

CS125381: Safety First- with BIM 360 Field

Lauren L. Collier

Global VDC Initiatives Department Manager

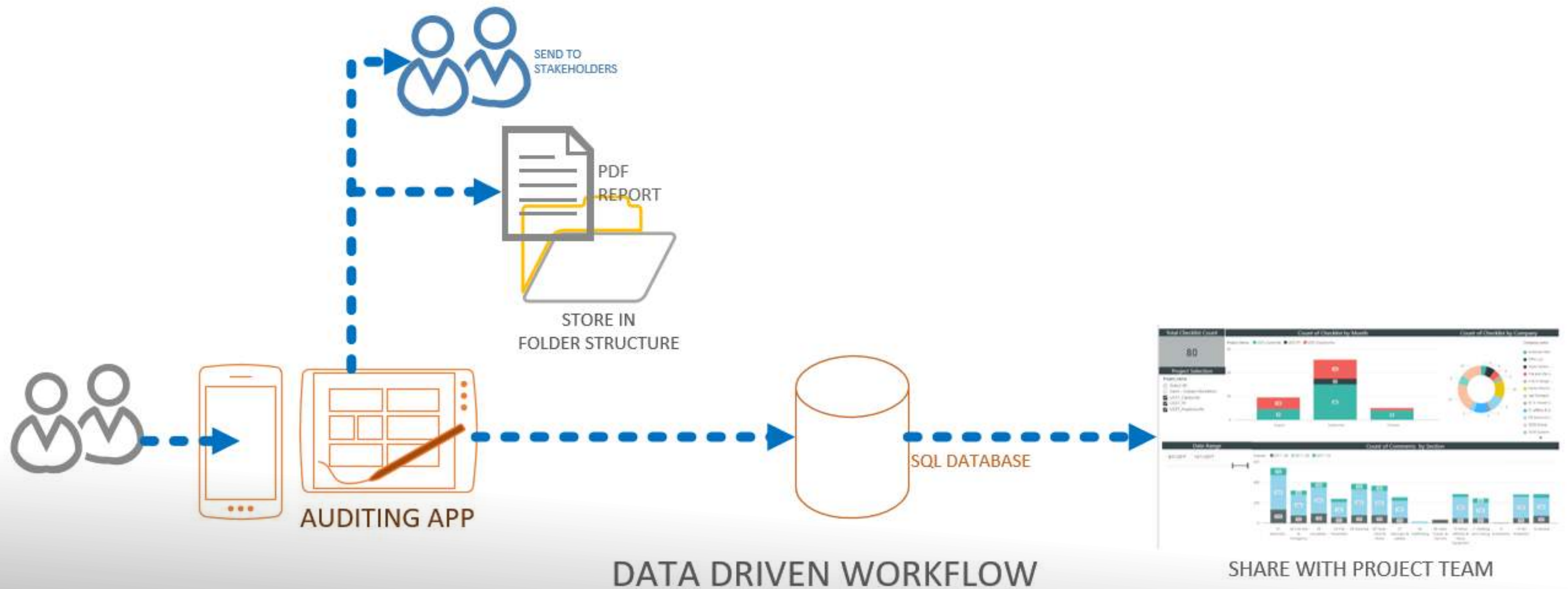
Join the conversation #AU2017

THE PROBLEM

TRADITIONAL DOCUMENT DRIVEN WORKFLOW



Traditionally in Design & Construction we create large amounts of documentation to track the Progress and Status of our projects. This leads to large amounts of paper (digital or hard copy) transmitted & stored away in our preferred repositories.



Data Driven workflow can still produce the “paper” trail to fulfill that need but we begin to store and collect data for integration and decision making. Thinking this way we need connected information to be accessible. Project data now can be more transparent, available, and predictable.

WHY SAFETY?

Why Safety

“Why is this important? Why not? 47 years after the creation of OSHA, we are still killing workers. We are disrupting families by telling loved ones that their Husband, Wife, Son or Daughter is NOT going home today! Auditing is critical to identify not just weaknesses but also patterns through some predictive analysis of data. I love this because it allows me to see issues, identify trends and implement corrective action via a custom dashboard and reporting.”

Robert "Scott" Goodwin, COSS

SSOE Corporate Safety Manager

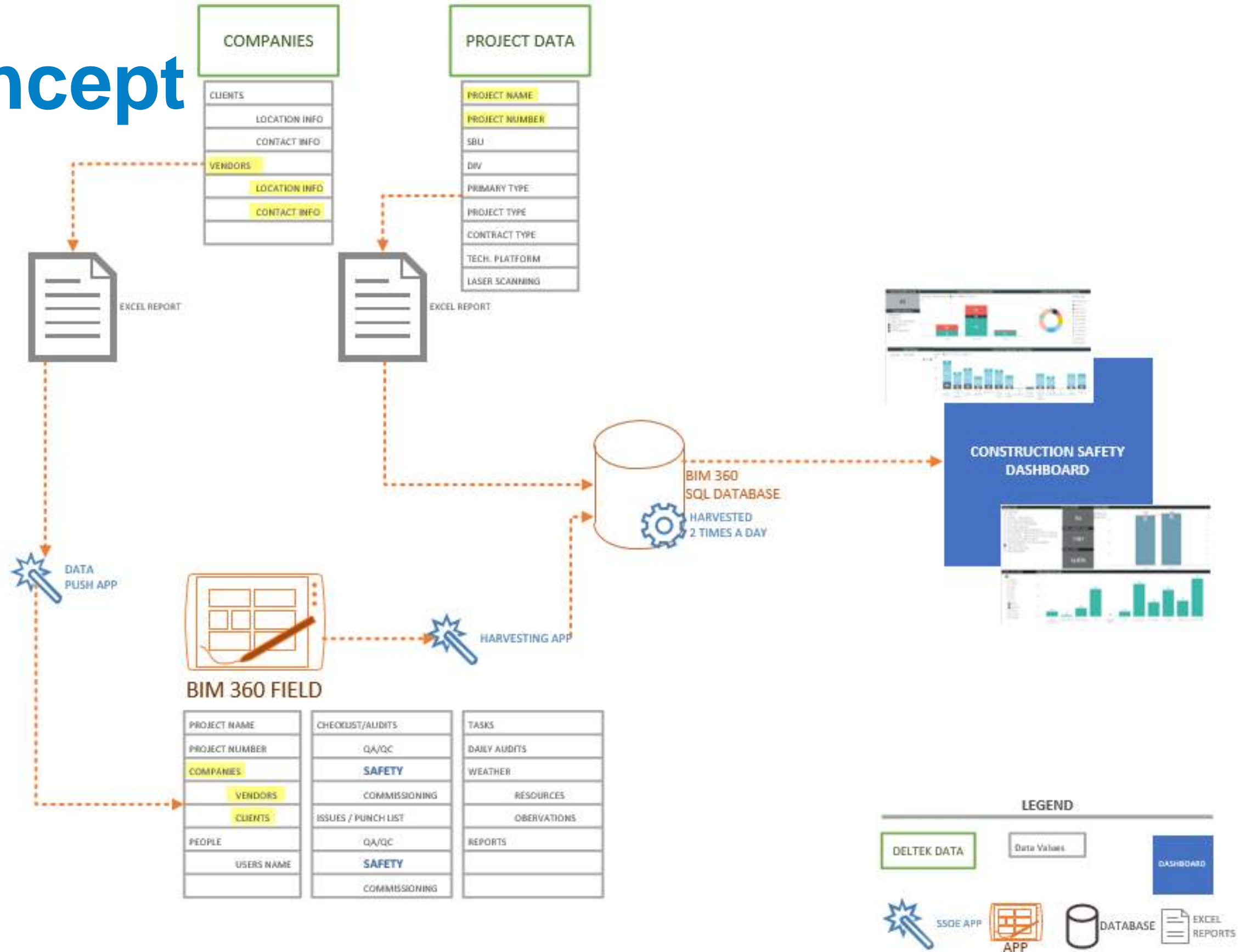


“Scott”



