

Construction Technology

Through the Looking Glass

Presented by Jeff Sample





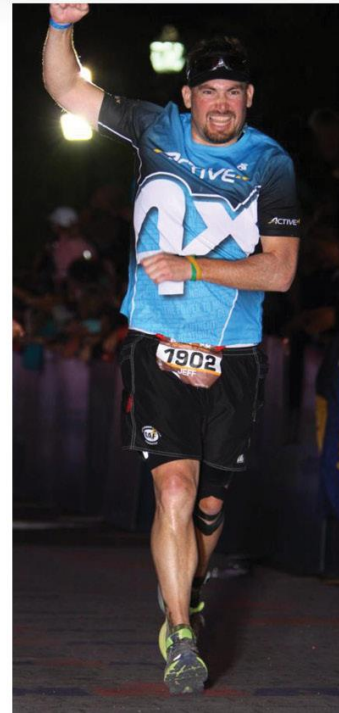
WHY ME?

- 20 YEARS – Information Technology Services
- DevOps Engineer–*Software Development Lifecycle*
- SaaS Design □ API's
- Cloud Solutions □ RFID

□ **CONSTRUCTION IT**

- IT Director
- Safety Committee Member
- Director of Media - JBKnowledge

- Hospitality, Ski Resorts, & Health Care
- Skier & IRONMAN enthusiast





Why

*The construction industry has to “build **1,000 buildings a day** for the next **31 years**, so that by **2050** we can accommodate the world’s population of **10 billion people**.” In total, McKinsey estimates that over **\$57 trillion** will need to be spent by 2030 to finance this construction boom.*

Autodesk CEO Andrew Anagnost

Constructing the Foundation

The Reality of DISRUPTION

LEADERSHIP

DATA THE DIGITAL CURRENCY

THE PEOPLE

“Disruption is a business model change where segments of an industry cannot adapt.”

Brett Young

IN THE LAST 15 YEARS, 52% OF THE
FORTUNE 500 COMPANIES
HAVE DISAPPEARED

1955

vs.

2015

Average life expectancy 75 years

Average life expectancy 15 years





RAD
U R B A N

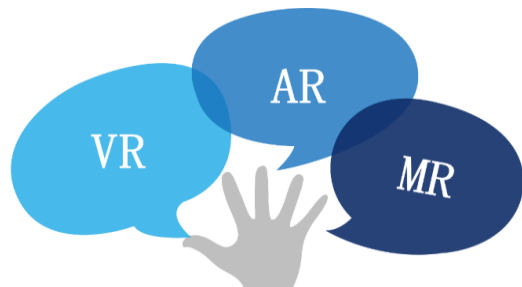
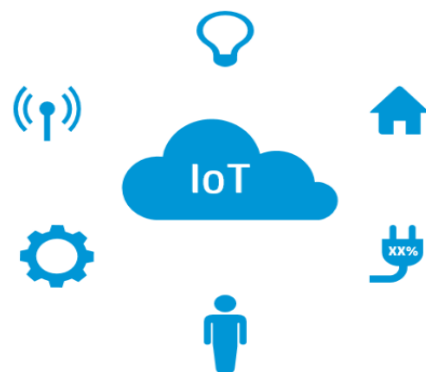


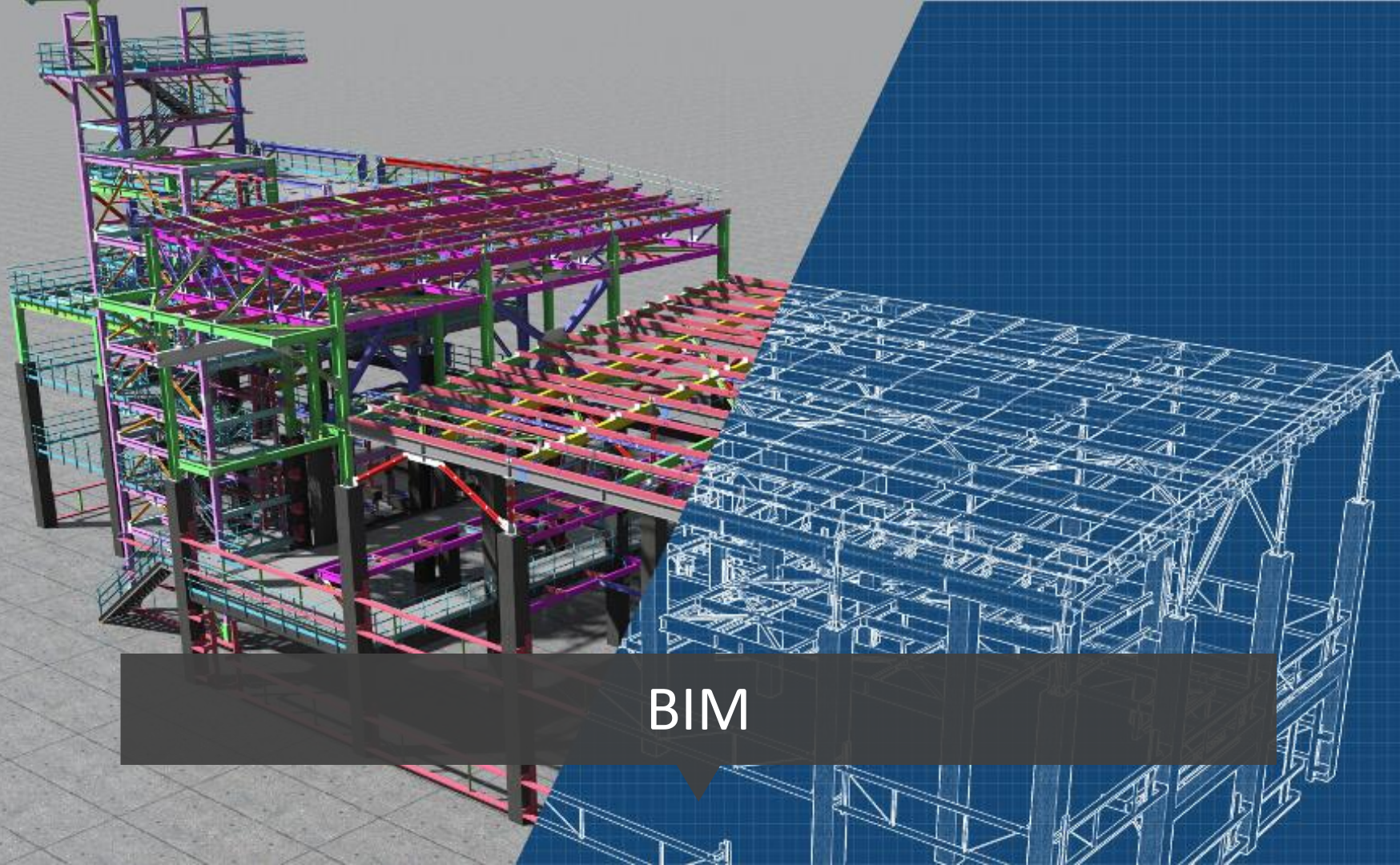
Leadership



The digital currency of
the future

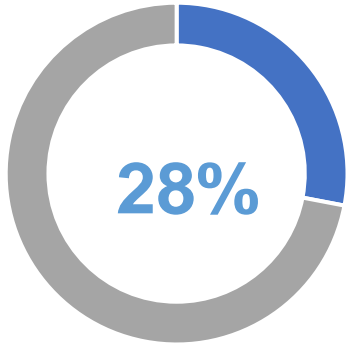
Data



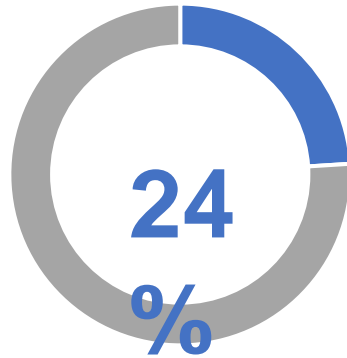


BIM

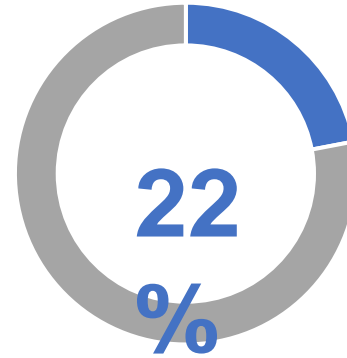
BIM is Still Not a Priority



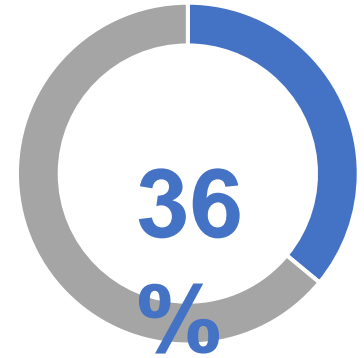
We do NOT bid
on projects
involving BIM



We have a BIM
department



We have employees on
staff that can work
within BIM



Number of active
projects that involve
BIM

Source: 2018 JBKnowledge ConTech Report

BIM & VDC



CONCRETE
FOUNDATION FOR THE
TECHNOLOGY
ECOSYSTEM



COMMUNICATION,
COLLABORATION, &
PLANNING



CONSTRUCT-ABLE BIM



PREFABRICATION AND
MODULAR
CONSTRUCTION

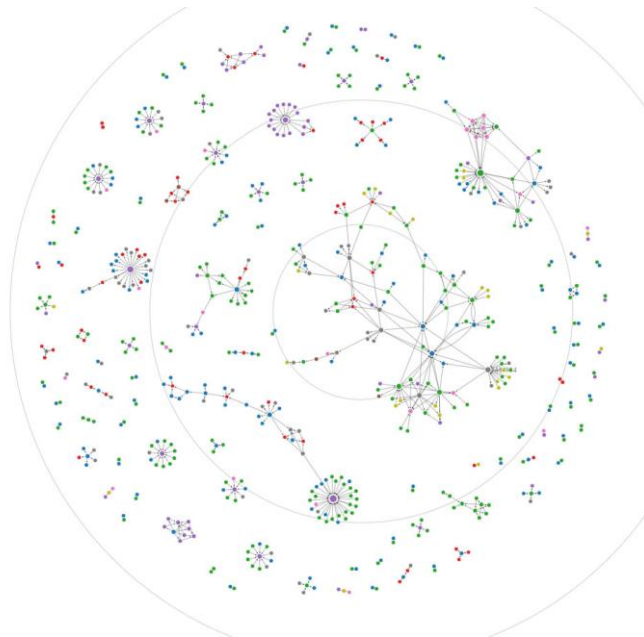
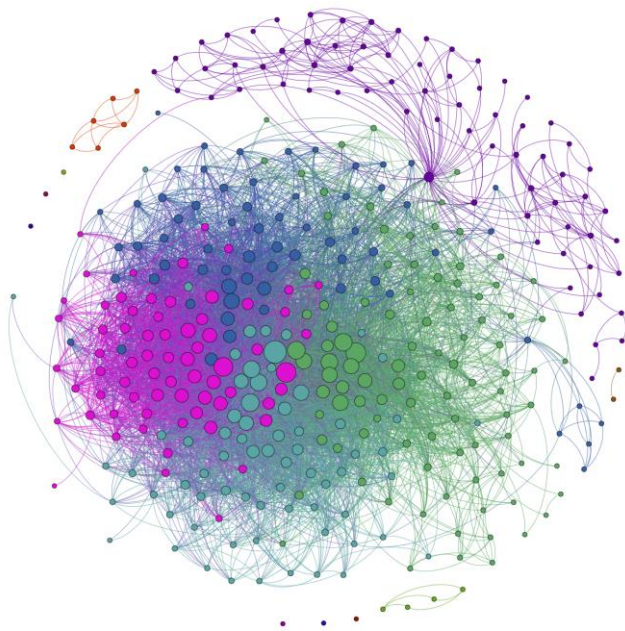


