

More Efficient Procurement and Reducing Costs

A Case Study with Aro Homes



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Systems Engineering
Aro Homes

October 18, 2023

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Safe harbor statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, timing, and pricing of any features or functionality described for Oracle's products may change and remains at the sole discretion of Oracle Corporation.



**NetSuite for
Homebuilders**



Reduce Waste



**Enable Startups
to Scale**



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Aro Homes



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Principal Product Manager
Oracle NetSuite









A decorative graphic on the left side of the slide, consisting of a grid of yellow chevrons pointing upwards, with some chevrons missing to create a stepped effect. To the right of the text, there is a cluster of small yellow circles.

Infill Production Homebuilder



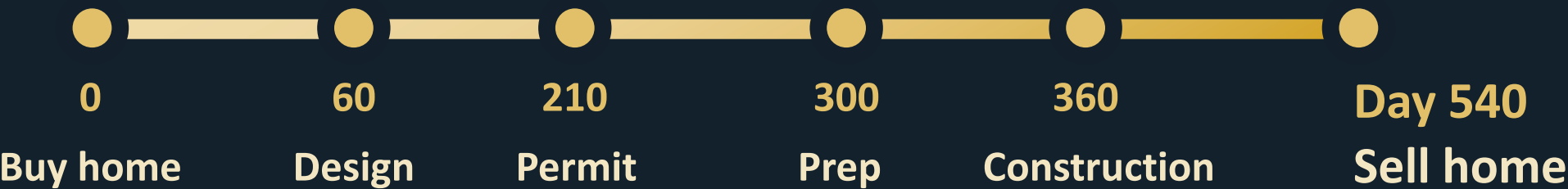


Aro Homes: Infill Production Homebuilder

Our process is 6x faster than industry standard

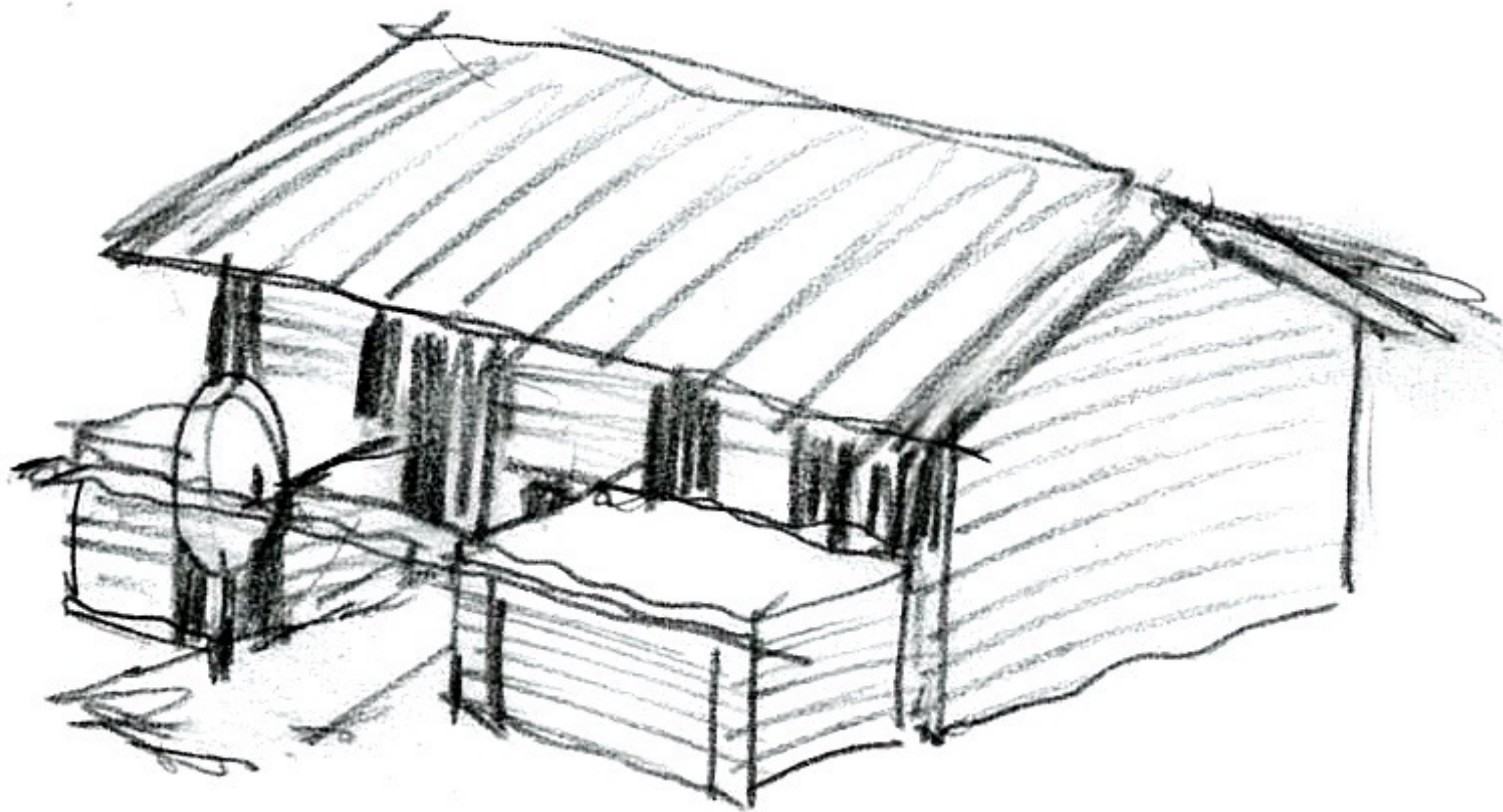


Standard



Aro Homes





Interim Procure-to-Pay and Operations System

Pain Points During ERP Selection and Set Up



Tighten Up Text –
can you make it
more concise?



