



360° of Field BIM

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Class summary

- Real life examples on how the BIM 360 related processes and their implication in the field are profoundly changing the way we document and transfer project related information. Ability to streamline day to day activities, organize the entire team around the next generation knowledge sharing platform and incise to actively participate in shaping collaborative solution are some of the benefits resulting from effectively deployed mobile technology solution like BIM 360.

At Clayco Inc. the “Long View” associated with digital technology and integrated practice, has resulted in pragmatic and efficient use of BIM enabled processes for design, construction with the purpose of supporting and innovative practice. This lecture will focus on the best practices of BIM 360 deployment and the use of information rich design and construction models.

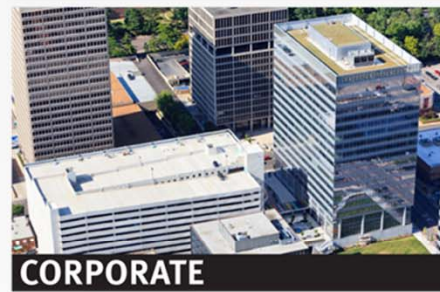
Key learning objectives

- Autodesk BIM 360 successful deployment and best practice
- Typical roll-out strategy and focus on clearly defined objectives
- Use of BIM to improve communication and overall project understanding in the field and ability to facilitate instant feedback
- Potential and desired future improvements of BIM 360 platform from the end user perspective

Clayco – Design & Construction

- Headquartered in Chicago
- Founded in 1984 as a Design-Build Contractor
- Revenue of over \$880M for 2010, close to \$1,100M in 2013
- ENR top 400 Contractors 2013 Rating #62
- Approximately 1100 employees
- National Diversification of Project Types
- Over 70 LEED Accredited Professionals / 45 LEED Certified Projects

COMMERCIAL



INDUSTRIAL



INSTITUTIONAL

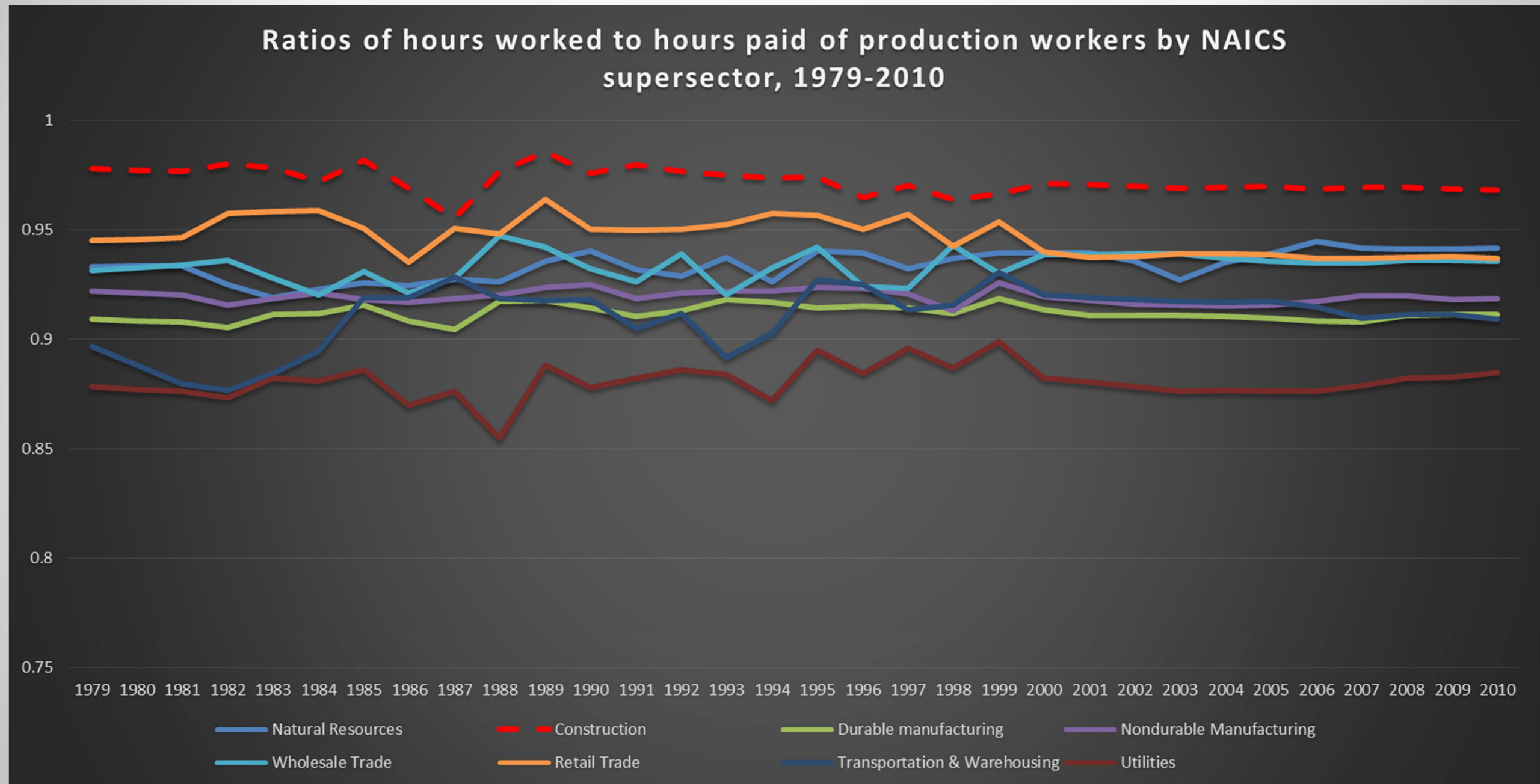


Corporate Strategy Alignment

What has changed...

- Construction as commodity???
- Owners are more proactive in controlling the overall project cost
- Redefining the master builder concept
- Moving from the transactional nature of construction business
- Shift in project delivery methods

Little room for margin....



Change for success...

- Strategic positioning
- Customer centric approach
- Technology as a profit center
- Define your market
- Self-performing as the positive alternative
- Innovations as the core business value
- Embrace change
- Understand productivity
- Sustainability more than skin deep
- Collaboration and services



Mobile paradigm

quality

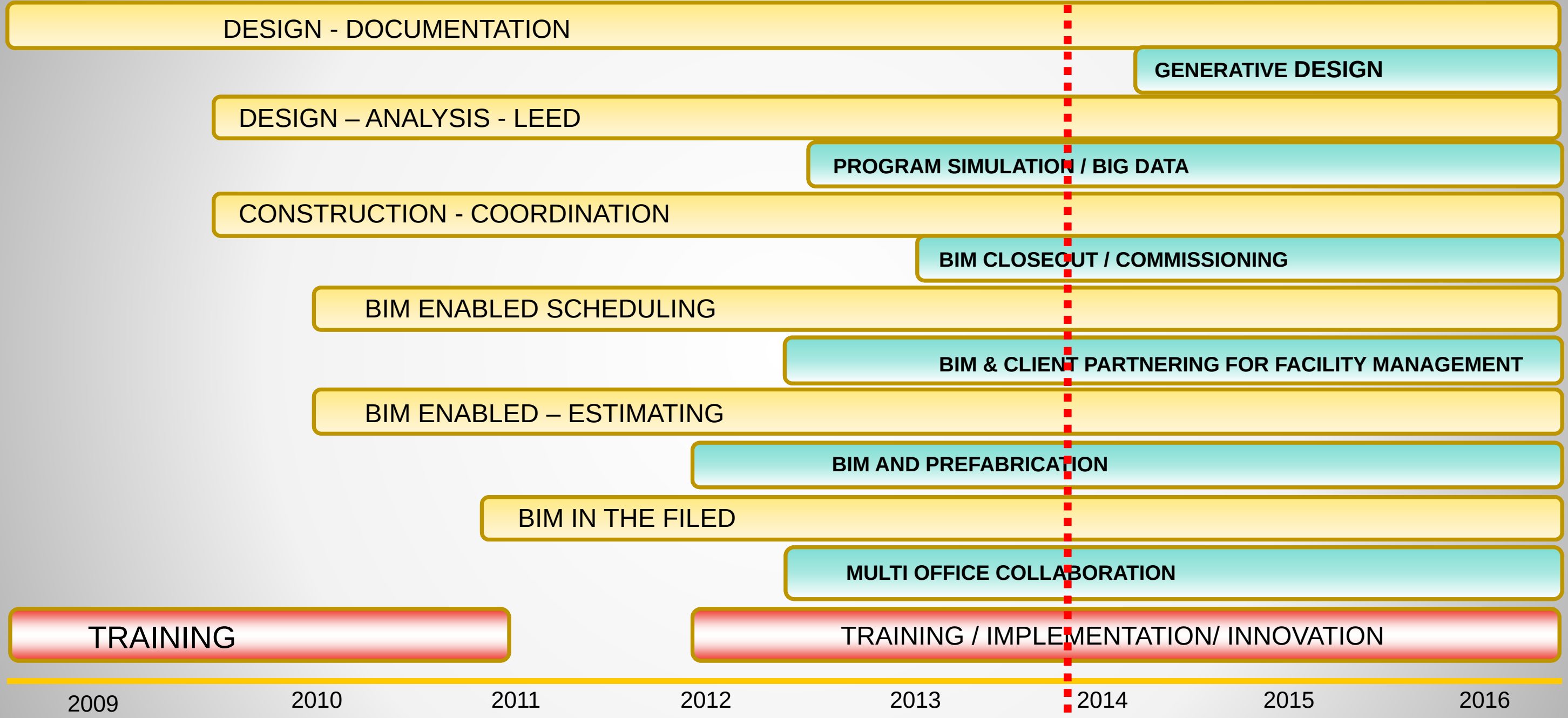
With the vast amount of **useful information** at users' disposal, now the industry is focusing on how to access and utilize this information using **mobile technology** during **construction, material & progress tracking, commissioning, handover, and operations and maintenance.**

cost

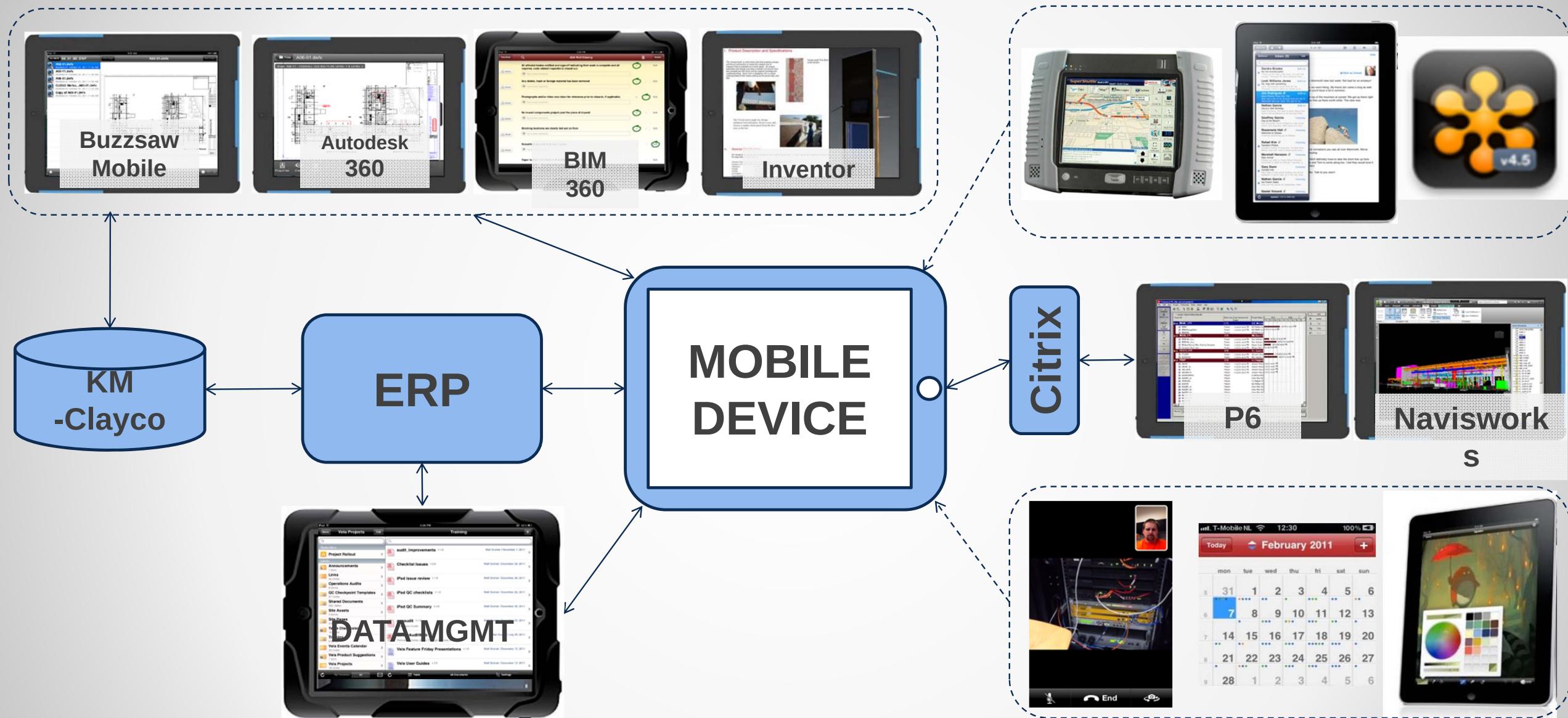
time.

VDC Today

VDC Tomorrow



Clayco – Mobile Taxonomy



- Information in hands of those that need it...
 - BIM 360 & Cloud oriented infrastructure are the backbone of Clayco field operations.