Data Driven – Diagramming the Needs

The Concept



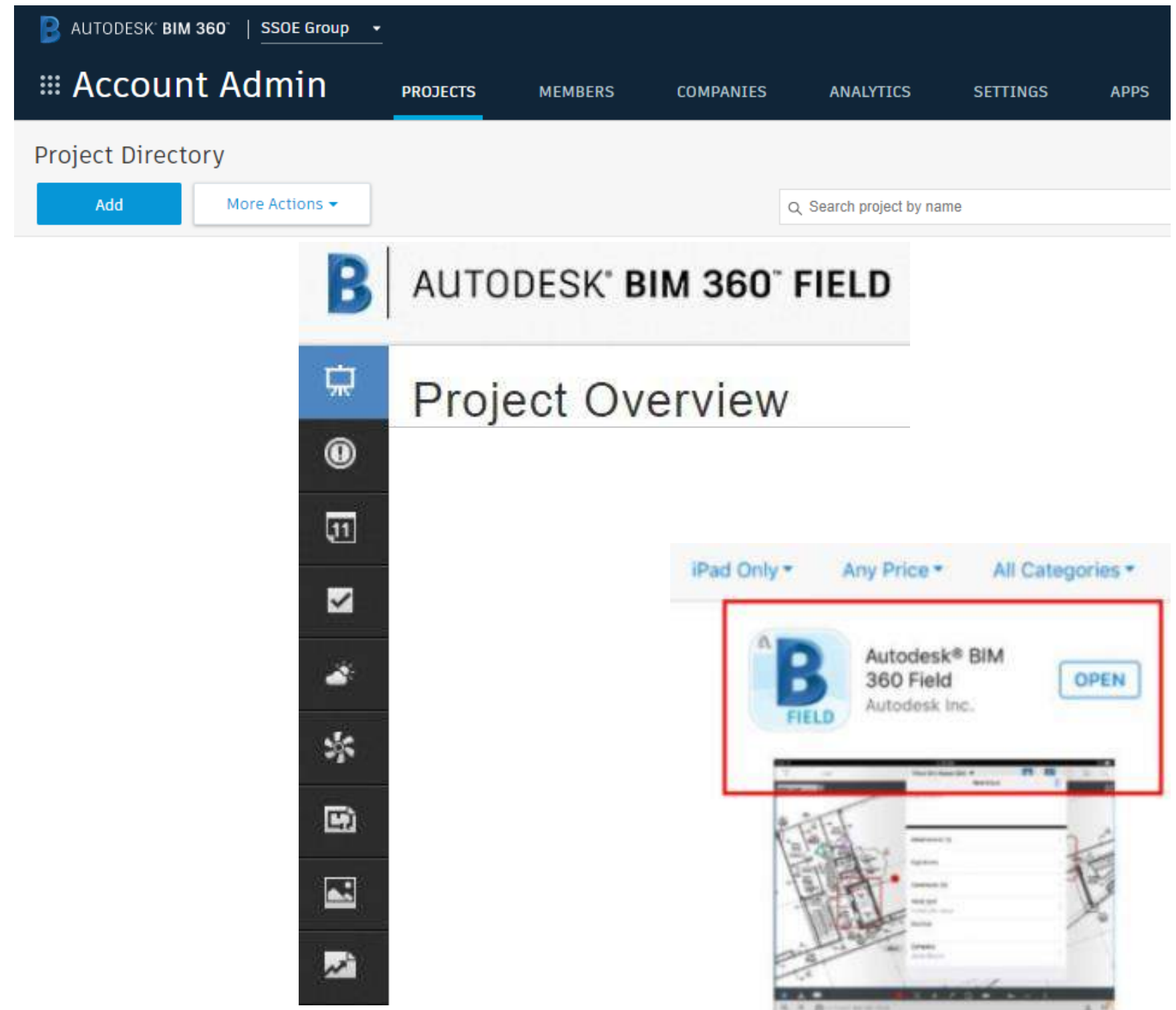
We had two desires – Pilot BIM 360 Field as a site auditing tool and begin to create a data warehouse environment to connect and visualize project data.

THIS ISN'T HARD...

IT IS JUST
DIFFERENT!

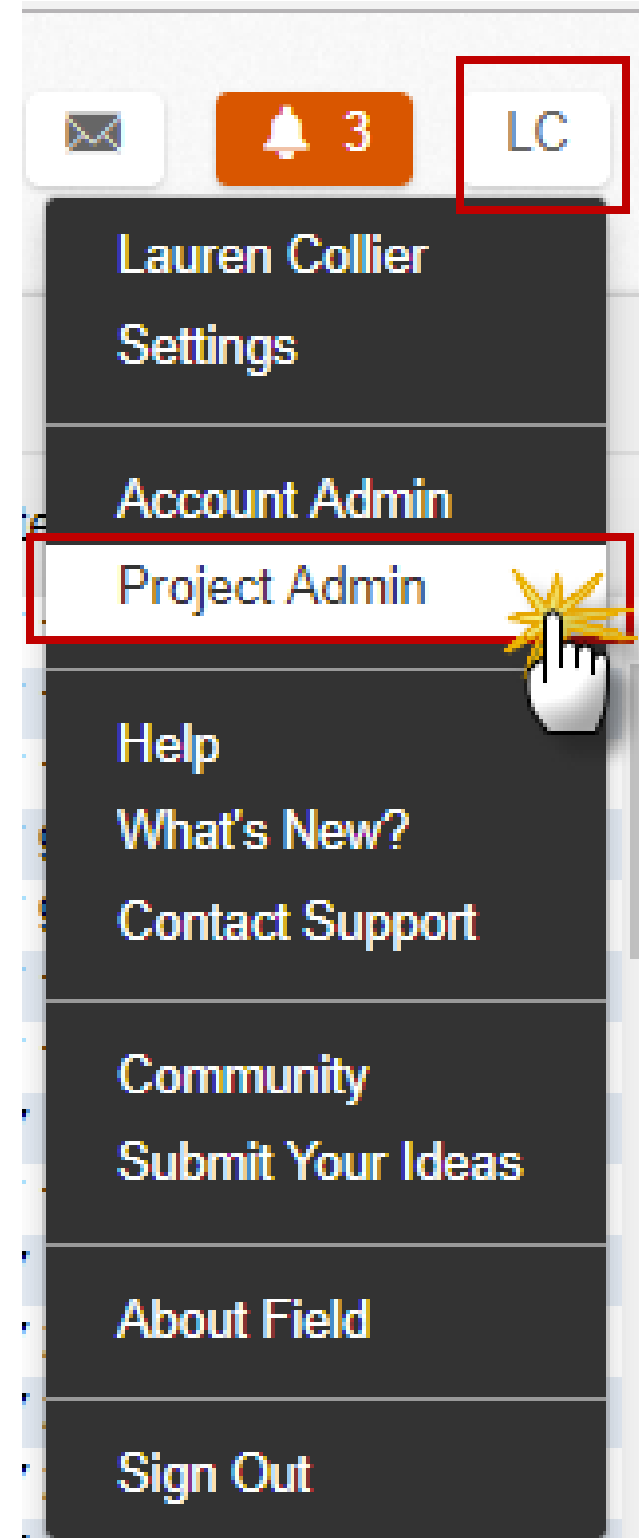
BIM 360 Field - Classic

- ***BIM 360 Enterprise (HQ)***
 - *Create Projects & Services*
 - *Companies & People*
- ***BIM 360 Field – Web (classic)***
 - *App Features +*
 - *Admin Portal*
 - *Permissions*
 - *Reports*
- ***BIM 360 Field – App (classic)***