SAFETY



DESIGN CONSULTANT

Project Virga – Data Visualization



Generative Design

Generative Design:

Goals &
Constraints

Form
Synthesis

Optimization

Properties

3D View

3D View: 3D No Walls Iso

Graphics

View Scale	1/8" = 1'-0"
Scale Value	96
Detail Level	Fine
Parts Visibility	Show Both
Visibility/Graphics Overrides	Edit...
Graphic Display Options	Edit...
Discipline	Architectural
Show Hidden Lines	By Discipline
Default Analysis Display S...	None
Sun Path	<input type="checkbox"/>

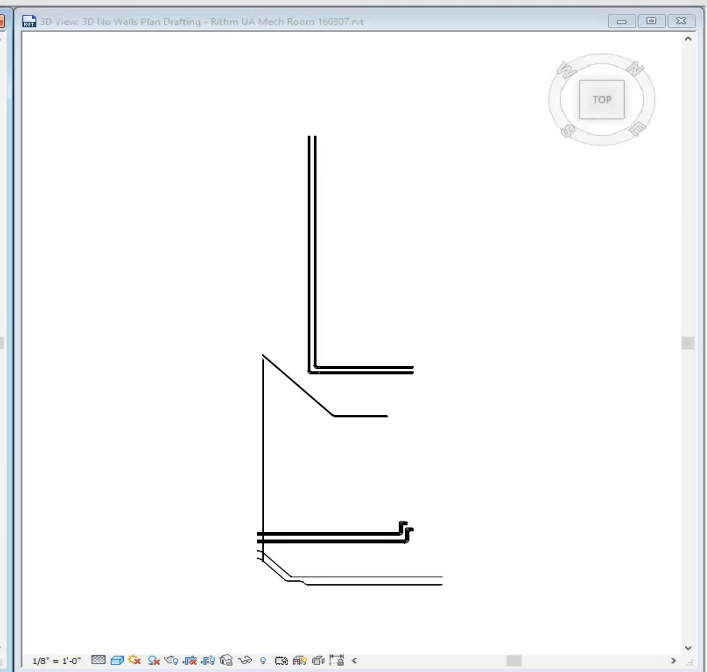
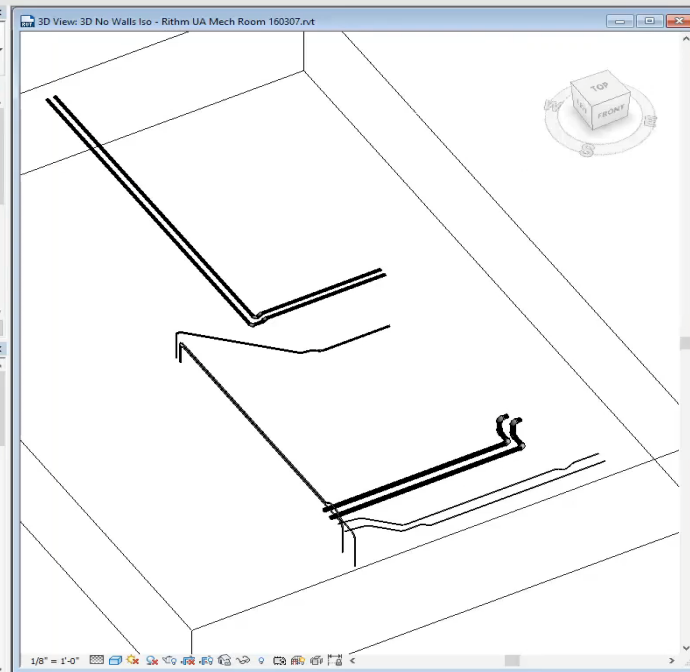
Extents

Crop View	<input type="checkbox"/>
Crop Region Visible	<input type="checkbox"/>
Annotation Crop	<input type="checkbox"/>
Far Clip Active	<input type="checkbox"/>

Properties help

Project Browser - Rithm UA Mech Room 160307.rvt

- Views (all)
 - Floor Plans
 - Level 1
 - Level 2
 - Level 02 - T.O. Footing
 - Level 03 - T.O. Basement Slab
 - Level 04 - T.O. Fnd. Wall
 - Roof
 - Site
 - Ceiling Plans
 - Level 1
 - Level 2
 - 3D Views
 - 01 - Existing
 - 02 - Demo
 - 3D
 - 3D No Walls Elevation
 - 3D No Walls Iso**
 - 3D No Walls Plan
 - 3D No Walls Plan Drafting
 - A10 - Substructure
 - B10 - Superstructure
 - B20 - Exterior Enclosure