Order Status



**Continuous
Improvement**



Track Costs



**Ordered vs
Delivered**



Material Demand



NetSuite at Aro Homes: Accounting, PLM, Manufacturing, and Field Management



ERP Decision Matrix

Why Choose NetSuite if You Are a Home Builder

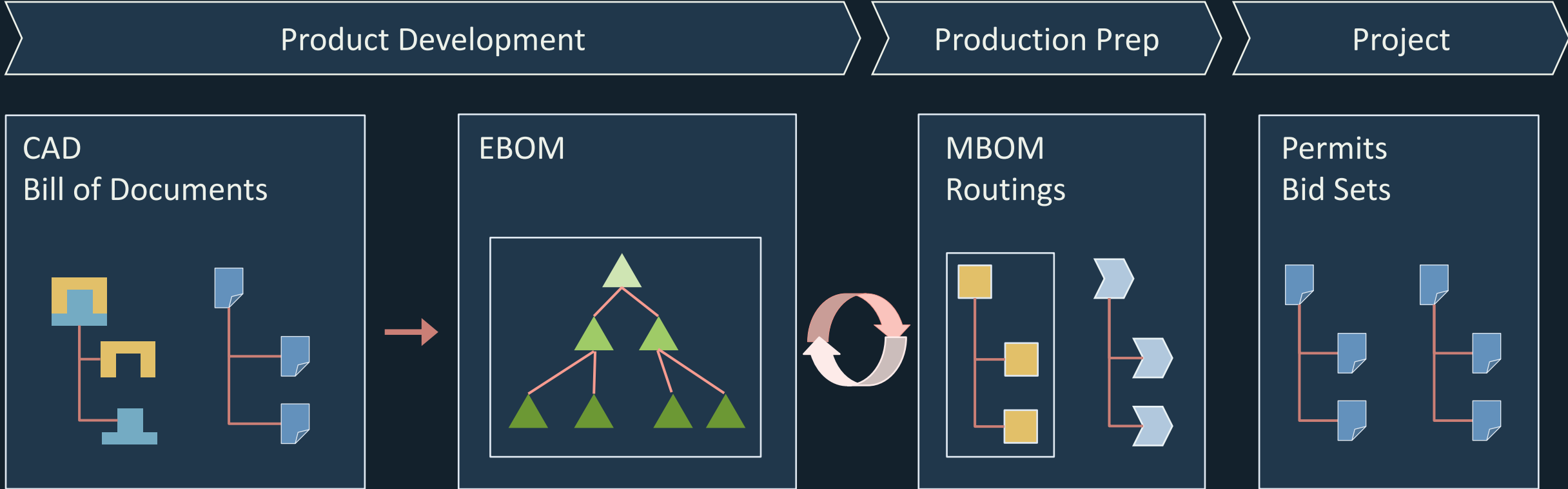


	Weighting	NetSuite	Dynamics	SAP ByDesign	Moducore	Manufacton
Vendor Management	100%	✓	✓	✓	✓	✓
Quote Management	90%	!	!	!	✗	✗
Part Numbering / Part Management	95%	✓	✓	✓	✓	!
BOM Creation	95%	✓	✓	✓	!	✓
BOM Management	90%	✓	✓	!	!	!
MRP / Production Planning	100%	✓	✓	✓	✓	✓
Inventory Management	95%	✓	✓	✓	✓	!
Procure to Pay	100%	✓	!	!	✗	✗
Inventory / Part Search	80%	!	!	!	!	!
Price	75%	!	✓	!	!	✗
Weighted Average		4.64	4.61	4.32	3.83	3.45



Product Development with NetSuite

Product Development Extended Through Project Execution

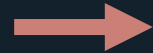


For more information, see:
Product Development with SAP PLM
Eudes Canuto, Bernd Daum, Michael Rodel