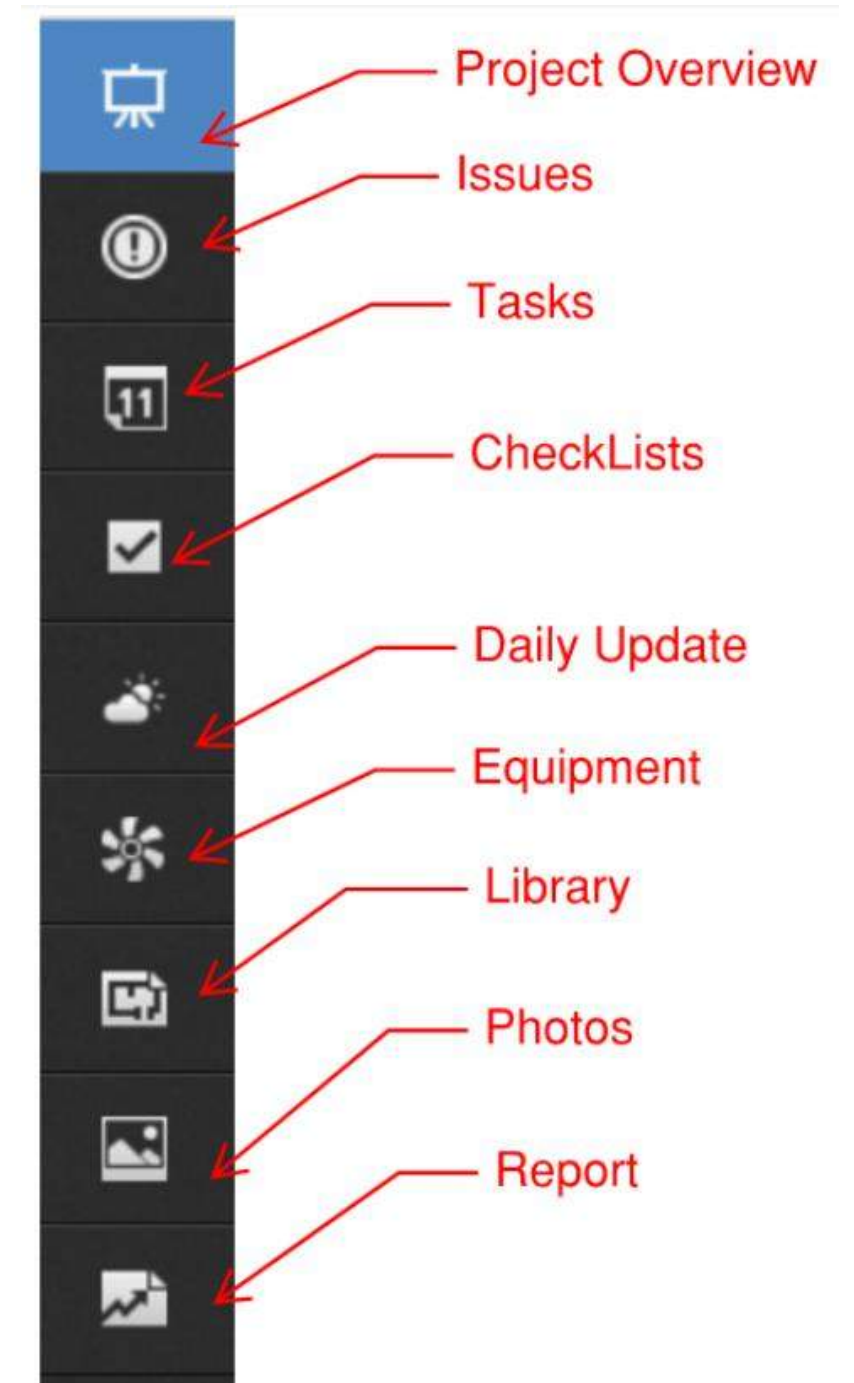
BIM 360 Field – The Web: Admin Portal

- Define your Checklist Needs
 - Create Templates
 - Start simple - Build
 - Define Issue Types
 - Define Root-causes or Categories
 - Add Members, Companies, and Permissions



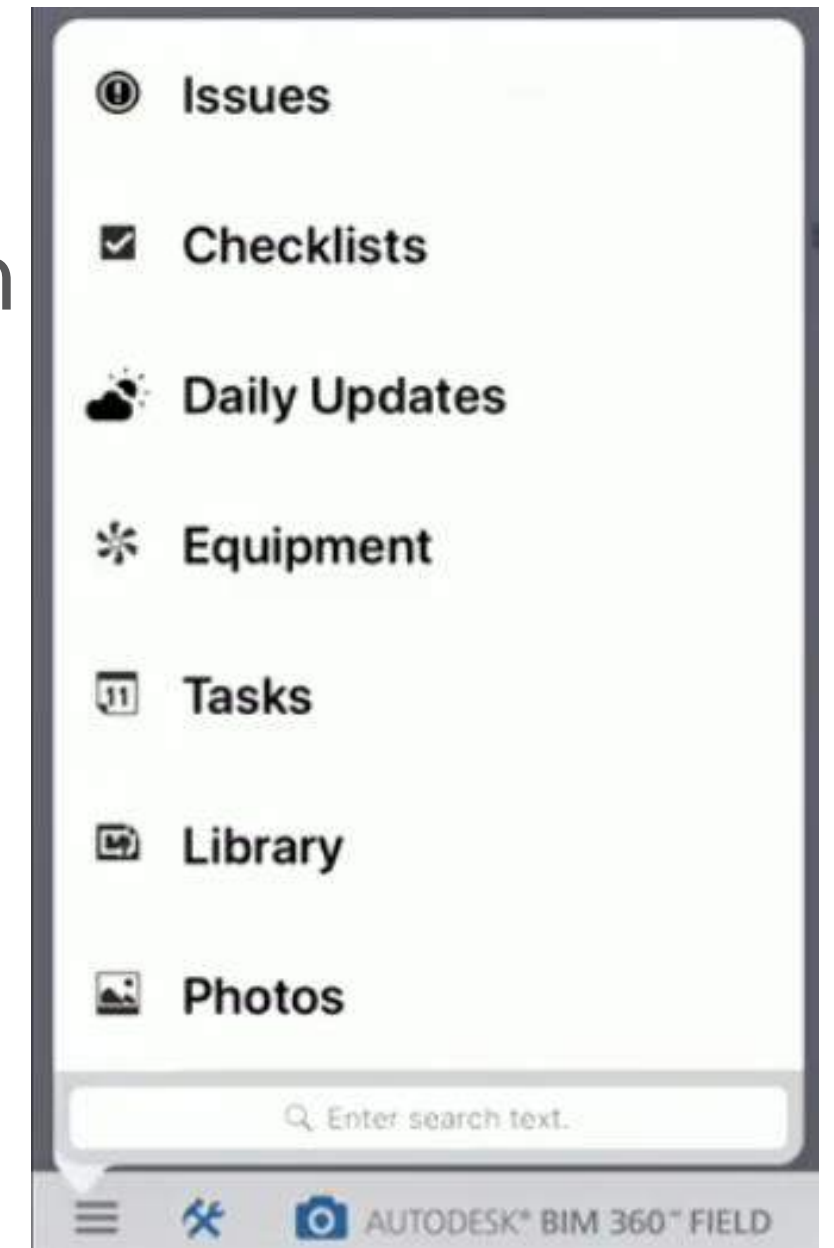
BIM 360 Field – The Web

- We focused on Checklist & Issues
 - Very effective with Surface Pro's
 - Field has much more functionality
 - Tasks, Daily's, Equipment....
 - Integrates with 2D (Library) & 3D (Glue)
 - Reports
- These were not attractive and only satisfied Documentation purposes.