This is what we need....focus on handheld



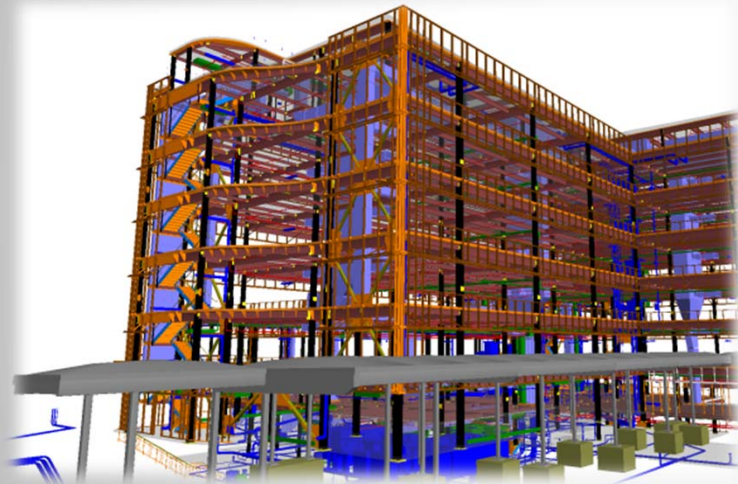
Drawings



Camera



Product Literature



BIM



Corporate Policies



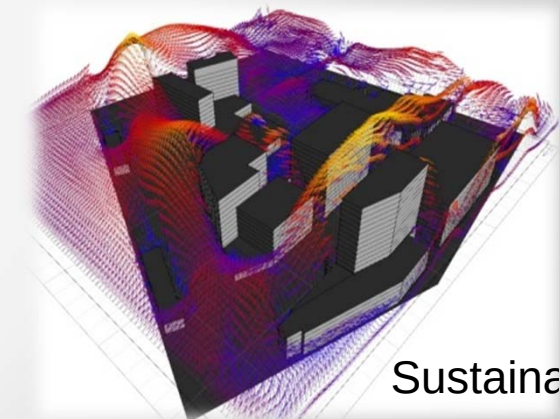
Files



Checklists



Codes



Sustainability

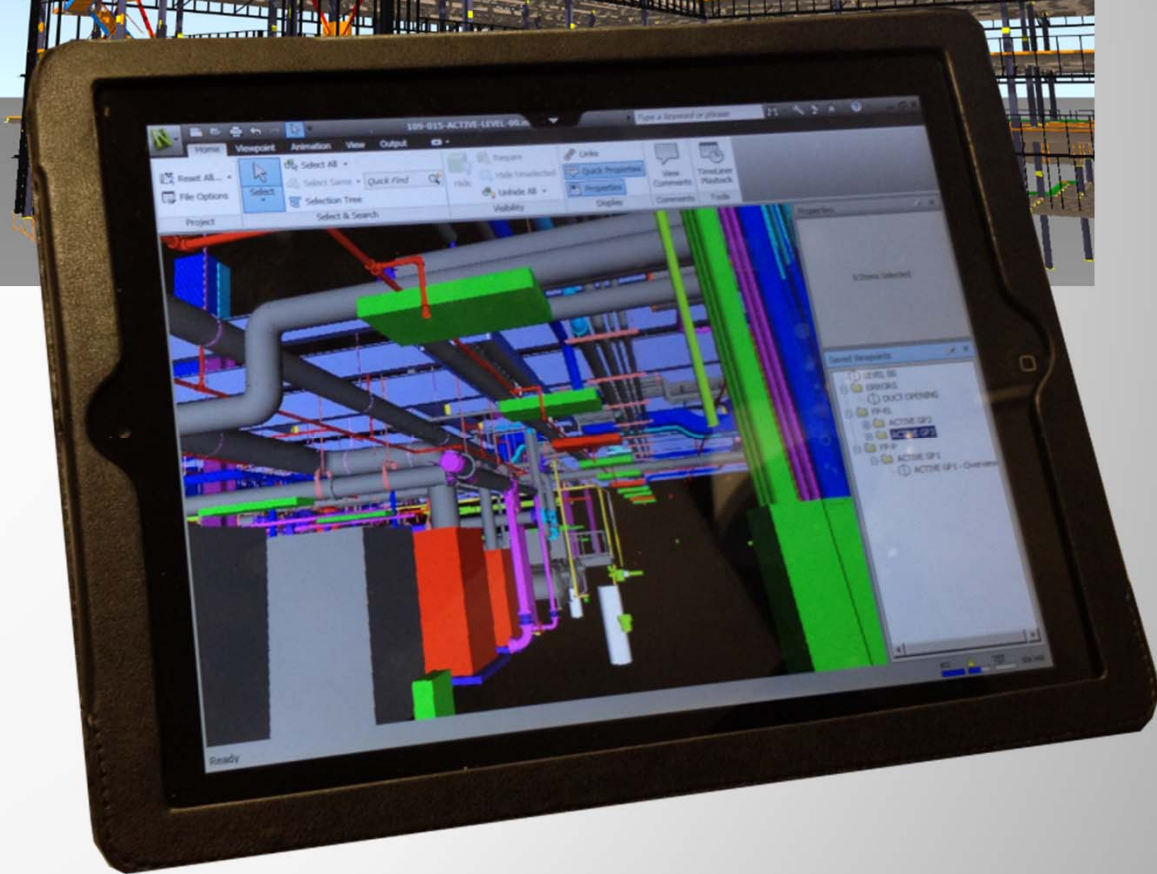
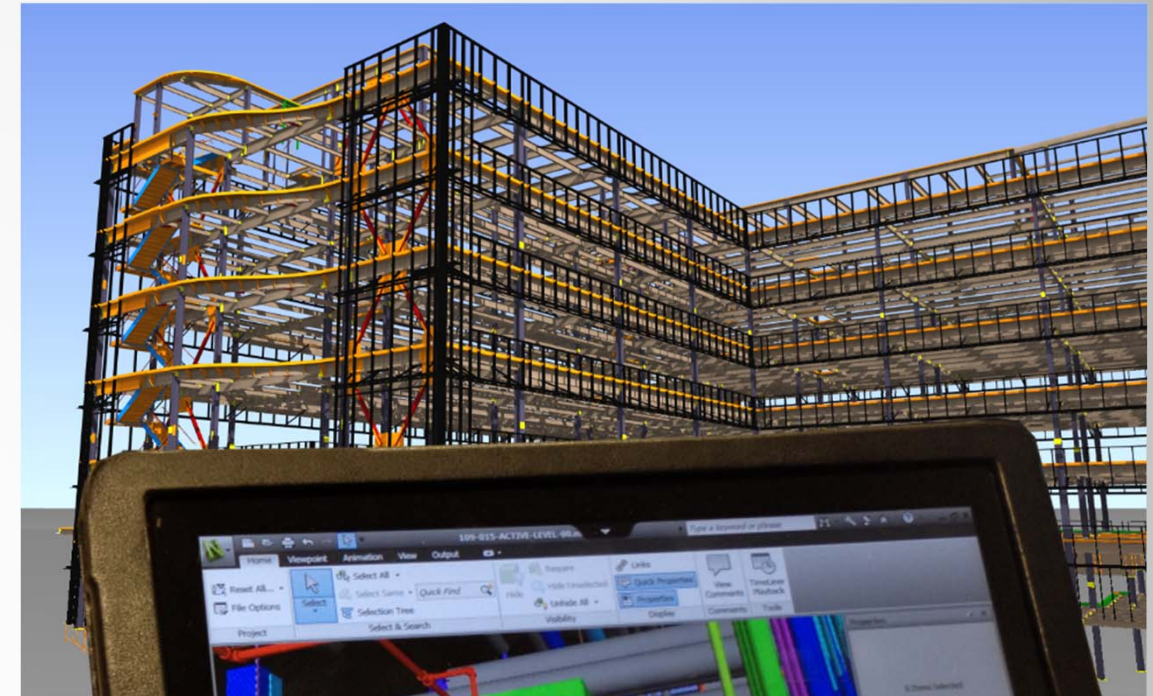
Early attempts toward mobility in the field...

PROS

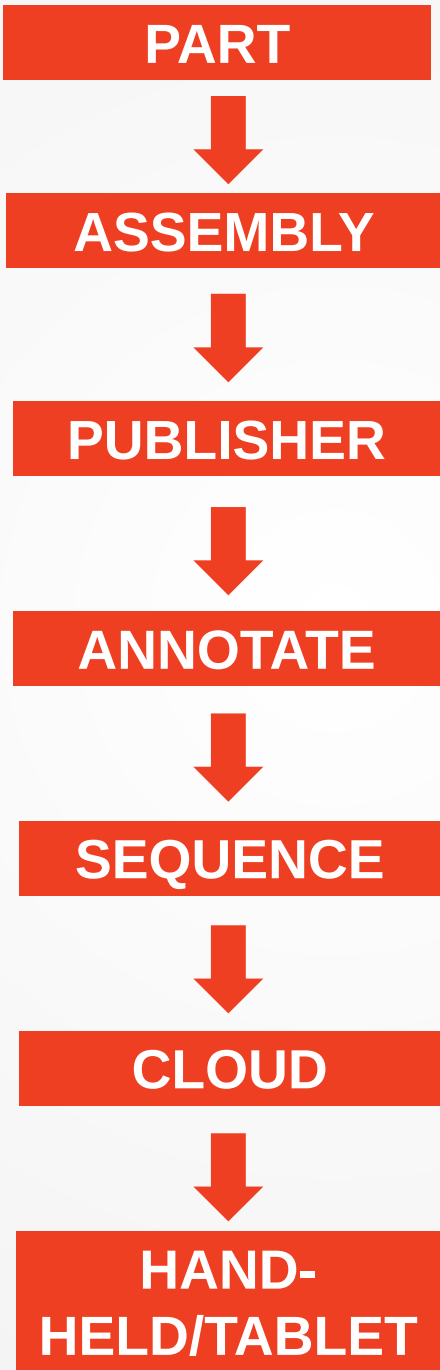
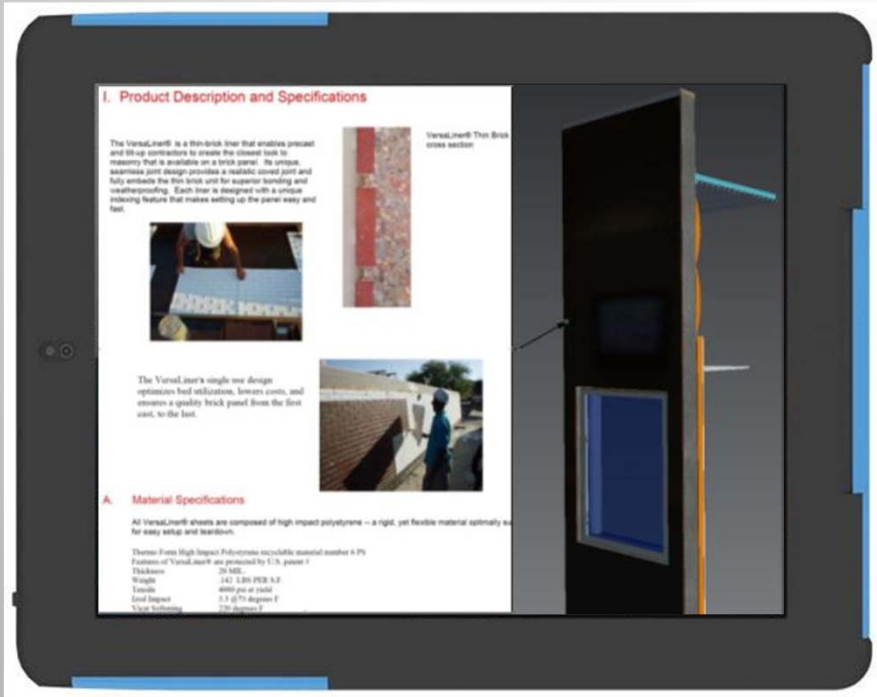
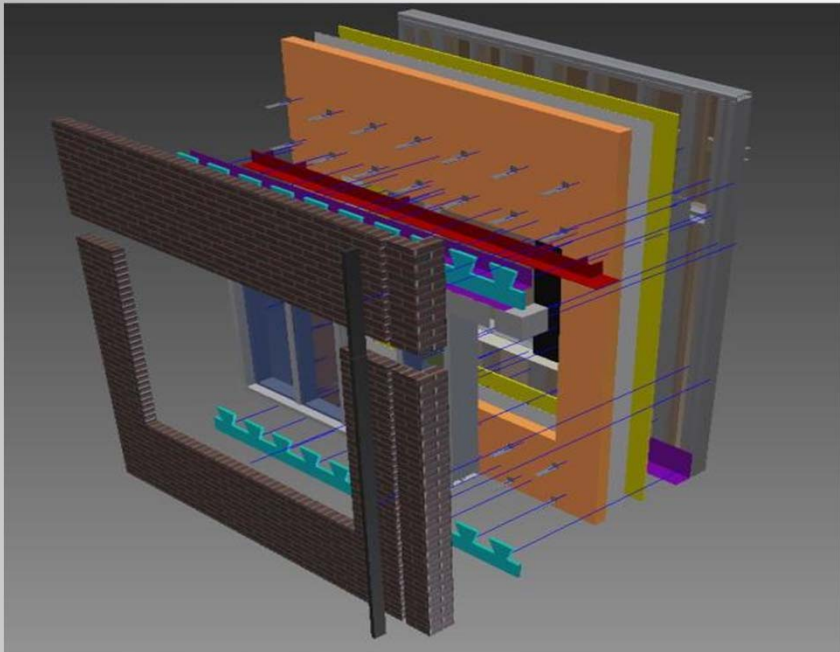
- Software use optimization
- Access to production environment
- Singular data set

CONS

- Bandwidth implications
- Additional licensing
- Ergonomic concerns
- Substantial in-house support