OnShape

- Fabrication Model
- Shop Drawings
- Field Drawings
- EBOM



NetSuite

- PLM
- Track Orders
- Track Inventory
- Track Demand
- Project Costs

Repetitive Manufacturing



Revit

- Permit Model
- Site Drawings
- Permit Drawings
- Subcontractor Drawings

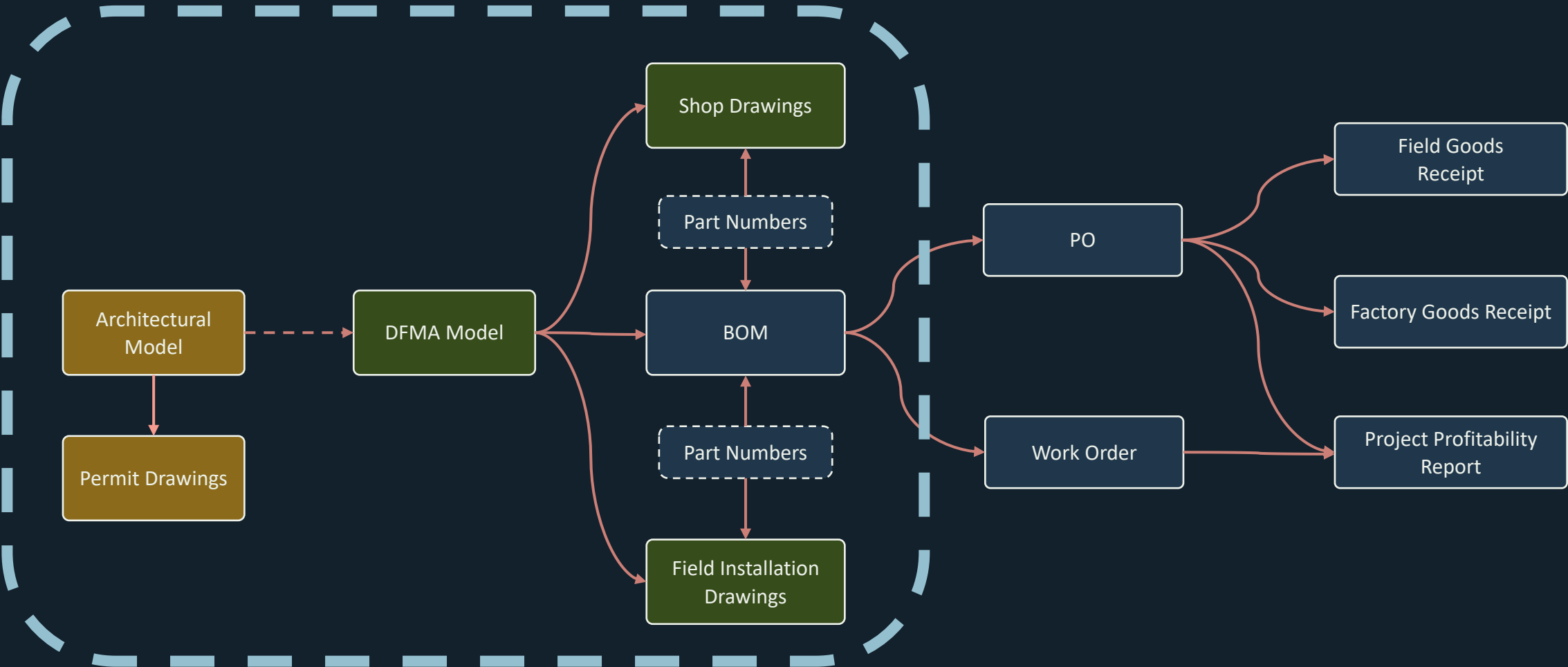