BIM 360 Field – IOS App (Classic)

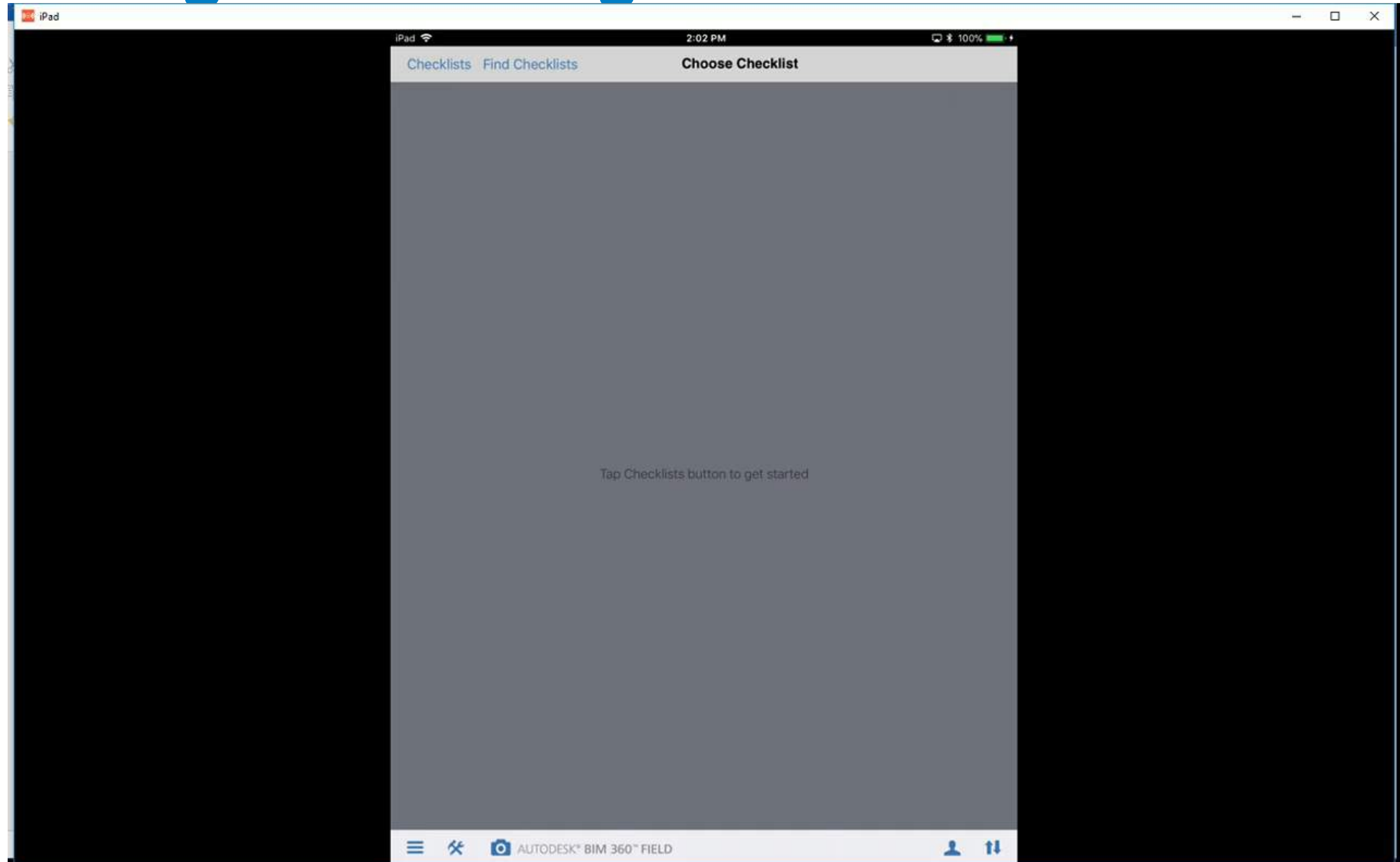
- Project Access – by Invite
 - Field Staff can audit & track construction execution
 - Can integrate with BIM 360 Glue – 3D Viewer
 - Can work off-line & sync when able
 - Data is access able in the Rest API



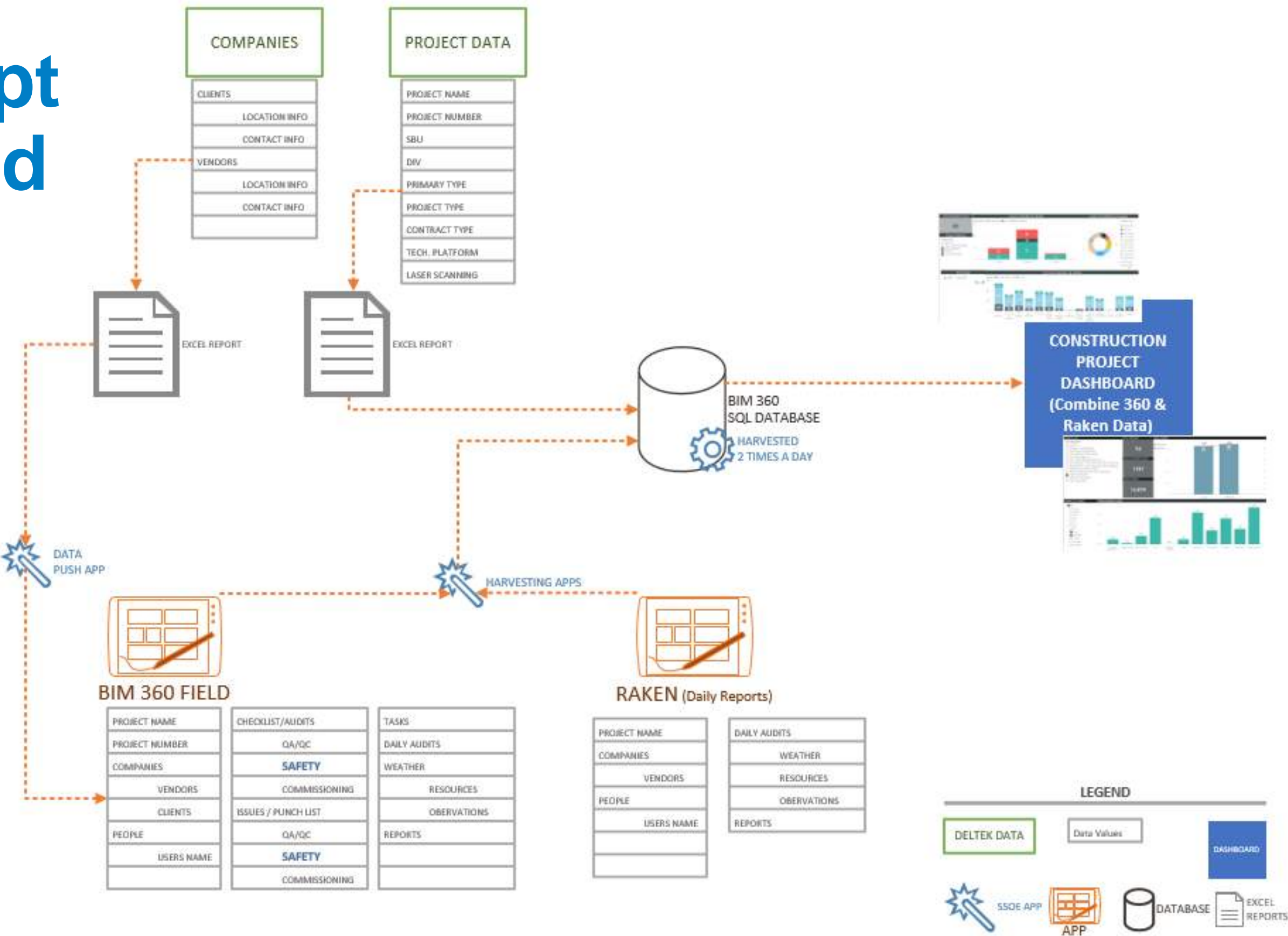
Filling Out a Checklist

The screenshot shows the 'SSOE_Job_Site_Safety_Checklist' application on an iPad. The interface includes a top navigation bar with 'Checklists' and 'Find Checklists' options, and a title bar displaying 'SSOE_Job_Site_Safety_Checklist'. Below the navigation, there are instructions: 'Tap + to create a new checklist.' and 'Tap checklist name to list existing checklist locations.' The main content area is divided into sections: 'QA/QC Safety', 'SSOE Safety Kickoff Checklist (0)' with '3 items', and 'SSOE_Job_Site_Safety_Checklist (1)' with '127 items' and a 'Last Run' timestamp of 'Today at 11/7/17, 12:53 PM'. A 'Commissioning' section is also visible. The checklist items are listed in a table-like format with columns for 'Yes', 'No', and 'N/A'. The first item is 'Weekly safety meetings documented' with a status of 'Yes'. The second item is 'SDS from all subcontractors in their office areas' with a status of 'No'. The third item is 'Competent Person assigned for site' with a status of 'No'. Each item has a corresponding 'Issue' icon and a 'Tap to enter comments' input field. The bottom of the screen features a navigation bar with 'AUTODESK® BIM 360™ FIELD' and a user profile icon.

