



THE ROLE OF BIM IN CREATING SMART CITIES

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Objectives

- Review the state of current Smart City concepts
- Learn how BIM tools actively integrate with transportation and infrastructure systems
- Understand best practices and touch points to maximize the ROI for BIM implementation
- Discover innovative technologies that can be used to further smart city integrations and improvements



State of Smart Cities and BIM Design Concepts

What is a Smart City?

A technologically modern urban area...

...Uses electronic methods and sensors to gather specific data (including IOT)

...Builds data helps to manage resources and services

...Leverages data to help improve operations



Sociology



Engineering



Data Science



Demography



Smart Cities/Communities =
Connections through Technology

Transportation
Planning



Community
Planning



Urban
Planning



What Does a Smart City/Community Look Like?

- 3 Components
 - **Data**
 - Communications
 - Policies



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Digital Delivery Summary

 **Gannett Fleming**

*Excellence Delivered **As Promised***

 **GANNETT
FLEMING**

What Does a Smart City/Community Look Like?

- 3 Components
 - Data
 - **Communications**
 - Policies



What Does a Smart City/Community Look Like?

- 3 Components
 - Data
 - Communications
 - **Policies**



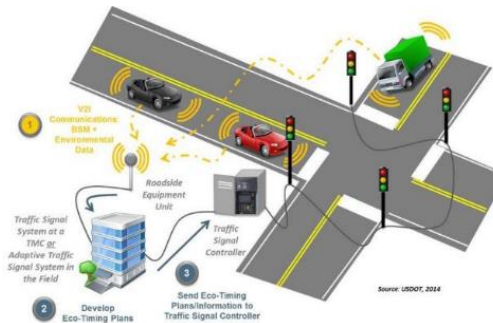
REAL WORLD EXAMPLE

BIM + Traffic Signals + Transit Systems = Balanced Energy Use and Maximized Mobility



BIM

- Maintenance
- Security
- Energy use
- Systems health



Traffic Signals

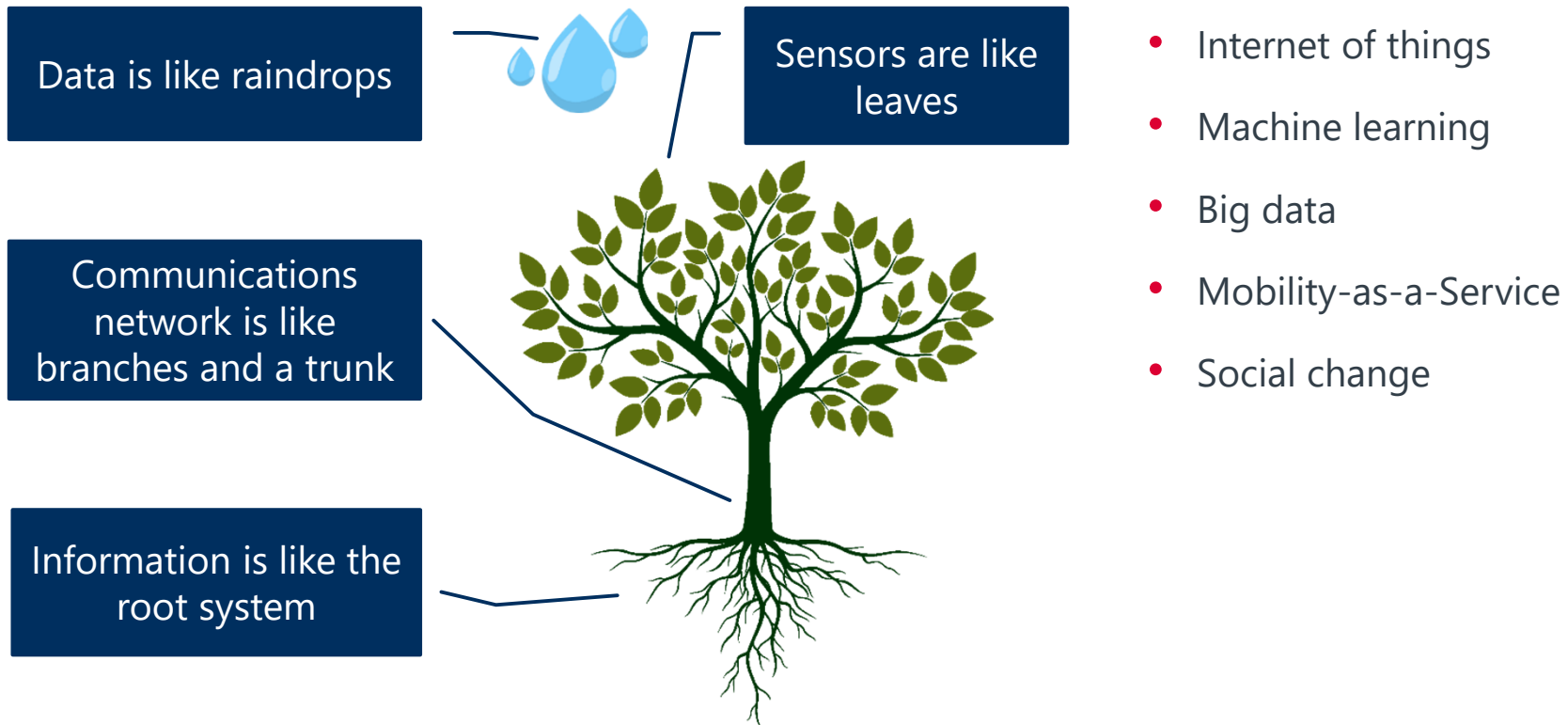
- LED
- Connected to central systems
- Communicating with vehicles
- Congestion responsive