Ready

850 - Extension Enclosure

810 - Substructure

810 - Superstructure

3D No Walls Plan Drafting

3D No Walls Elevation

3D

05 - Demo

01 - Existing

3D Views

Level 2

Level 1

Ceiling Plans

200

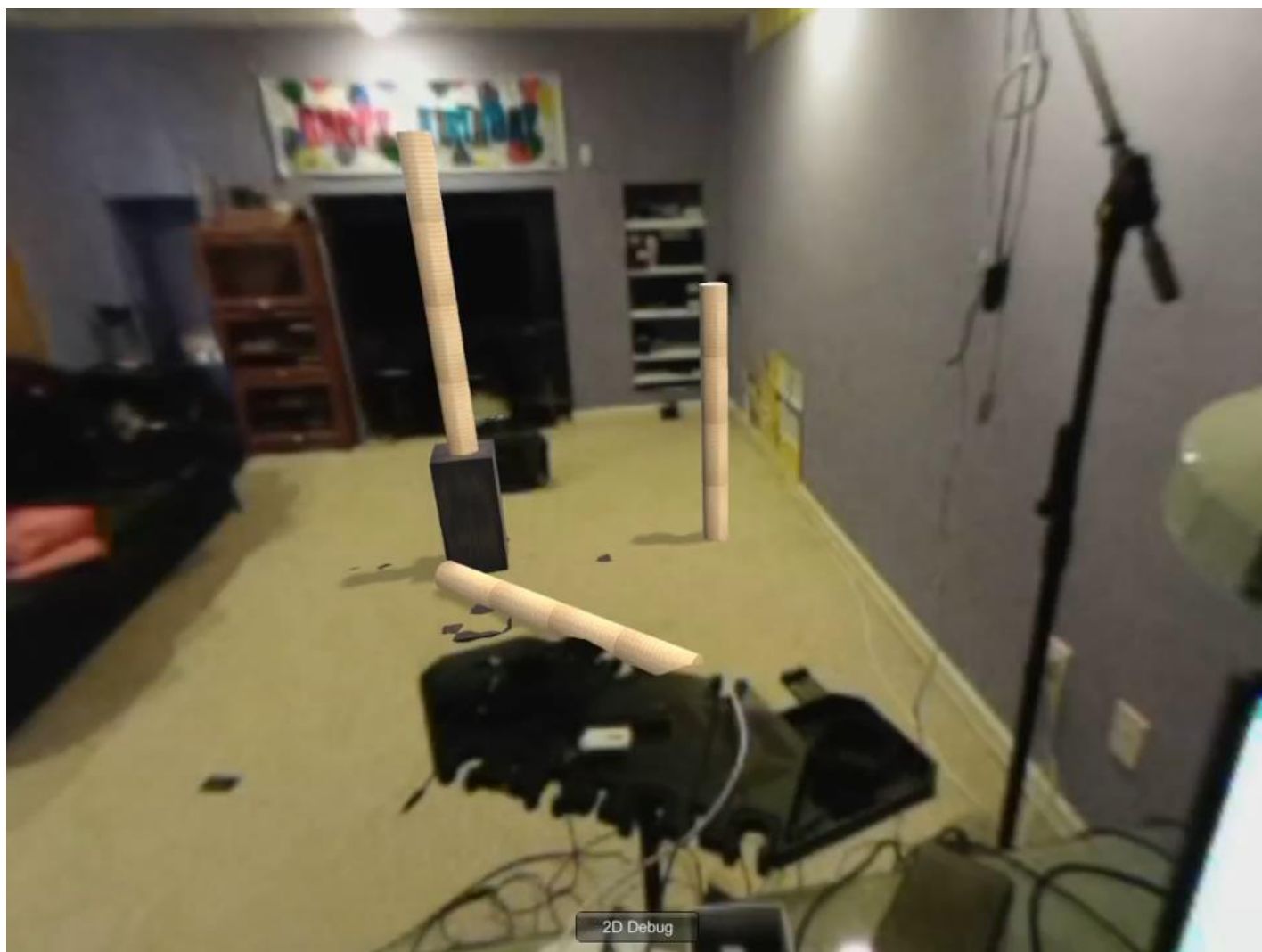


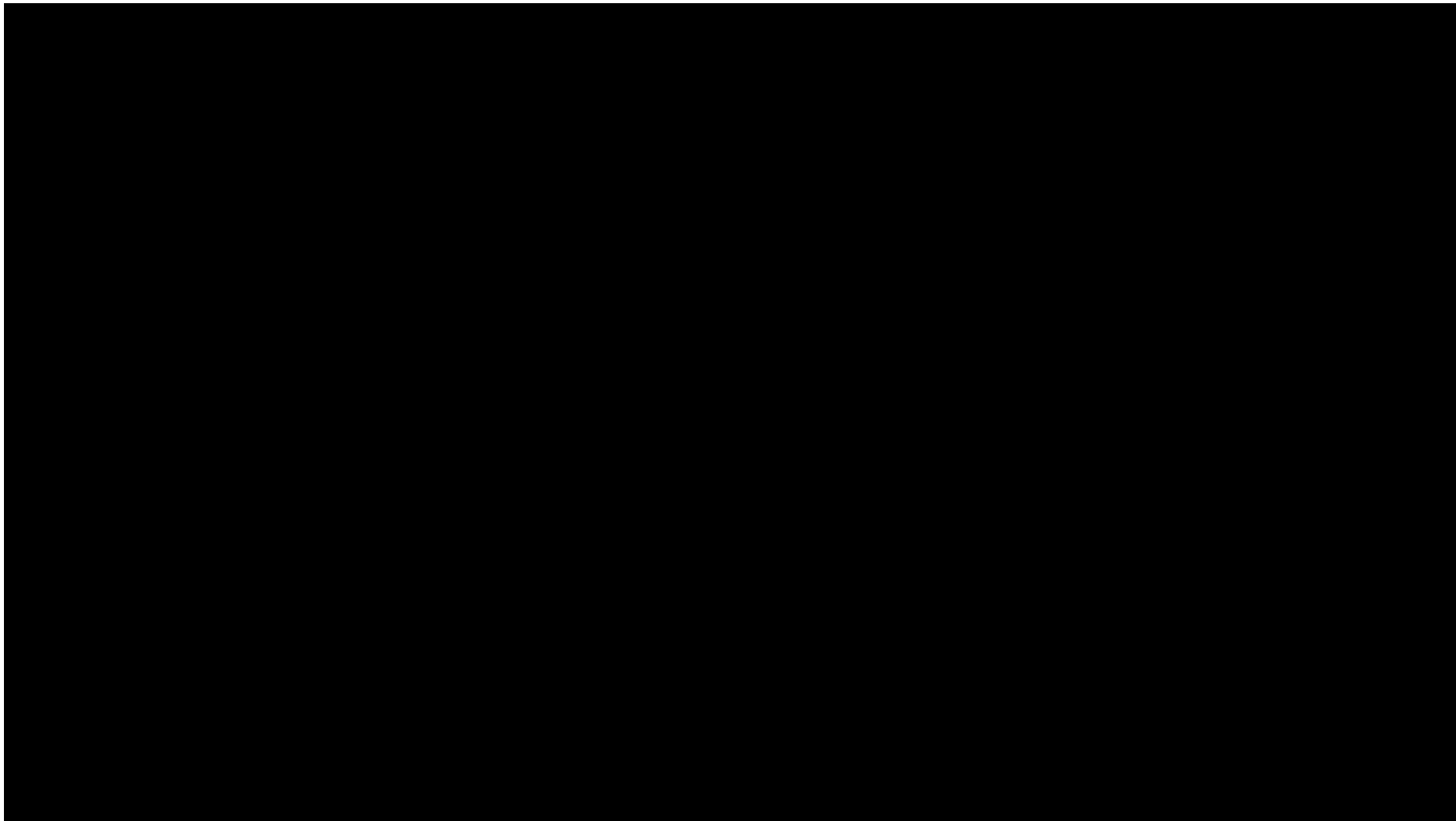
VIRTUAL, AUGMENTED, & MIXED REALITY

Virtual Reality Use Cases

- Design and Visualization of space
- 50% of people cannot visualize 2D plans in 3D without assistance
- More iteration in design translates to less rework in the field
- Less Man Hours = Safer Site
- HAPPY CUSTOMERS
- Training and Simulation
- Hours on the tools with less waste and risk to train
- Creates physical Muscle memory
- Simulate difficult or risky procedures
- Simulate Jobsite conditions and create collaboration with team members







Augmented Reality Use Cases

Verification

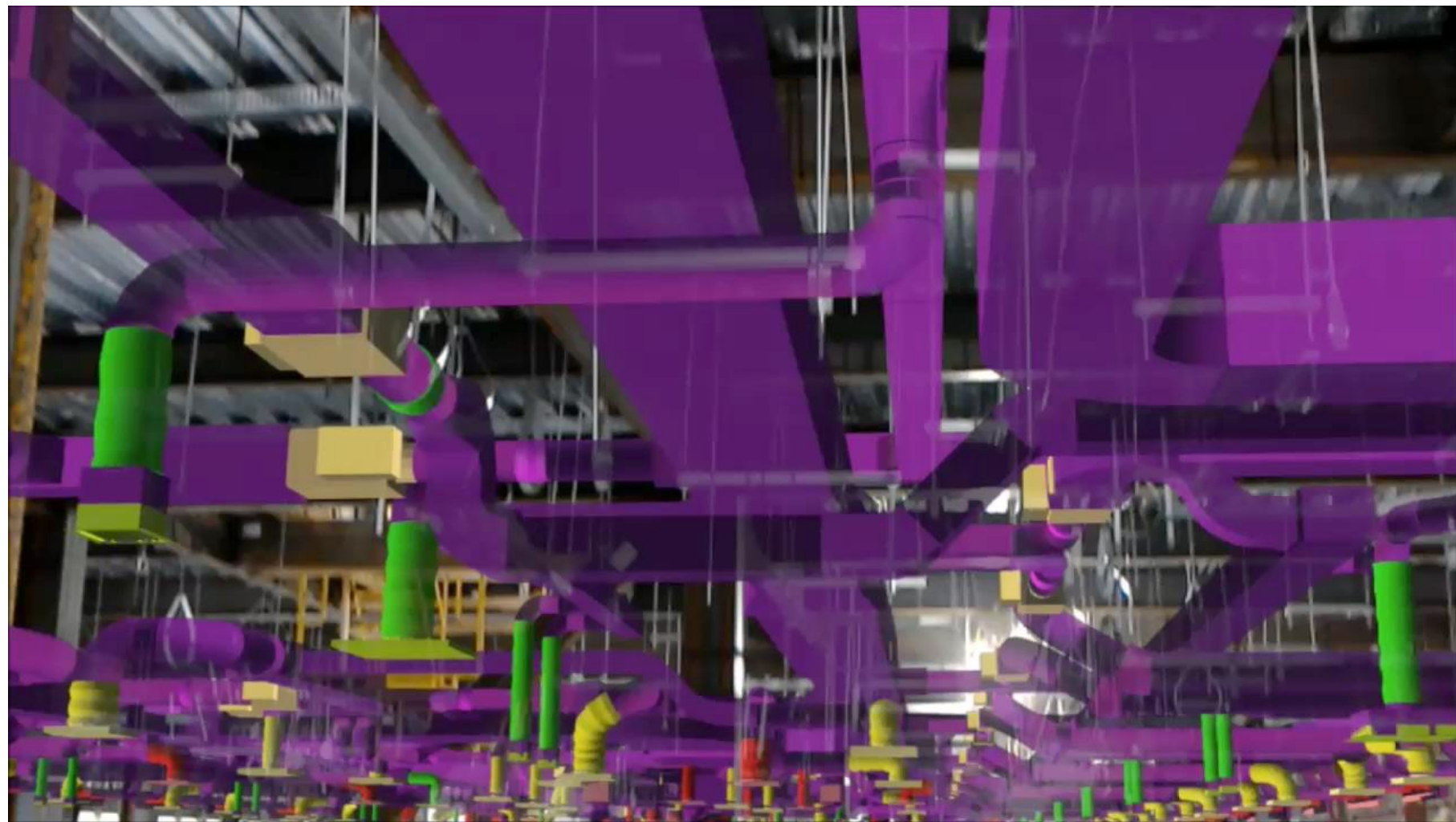
Documentation

Collaboration

Visualization

Trimble XR10 with Holo Lens 2

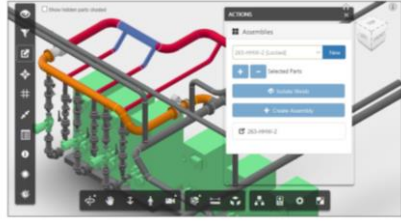






Wm. T. SPAEDER
Since 1914

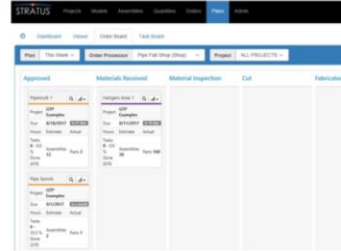
Prefab Assemblies are defined



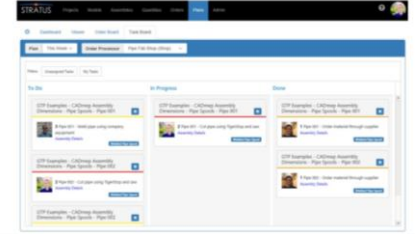
Models are sectioned into Levels and Areas