Starting point for Clayco - Virtual Manuals



Autodesk

Inventor

Inventor

Publisher

Mobile

App

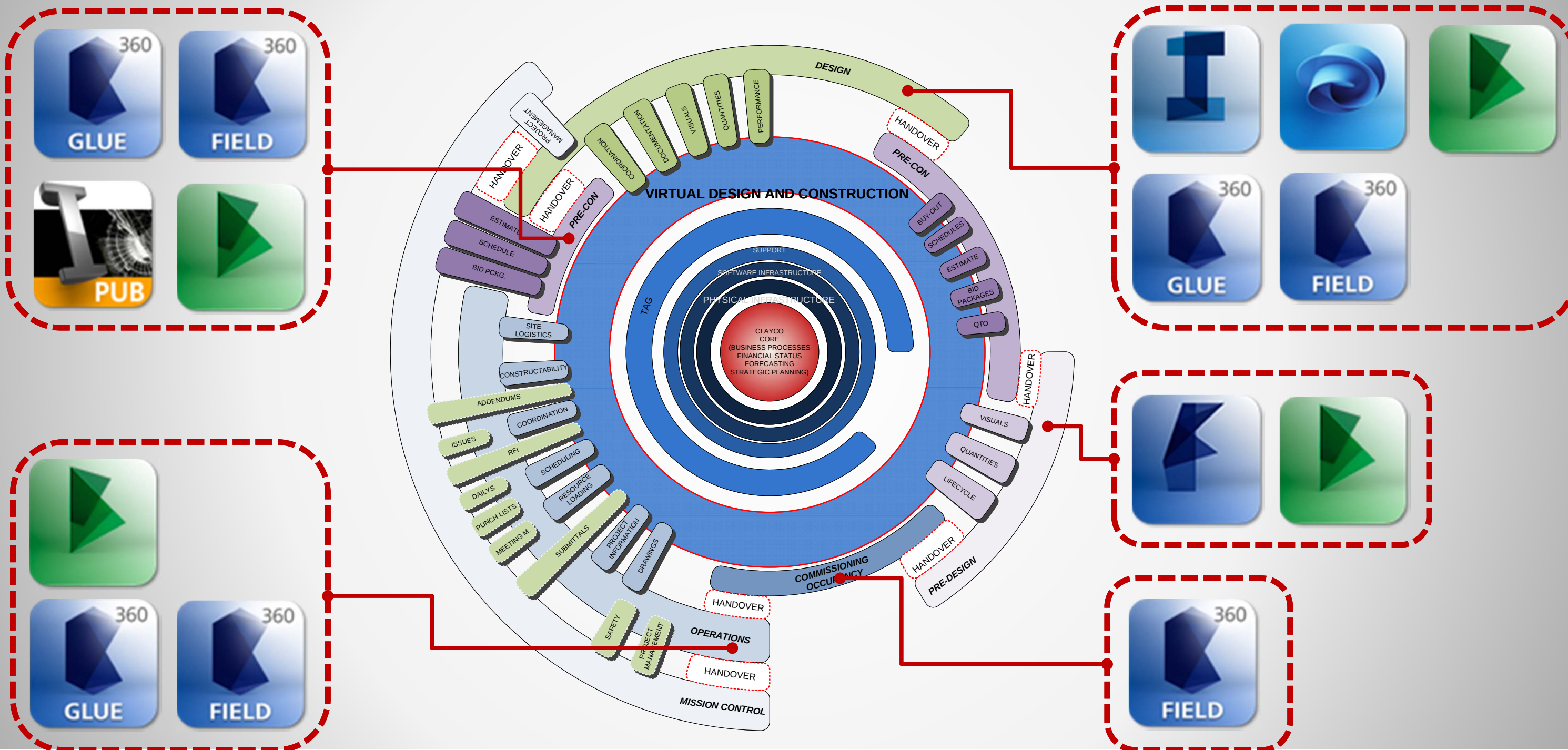


Understanding mobile ecosystem

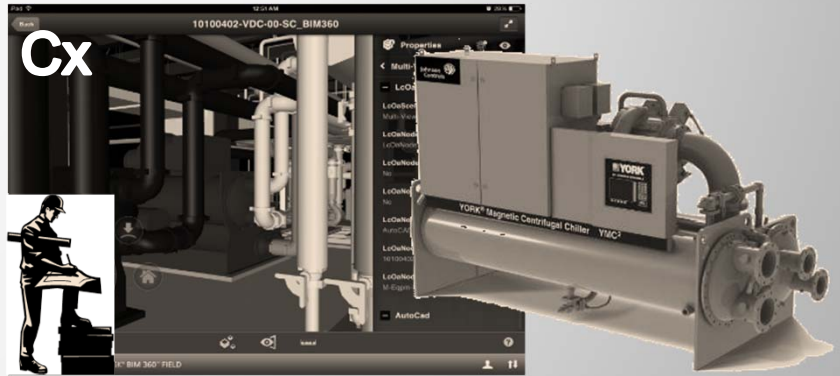
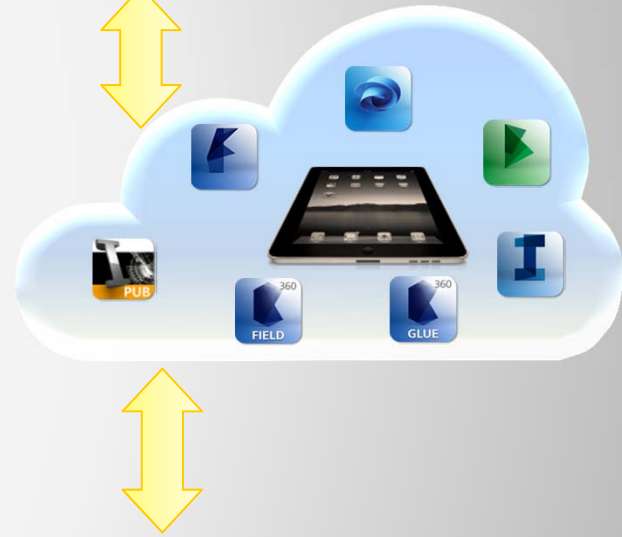
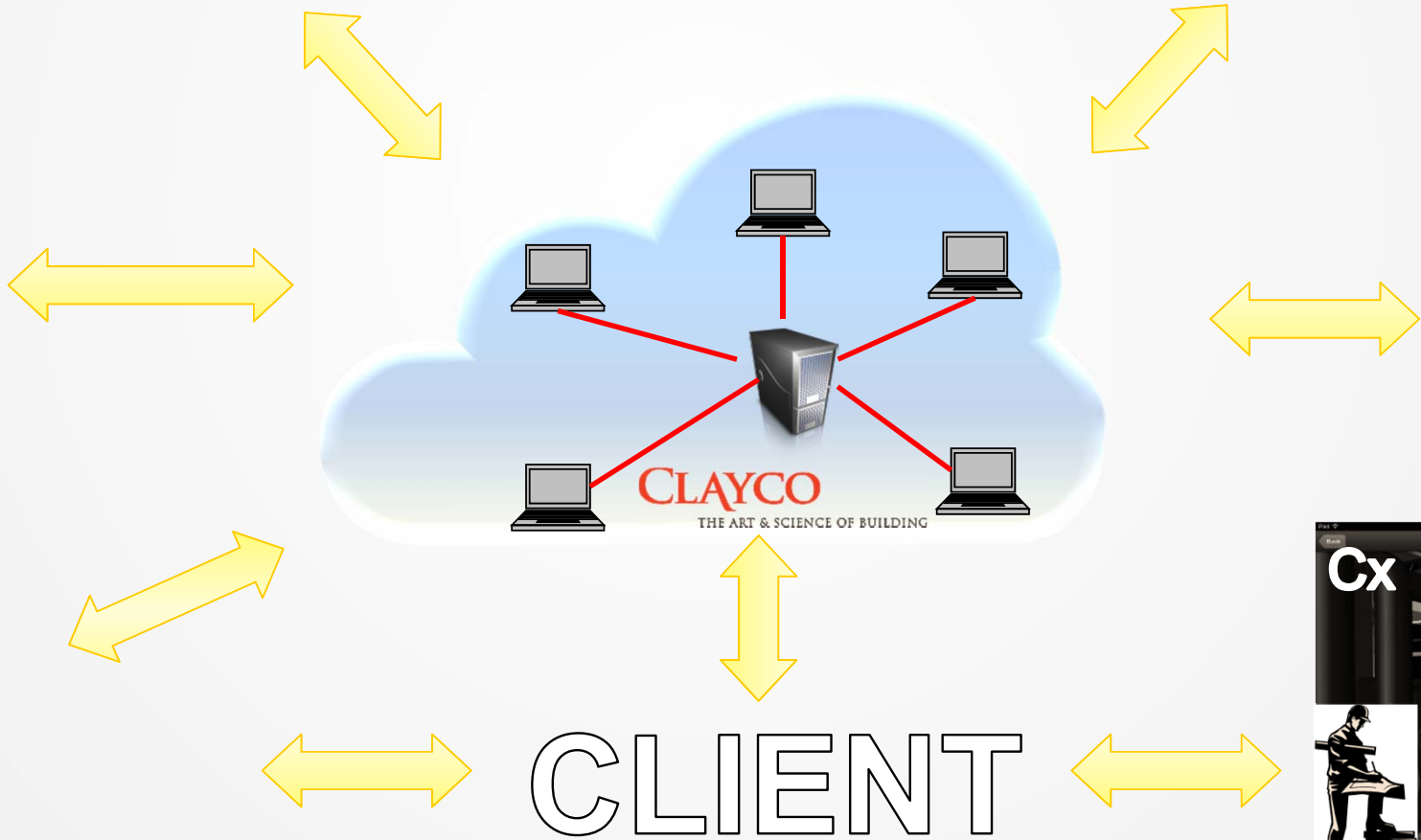
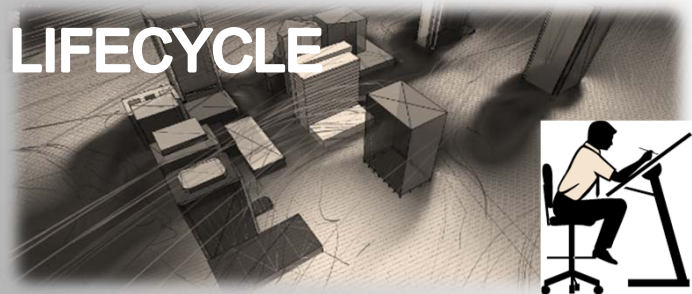
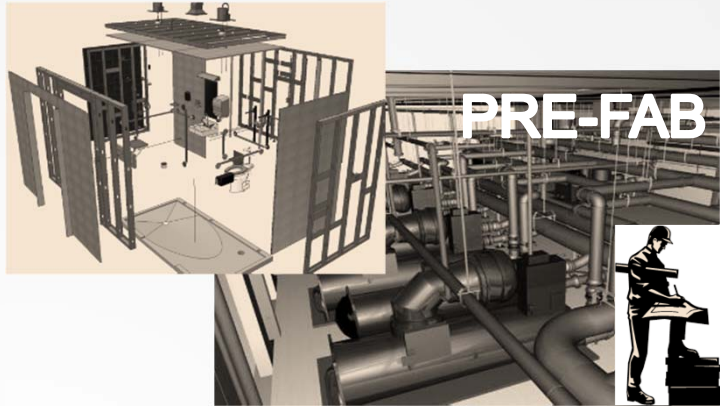
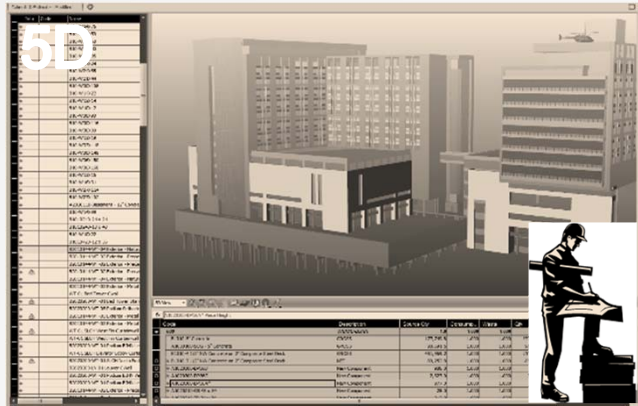
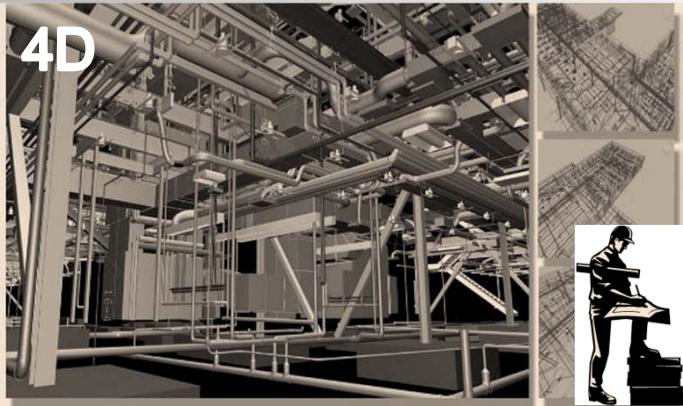
- All major software platforms
- Focus on content viewing and collaboration
- Limited document management
- Field data capture
- Virtual manuals
- Limited content creation and sharing
- Project management



Project Delivery Cycle – Integration Points



Client Centric – Cloud based project delivery cycle



The Need....