Creating and Editing Issues



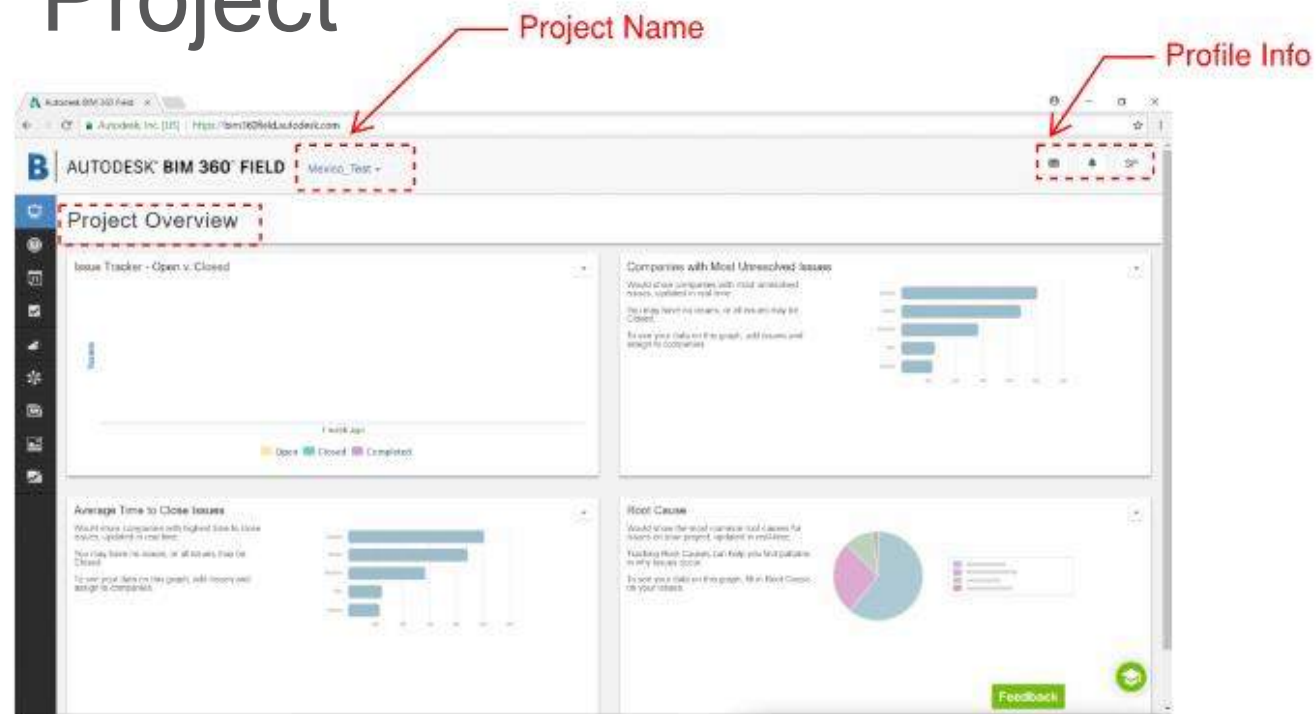
Concept Evolved



Our Site CM Team was already using Raken for Daily Audits and we evolved our data collection concept. Could we connect our two data sets into one Visual Dashboard?

Technical needs

- To have a BIM 360 Project
- Have Field Classic activated
- Checklist Templates and Companies Loaded into 360 Project



- SSOE Data Harvester App
 - Get – Project, Issues, Companies, Questions, Checklists, etc.
- Write to SQL Tables
- Power Bi Connected to SQL Tables
- Use Power Bi Report Server or Online Power Bi Dashboard

Rest API

(application programming interface)

- GET
 - Projects
 - Checklists
 - Questions
 - Companies
 - Issues

```
public class API
{
    private string _url;
    private Token _token;
    private Project _defaultProject;
    private string _login = "/api/login";
    private string _logout = "/api/logout";
    private string _projects = "/api/projects";
    private string _project = "/api/project";
    private string _templates = "/api/templates";
    private string _contacts = "/api/contacts";
    private string _get_tasks = "/api/get_tasks";
    private string _checklist = "/fielddapi/checklists/v1"; // I'm RESTful (but, not all operations are supported!)
    private string _create_checklist = "/api/checklists";
    private string _get_checklists = "/api/get_checklists";
    private string _get_equipment = "/api/get_equipment";
    private string _issues = "/fielddapi/issues/v2"; // I'm RESTful
    private string _get_locations = "/fielddapi/admin/v1/locations";
    private string _get_companes = "/fielddapi/admin/v1/companies";
    private string _get_companies = "/fielddapi/companies/v1";
    //private string _post_companies = "/fielddapi/companies/v1";
    private string _get_issue_types = "/fielddapi/issues/v1/types";
    private string _create_issue_type = "/fielddapi/issues/v1/create_type";
    private string _destroy_issue_type = "/fielddapi/issues/v1/destroy_type";
    private string _create_issue = "/fielddapi/issues/v1/create";
    private string _get_issues = "/api/get_issues";
    private string _issue_filters = "/api/issue_filters";
    private string _get_users = "/fielddapi/admin/v1/users";
    private string _publish = "/api/library/publish";
    private string _delete_document = "/api/library/delete";
    private string _all_folders = "/api/library/all_folders";
    private string _all_files = "/api/library/all_files";
    private string _custom_fields = "/api/custom_fields";
    private string _create_custom_field = "/fielddapi/admin/v1/custom_field_create";
    private string _vela_fields = "/api/vela_fields";
    private string _binary_data = "/api/binary_data";
    private string _create_project = "/fielddapi/admin/v1/project_create";
    private string _attachment = "/api/attachments";
}
```




Interactive Data vs. Reports

Daily Checklist Report Examples

Daily Safety Report Clarksville

SSOE

Details

ID

000286

Company

SSOE Group

Name

SSOE_Job_Site_Safety_Checklist

Priority

Medium

Description

Status

Closed

Author

rbowen@ssoe.com

Location

<Top level>

Updated On

30 Oct 2017 8:46 AM

Tags

Custom Properties

Author Print

Bob Bowen

Construction Manager

Neil Fladung

Checklist Date

20 Oct 2017

Checklist Items

Item #

Item Text

Response

00_Contractors Working Today

Comments

American Mechanical Inc., Beldon Roofing, F & Z Electrical, Fire Life Safety America, Harlan Electrical, Lee Mechanical and R. Lafferty have worked on site this week.

01 Administration

1

Pre-construction meeting with subcontractors regarding safe work practices

Yes

2

OSHA poster and other warning signs posted in office

Yes

3

Emergency phone numbers posted with routes to medical help

Yes

4

Written Safety Program on site including HazCom Program

Yes

5

Weekly safety meetings documented

Yes

Report run on 13 Nov 2017 9:08 AM by Lauren Collier (lcollier@ssoe.com)

Daily Safety Report Clarksville

SSOE

Comments

At their job boxes and roofers supplied booklet to our field office.

Item #

Item Text

Response

Issues

7

Competent Person assigned for site

Yes

0

02 First Aid & Emergency

1

First aid kit fully stocked

Yes

0

2

Employees aware of personnel trained in first aid

Yes

0

3

Employees aware of emergency procedures

Yes

0

4

Employees know what to do in case of emergency

Yes

0

03 Housekeeping

1

General neat appearance of all work areas

Yes

0

Comments

Ongoing clean up being performed for all area's.

