AUTODESK UNIVERSITY

Class ID: BU22085

How to Capture the Value of IoT in Buildings

Vladi Shunturov
Lucid

Learning Objectives

Learn how to:

- Design a successful IoT strategy in the highly fragmented, highly complex landscape of building IoT
- Turn data into insights that can be used to affect change and impact the bottom line
- Present insights in a way that is useful and engaging, holistic yet readily tailored to different users
- Enable collaboration across disciplines, and how to drive toward aggressive business and sustainability outcomes

Description

Commercial buildings are on the verge of the biggest transformation in history. Internet of Things (IoT) is making connected buildings a reality, and adoption is on the rise across architecture, engineering, building technology, real estate, and construction industries. The use of IoT data for building modeling offers tremendous opportunity to optimize the design, construction, retrofit, and operations of buildings. But just having access to data doesn't unlock actionable insights. Vladi Shunturov, founder and president of Lucid, will explain how we can harness the power of Building IoT for teams across any number of disciplines, from energy management to finance, operations, tenant communications, and more. He'll explain how to turn what were once reactive processes into proactive opportunities, and share proven best practices and use cases to arm attendees with information they need to turn disparate data from connected buildings into strategic assets. This session features Building Ops.

Your AU Expert

Vladi Shunturov is the co-founder and president of Lucid. He led Lucid's early product and engineering teams and has driven the evolution of the company from its inception in 2004. A recipient of awards from U.S. EPA and Cleantech Open, Vladi has dozens of widely-cited publications in the field and has delivered many distinguished presentations, including at TEDx. Vladi helped pioneer groundbreaking research in commercial building monitoring systems and real-time feedback technology. Vladi holds a BA with high honors in Environmental Studies and Computer Science from Oberlin College.

Transforming Building Data to Create Better Buildings in 3 Steps: Centralize, Discover, Improve

Buildings are the largest remaining frontier for digital transformation. Over $7.5 trillion is spent on commercial buildings globally each year. In the US, 82% of the GDP is dependant on commercial buildings. For the first time ever, centralized, normalized data is unlocking valuable insights that affect the profitability, performance and comfort of commercial buildings. Building operations accounts for a massive $865 billion annually in the US. Because building operators must improve utilization and performance, they are rapidly embracing new technology to gather accurate building data. However, all this investment into new sensors, systems, and technology is creating a new challenge: transforming all the data into insights that actually improve building performance for owners, managers operators and occupants. Better building management is not only a business imperative, it's also a mandate. Three essential steps to this transformation are critical:

CENTRALIZE building and business data to create a single "source of truth"
DISCOVER insights through a unified view
IMPROVE performance by identifying and executing projects

DATA: THE KEY TO BETTER BUILDINGS

Did you know: There are 5.6 million commercial buildings in the U.S., which consume 40% of our total energy. We spend 90% of our lives indoors and 15% of our GDP is represented by our buildings. Roughly $840 billion dollars are spent just in the U.S. on APEX alone. So, even small improvements can have a pretty big impact.

Vast amounts of essential building data is trapped in silos within different functions across an organization. Success with any better building initiative begins with centralizing and normalizing the data across these existing data silos. As vast amounts of data is centralized into a unified view, and made accessible to different departments, new insights are discovered. These insights tend to drive cross-functional cooperation, shared goals and more effective transformation. Once prioritized, and implemented, organizational and building performance is increased. The result is better buildings, better business performance, and better occupant satisfaction and loyalty. The following pages will dive into more detail on how to leaders at the Summit are embracing a thoughtful, technology-assisted methodology of centralizing, discovering, and improving building operations. By leveraging the vast amount of data captured in buildings, all stakeholders can work together to drive profitability, sustainability and efficiency across their building portfolios

CENTRALIZED DATA: THE HEART OF THE BUSINESS OF BUILDINGS

Shared building data transforms the way operations, sustainability and finance teams collaborate for better business outcomes. While the concepts of centralizing data, discovering new insights and then making improvements seems straight forward, actually implementing a better buildings project requires thoughtful planning. There are five key considerations when evaluating your data assets:

1. INVENTORY: Consider and capture the data that affects buildings including asset management, utility data, IoT devices, sensors, meters, building management system data, ERP data and property management data.