Project-Specific

NetSuite MVP System

Core Operations Technology Stack

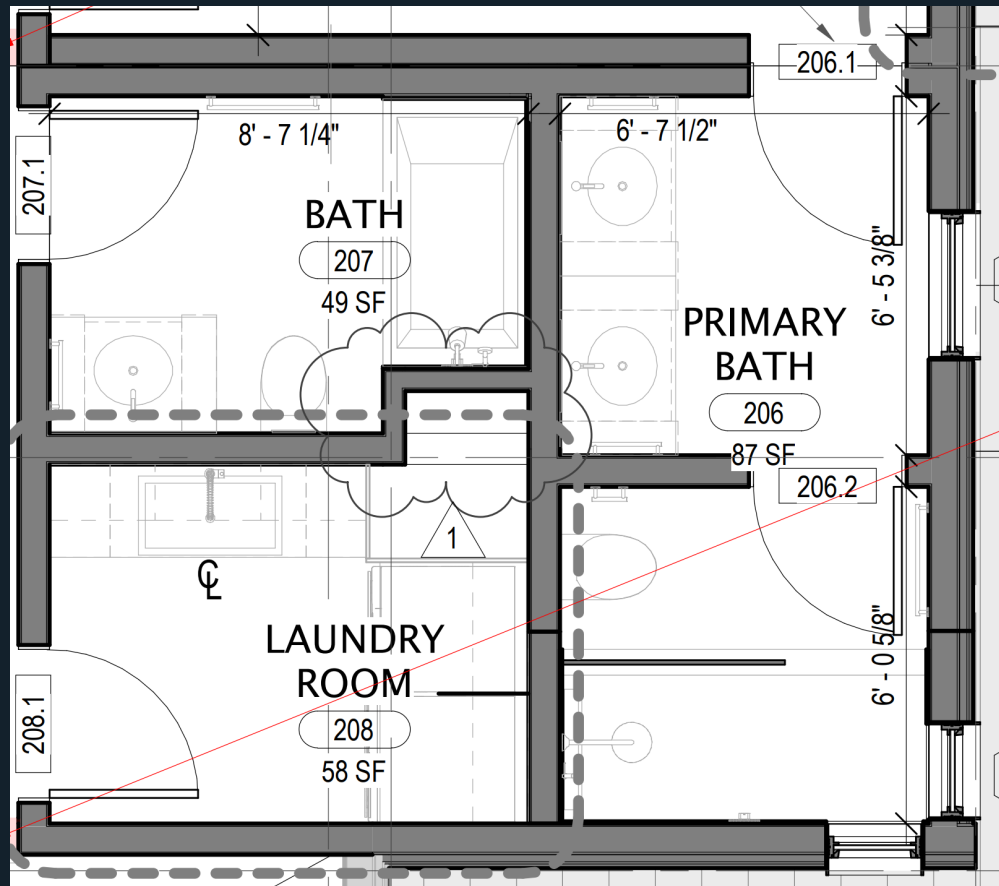


- Revit
- OnShape
- NetSuite

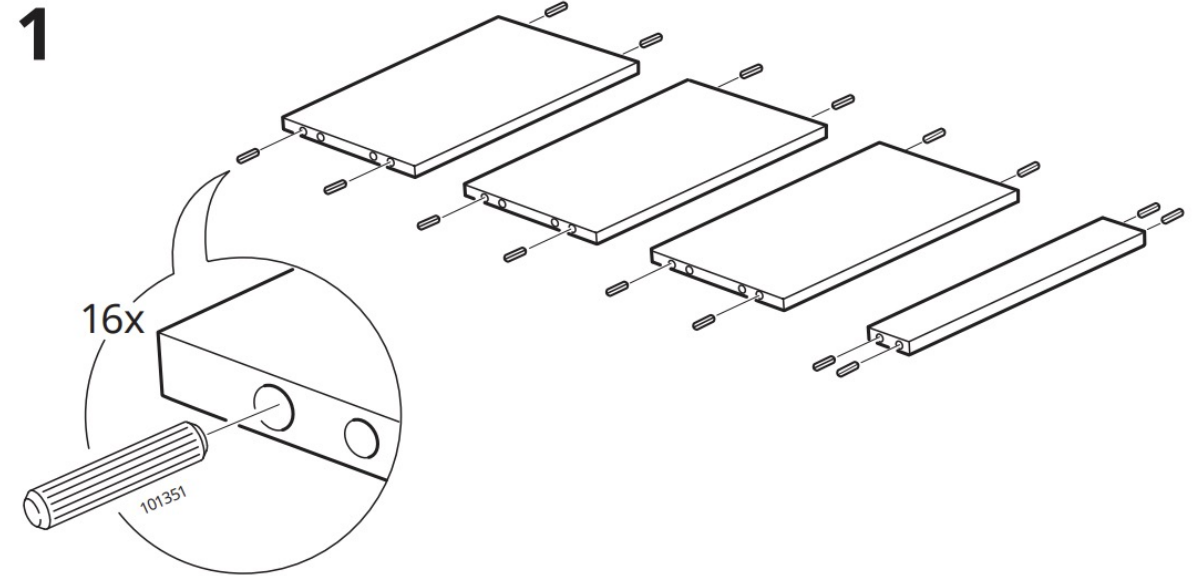
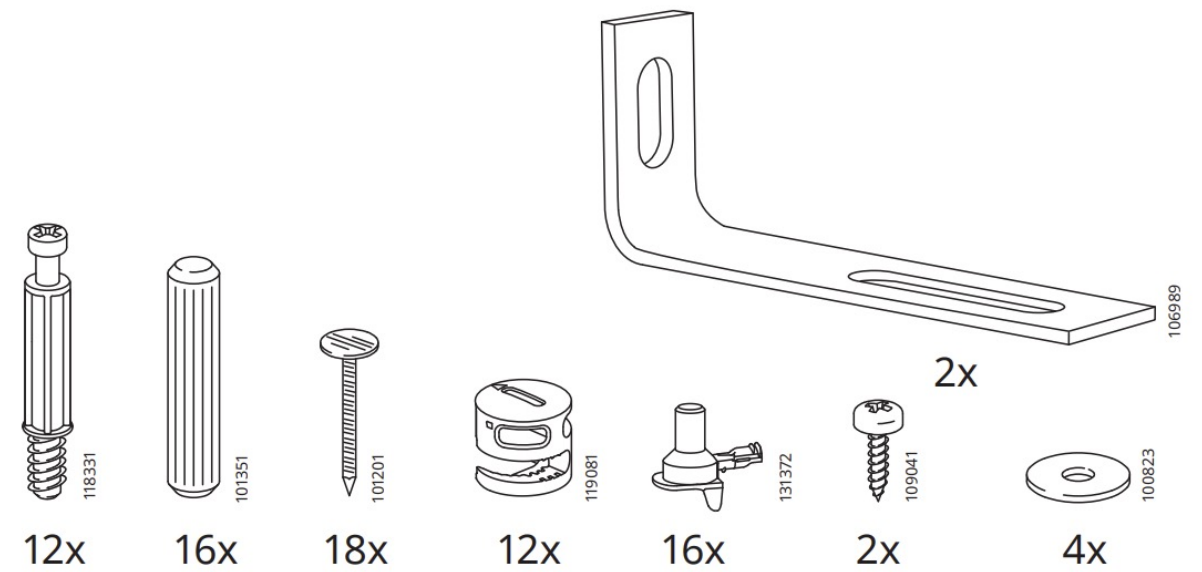
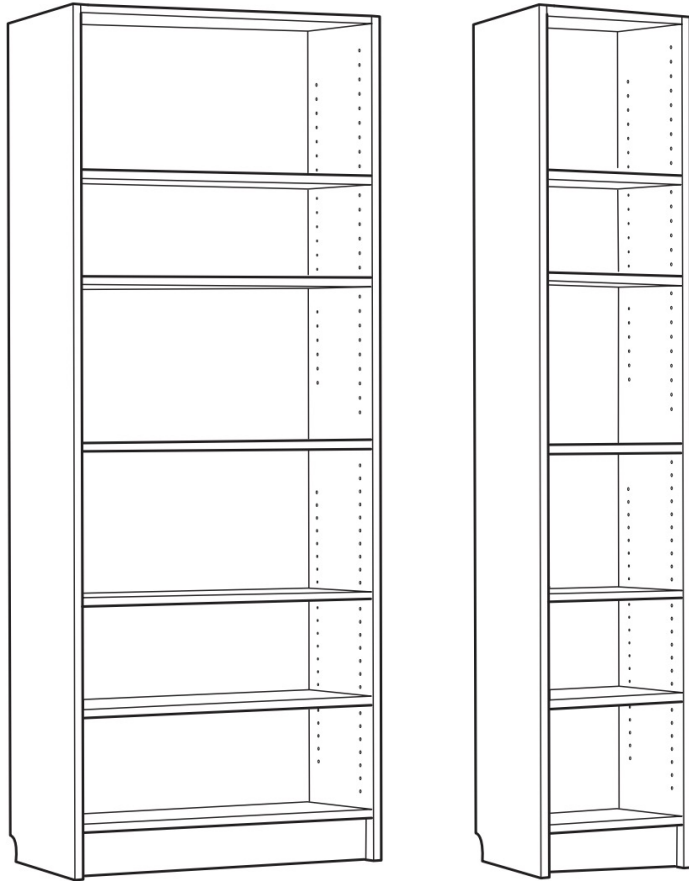