Orders are sequenced within a Plan

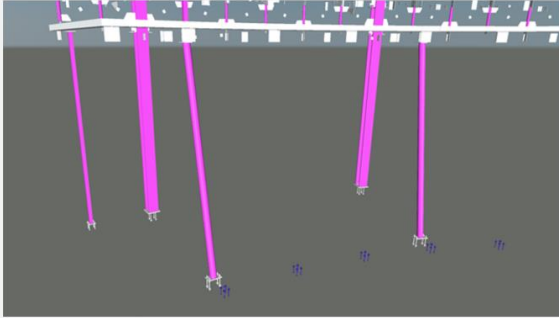


Tasks are tracked as Orders are processed

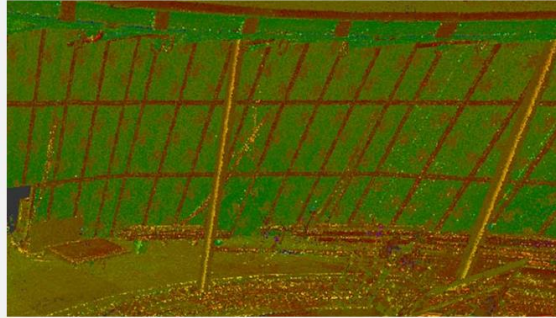


Stratus Ordering from the model

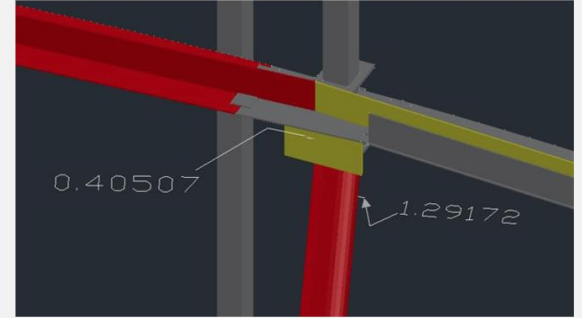
1. Upload Your Design File



2. Scan & Upload



3. See The Result



Reality Capture



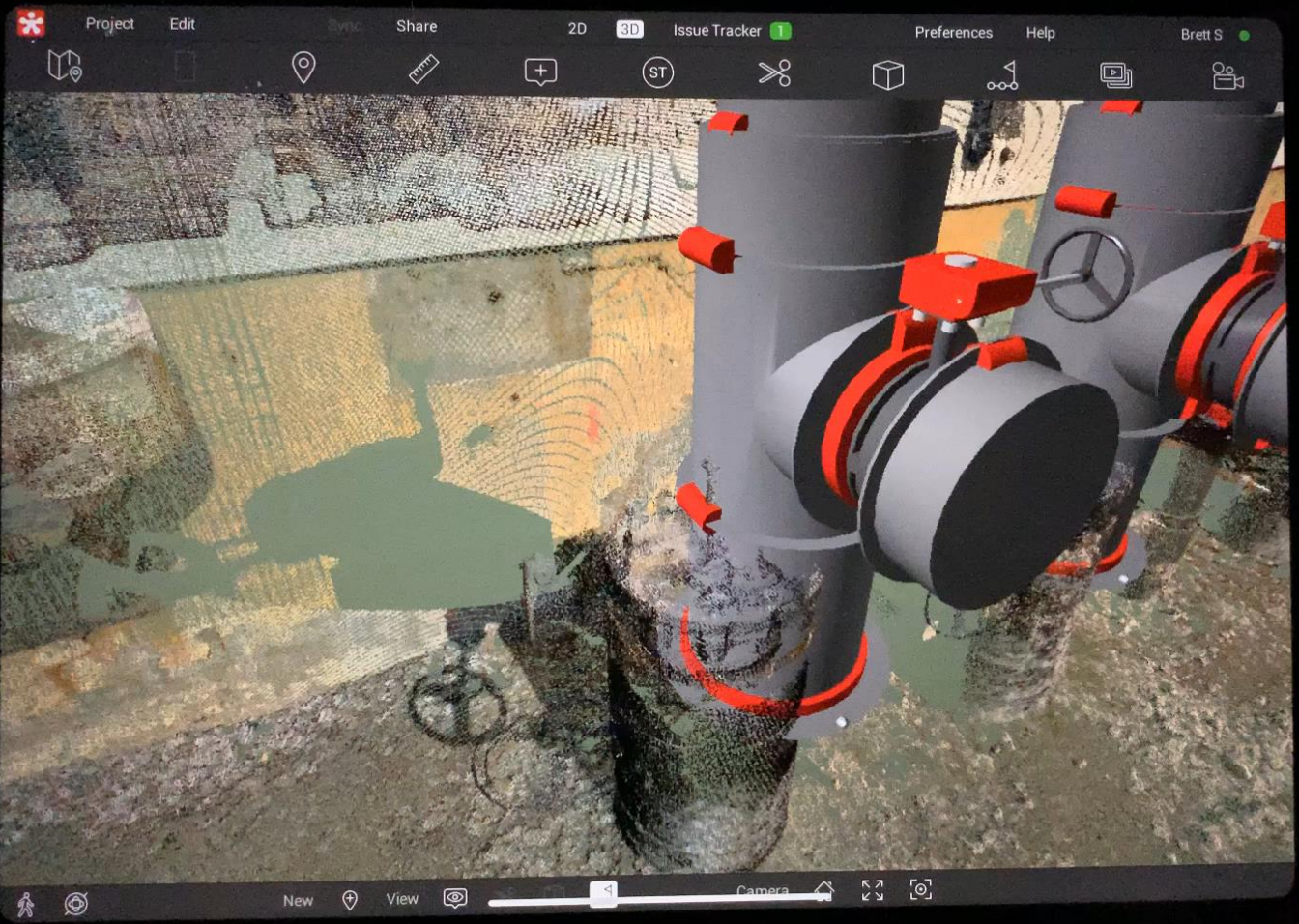
Faro S150 & S350
Leica BLK 360

Photogrammetry





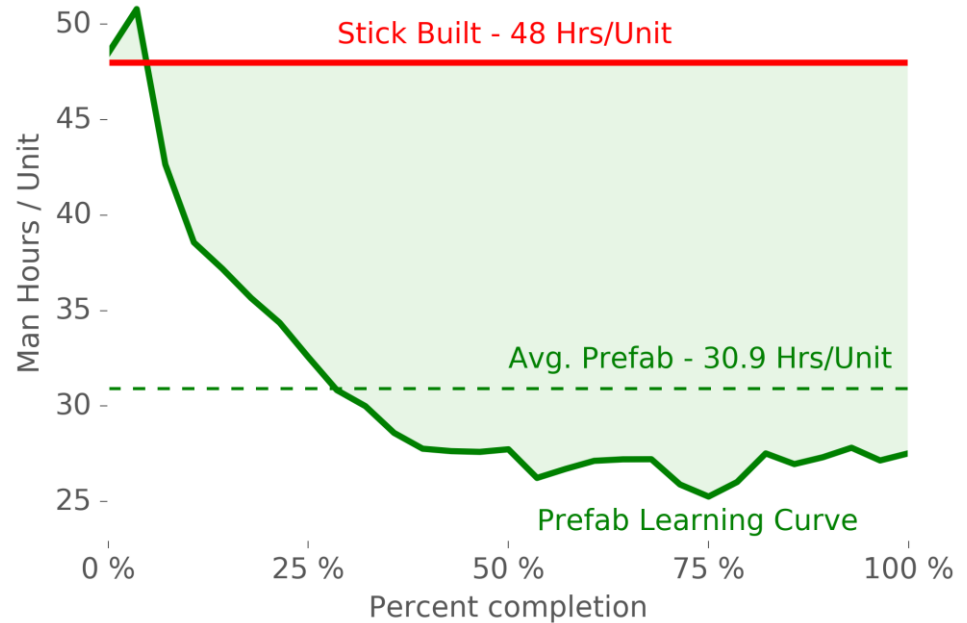
When it all comes together





Prefabrication, Modular & Offsite Construction

Where we fall down



Traditional Build	Prefab
13 miles walked	2.8 miles walked
58 hours to build	18 hours to build

Prefab Unit 2	Prefab Unit 23
25 hours	7 hours

Comparing work in the Shop to the Field



**FRANK M.
BOOTH, INC.**

Shop

Field

**HOURLY
LABOR
RATE**
\$
MIN. CHARGE
\$

Labor Rate

\$75/Hour

\$110/Hour

Single Clevis Hanger

3 Minutes

10 Minutes



Single Tier Trapeze Hanger

6 1/2 Minutes

17 Minutes



INTERNET OF THINGS

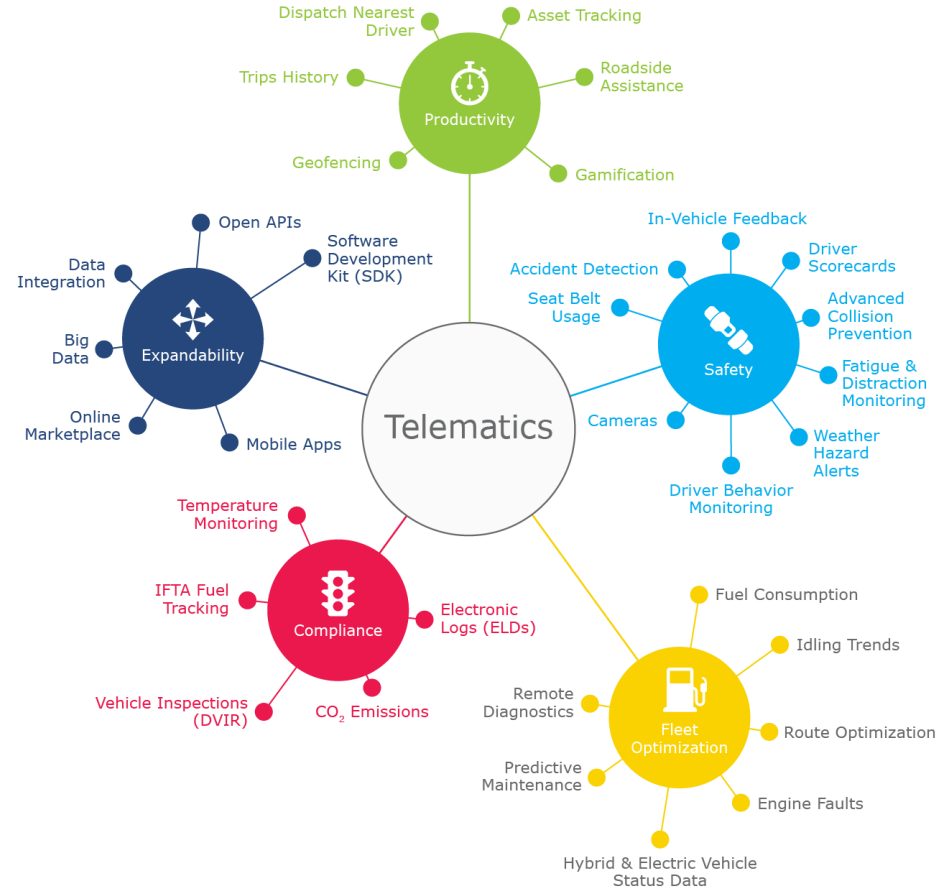
Connecting People and Equipment

Fundamentally change the Jobsite

- Respond to safety incidents instantly
- Devices and People Communicating real-time for safety and efficiency
- Creating Data for visual and machine learning Analysis



Telematics





Spot-r by Triax

- Telematics
- Monitor Employee position onsite and Automatic Headcount
- Automatic Slip Trip and Fall Notification
- Safety Alerts
- Flag Hazards
- Remote Call for Help
- Evac Tag



spot-r
by triax®



M18 FUEL SMART TOOL

The latest generation of FUEL™ tools but with integrated Bluetooth™ technology.

SYNC WIRELESSLY AND CONTROL YOUR TOOLS

Wireless communication & tool customization through Android or iOS apps.

ONLINE + MOBILE INVENTORY MANAGEMENT

Organize your information in one place, for a complete picture of the assets you use.




Milwaukee

ONE KEY™

UNLOCKING THE DIGITAL JOBSITE.™

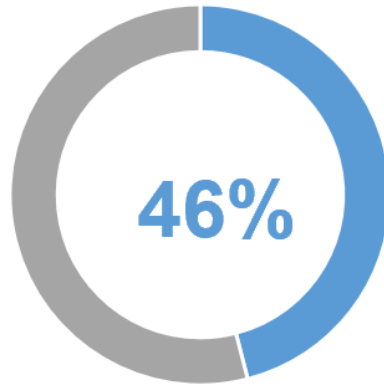
The advertisement features the Milwaukee logo at the top. Below it, the text "ONE KEY™" is prominently displayed, with a keyhole icon integrated into the letter "O". Underneath, the tagline "UNLOCKING THE DIGITAL JOBSITE.™" is written. At the bottom, there are three small icons: a Milwaukee M18 FUEL Smart Tool, a smartphone with a Wi-Fi symbol, and a laptop displaying a data dashboard.

Connected Tools

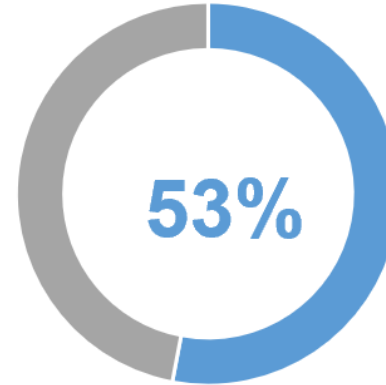


RFID

Manual Process Are Still Prevalent

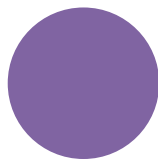
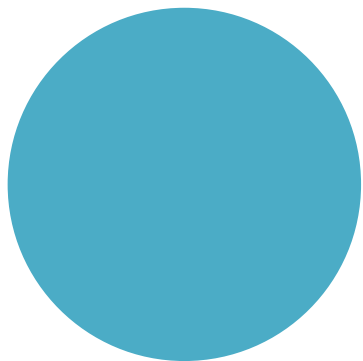


Nearly half of all contractors surveyed still process daily reports manually.