2. STANDARDIZE: Data Formats It's essential to process the data into a common format that can be leveraged across other systems.
3. SCALE: Ensure data is acquired, from all necessary sources, at sufficient volume so meaningful patterns can be revealed.
4. EVALUATE: Through data visualization and algorithms, you can begin to draw out patterns from the various data streams to discover actionable insights.
5. TAKE ACTION: Use these data driven insights to formulate plans for improvement. Ongoing performance will reveal benefits from these activities.

Communicating the insights and opportunities unlocked by accessing this building data is critical. This is the time for building operators to take a new strategic role within their organizations by providing unprecedented information about some of the organization's most critical assets.

CENTRALIZED DATA: WHAT ABOUT IoT?

IoT advances are creating new ways to gather data and drive efficiency at lower cost. With that promise comes the challenge of managing data, security, and constant technology changes. Industry experts agree that IoT represents new, exciting opportunities to the connected buildings trend. Data from connected sensors, cloud-based meters, weather monitors, and other parts of collected infrastructure are producing data at never-before-seen rates. As building operators attempt to capture, normalize and interpret this data, they can quickly find themselves in a sea of unstructured, hard to manage information. The key is capturing it, interpreting it and using it with defined, centralized data strategies, analytics and integrated applications. When appropriately managed, dataflows from IoT devices can provide incredibly valuable information and insights, real time. Here are four expert tips for embracing IoT in your connected buildings project.

1. DEVISE AN IoT DATA PLAN: The world is entering the 4th era in computing. An era in which we connect the physical and the digital world and begin to really unlock value. That's when our buildings, and our cars, and our infrastructure really starts to get connected. And as a result, buildings are undergoing one of the biggest transformations in history. Since buildings bring legacy technology with them, it is imperative to have a plan to centralize and standardize the information across buildings and systems. — Vladi Shunturov, President, Lucid

2. START WITH THE END IN MIND: Sensors are cheap and you can deployed a lot of them. The trick is to know what data you want to capture based on the insights that will help you make better decisions. — Tom Herbst, CTO of IoT Solutions, Cisco

3. TAKE DATA SECURITY SERIOUSLY: The advent of IoT makes safety, reliability, security, and privacy key concerns. It is a daily battle to stay on top of the many changes in both technology and how individuals are using the technology to increase operational efficiency and occupant comfort. — Sven Schrecker, Chief Architect of IoT Security, Intel

4. CONSIDER BOTH LEGACY INFORMATION AND NEW IOT DATA: Many organizations are challenged with how to integrate the older technology in existing buildings with the new technology in new buildings. Assess all information sources to determine the exact information you need to centralize. Find the line between legacy data and IoT data, and determine what is and is not possible as you build out a plan across a broader portfolio of buildings. — Josh Carter, VP of Business & Client Development, LVR

CENTRALIZED DATA: PLATFORM ESSENTIALS

A solid data platform enables easy creation of layers or tools that facilitate insights and innovation. Centralizing the data is more than just pushing it all into one place. For data to be useful, it needs to be organized, normalized, and unified. It is a major task to get data from different sources into one centralized location, in a common data structure, and ready for the business user. Data generated within buildings varies widely. Data about utility usage and costs, occupant behaviors and preferences, building assets, trends and differences between tenants, weather, etc., is essential. A powerful data platform is required to understand different data types and to analyze how the different building data interacts. Insights are revealed in these intersections of data.

For example, tenant behavior vs. weather trends vs. utility usage can provide insights about heating and cooling efficiency. The more data available, the stronger the foundation for insights. One way to understand how buildings can come to life is to think of a building as if it were a person. Give it an identity and a profile; a name, a location, a function, a height, etc.

Thinking of building profiles can help building operators track the health and efficiency of each building, especially when a combination or “intersection” of various data types is considered. As more data is available, owners, operators, and occupants are all asking more questions about their buildings and about their business. And as they engage more people within their organization, more stakeholders are asking questions. From a central data platform, all stakeholders can understand more about their buildings and their business, their tenants, employees, utility bills, performance contracts, service requests, and more.

This is just the beginning. Building operations can impact productivity, health, safety, profit, and value. There will be more data required to answer these questions in the future.