Management of field data

- Need

- Leveraging shrinking profits and quality of deliverables
- Managing ever increasing amount of job related information

- Value Proposition

- Focus on reduced construction cost and increase in efficiency
- Eliminating silos

- Implementation

- Integration of project related processes and documentation
- Getting operations buy-in

- Results

- Benchmarking through reduction of costly rework and decreased feedback time

Better collaboration and reporting

- Need
 - Accountability and Consistency
- Value Proposition
 - Job cost reduction, safety awareness and informed executive decisions
- Implementation
 - From day one
 - Agreeing on standard reports
 - Integrating with Sharepoint
- Results
 - Expediency in issue resolution
 - High visibility
 - Reporting as a necessity

(One) Portal – multiple datasets

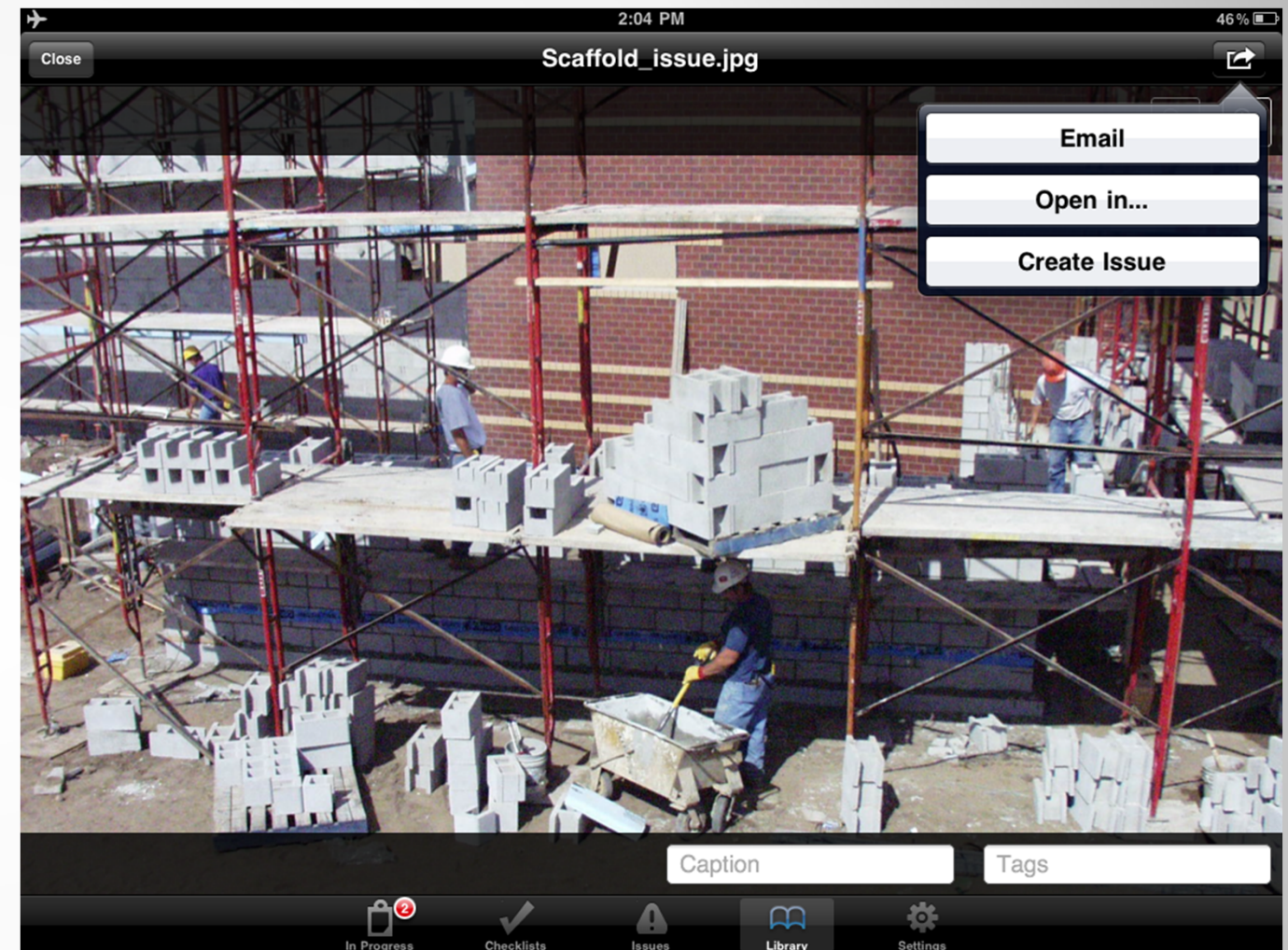
- Centralized model repository
- Datasets diversity
 - Models & Properties
 - Construction Documents
 - Specifications
 - Submittals
- Location/model driven issues creation
- Equipment
- Checklists
- Issue lists (RFI, Logs....)

Why it matters

- All actionable items can be documented and tracked in one database
 - Meeting minute action items
 - Job tours follow up
 - Safety follow up
 - Expectations
 - Deficiencies
 - Work to Complete
 - Reminders
 - Requirements
- Think ahead and plan for success
- Ask questions on site and off site

How to properly execute

- Complete a quality checklist and locate it on the site plan
- Lookup any construction drawing, document, or photo for reference
- Create tasks during a site walk using quick access templates and create issues using markers on floor plans.
- Capture site photograph, create an issue, mark it up and distribute.
- Quickly close out completed items and set due dates or comments for work left to close.



2D and BIM construction document access

- Need
 - Up to date project information and consistency
 - Leveraging field data and information models
 - Realize savings
- Value Proposition
 - Cost reduction and paperless project cycle
 - Information management as basis for repetitive business
 - Enhanced collaboration without the need for co-location = \$avings
- Implementation
 - Development and integration of standards is a must (COBie & Omniclass)
 - Defining the end use and the end user
- Results
 - Documents are readily accessible
 - Field crew and clients are demanding access to model related datasets

Photo, markup, pushpin

- Need

- Capture, analyze and resolve field related events

- Value Proposition

- Feedback, storage, access, liability
- Boots on ground approach

- Implementation

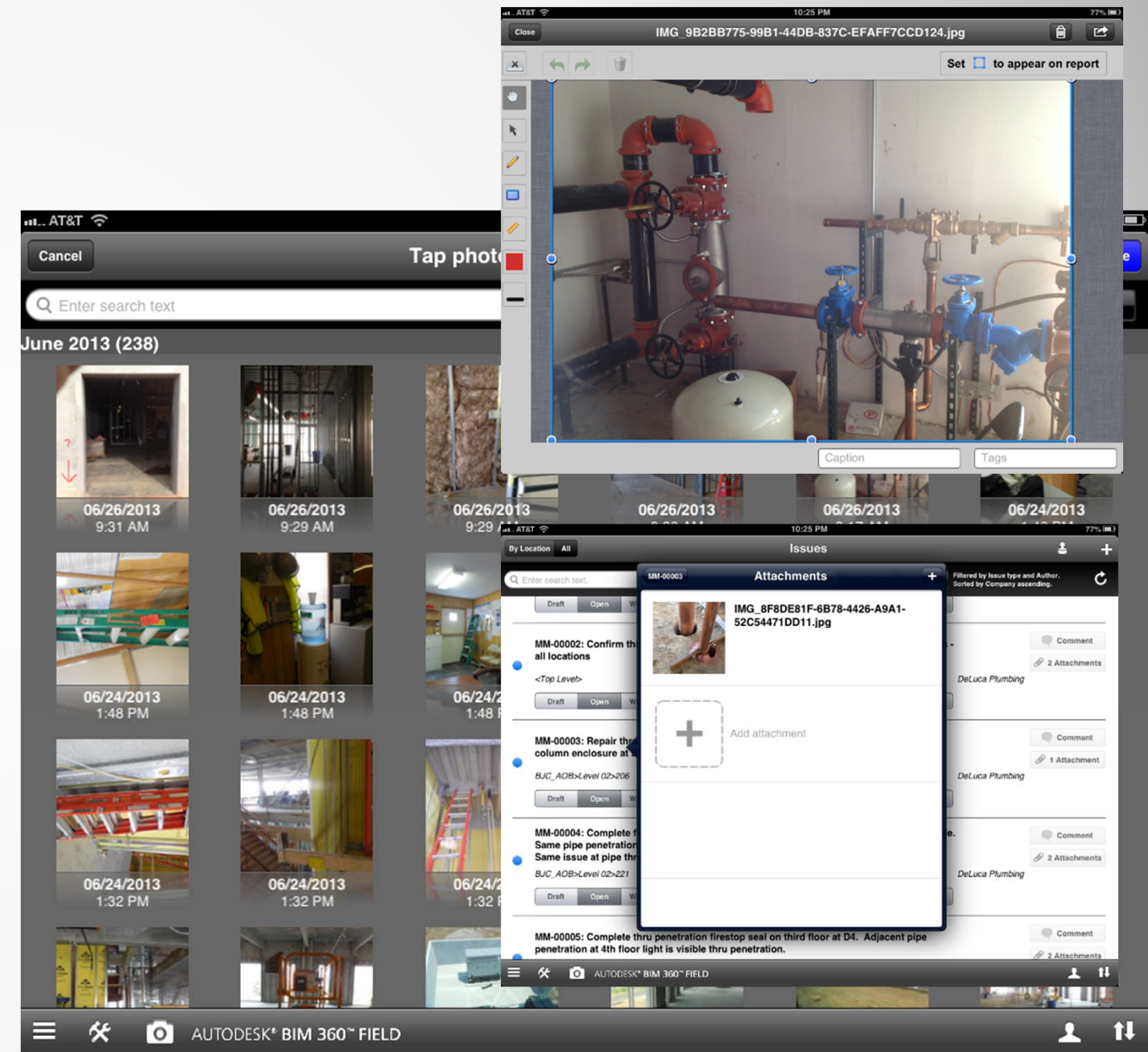
- Focus on tying locations to captured or created information
- Sticking to best practices

- Results

- Enriched project documentation
- Addressing multitude of project concerns in a proactive fashion

Walking the job site

- Capture and share
- Identify problems, create issues, assign tasks
- Ability assign the location and categorize
- Tagging and marking up



Deployment and Best Practices

How to get there ?

Corporate implementation methodology

Pilot

- Identify team & obtain buy-in
- Determine projects and timing
- Determine Standard Operating Procedures
- Implementation approach
 - Autodesk conducts first two projects/Clayco team observes
 - Remaining projects Clayco team conducts/Autodesk observes
- Deploy Pilot Projects
 - Discovery & process mapping
 - Setup
 - Training/Go-Live

Analysis

- Review Pilot Results
- Determine Best Practices
- Review Standard Operating Procedures
- Create Field Roll-out Project Plan and training guide

Field Roll-out

- Clayco Implementation Managers work with ongoing projects for set up and user training using Standard Operating Procedures
- Clayco Program Manager and SIMs provide first level support to project teams
- Cross-Project management reporting & analysis using BIM 360 Field Reports
- Autodesk Implementation Consultant and Clayco Program Management team checkpoint periodically with project teams

A New Start

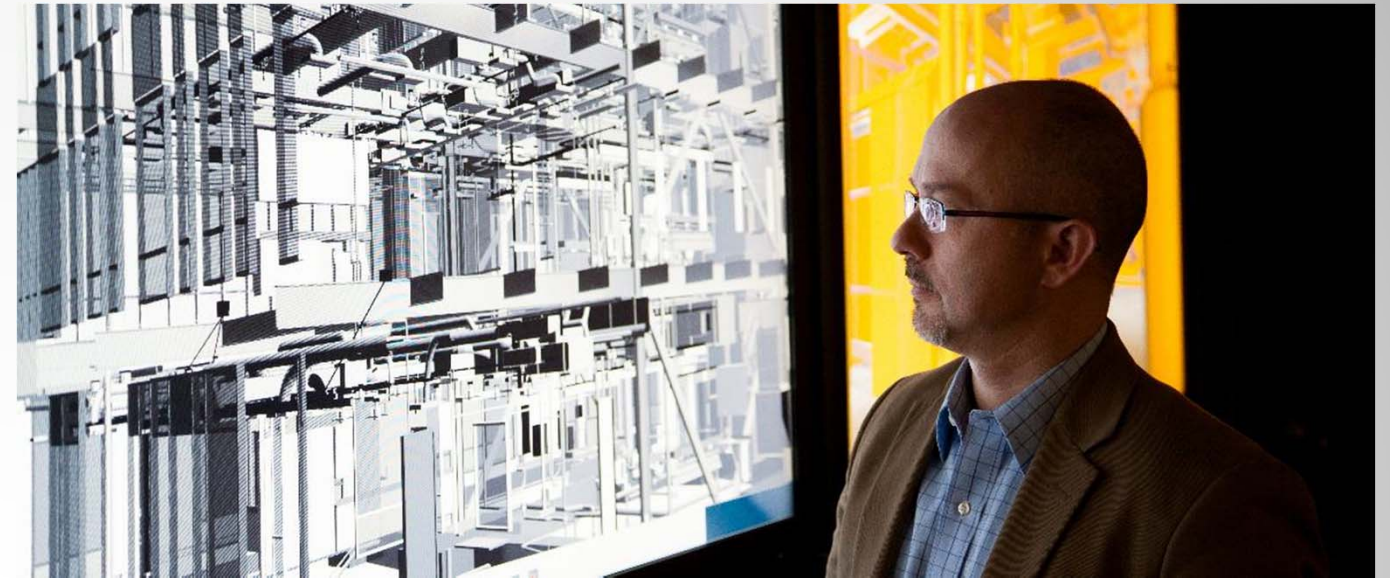
Enterprise Agreement up for Renewal March 31, 2013

- Other applications seriously considered before renewal
- Laissez-faire approach taken before, just another tool in the toolbox
- Ultimately other applications not ready for prime time
- To justify expense, make serious deployment efforts



