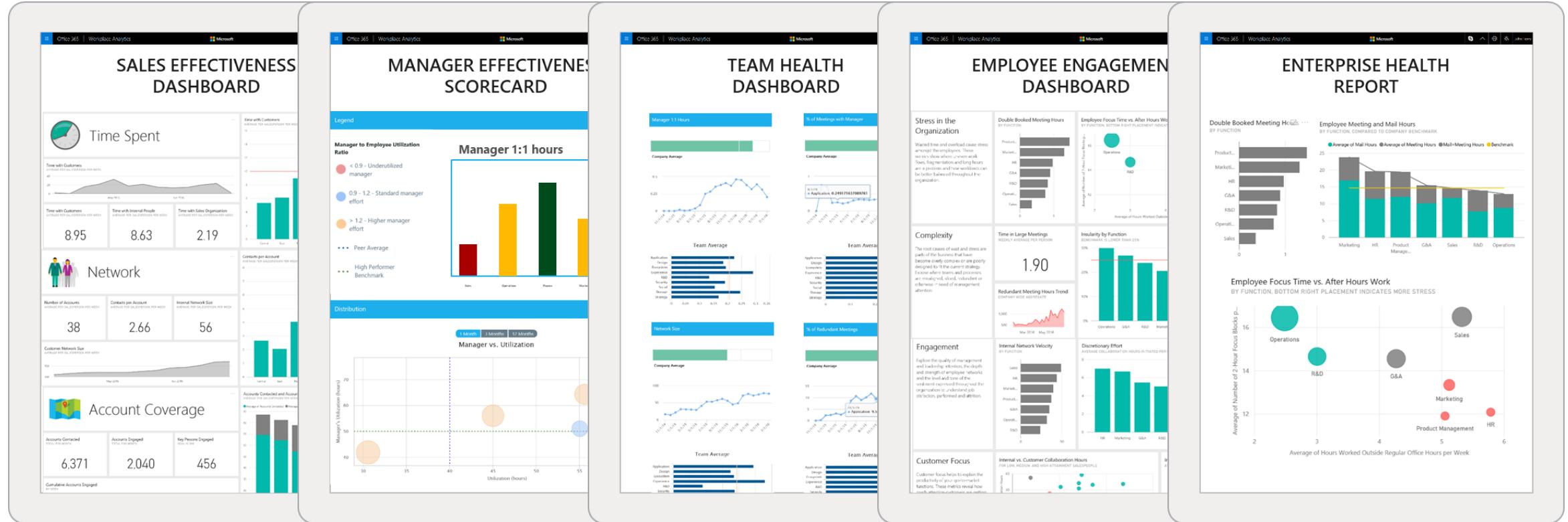
Outlook add-in

Contextual MyAnalytics experience directly in Outlook

Email relationships and response times

Improve reach and impact of communications

OFFICE 365 - WORKPLACE ANALYTICS

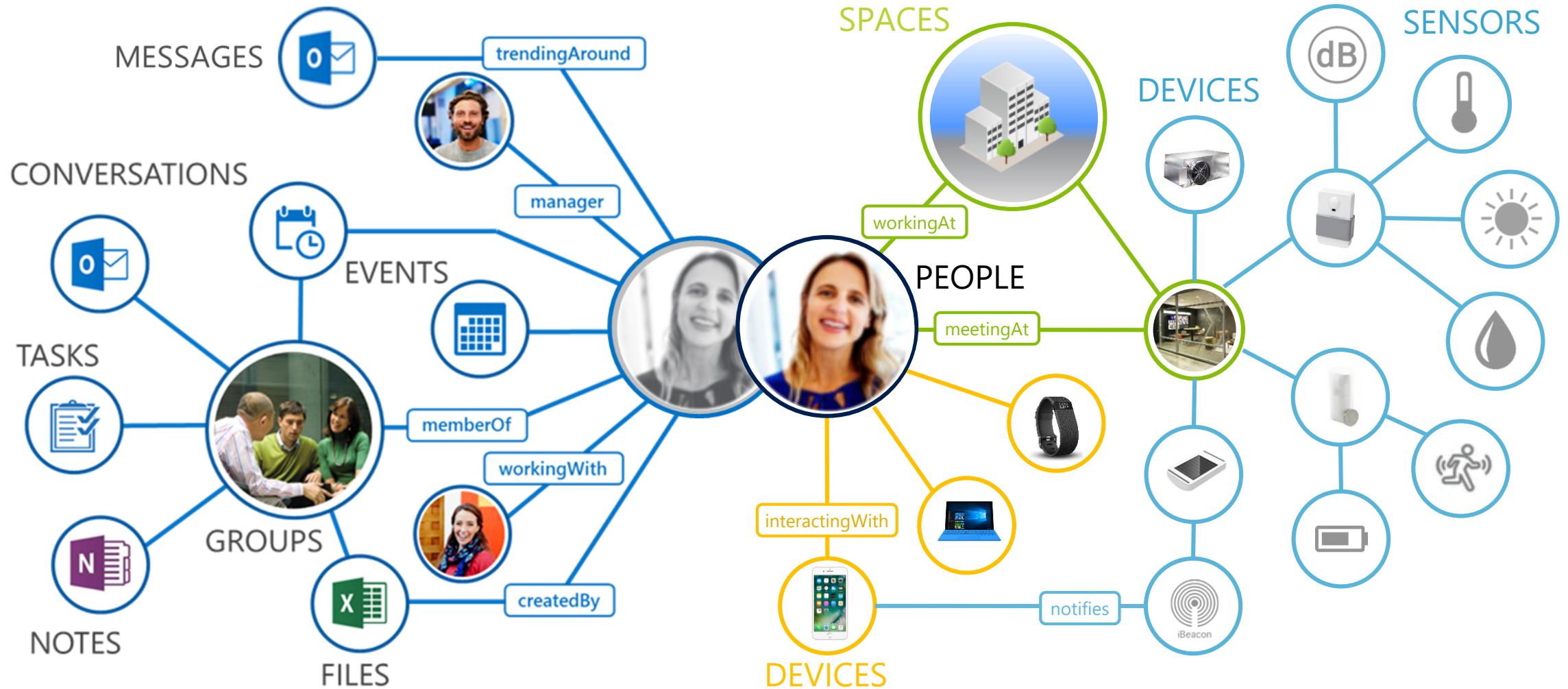


Understand how **your entire organization** spends its time & collaborates

Discover new insights through **customized queries & templates**

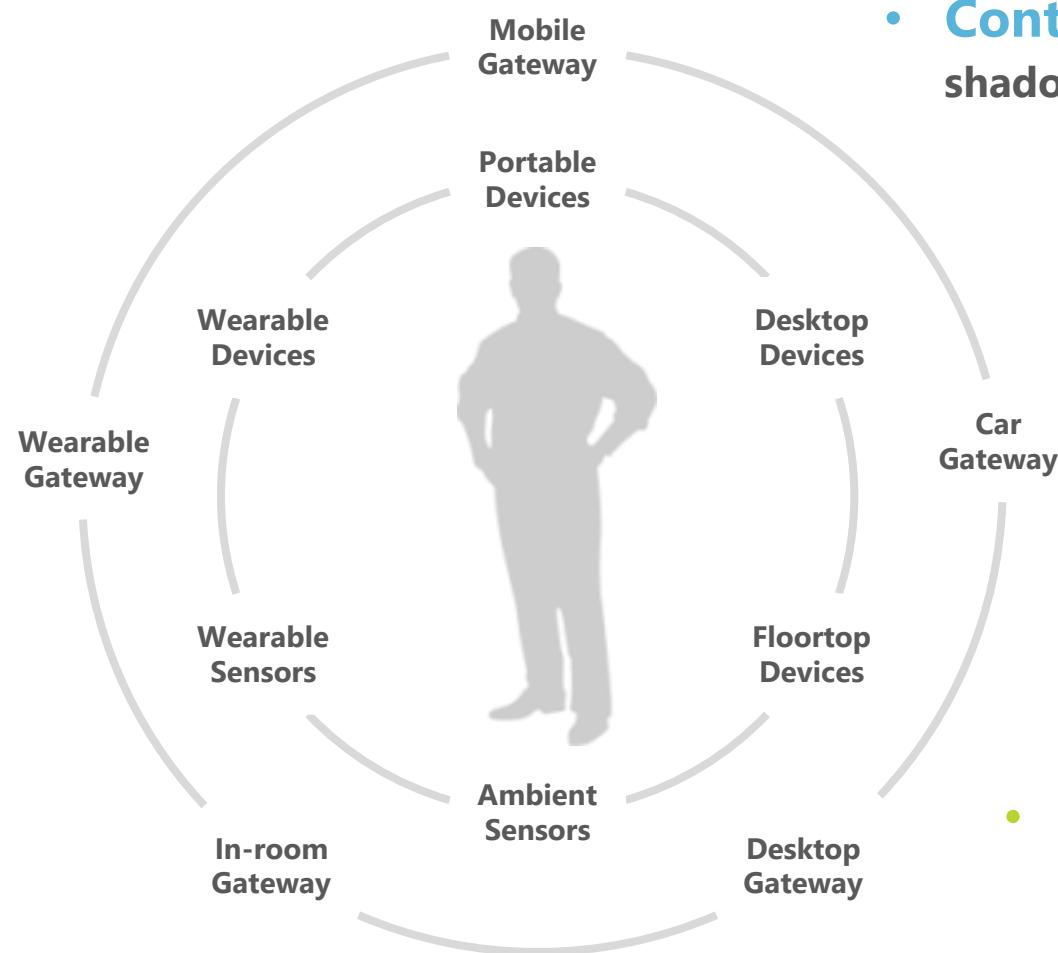
Enrich existing collaboration data with relevant **business outcome information**

SPATIAL INTELLIGENCE



'THINGS' - THE DIGITAL SHADOW OF A PERSON

The most interesting aspect of the Internet of Things is the world of humans that use it



- **Context** - Each "thing" or connected device is part of the **digital shadow** of a person, essential to enable deeply contextualized services.
- **Knowledge & Insight** - From the data streams that implement the "digital shadow", we can use **predictive analytics** to **understand people's needs and behaviors** better than ever before.
- **Understanding Intent** - Every new dimension of data increases predictive power, enabling an **agent**, **bot**, or **application** to contextually answer the question: **"What does the human want?"**
- **Assistance & Task Completion** - This informs business operations and services as much as it informs an individual's engagement and behavior.

WORKPLACE 2.0 & IOT

As the physical world and digital worlds fuse into one, we have a historic opportunity to redefine the future of work.