How We Design vs How The Industry Designs

Permit Drawings vs Design for Manufacturing and Assembly

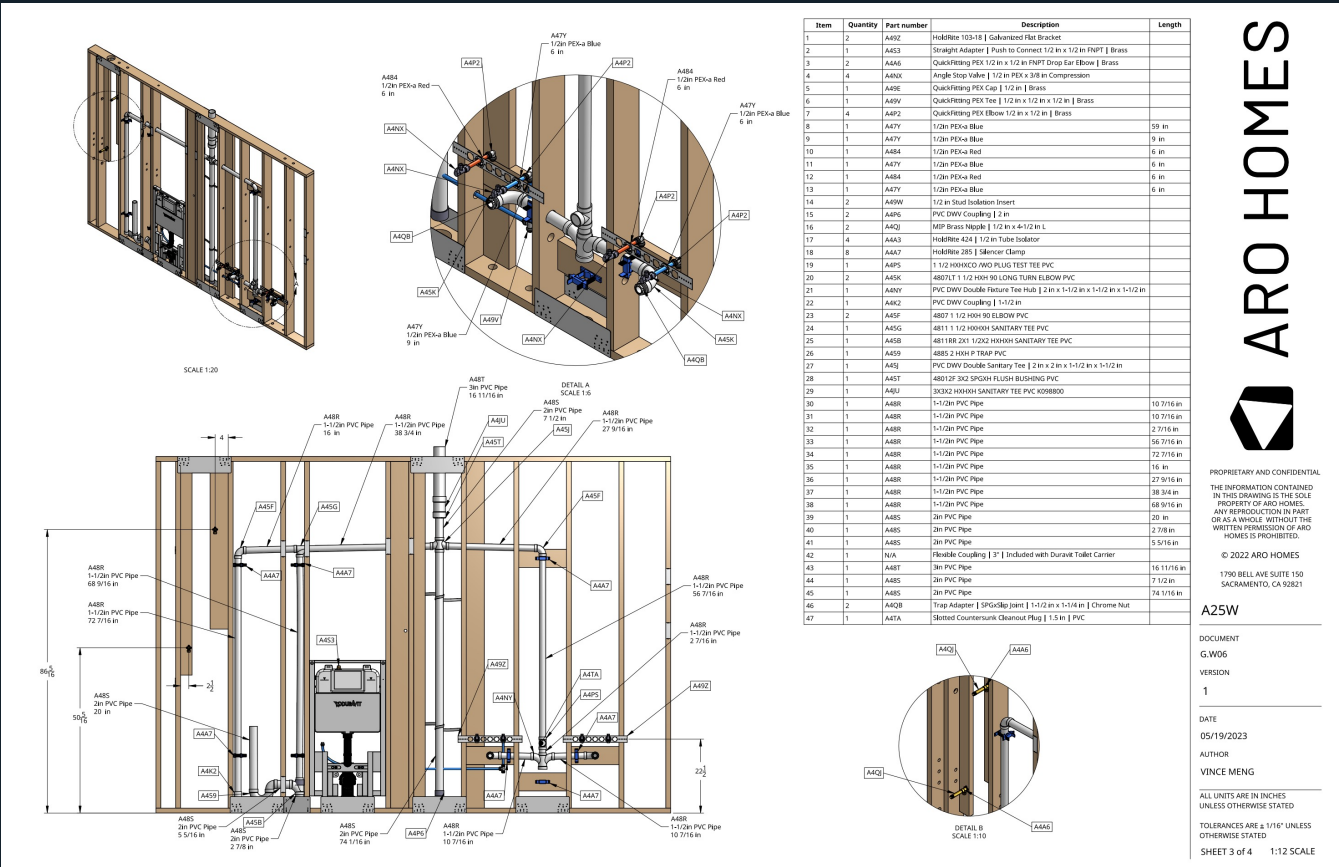


BILLY



Shop Drawings and Field Installation Drawings

IKEA Assembly Instructions for a House



ARO HOMES

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A25W

DOCUMENT
G/W06
VERSION
1

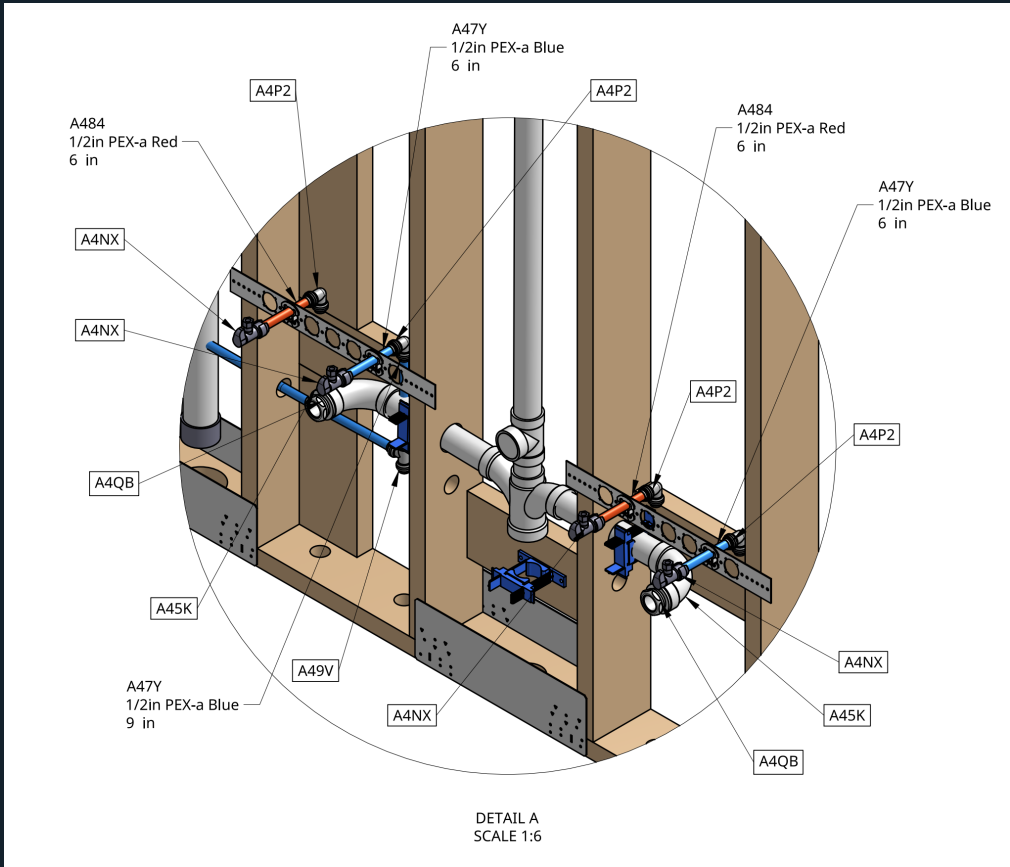
DATE
05/19/2023

AUTHOR
VINCE MENG

ALL UNITS ARE IN INCHES
UNLESS OTHERWISE STATED

TOLERANCES ARE ± 1/16" UNLESS
OTHERWISE STATED

SHEET 3 of 4 1:12 SCALE

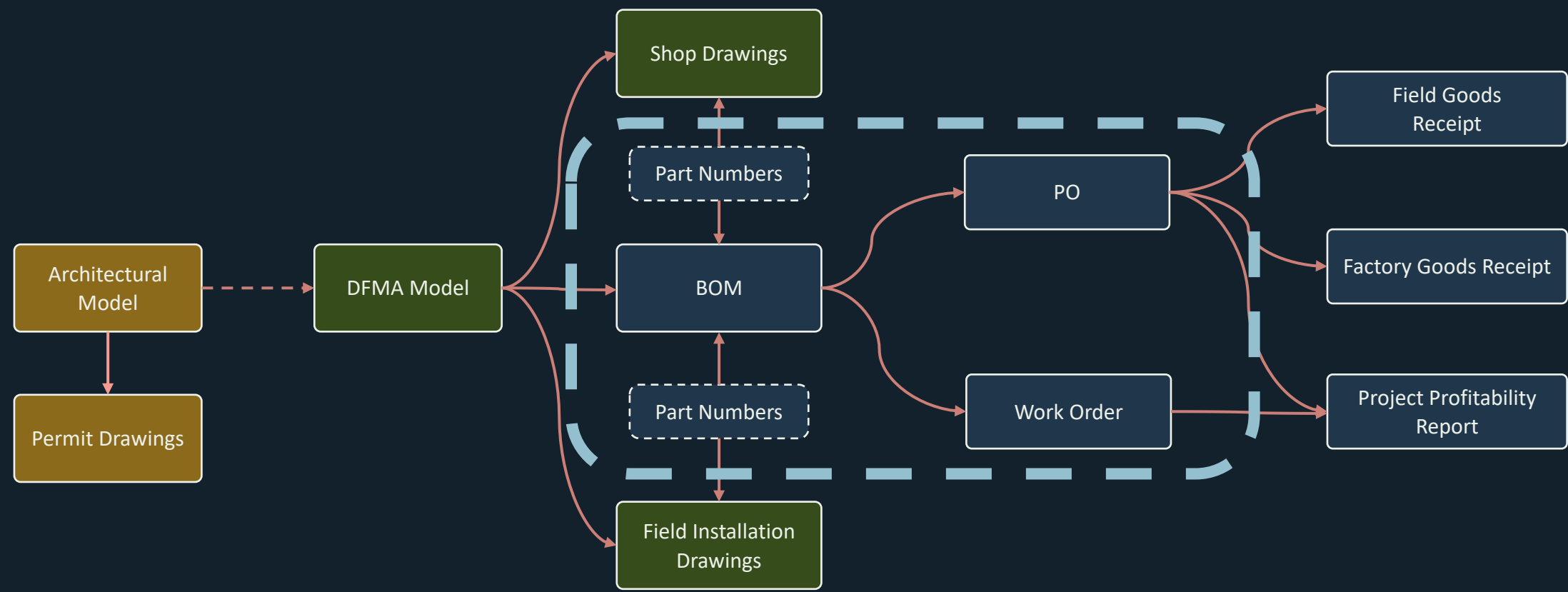