BUILDING DATA PLATFORM CHECKLIST:

- A powerful data platform that can normalize different data sets at scale.
- A centralized, extensible, flexible platform that provides a single “source of truth” for data that is important to your business.
- Advanced analytics that can decipher the relationships and intersections between data types.
- A wide variety of applications for your portfolio of buildings.
- Customization capabilities that allow you to create a relevant story that’s important to your portfolio of buildings.
- An evolving platform, always capable of delivering something new as information and needs evolve.

DISCOVER BUILDING INSIGHTS. UNLOCK NEW OPPORTUNITIES.

Discovering the links between different silos of data can reveal new opportunities for savings, efficiency, teamwork and productivity. For example, with a central data source and a set of related applications that span different parts of the business, teams can work together to achieve their common and individual goals. There are natural decision flows that are revealed as different teams share their insights. Consider these examples.

GOAL: Lower energy consumption faster identification of opportunities to to reduce energy smarter capital decisions related to energy more efficient operations.

GOAL: More effective reporting faster access to sustainability data → accurate tracking of sustainability project expenses higher sustainability performance across the portfolio.

GOAL: Improve occupant energy usage→ occupants have access to energy and sustainability metrics better forecasting for occupants and managers happier occupants and higher utilization

SUSTAINABILITY AND CORPORATE PERFORMANCE: A POWERFUL RELATIONSHIP

"In the top 10 office building markets in the U.S., there is an opportunity for 35 billion dollars of asset value growth by improving the sustainability performance of buildings." "SASB research has found that capital markets are systematically underinvesting in sustainability. ...There are massive missed opportunities." Bryan Esterly, Sector Analyst, SASB

The latest research from the Sustainability Accounting Standards Board (SASB) reveals an undeniable fact: sustainability strategies are a key component of overall corporate performance. Just like the standard accounting principles created the corporate transparency to drive better investment decisions, SASB was founded to create common principles for sustainability projects to drive better investment into those projects.

The missing link has been a common language for companies to communicate the value of sustainability investments to investors. Centralized data, as described in the last chapter, can begin to form common terms and metrics that can be used by investors and building operators and corporations in order to accurately measure the value of connected building or sustainability initiatives. Like all corporate investments, there must be a strong financial business case to drive a successful sustainability project.

With constant pressure on the bottom line, companies often delay or minimize investments in sustainability projects. For investments that have been made, the drivers have frequently been regulatory forces, or a strong business case. With more data available, there is an immense opportunity for building owners to accurately understand the financial value of sustainability projects, and to communicate that value to stakeholders and investors in a common language.

With a common language, investors and companies can come together to understand what sustainability investments really mean to financial performance, investors and the company's bottom line.

BEYOND SUSTAINABILITY: USING BUILDING DATA TO DISCOVER AND DRIVE OPERATIONAL CHANGE

Progressive companies use data to meet aggressive efficiency goals and to better inform capital planning, production improvements, team structures and operational performance. In a round table discussion, corporate leaders revealed their strategies for driving operational change and achieving business goals using building data as a baseline. They share common strategies for defining the information they need and uncovering data and insights that guide their decisions.

Observations included:

Many of the ASHE members are driven by the need to save money by reducing energy. They have set up their systems to provide the best data about resources utilization to more easily identify opportunities and report their achievements to other stakeholders.
– Terry Scott, President, ASHE

Building data in silos is not effective. It is also prohibitively labor intensive, slow, and inaccurate to consolidate all relevant building data manually and expect to extract meaningful insights. No matter how good you are at Excel.
– John Elliott, CSO, Lawrence Berkeley National Laboratory

Tools are absolutely necessary to scale the data analysis and discover trends, patterns, and opportunities. Uncovering the hidden insights hidden inside the data requires aggregation and normalization that can only be done through technology.
– Joaquin Serrano, Sustainability Manager, Avery Dennison

Even once you have used your data to implement projects, you need to be able to track ongoing progress and to communicate your results to the right stakeholders to show your for success.
– Dipal Patel, Senior Manager, CBRE

Key questions to ask:

- What are your building operations goals?
- What investment decisions do you want to make?
- Who within your organization will be affected by these decisions?
- What data are you already gathering?
- What data exists in silos that could be combined to discover insights?
- What new operational best practices can help you achieve your goals?

IMPROVE

Building performance drives business performance. With data at the heart of building management, and insights revealed across data silos, companies can dramatically improve bottom line performance.