2

Passageways and walkways clear

Yes

0

3

No projecting nails and screws in material

No

1

Issue ID

Description

Type

Status

Company

Date Created

Due Date

000056

No projecting nails and screws in material

Observed Hazard

Closed

SSOE Systems

23 Oct 2017

4

Regular site cleanup and trash disposal

Yes

0

5

Materials stored/stacked in orderly and safe manner

Yes

0

04 Fire Prevention

1

Proper number of Fire Extinguishers provide and charged

Yes

0

2

"No Smoking" posted and enforced (no cigarette butts in posted areas)

Yes

0

3

Combustibles >10' from building

Yes

0

4

Approved safety cans for all fuel

No

1

Comments

Contractors changing over to correct safety cans

Issue ID

Description

Type

Status

Company

Date Created

Due Date

000057

Approved safety cans for all fuel
Contracts changing over to correct safety cans

Observed Hazard

Closed

SSOE Systems

23 Oct 2017

Report run on 13 Nov 2017 9:08 AM by Lauren Collier (lcollier@ssoe.com)

Page 8 of 28

Daily Safety Report Clarksville

SSOE

000056

No projecting nails and screws in material

Observed Hazard

Closed

SSOE Systems

23 Oct 2017

000057

Approved safety cans for all fuel
Contracts changing over to correct safety cans

Observed Hazard

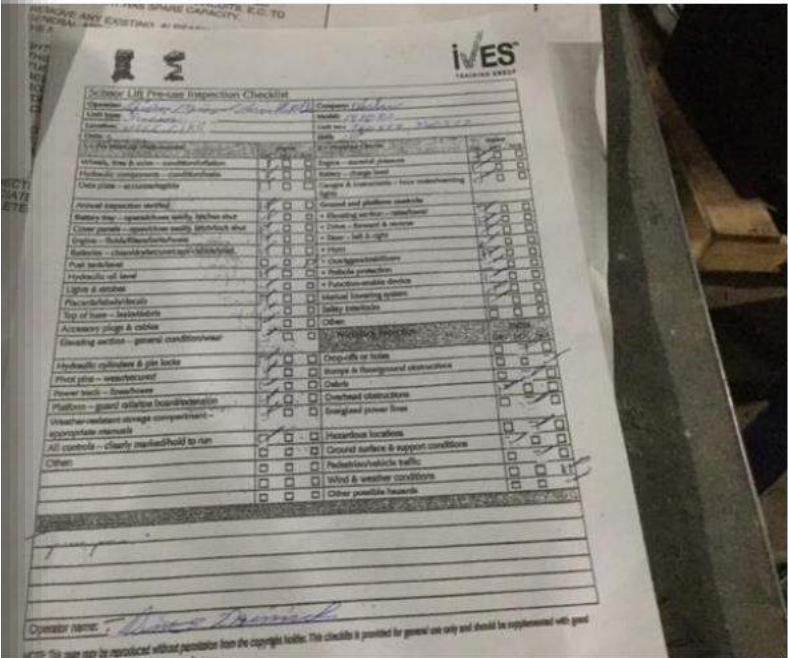
Closed

SSOE Systems

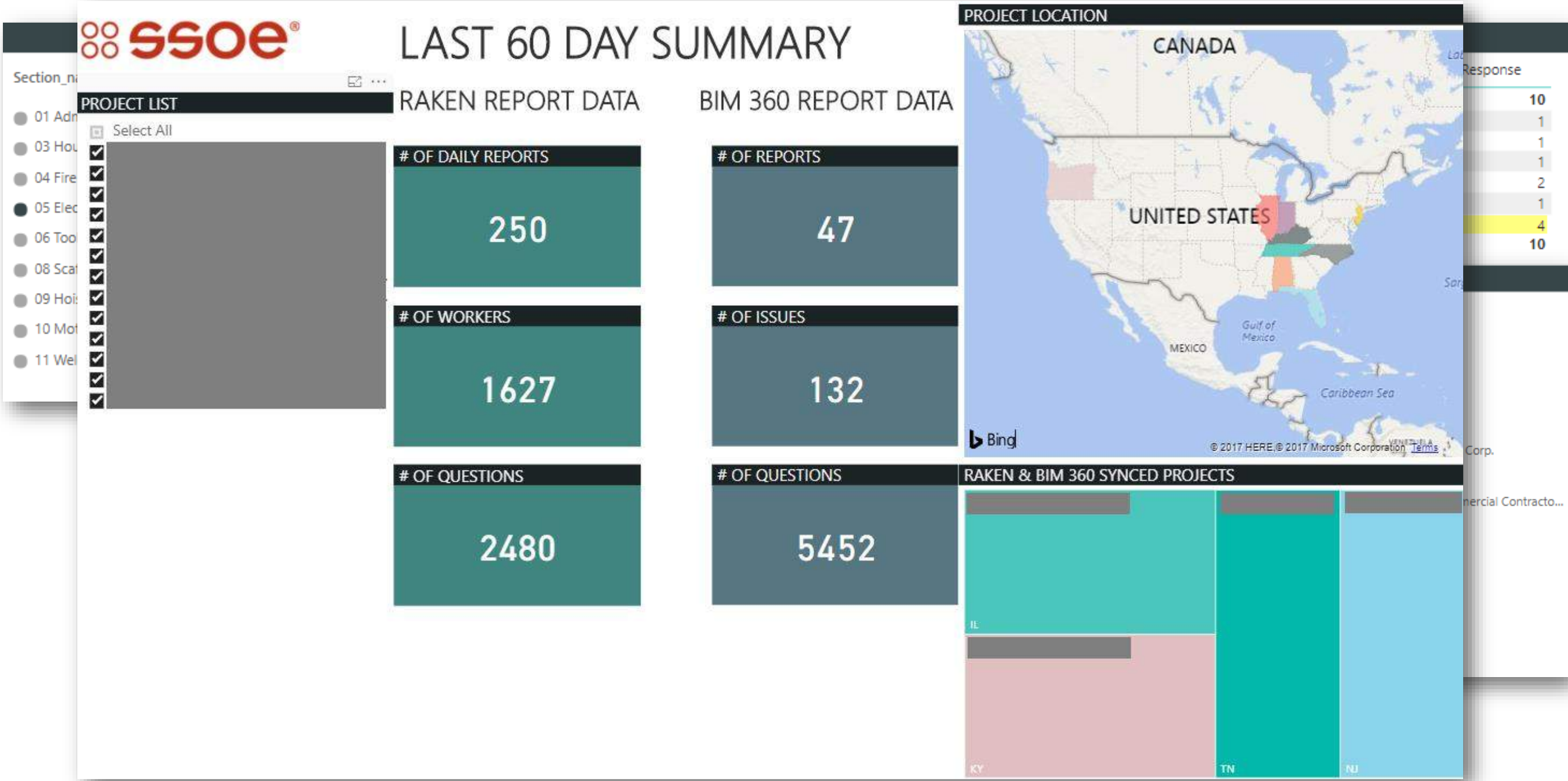
23 Oct 2017

Report run on 13 Nov 2017 9:08 AM by Lauren Collier (lcollier@ssoe.com)