Steps to Increase Usage

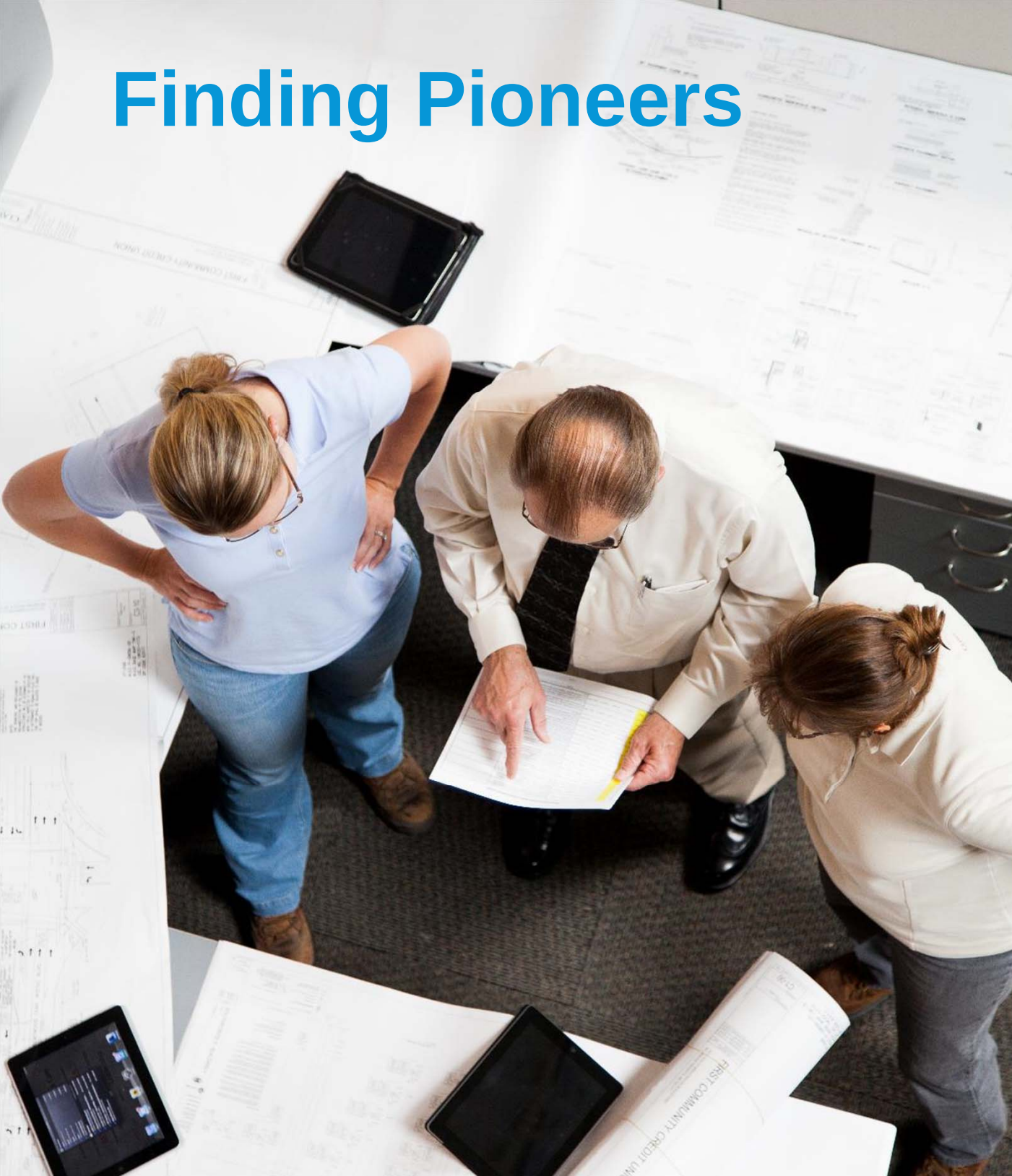
- BIM 360 Field Team
- Targeted Training
- On Boarding & Project Setup Process
- Finding the Pioneers
- Increase Access
- Planning for future Developments



Challenges

- Minimal IT support
- Competition with other applications / Interoperability
- Uncertainty created during renewal period
- People set in their ways

Finding Pioneers



- Previously a handful of users made up >90% of activity
- Sought out these users to pilot new features and methods
- Met with these pioneers for progress meetings and exit interviews



Formalized Start Up & On Boarding

- Formalized Project Start up
 - Locations
 - Checklists
 - Library
- Subcontractor Training
 - Focused training with subcontractors
 - Training exercise with practice issue
- A/E Team
 - Training and enabling



Targeted Training

- Previous approach was broad training for general use and geared toward platform evaluation
- Developed focused training on individual user groups
 - Safety, Cx, Project Management, Admin, etc.
 - Use opportunity with small groups to solicit feed back
 - Shortened training sessions
 - Focused on specific features



Increasing Access

- Wider distribution of iPads
 - Including project admins
- Set up workstations in job trailer
 - Gave foreman access to BIM 360 Field
- Loaner iPads on site



Clayco – iPad driven Field Management today

- 400 iPads in the field
- Close to 40% of workforce has an iPad
- Enterprise deployment of BIM 360 Field and BIM 360 Glue
- 65+ active “Field” projects
- 10+ active “Field & Glue” projects
- Weekly BIM 360 best practices training



Before mobile.....

Resulting Negative Issues:

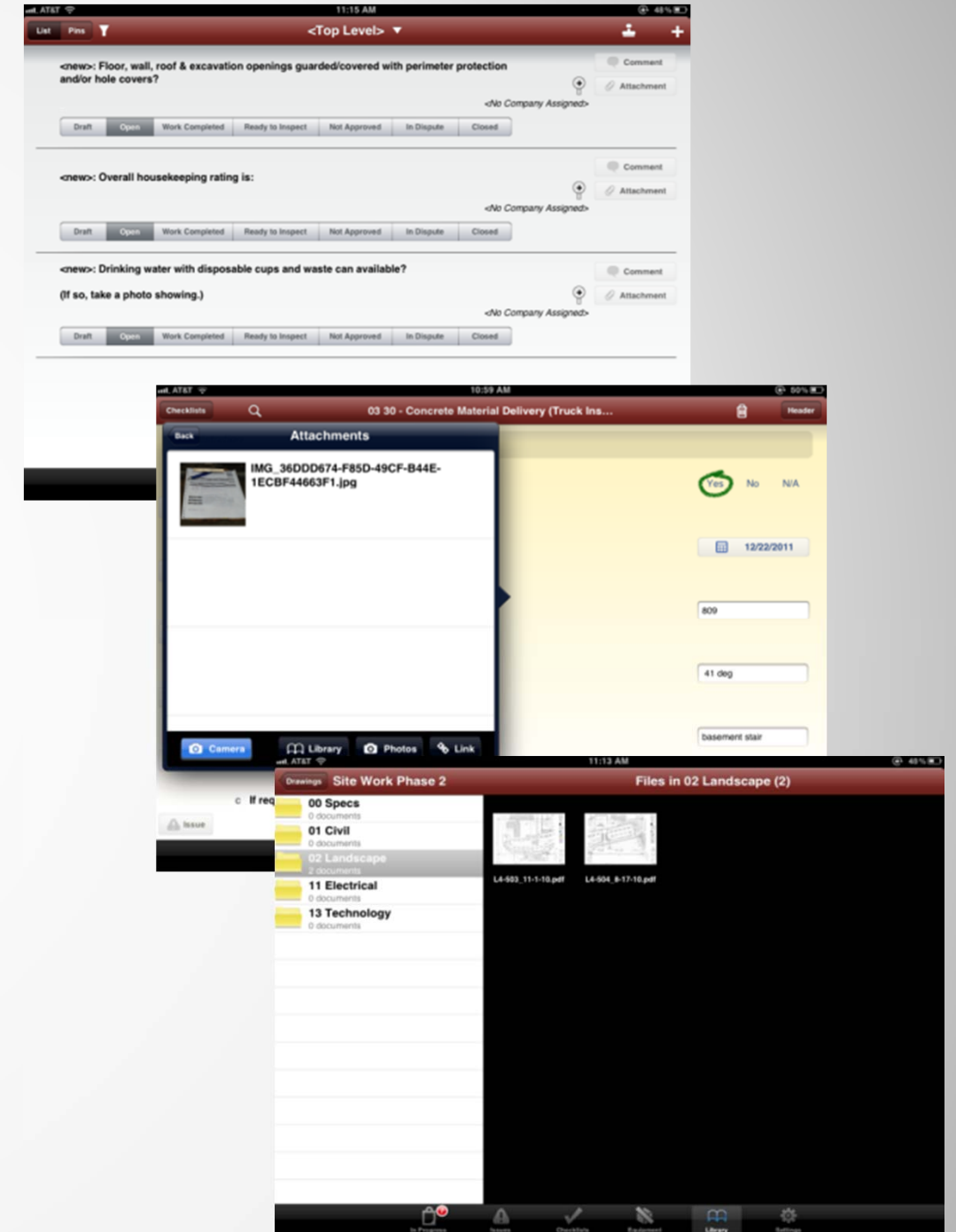
- Risk of losing important data.
- **Not GREEN** –redundancy in the work load and massive amounts of paper.
- Increased overhead cost and man-hours.
- Increased likelihood of Change Orders due to inaccurate information
- Reduction of Safety awareness due to inability to monitor and track safety on site.
- Increased cost to maintain a safe worksite.



Mobile solution realized

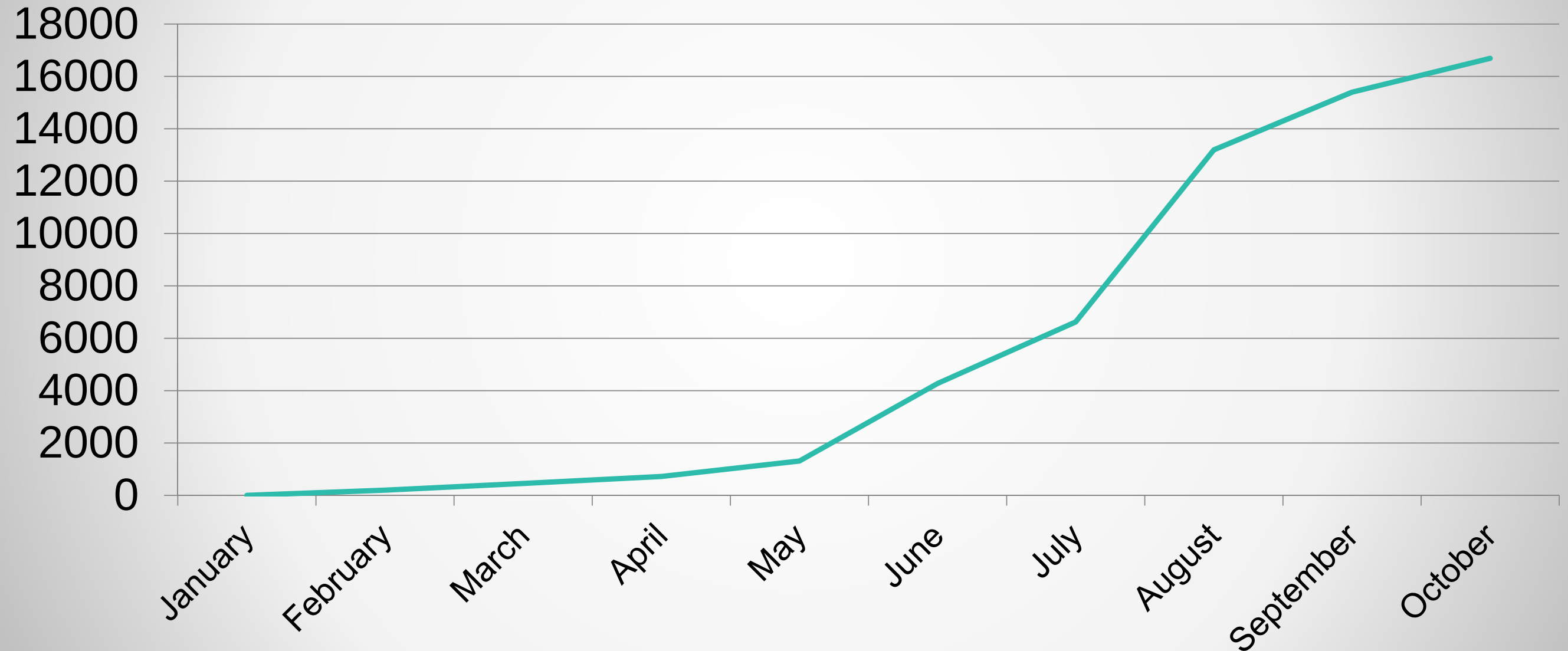
Resulting Positive Issues:

- **GREEN** – Paperless
- Availability of drawings, submittals and specs at all times.
- **Reduction in deficient work**, due to human error.
- Ability to attach photos to reports as they are written.
- **No lost data due** to lost or damaged paperwork.
- Increased **Speed, Accuracy**, and **Quantity** of Information Captured
- Reduced the Complexity of Filing and Tracking Important Documents on Complex Projects.
- Limited redundancy.
- Increased **Field Awareness** and **Involvement** in the process.
- Increase in **SAFETY**