NetSuite MVP System

Core Operations Technology Stack



- Revit
- OnShape
- NetSuite



Design to Build & Item Numbering

System and Limitations

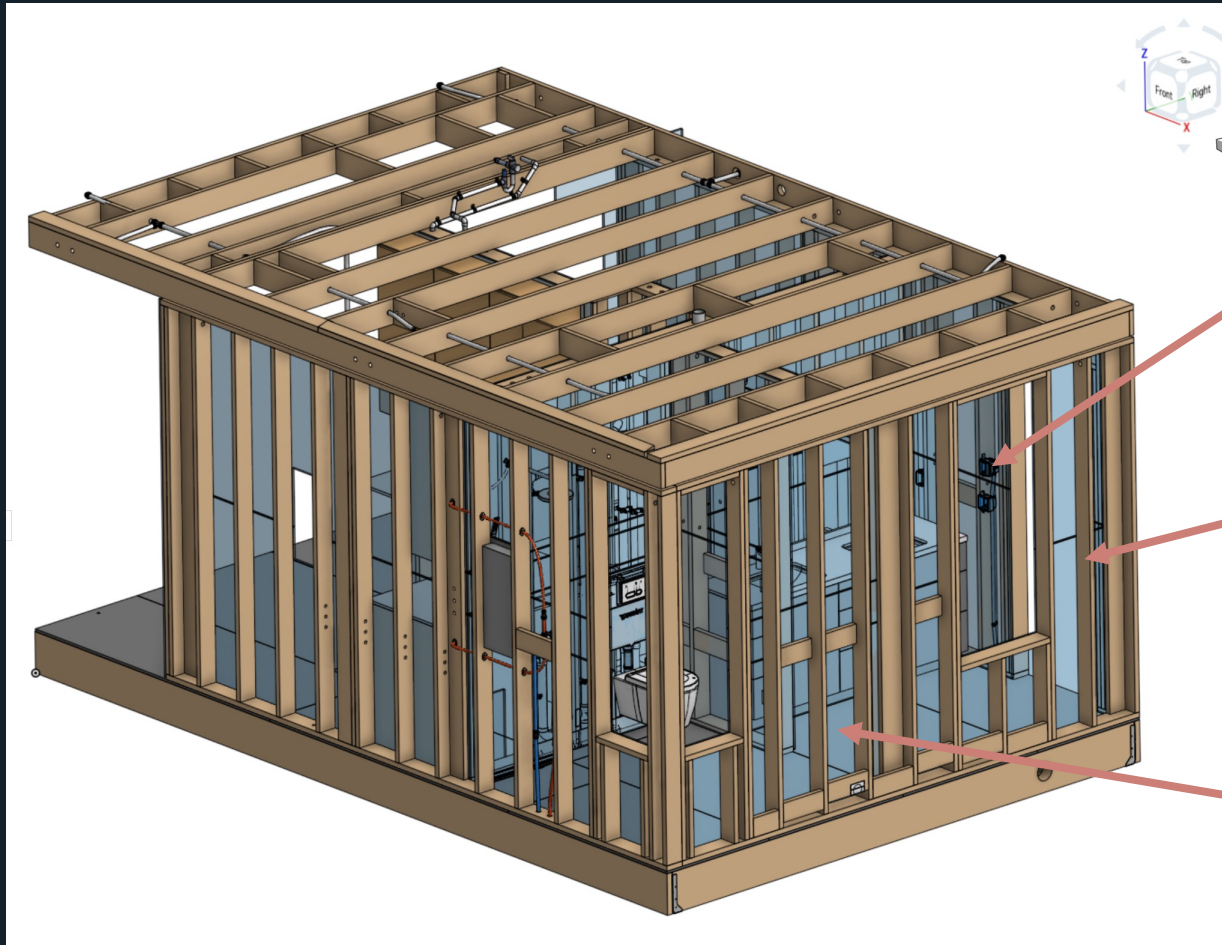


- Four-character item numbers
- On shop drawings and physical items
- Shop drawings have limited space
- Physical items have vendor constraints
 - Wood is labeled by vendor's CNC machine
 - Door hardware kits hand-label by supplier
- Exclude O, 0, I, 1, L, S, 5
 - $(10+26-7)^3 = 29^3 = 24,389$
 - $(10+26-7)^4 = 29^4 = 707,281$
- No additional information in numbers