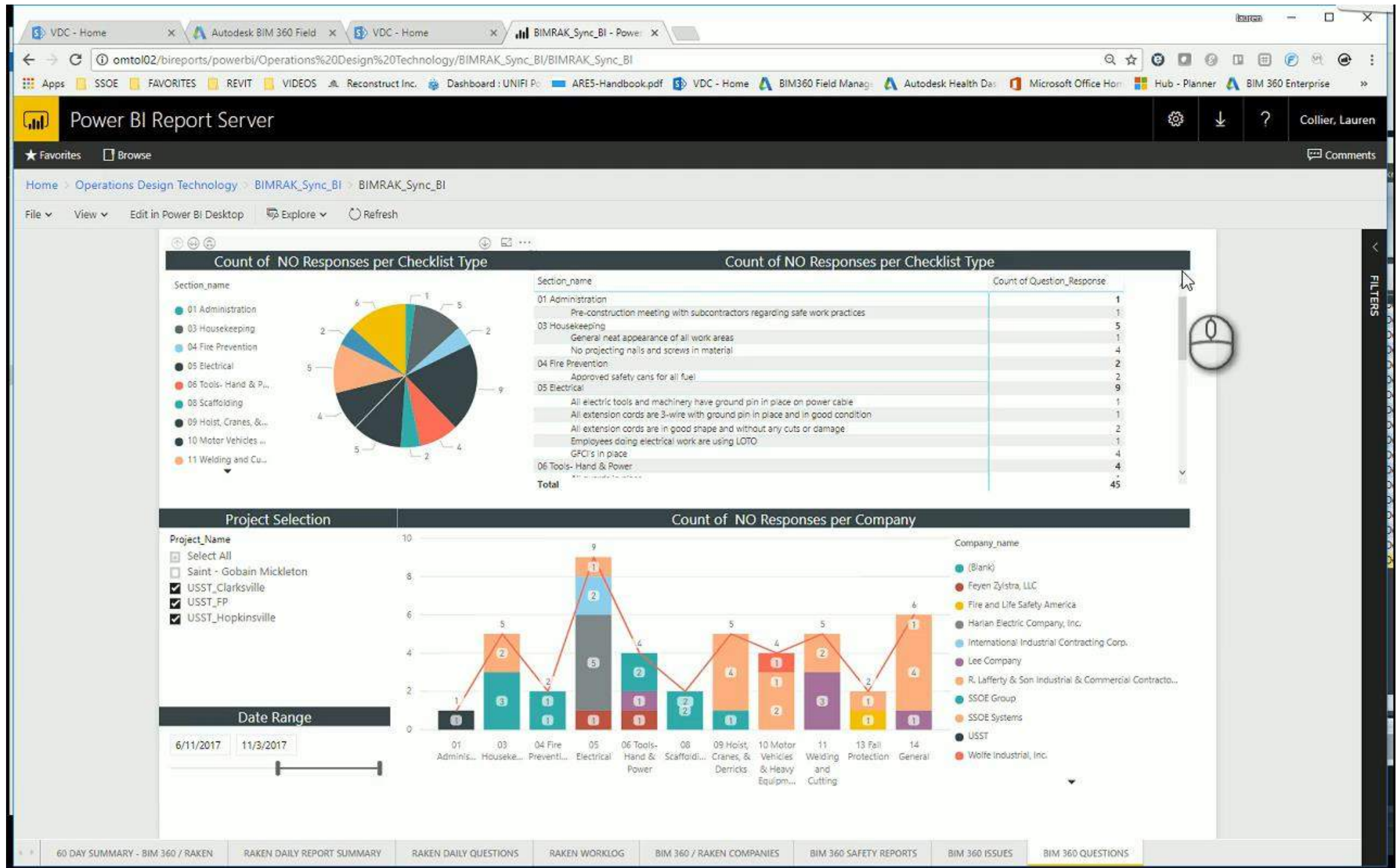
Page 2 of 28



Dashboard Examples

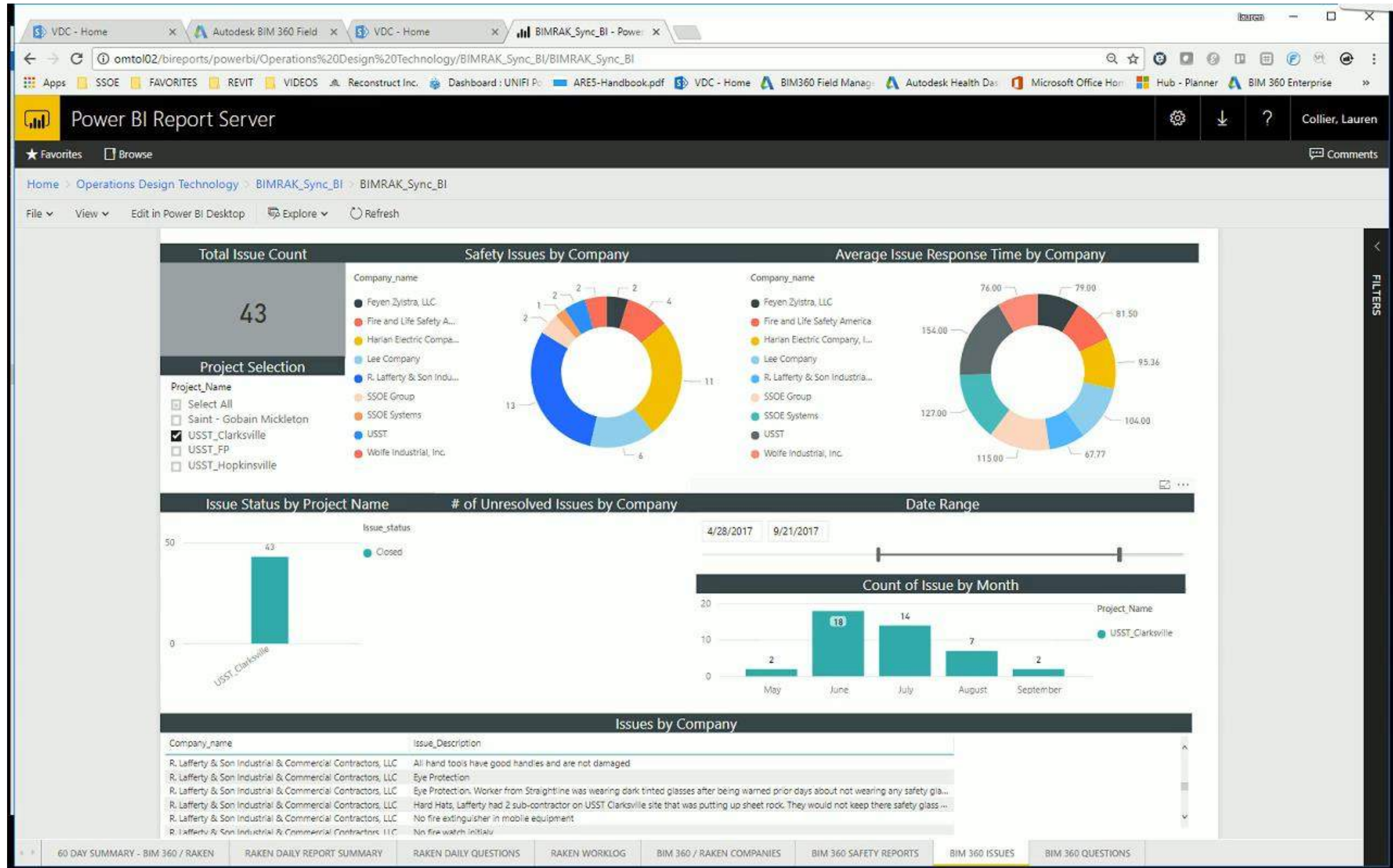


The Data



Sample data over a few projects collecting consistent daily safety audits. Looking at # of Audits vs. # of Issues. What Sections are seeing the most activity?