Improvement is possible when decisions are driven by data. Data allows building operations teams, executive leaders and companies to embark on projects that improve bottom line performance, create new efficiencies and increase occupant satisfaction.

IMPROVED UNDERSTANDING of actual building use patterns and cost helps informs sustainability, energy and use strategies.

INSIGHTS ABOUT HOW DECISIONS AFFECT OTHER DEPARTMENTS, teams, business functions and investments drive greater collaboration and better organizational efficiency.

INSIGHTS ABOUT BUILDING PERFORMANCE and financial performance reveal opportunities to improve investment decisions and their results.

INSIGHTS HELP ORGANIZATIONS TRACK

EXPECTED PERFORMANCE, consumption or financial variances so that exceptions can be tackled right away.

INSIGHTS HELP BUILDING MANAGERS AND OWNERS ENGAGE OCCUPANTS to achieve goals, while maintaining their comfort.

BRINGING 21ST CENTURY INNOVATION TO BUILDINGS

The rate and pace of technology has to be matched with the realities of making change happen. Understanding the power of intelligent, connected building strategies is one thing. Implementing a new strategy is another. The following is an assembly of real world ideas and lessons from industry experts that will help you on the road to bringing your building strategy into 21st century.

MOBILZE AND EMPOWER YOUR ENTIRE ORGANIZATION WITH DATA. Embrace automation and the data part of your culture to ensure employees from different backgrounds can access and see the value in the new insights. -- Jim Young, CEO, Realcomm

VISUALIZING DATA BRINGS IT TO LIFE. Big data can be turned into big visualizations that can become big insights and big understandings. Sometimes too much data is overwhelming without the right systems and training to see and understand it.

NEVER FORGET THAN THE BUILDINGS ARE THERE TO SERVE THE PEOPLE. Buildings are all about people, ultimately enabling people to be more productive. Leverage technology to unleash the potential of occupants. -- Gary Dillabough, Managing Partner, Westly Group

DATA BECOMES USEFUL WHEN IT'S SHARED. Information and insights that are shared across individuals, teams, and organizations helps everyone to get aligned. This is when major improvement projects really take off and transformation of the organization begins. -- Sara Neff, Senior VP of Sustainability, Kilroy Realty

BRINGING 21ST CENTURY INNOVATION TO BUILDINGS DATA NEEDS TO BE FLEXIBLE TO BE USEFUL. The way an organization collects, analyzes, and visualizes data must be flexible and customizable to get the most value. Greatest benefits are realized with standard data collection and structure, yet personalized presentation. -- Jeff Eichenfield, Director of Real Estate Asset Mgmt & Leasing, The Presidio Trust

WHEN BIG DATA, BUILDINGS AND IoT MEET

Today's investment experts see tremendous market opportunity as companies unlock the value of their buildings. Investment experts are watching the intersection between big data, connected buildings and IoT. Building performance improvement goes beyond energy and resources efficiency. The relationship between the investor, the manager and the occupant is where the real benefits of intelligent strategies for connected buildings is uncovered.

Communication can be accelerated immensely and it can create a profoundly better experience for the occupant while enhancing the owner and investor's business stability.

The opportunity to connect the physical and digital world is a tremendous opportunity for buildings--one of the last segments of the economy to benefit from big data transformation. For the greatest benefit, companies must incorporate IoT data into the design of buildings, systems,

and processes for their business. As older building get connected, and new buildings are added to the data grid, a powerful transformation of this part of the economy can take place.

“Financing and operations departments are the earliest beneficiaries of this integration. They’re essential to unlocking the full value of data.” -- Sidharth Haskar, Corporate Development, Autodesk

“We’re looking at technology as a way to answer questions about how tenants use their spaces.” -- Will O’Donnell, Managing Partner, PLD Ventures

“Everything is changing much faster than we are used to. But, the opportunity is great if we embrace it.” -- Ivan Bel, VP of Integrations & Bus. Dev., Ecova

CONCLUSION

Uncovering the potential to make your buildings more energy efficient, your employees more productive, and your occupants happier is no simple task. The process starts with centralizing your data. A valuable data platform should then be able to provide insights to help you discover and prioritize which projects to pursue. Acting on the opportunities revealed will improve building performance.