Transit

- Occupancy
- Real-time schedule
- Maintenance

THE WAY TECHNOLOGY "TALKS"... IS CHANGING HOW TECHNOLOGY AFFECTS OUR LIVES



BIM Tool Integration for Smart Cities

What is BIM?

- Building Information Modeling
 - Building (V): *the act of building something...*



- Information – *data associated with the physical elements*

- Modeling – *act of creating an accurate 3D model representation of real world elements*

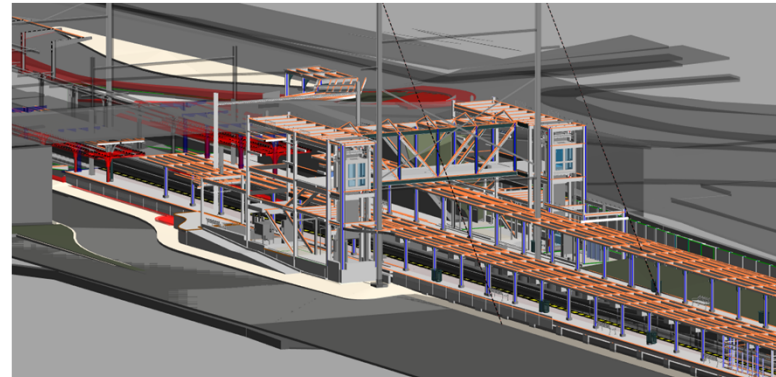
How do BIM applications impact Smart Cities?

BIM designs and workflows create and enable:

- digital representation of physical systems and associated processes
- Improve planning, design, simulation, testing, scheduling, costing, constructing, recording existing conditions, monitoring and maintenance



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How do they integrate? The Digital Twin Environment

Virtual representation of real-world objects

Maintained throughout a structure's life cycle

Leverages sensors to monitor behavior and operations

Operates from single element to entire assembly

The data connection for BIM content and Smart City objectives



The Digital Twin Environment...is not one.

There are a host of cloud solutions used by BIM technology for today's common data environment...

SharePoint

BLUEBEAM
A NEMETSCHKE COMPANY

PROCORE



ArcGIS Pro

 **Cintoo**

 **HOLO
BUILDER**

 **AUTODESK Construction Cloud**

Bentley Infrastructure Cloud

State of BIM in AEC

BIM tool usage continues to increase

Mid to Large size firms have adapted at a faster pace

Most frequent use by institutional firms

Operates from single element to entire assembly

Less than 20% of all design firms do not use BIM tools

FIGURE 5.4: Share of firms using BIM for billable projects continued to expand, with all large firms now all using it
% of firms