The Data

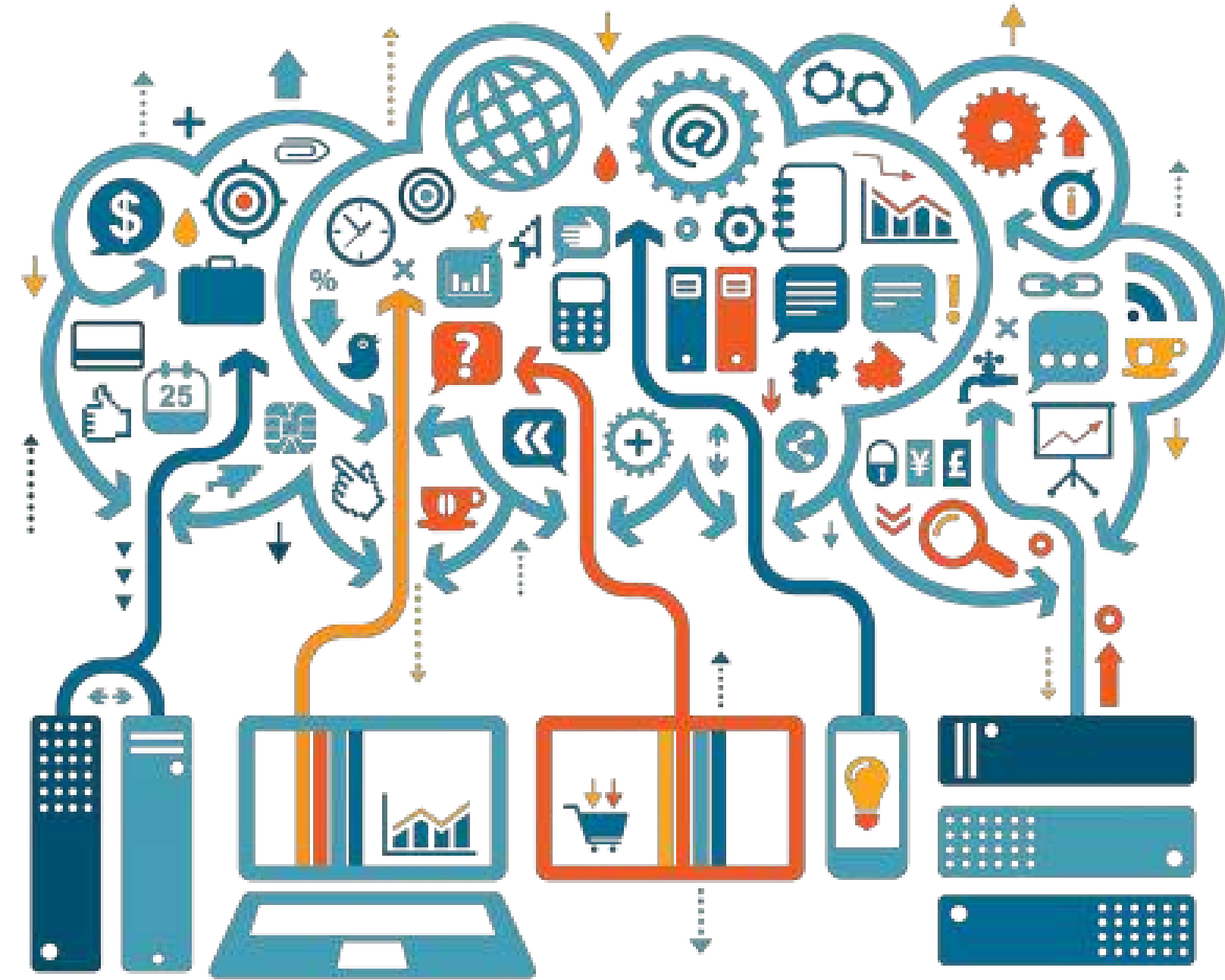


Sample data over a few projects collecting consistent daily safety audits. Looking at # of Audits vs. # of Issues. What Sections are seeing the most activity?

DISCOVERY?

What did we learn?

- #1 Good & Consistent Data will tell a compelling story.
- #2 Change is hard – don't take it personal.
- #3 Passion is personal keep on keep-in On! It is worth it.
- #4 Closed platforms or apps will have a short life-cycle in this ecosystem of data exchange.



WHAT FAILED?

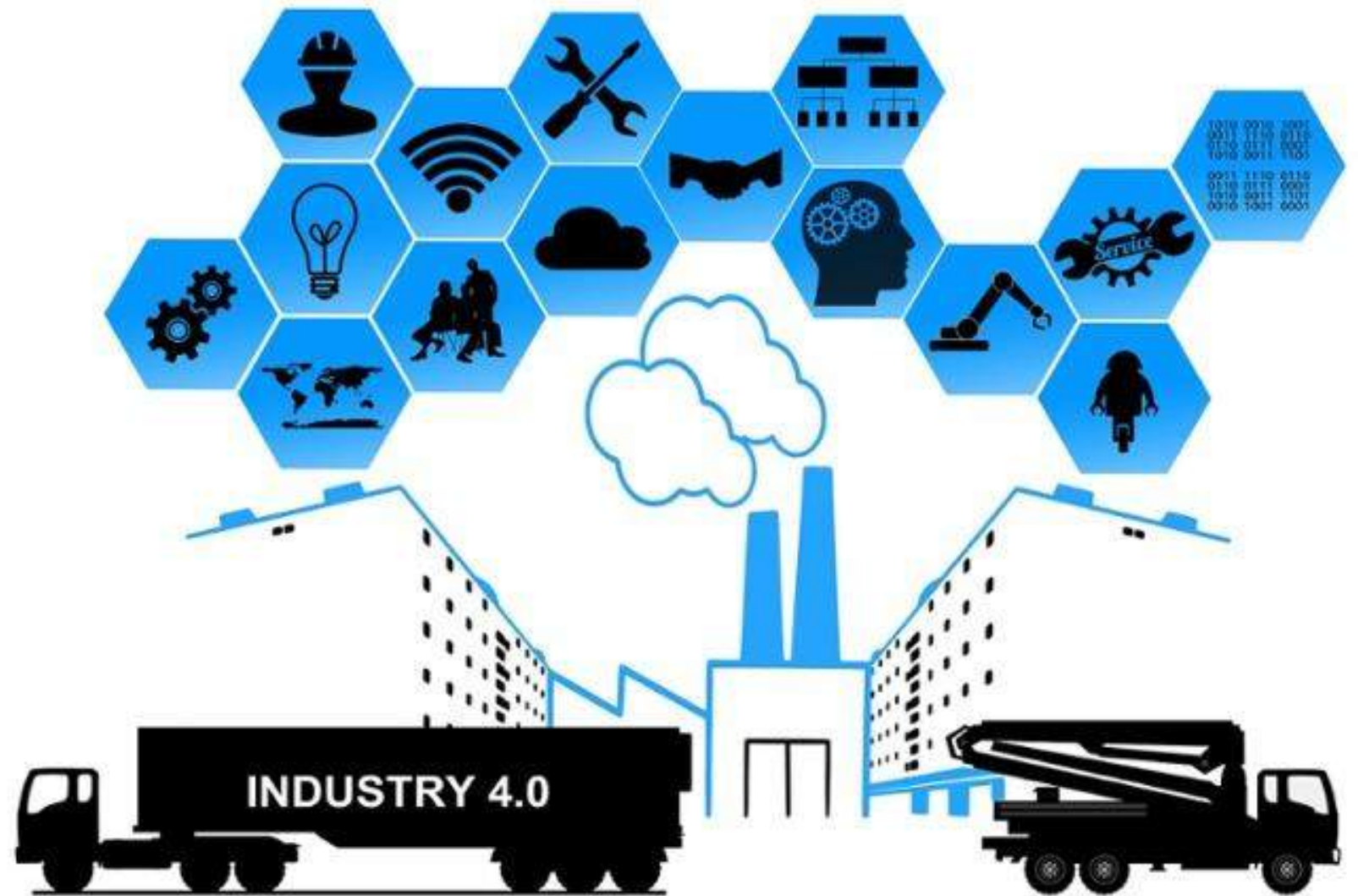
Improvements

- Are Harvesting App had to deal with archived project data.
 - Mistake we were re-writing data base instead of compare-update.
- Question feedback loop
 - We were missing Haz-com – Chemical procedure
 - We were too generic for a job.
- Question Wording
- Issue Types
 - What can we use to connect to other Business Intelligence?

WHAT'S NEXT?

Building Beyond Safety

- Integrate Construction Quality Program- Standardization
- Build and Improve better Dashboards
- Continue to automate – for internal and external experiences
- Integrate with other digital construction apps *(Connect & Construct Exchange)*
- Next Generation BIM 360 2.0



QUESTIONS?

- Contact Information
- Lauren L Collier
 - Email: Lcollier@ssoe.com
 - [Linkedin.com/in/collierlauren](https://www.linkedin.com/in/collierlauren)
 - Twitter: [@LLC_Collier](https://twitter.com/LLC_Collier)

Refer to Class Handout for step by step instructions to create checklists.