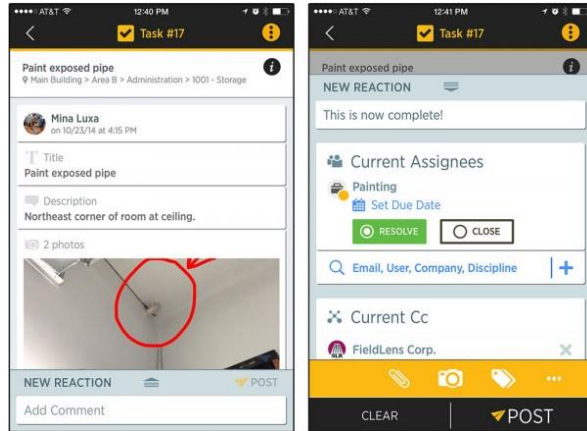
More than half of all contractors still process time cards manually

Source: 2018 IBKnowledge ConTech Report



EVOLVING APPLICATIONS

The first step to
transforming your
company



Daily Reports

RocketBook

- Digital Paper
 - Email
 - Cloud Services
- Same Workflow different result
- Remove the noise but achieve the results
- Pen and Paper
- Reusable





Photos



Smartvid.io



Pictures, Video, Media
from any device

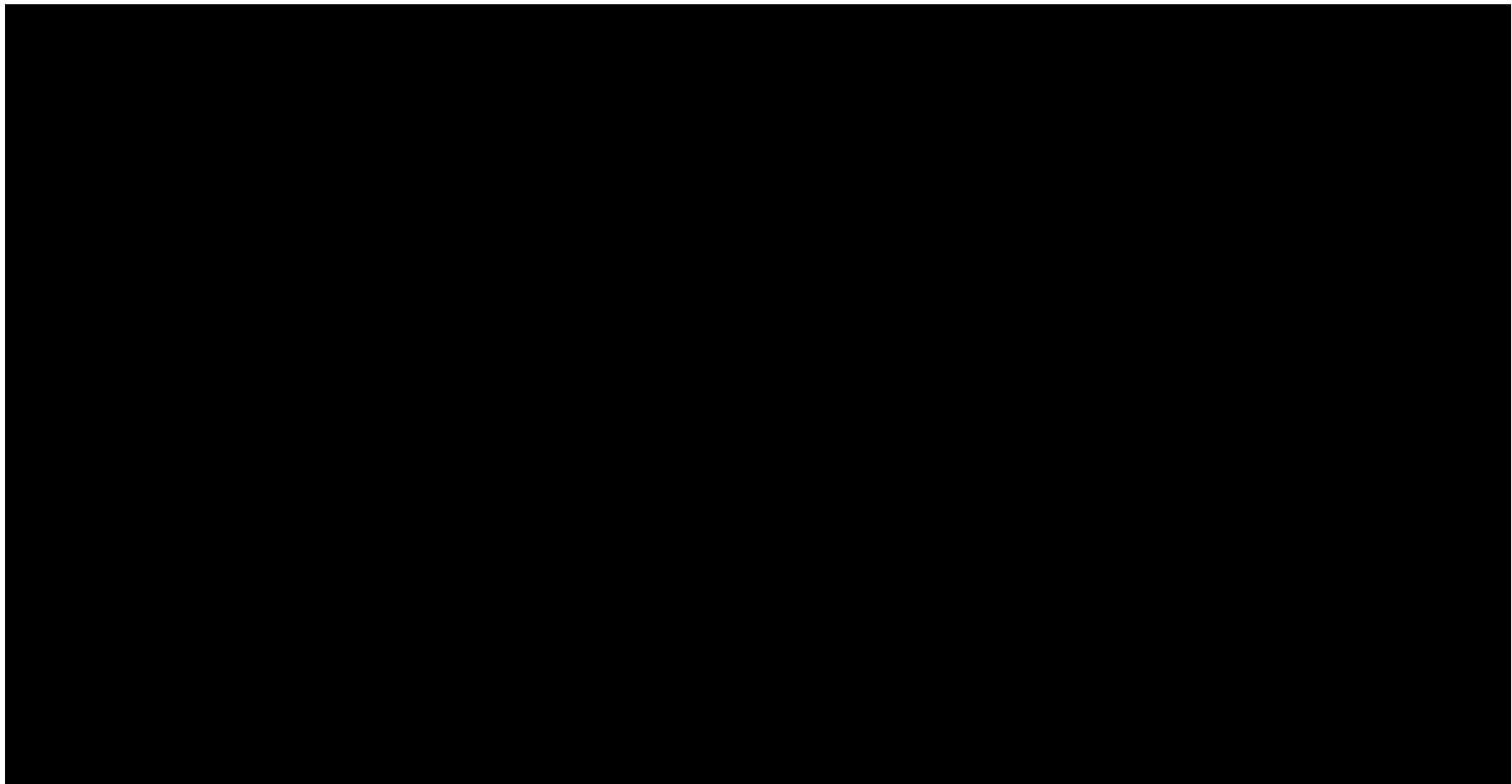


Single Platform for
Machine Learning and
Artificial Intelligence



Vinnie.AI

Vinnie was a
Foreman on a
project with a
Video on his
phone worth 4
Million Dollars