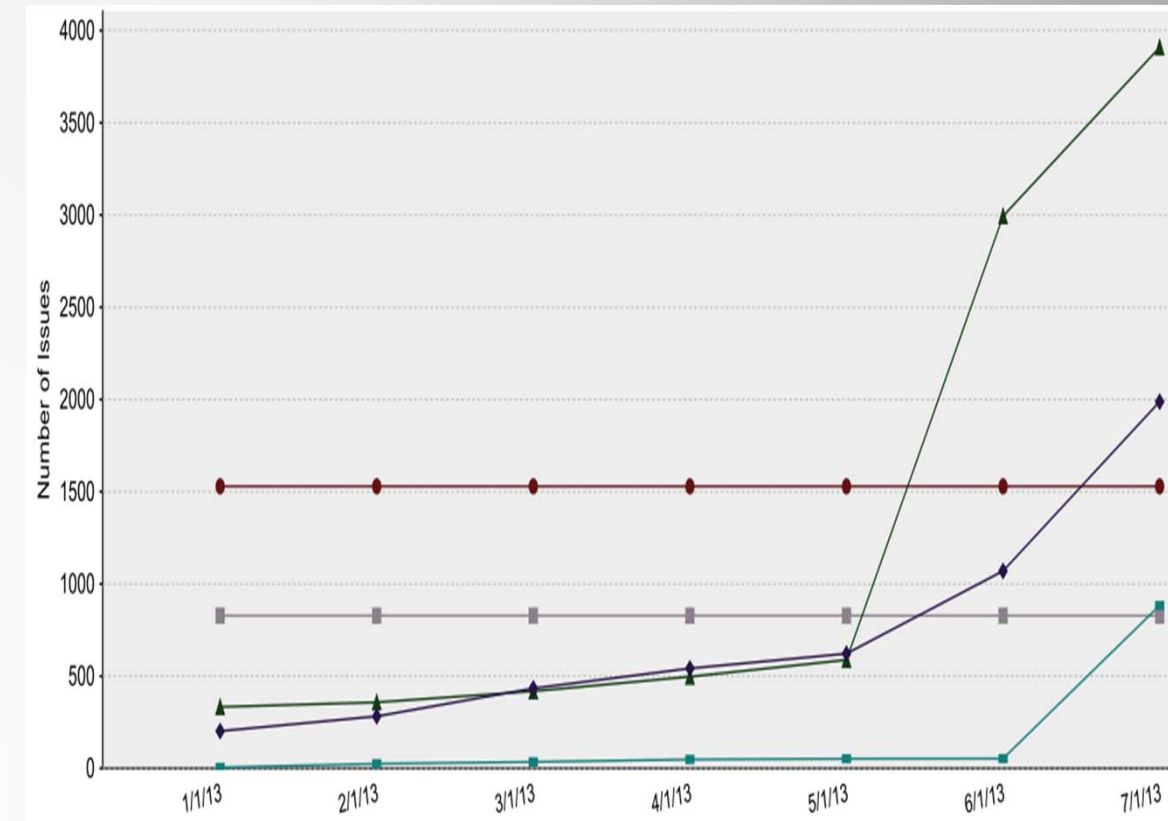
Progress

Issues



Results

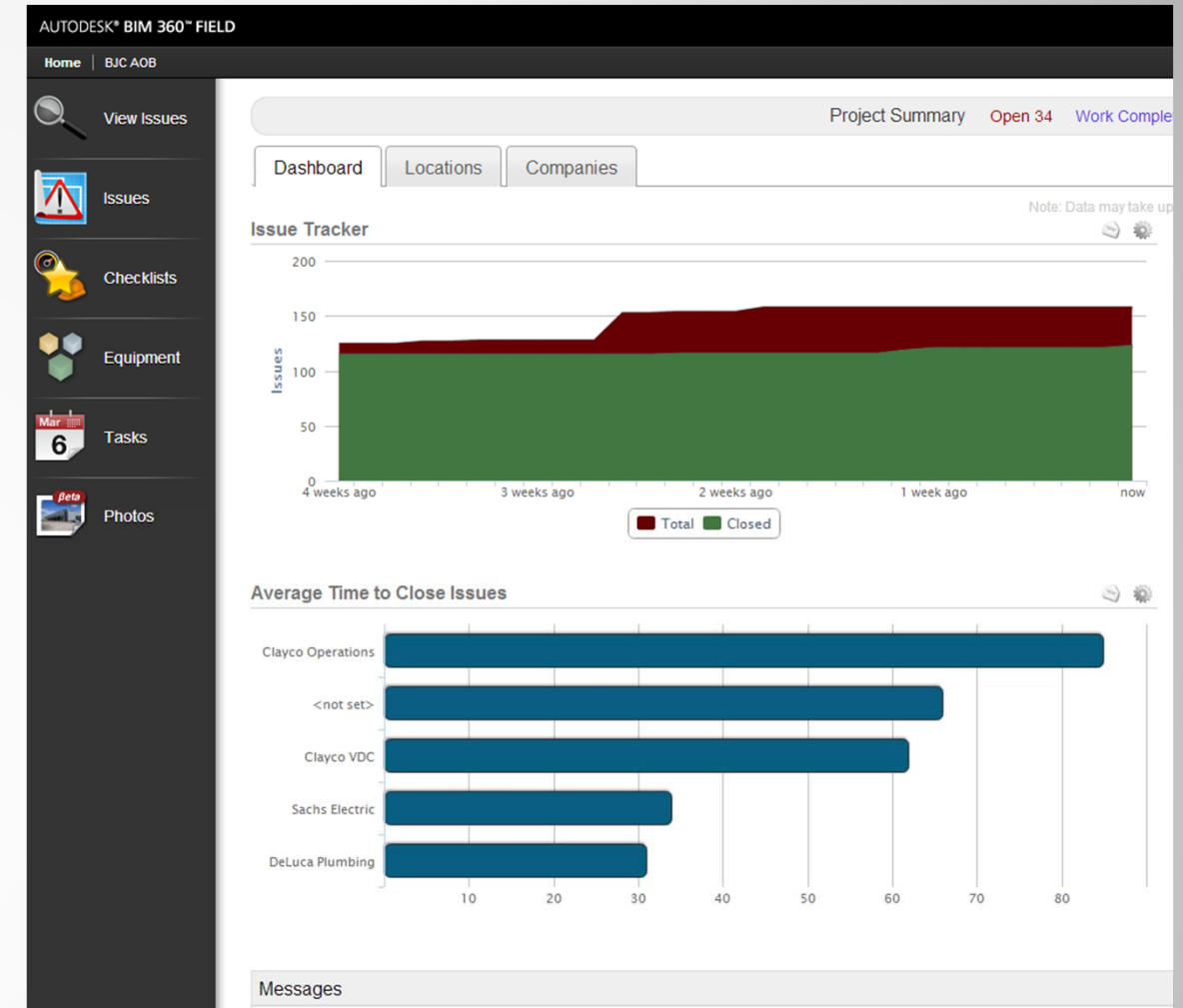
- Average 1.7 hours / week / user reduction in information obtaining time
 - Easy access to documentation everywhere on the site and off site
- Average field issue creation and distribution time, reduced on average by 80%
 - Translates in 1.2 hours per an issue
- Average Coordination meeting time under 2 hours



Communication and Feedback

Site visits and field reports

- Customization of Issue Types
- Specialized tracking and reporting
 - PreCx
 - Architect Field Reports
- Degree of Owner involvement
- Managing deficiencies and communication
- Document expectations early
- Tracking progress vs data input
- Report templates for consistent metrics



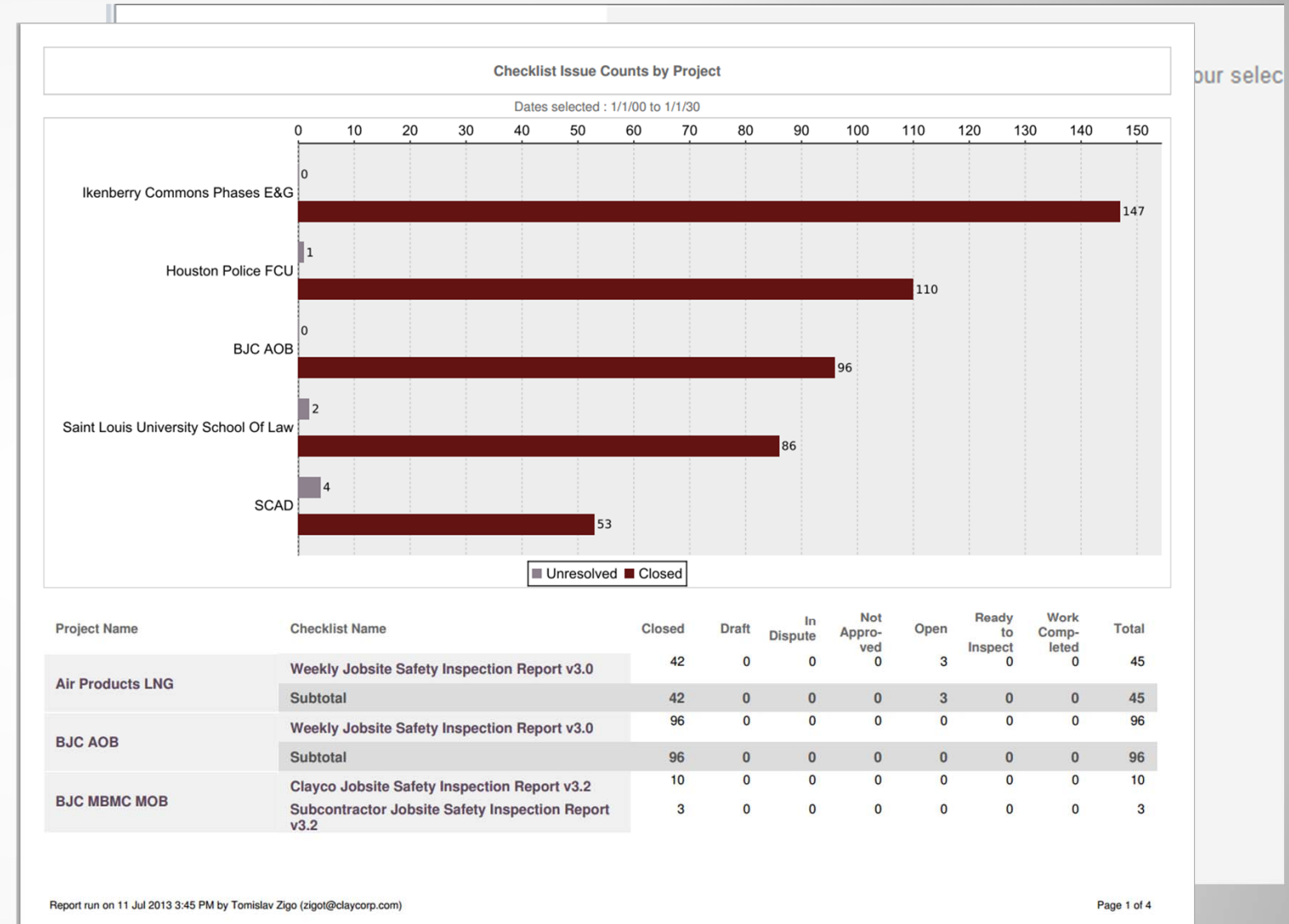
Report types

- Project reports

- Issues
- Checklists
- Equipment
- Tasks

- Enterprise reports

- Checklist reports
- Issues by project



Design/Builder as Information Manager

■ OPPORTUNITIES

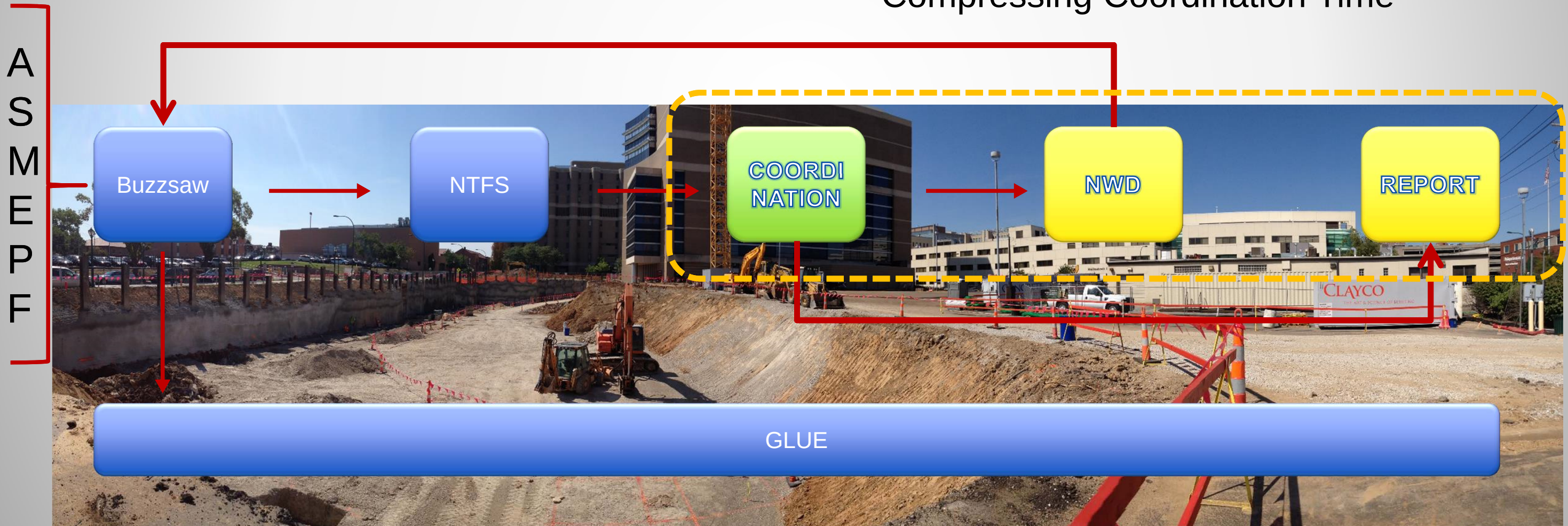
- FOCUS ON PROJECT LIFECYCLE (DESIGN / CONSTRUCTION/ OPERATIONS)
- INTEGRATED / COLLABORATIVE MODEL HANDOFF
- MEANS AND METHODS BUILD MODEL (ESTIMATE + SCHEDULE)
- COVERS 75 % OF PROJECT LIFECYCLE
- LOD 400 COORDINATION
- BEST CHANCE FOR SUCCESSFUL AS-BUILT MODEL
- EXCELLENT OPPORTUNITY TO CREATE DATA RICH FM/CMMS MODEL