Bill of Materials

Multiple Item Type Units of Measure



EA

LF

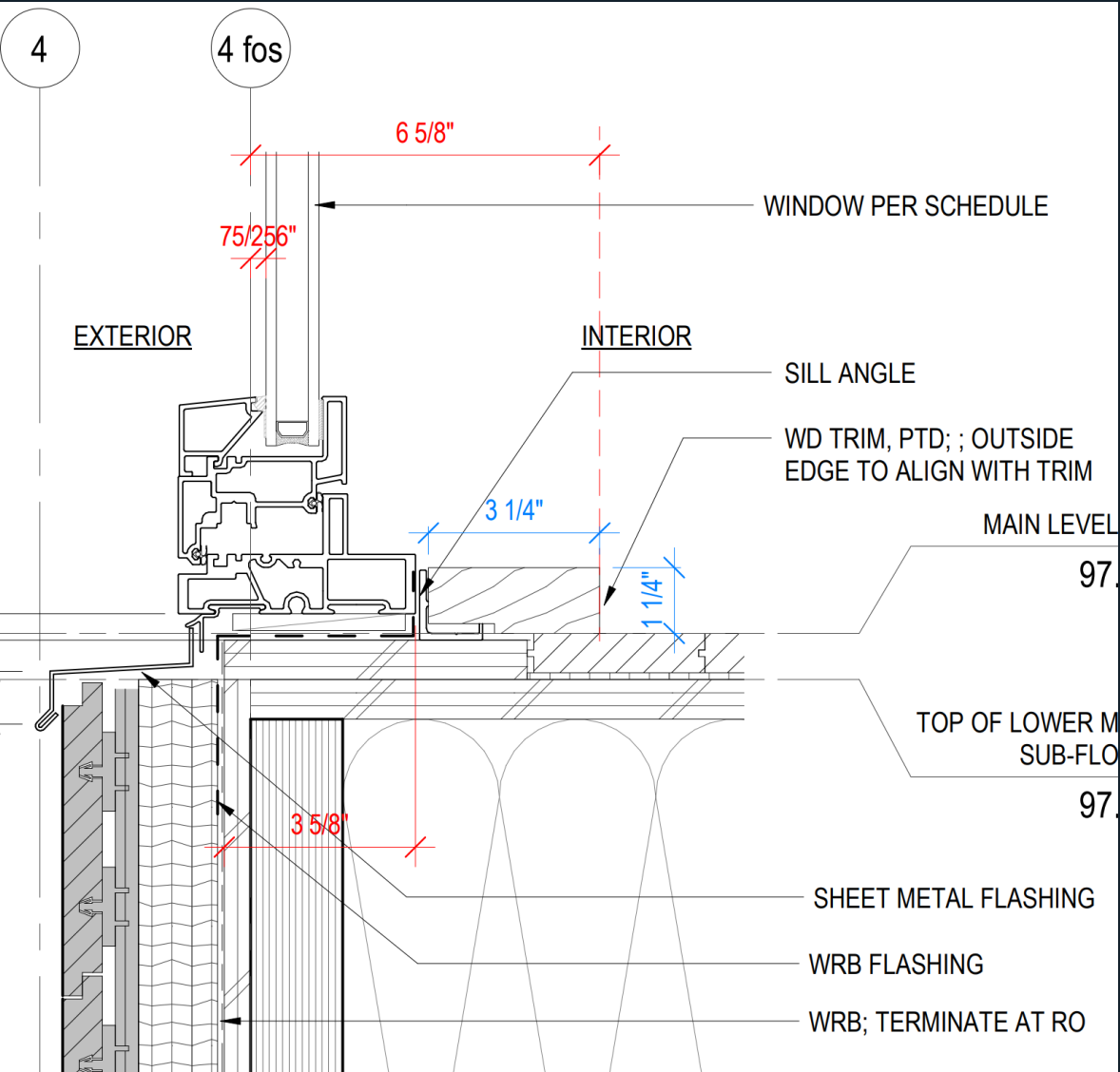
SF

BOM Structure

Capturing All Items in a Home