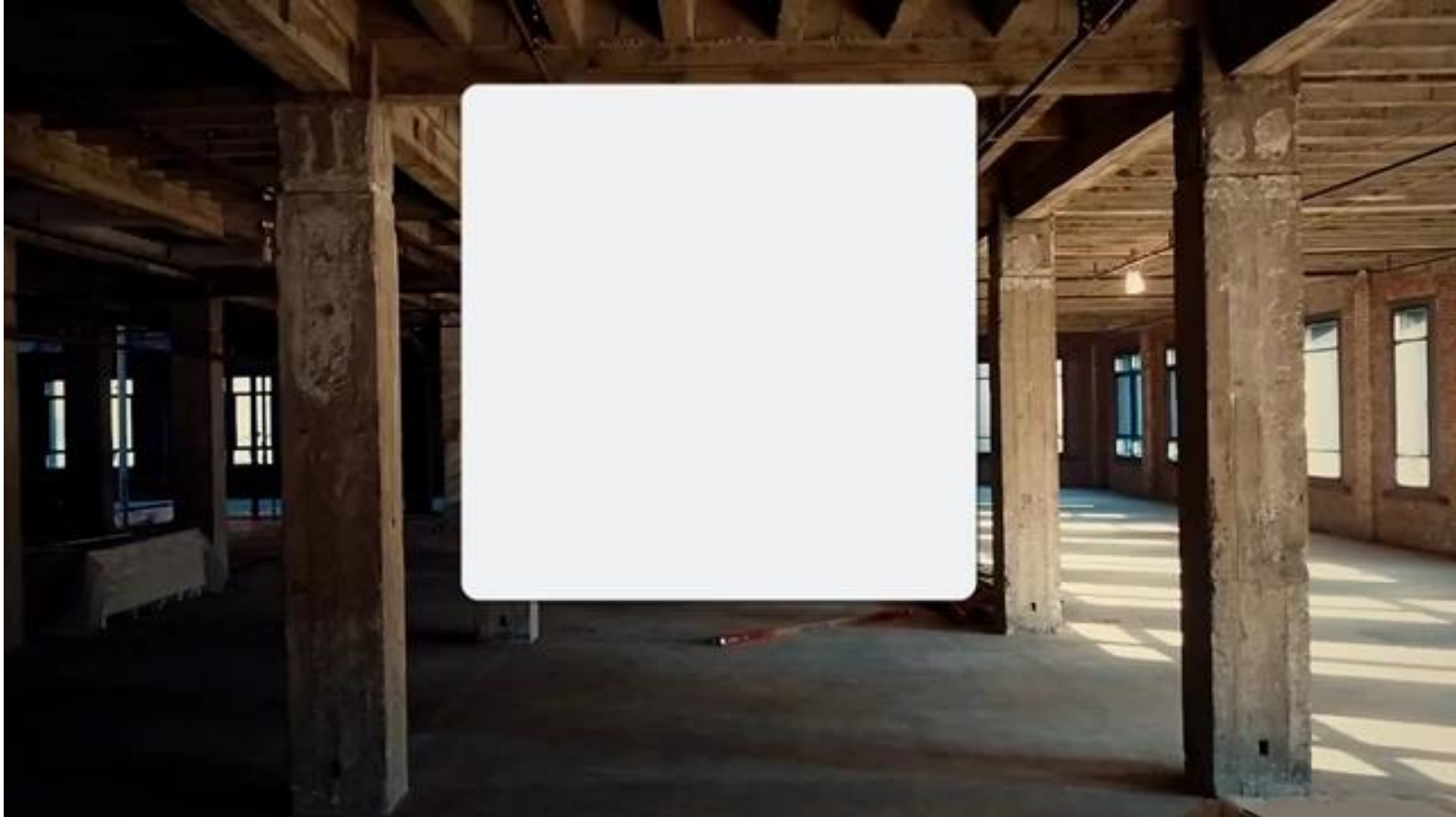
360 Photos & Video



 **THETA**
360° experience.



ConstructionSite



Data Integrations



Current State

Linear Integration

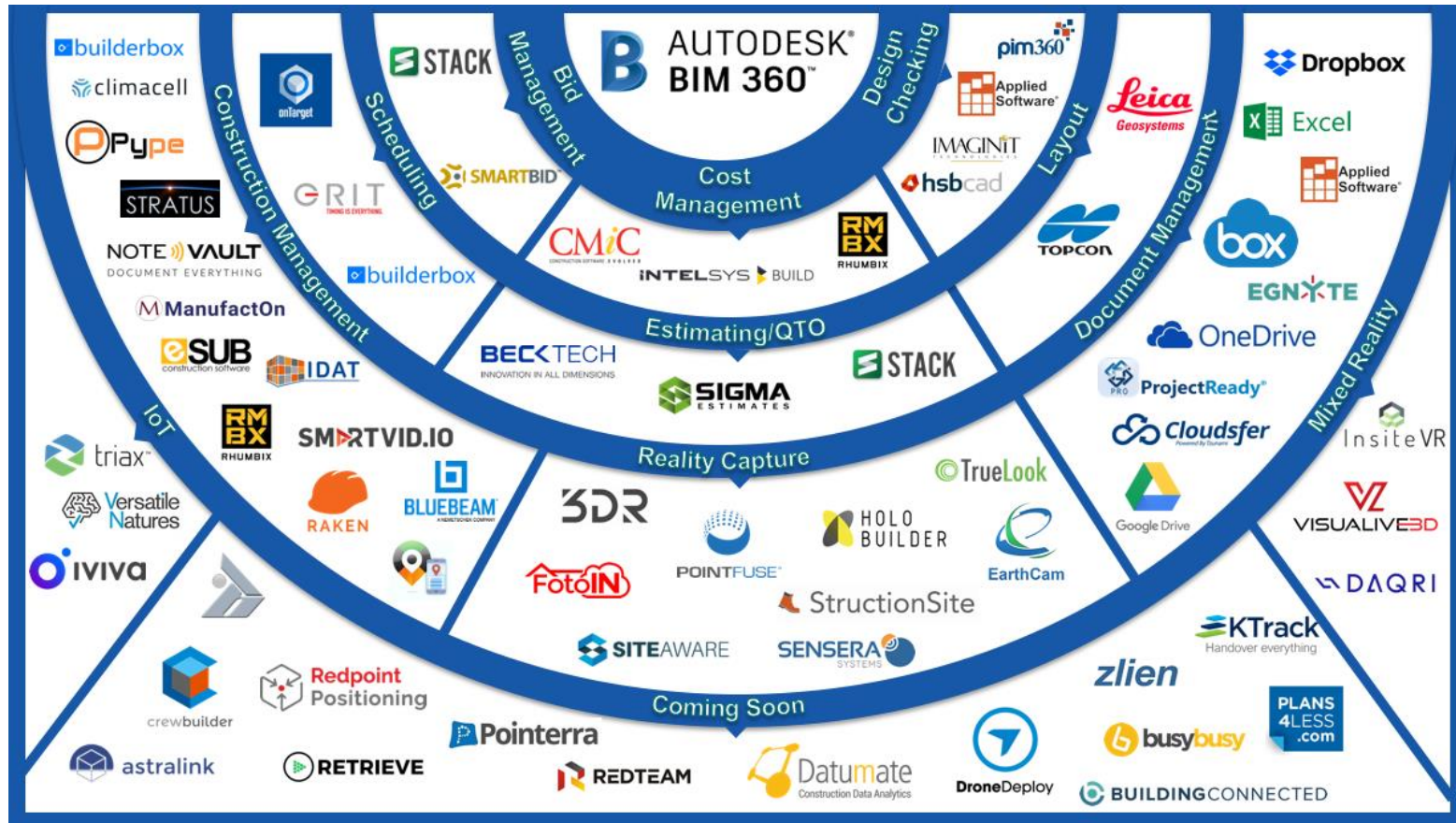


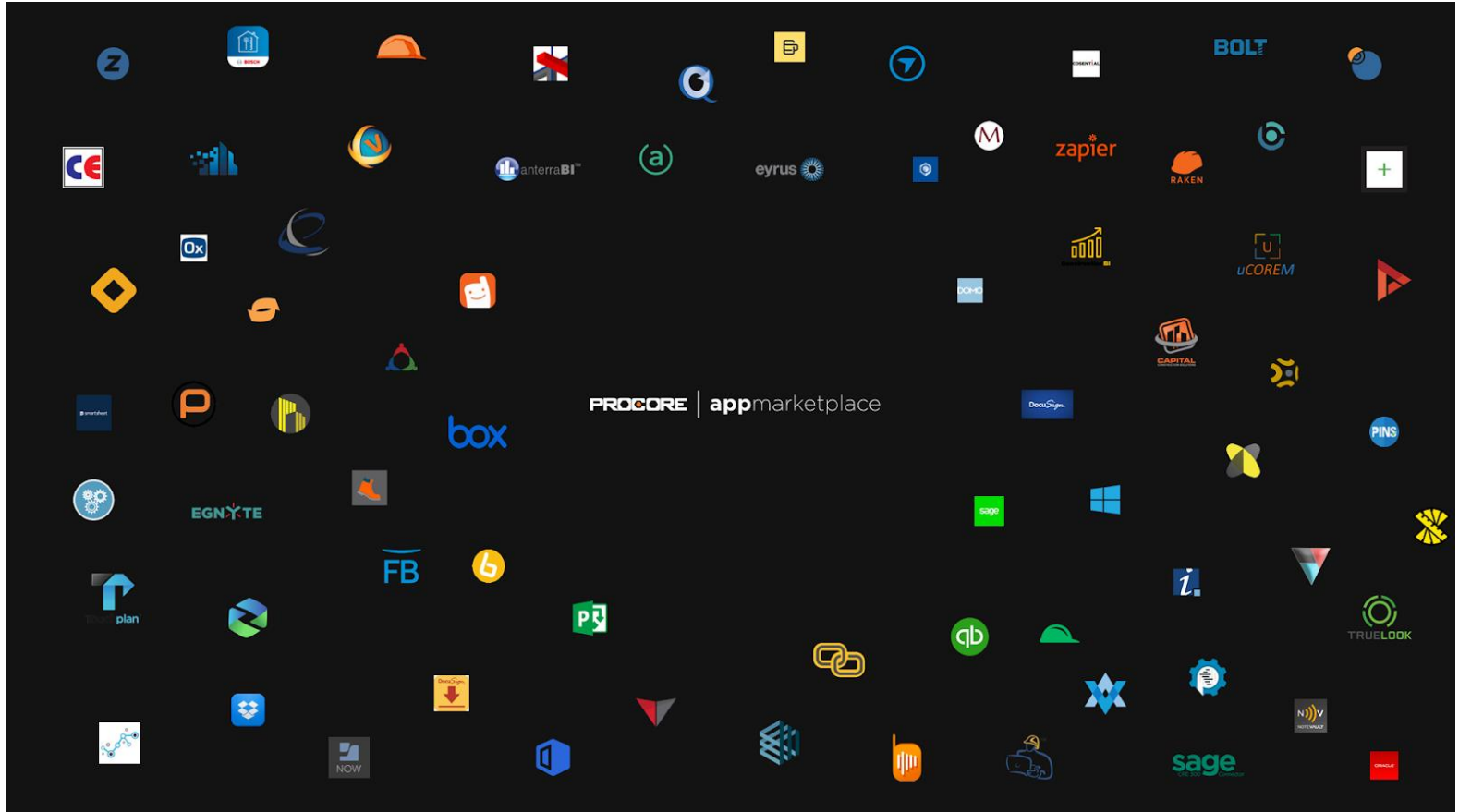
Source: Construction Progress Coalition

Future State Common Data Environment

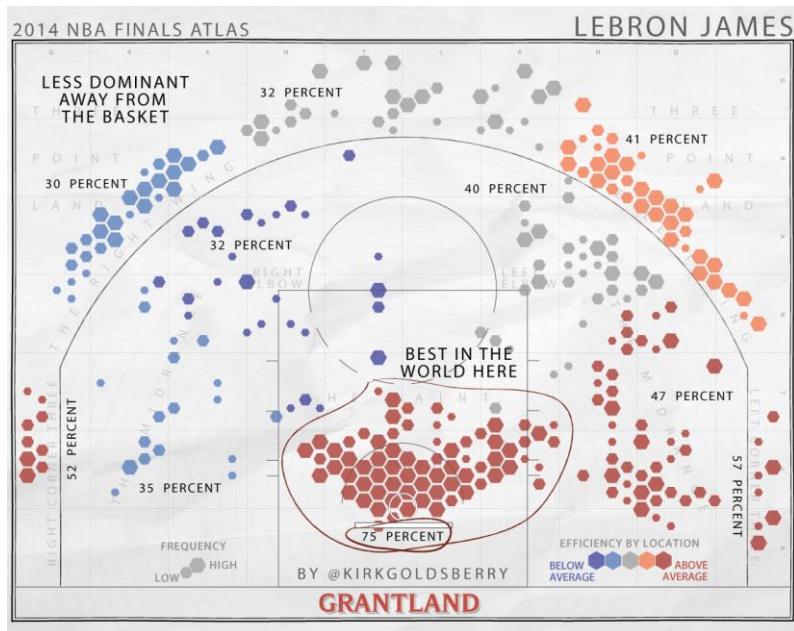


Source: Construction Progress Coalition





It's All about the Data going forward



Mike Trout Batting Average

2014 Season

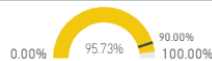
Projects

426

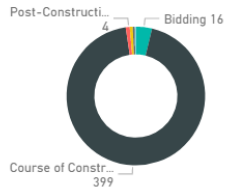
Project

All

Project Health Score



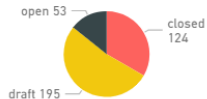
Projects By Stage



Project Details

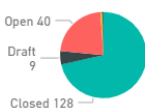
RFI's

Status ● closed ● draft ● open



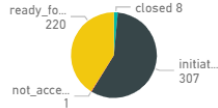
Submittals

Status ● Closed ● Draft ● Open



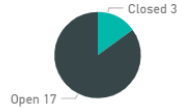
Observations

Status ● closed ● initiated



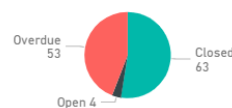
Inspections

Status ● Closed ● Open



Punch Items

Status ● Closed ● Open ● Overdue



Average Days Late

477.23

Average Days Late

683.17

Average Days Late

40.52K

Days Since Last Inspection

237.00

Average Days Late

336.68

Financial Details

Budget Summary

Division	Original	Approved Co's	Revised	Committed Costs	% Committed	Direct Costs	JC To Date	Pending Costs	Est Cost @ Completion	Proj Ov...
01 - A&E	768,603.00	0.00	768,603.00	135,469.00	17.63%	0.00	30,000.00	0.00	410,504.00	3
01 - CONSULTANTS AND PERMITS	34,832.50	0.00	34,832.50	0.00	0.00%	0.00	0.00	0.00	24,832.50	
01 - Gen Requirements	1,580,160.00	0.00	1,580,160.00	0.00	0.00%	999.00	999.00	0.00	1,581,109.00	

Budget vs Committed

● Revised Bu... ● Committe... ● Proj Over/...



Dashboards

PC's	\$ PC's	Approved CO's	Avg Size	Pay Apps	Payments	Draw Requests	Projects By Stage
------	---------	---------------	----------	----------	----------	---------------	-------------------