■ CHALLENGES

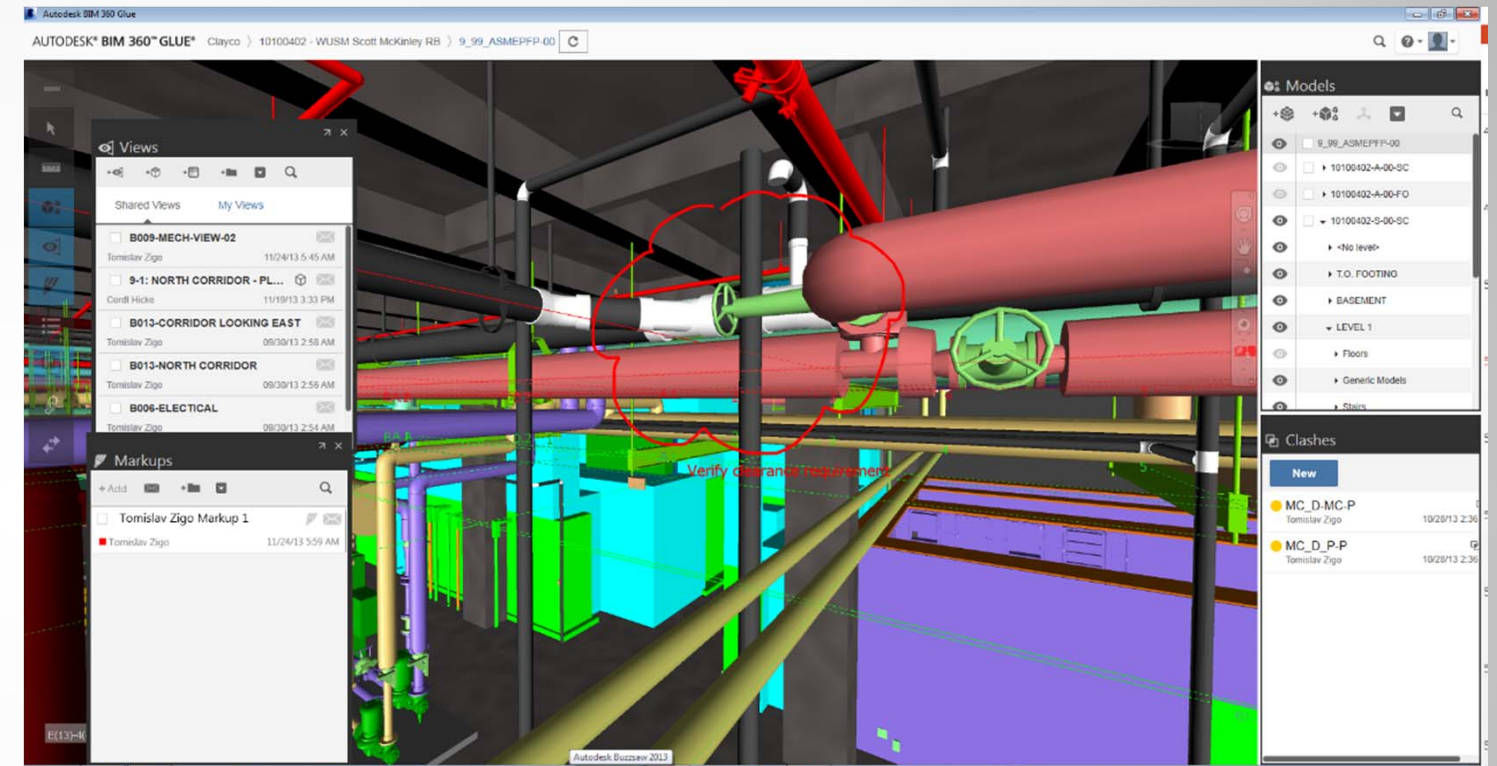
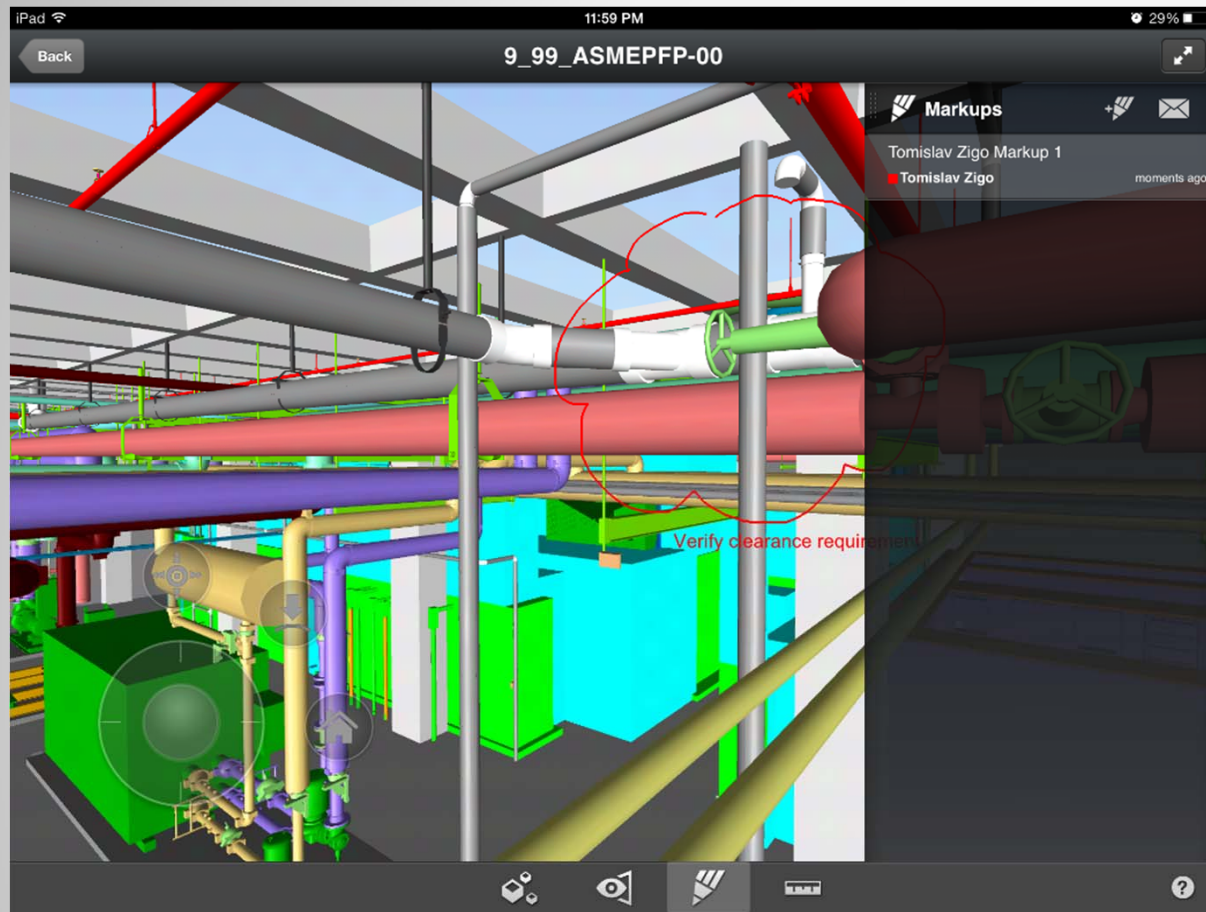
- MORE COMPLEX MODELING REQUIREMENTS
- LONGER SETUP TIME
- REQUIRES ALL TEAMS TO FOCUS ON CONSTRUCTABILITY

BIM 360 Glue – Virtual co-location (glue it)

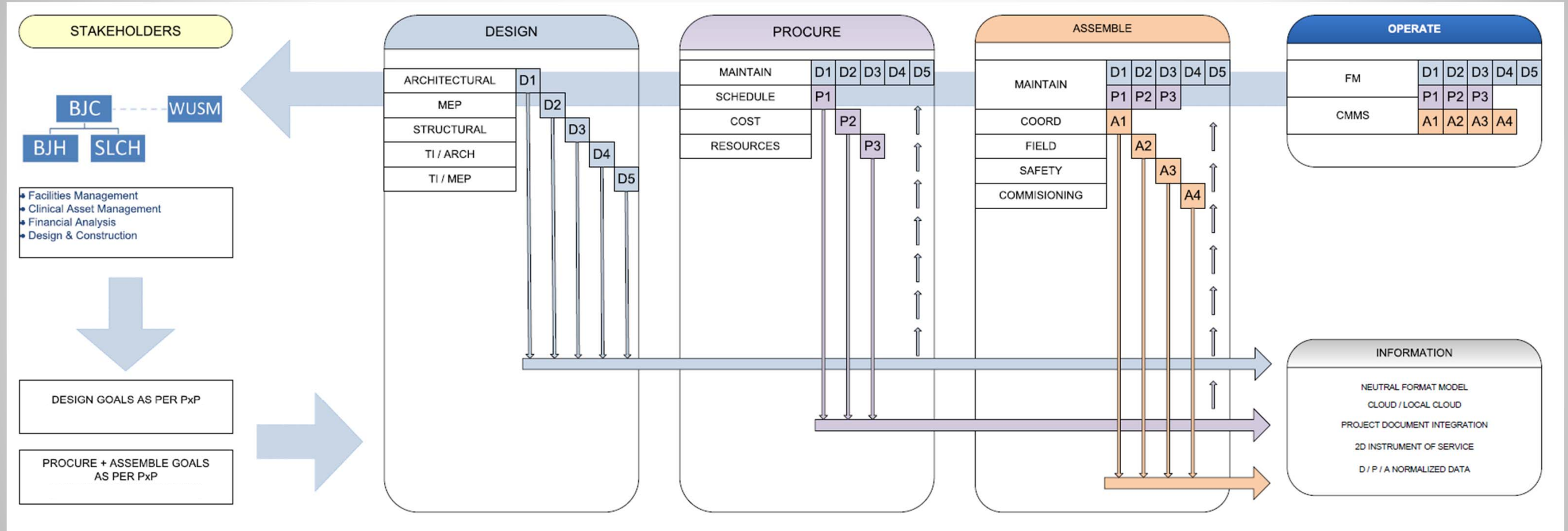
- Seamless transition from desktop to mobile platform
- Multi discipline coordination autonomy
- Field access to coordination results
- Enterprise linking via API
- Compressing Coordination Time



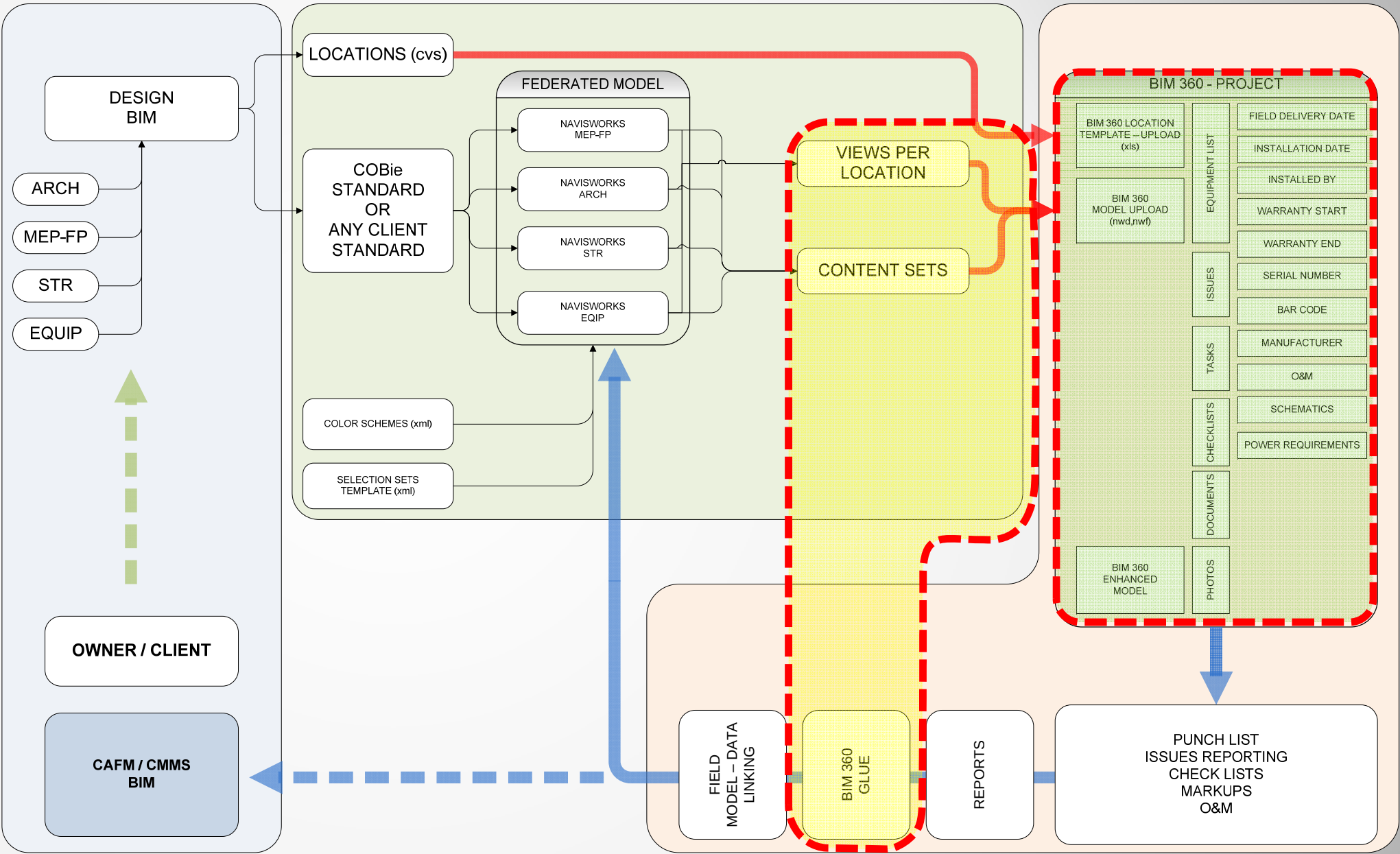
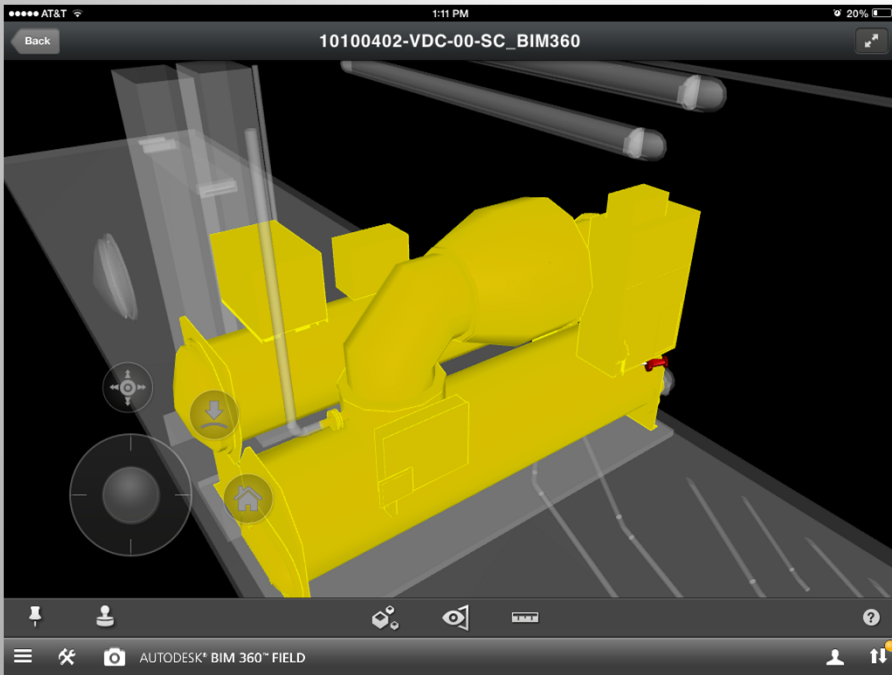
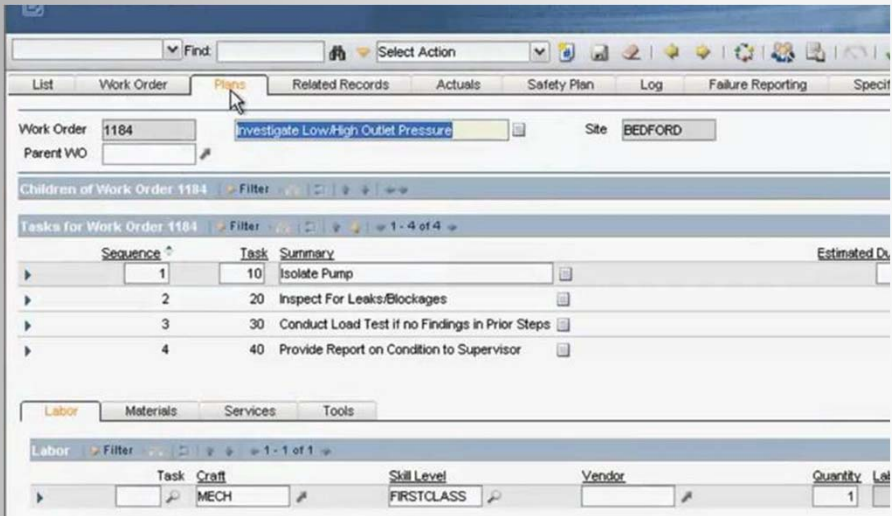
BIM 360 Glue – Desktop to Tablet and back



What Does Client Want?