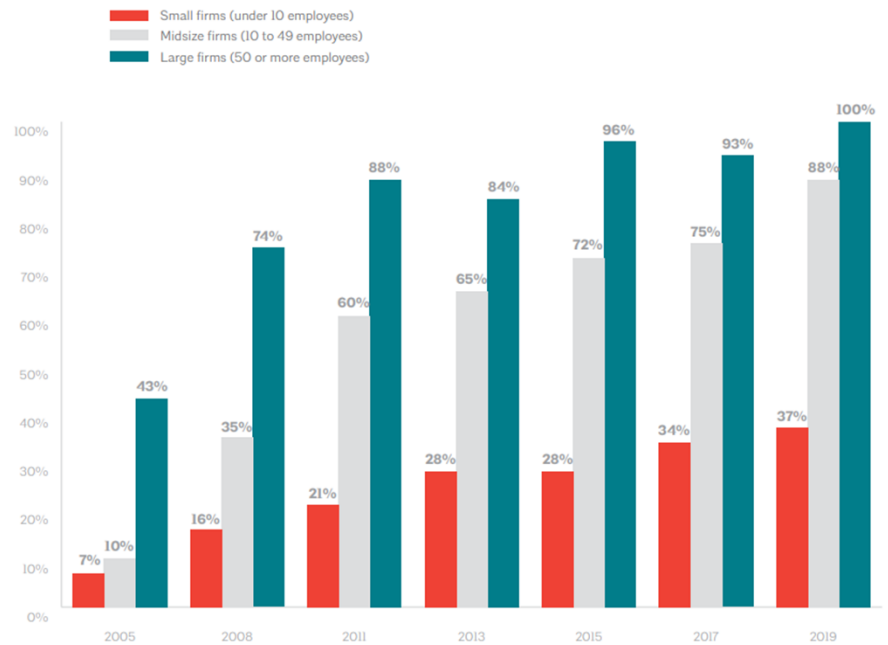


Image Credit: ©AIA 2020 Firm Survey Report

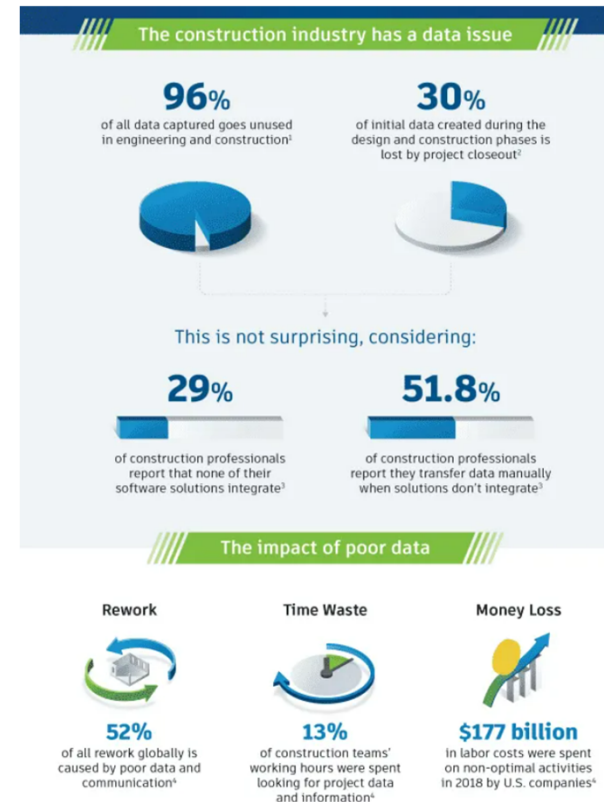
What are the barriers?

Dependence on Legacy Technology

Lack of Continuity for Data in project lifecycle

Outdated Standards, Workflows and Processes

Extended Lifecycle for Contractual obligations



Maximize BIM ROI

BIM ROI for Smart Cities



Incorporate more detailed existing conditions – capture and introduce into design environment more, detailed as-is data



Minimize clashes and rework – more effectively incorporates sub-contractor contributions and issues tracking/resolution



Strengthen design collaboration – shared design models and reviews enhance stakeholder access and communication



Increase efficiency through automation – reduce error, increase prototyping by automating process, design, and operational tasks



Streamline client approvals – increased review frequency using models results in greater transparency and client confidence/trust



Improve constructability – review alternative approaches in advance of construction to detect/document/resolve problems



Derive more accurate quantity and cost estimates – automated extraction of components and materials



Improve safety – virtual tours identify potential hazards prior to their occurrence allowing for proactive changes



Enrich knowledge capture and transfer - record lessons learned throughout the lifecycle available for future teams/projects

Investment in Cloud Platforms

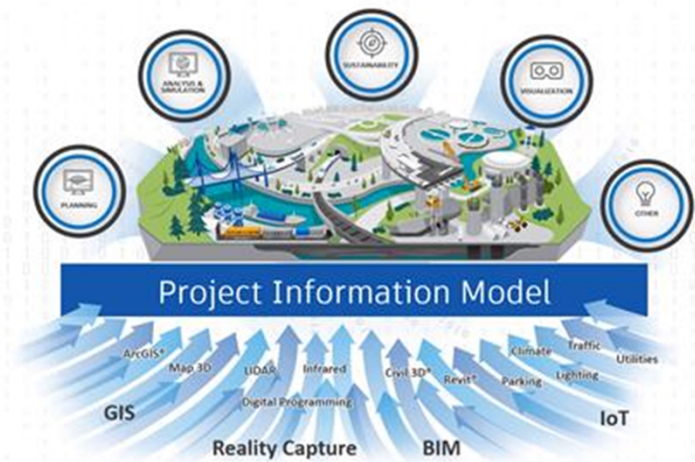
Gather assets into a digital environment

Industry-based data structure – formatting, usage, etc.

Summary of everything connected

Layer connectivity to get data to the right place

Leverage tools that can consume the data agnostically



Innovative Technologies for Smart City Integration

Where do we want to end up...

Establishing goals and standards for CDE

Eliminate/reduce silos and barriers

Integrate temporal data (4D)

Layer connectivity to get data to the right place

Leverage tools that can consume the data agnostically





THANK YOU FOR YOUR PARTICIPATION!