107

14.02M

753.32K

131.00K

498.29K

165.20K

3.62M

Post-Constr... 4
Bidding 16

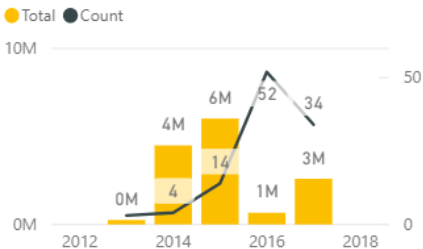


Course of Co... 399

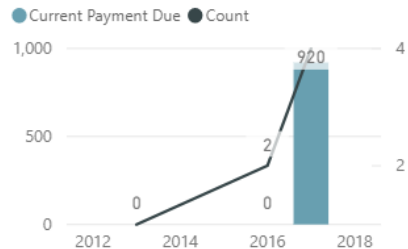
Project

All

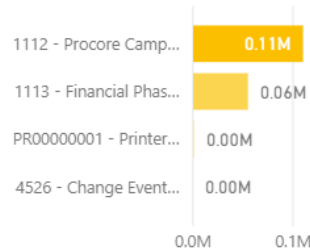
New Prime Contracts



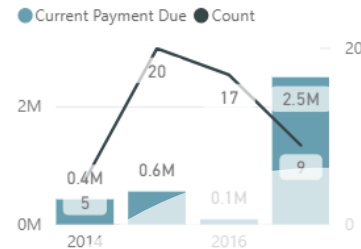
Pay Apps



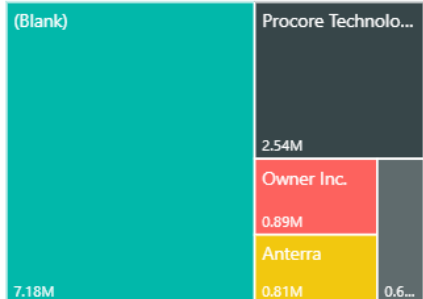
Payments



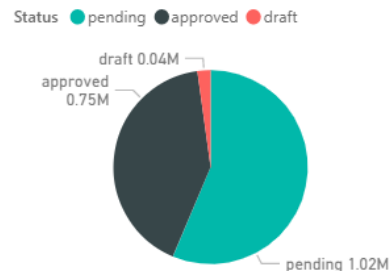
Draw Requests



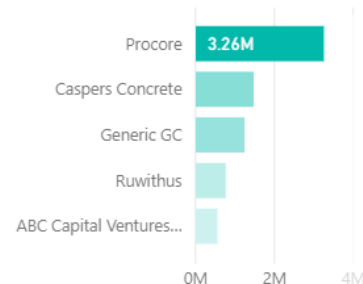
Top 5 Clients



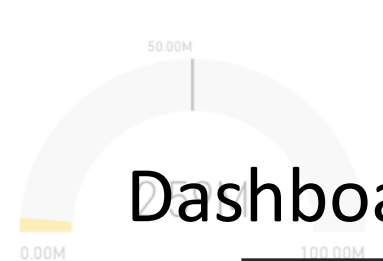
CO's by Status



Top 5 Contract Holders



New Prime Contracts vs. Goal

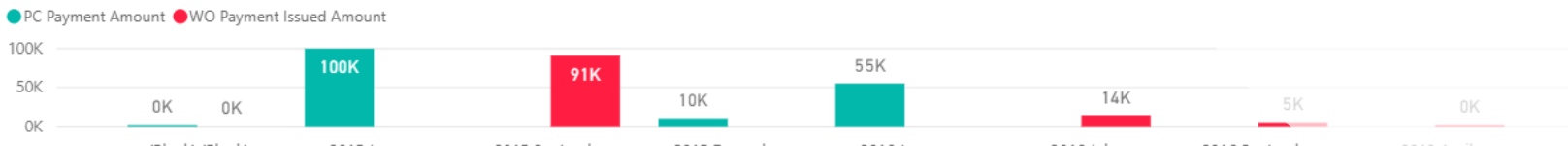


Owner

All

Dashboards

Payments In vs. Draw Payments Out



Projects

426

Late Submittals

36

Late RFI's

247

Open Observations

528

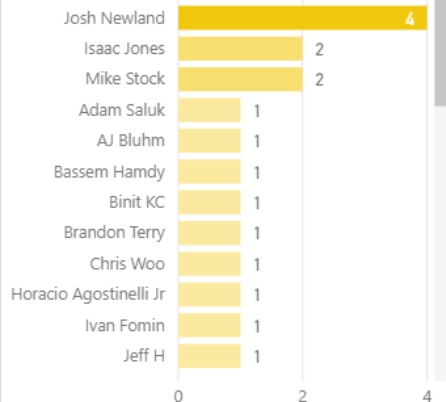
Open Punch Items

53

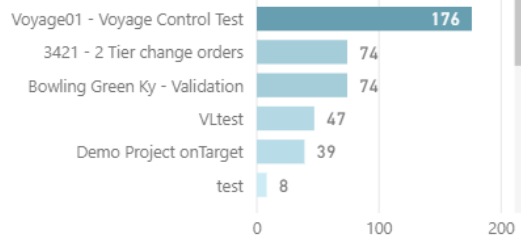
Projects By Stage

Post-C... 4 Bidding 16

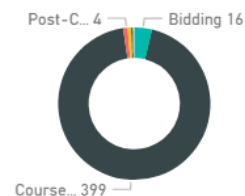
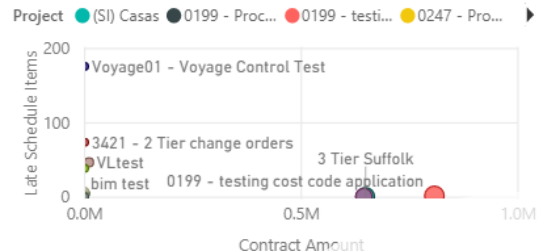
Project Assignments



Late Schedule Items By Project



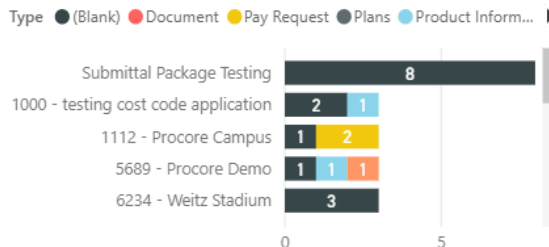
Late Items by Project Size



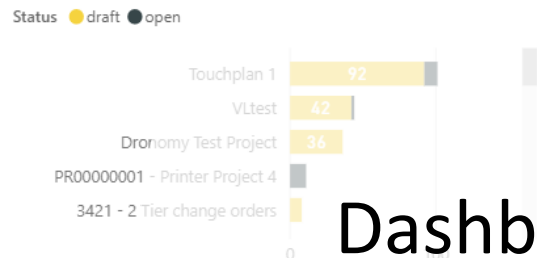
Project

All

Open Submittals By Type



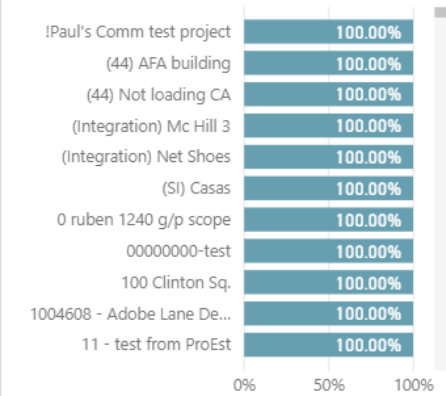
Open RFI's By Status



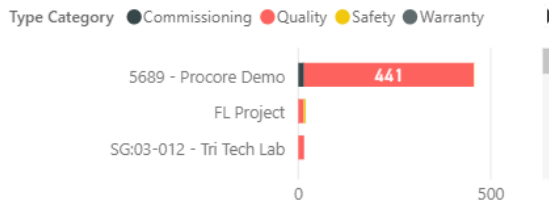
Project Role

All

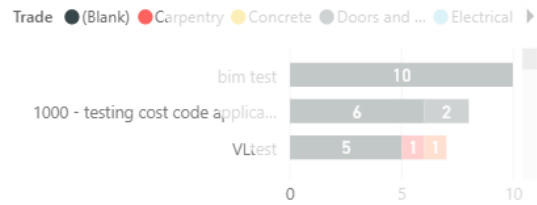
Health Score



Open Observations By Category



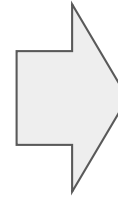
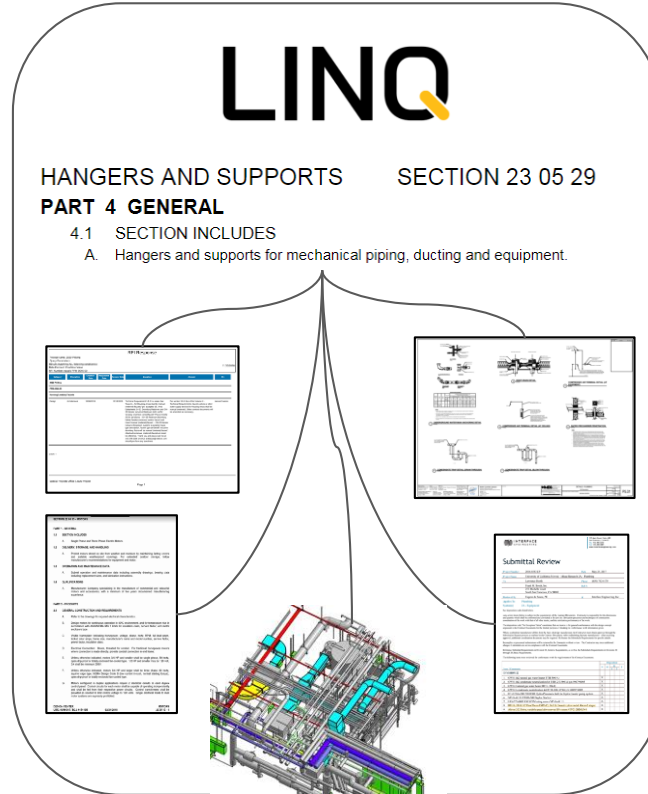
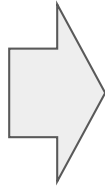
Past Due Punch Items By Trade



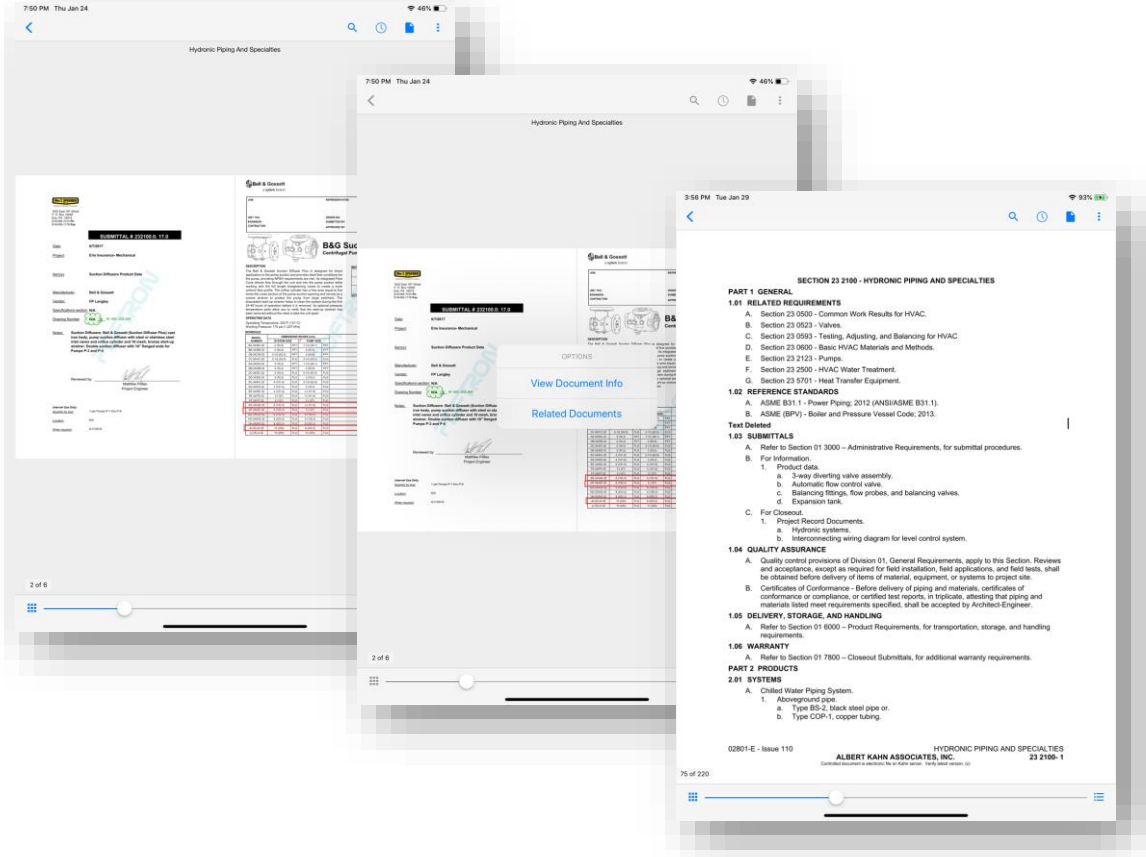
Dashboards

LINO

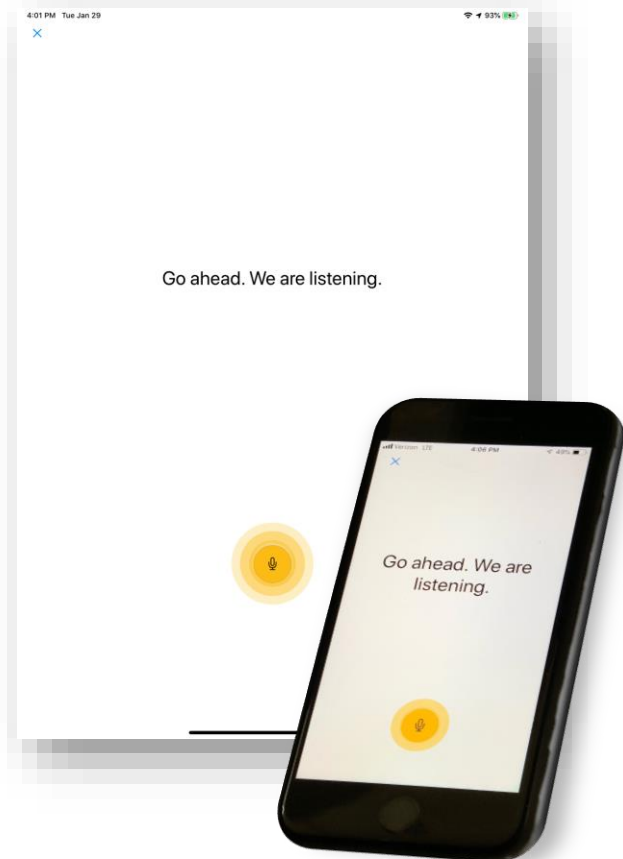
LINQ is Google for your construction info