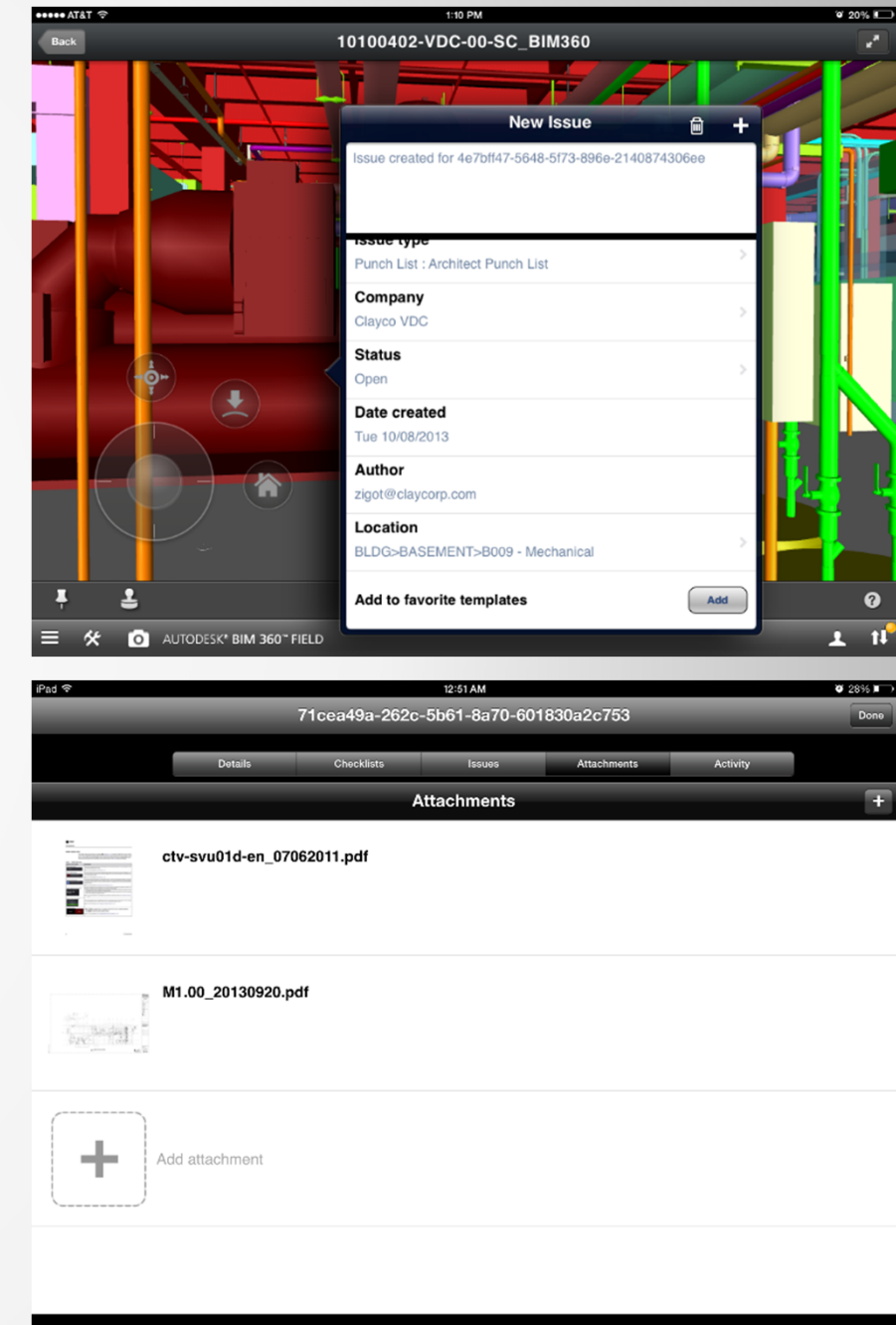


CAFM / CMMS ready deliverables



Steps to execute CMMS deliverables

- Defining BSOC (Basic Scope of Services) as part of the BxP
- Defining LOD 500, or even better Minimum Client Requirement for information exchange
- Defining or using the existing maintenance data standard
- Defining the as Built modeling process and identifying responsible parties
- Extracting model based locations and tying them to BIM 360 Field location Structure
- Utilizing OmniClass equipment coding
- Utilizing OmniClass BIM 360 Field content coding, checklists, library content
- Utilizing OmniClass BIM 360 Field equipment classification
- Assuring the consistency of model properties transition to BIM 360 Field
- Setting the visual Appearance standards for Navisworks nwd file utilization
- Associating views with equipment location
- Defining the standard selection sets and properties mapping template for BIM 360 Field



BIM 360 Field – tying it all together

- Centralized model repository
- Location/model driven issues creation
- Checklist integration
- Procurement tracking
- Equipment management
- Weekly jobsite arrival reports



Future of BIM 360 platform ...

from user's perspective

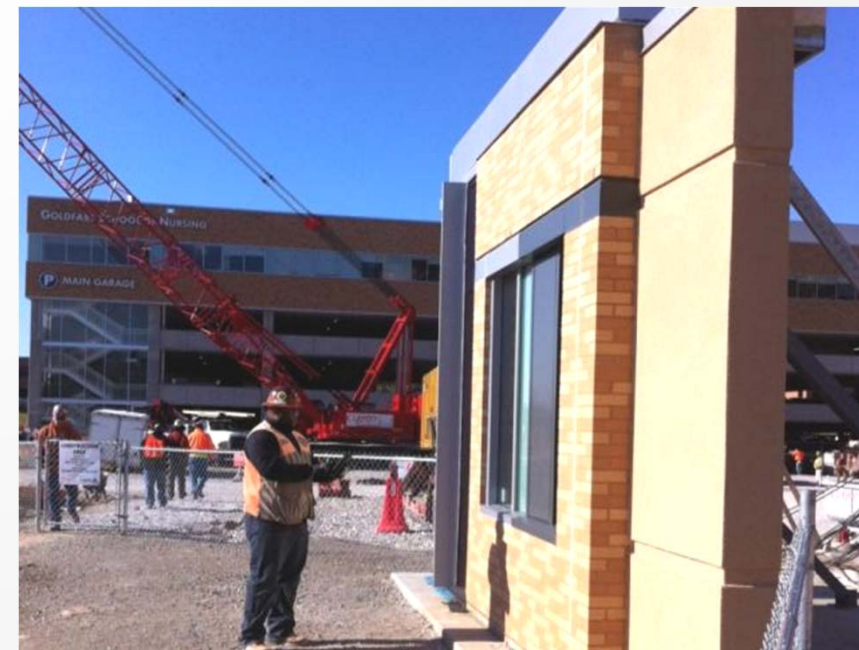
Concerns and future development

- Change in the workflow paradigm
 - Decision needs to be made about project storage locations
- Security and visibility of project information
 - Cloud or not to cloud...
- Design process integration
 - Communication
 - Documentation
- File format limitation and legacy process
 - PDF and DWF
- Integration with current system
 - API and its potential

Mobile solution realized

Resulting Positive Issues:

- Enhanced visualization and model navigation
- Materials and equipment tracking
- Creating a comprehensive and easy to understand project environment
- **Reduction** in verification time
- **Placing the technology** in hands of those who need it most.



Recommendations

- More robust analysis and reintegration of analysis data into job planning process.
- Procurement opportunities and non transactional supply chain could be a key to tangible success of field management.
- More proactive client involvement into extending lifecycle of field data into CAFM and CMMS.
- Capitalize on the potential of enterprise agreement.
- Root cause analysis as the basis of a comprehensive knowledge management system!

To those that wait....

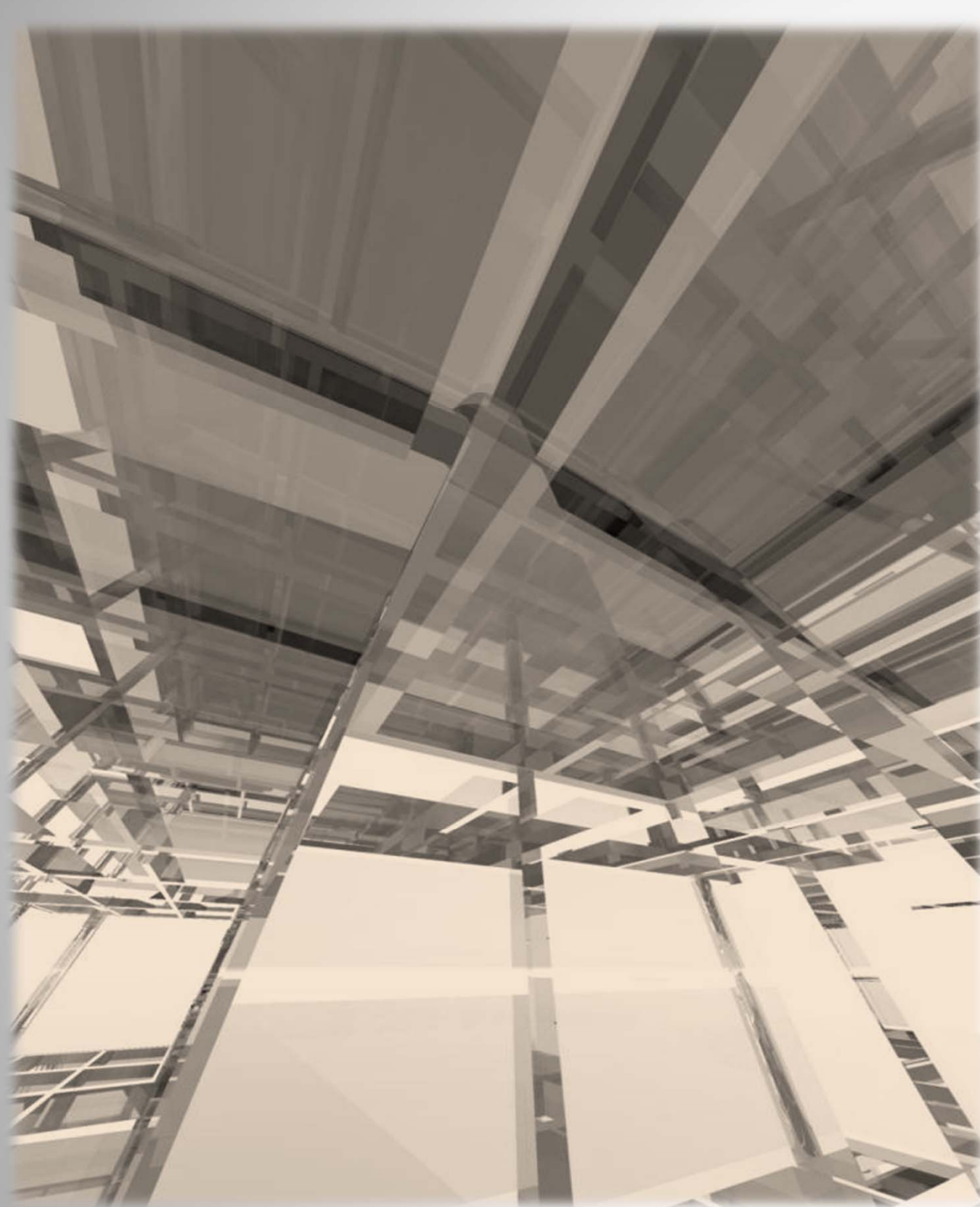
- Even closer integration of BIM data into day to day workflow
- Tighter integration between current “Cloud” silos
- Work toward better enterprise-wide reporting
- Greater gap between those that do or do not embrace technology
- BIM methodologies converting toward a true PLM process

Next Steps

- Increase use of checklists & Equipment
- Root Cause development
- Enterprise Wide Reporting
- More advanced use of Tasks & Filters
- Tighter integration with BIM and Document management

Where to start with BIM 360

- BIM 360 Field Free Trial: <http://bim360field.com/bim360field-trial/>
- BIM 360 Field Mobile App: <https://itunes.apple.com/us/app/bim-360-field/id372800500?mt=8>
- BIM 360 Field YouTube Playlist: <http://www.youtube.com/playlist?list=PLY-ggSrSwbZp0eJ92UnmoB8qyCgE-y4Sd>
- BIM 360 Glue Free Trial: <http://www.autodesk.com/bim360gluetrial>
- BIM 360 Glue Mobile App: <https://itunes.apple.com/us/app/autodesk-bim-360-glue/id554629830?mt=8>
- BIM 360 Glue YouTube Playlist: <http://www.youtube.com/playlist?list=PL71F6A665981BE491>



Q&A

Thank you.