Information At my finger tips



At our command

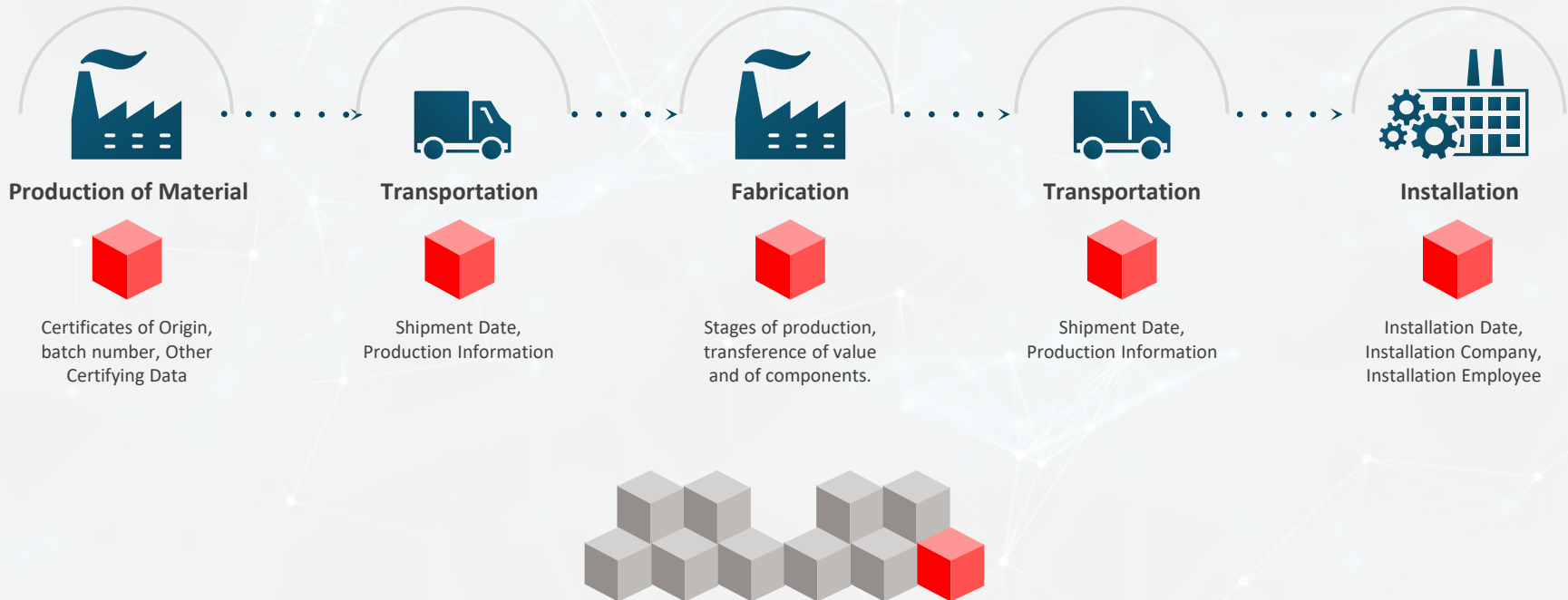




CONSTRUCTION AND REAL ESTATE

DATA MADE SMARTER

Material Provenance and Supply Chain Use Case



Data Tracked in Smart Contracts to Provide Full History of Material and Products Regardless of Company or Location

ROBOTICS



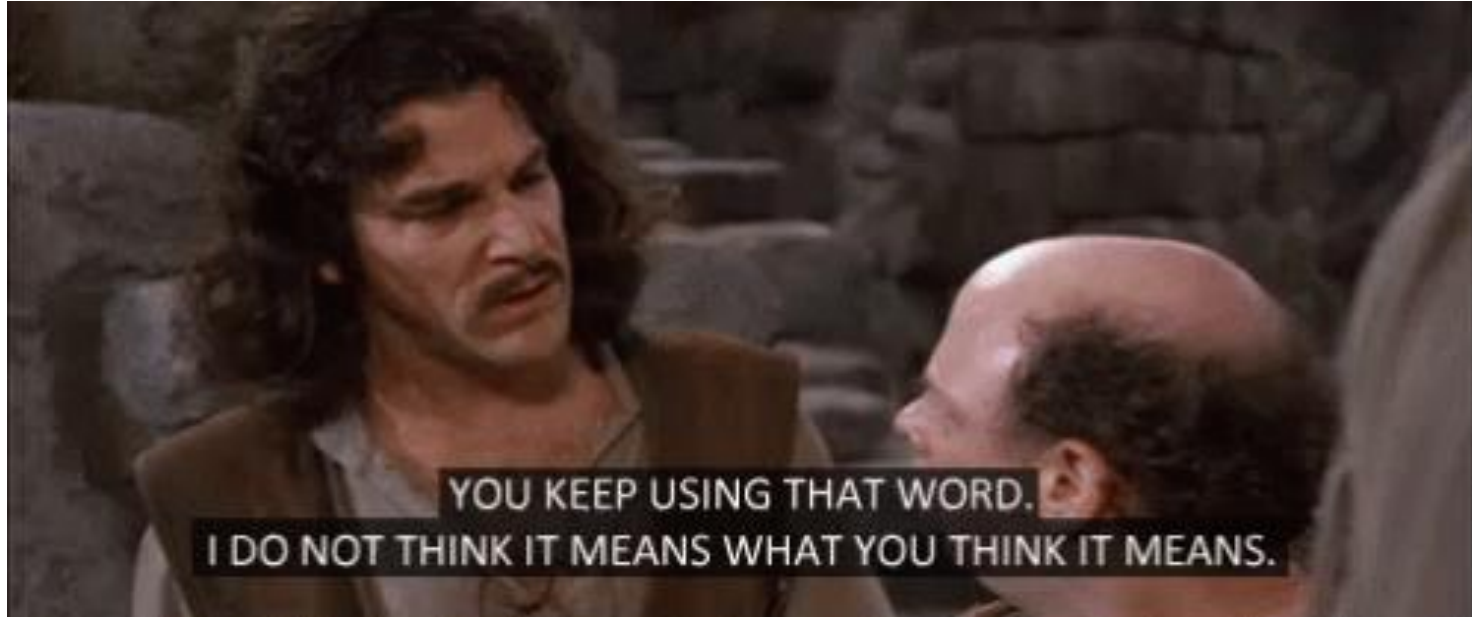
Boston Dynamics



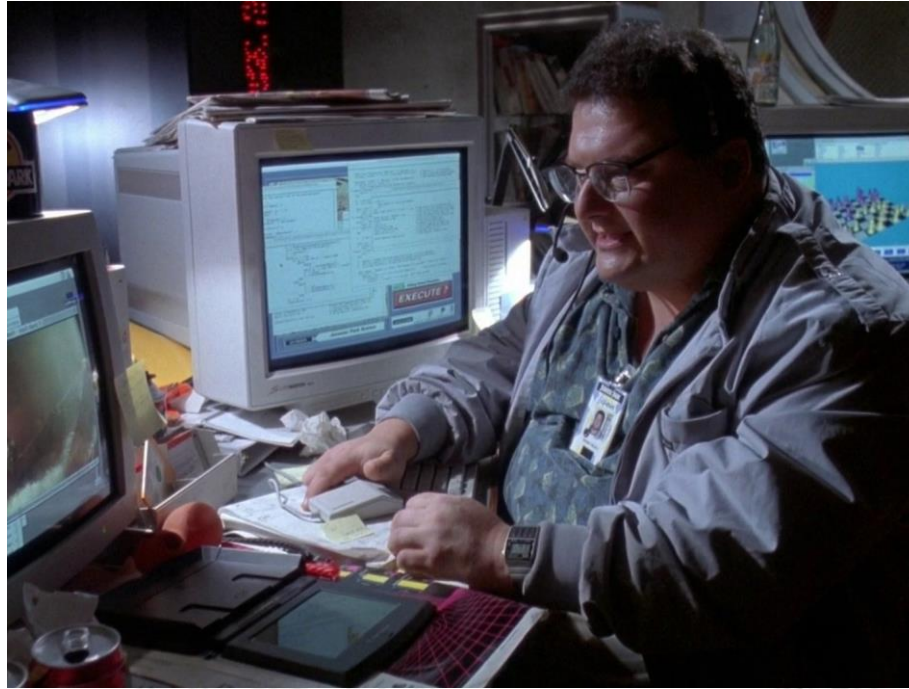




Digital Transformation



People are important



A portrait of Elon Musk, looking upwards and to the right. He is wearing a dark shirt and a grey blazer. A white banner with the text "People are Important" is overlaid at the bottom of the image.

People are Important



Construction Technologist

- Industry process focused
- Construction teammate
- NOT THE IT GUY
- The IT teams biggest ally



Q & A

#PowertotheTrades

#ConstructionDorks

ADDITIONAL RESOURCES

IronmanOfIT.com



Modern IT Innovation

Changing the Conversation in Construction

Presented by Jeff Sample

SUB

AEC NEXT - Modern IT Innovations

Learn about some of the innovations allowing Construction Companies to scale with the growing demands and maintain business agility in the changing technology landscape.

[DOWNLOAD](#)



WEBINAR

THE RISING ROLE OF THE CONSTRUCTION TECHNOLOGIST:

Ensuring Your Success in Construction Tech

Webinar - The Rising Role of Construction Technologist

The "Ironman of IT" Jeff Sample hosts Travis Voss, Construction Technologist and Director of Innovation at Mechanical, Inc. in an engaging discussion on the rising role of the construction technologist and their role in your ConTech success.

[WATCH](#)

Upcoming speaking events:

June 2 - 6: CFMA

June 19: JbKnowledge ConTech Roadshow

August 6 - 9: AGC IT Forum

August 21: JbKnowledge ConTech Roadshow

August 26 - 28: XCON Bluebeam Extreme

October 2 - 5: Mechanical Contractor's Association of Canada

October 16: JbKnowledge ConTech Roadshow

October 24 - 25: CFMA Ohio Valley

November 18 - 22: Autodesk University

December 10: JbKnowledge ConTech Roadshow

Thank You