44%
Items Modeled



BOM Structure

Factory and Field Split

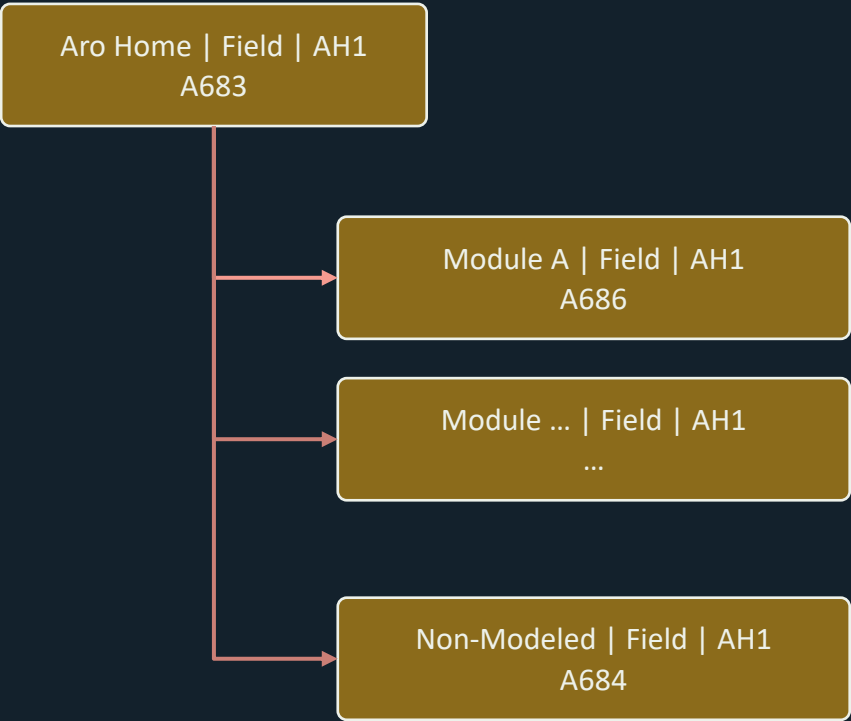
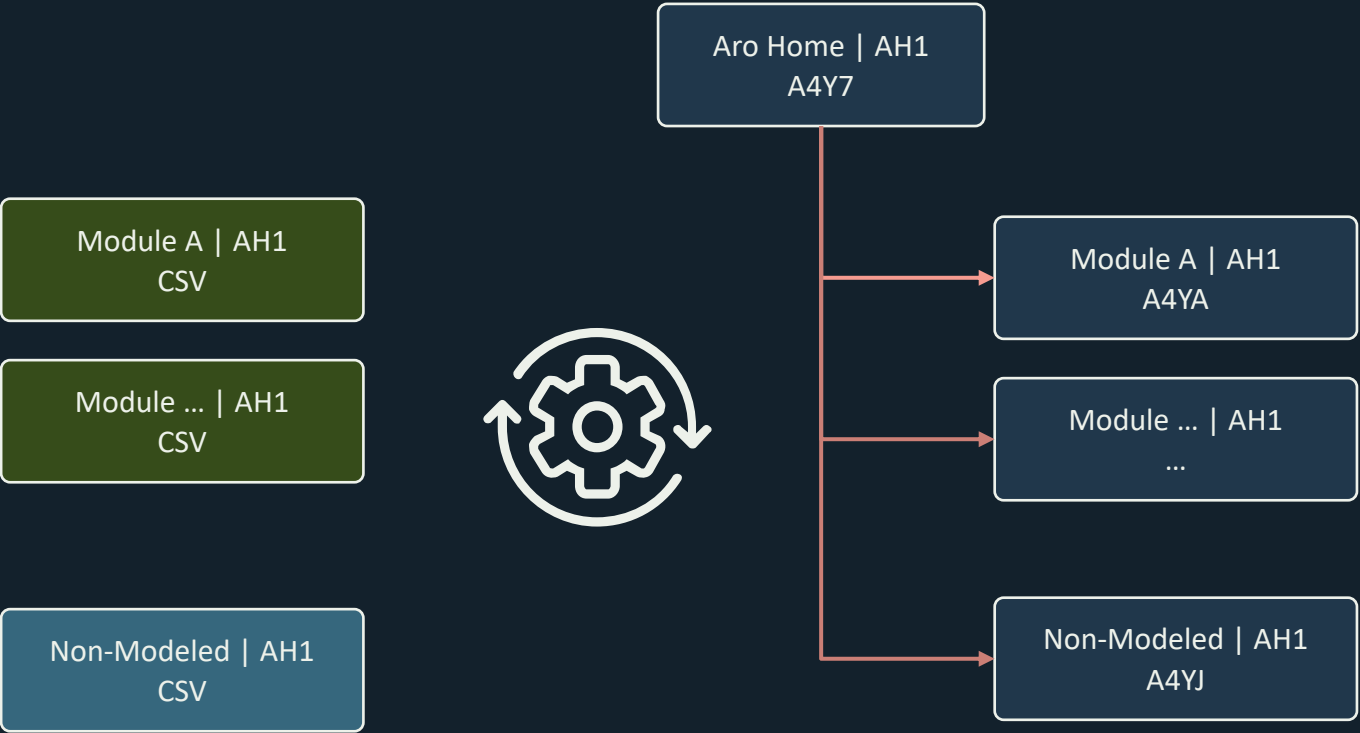
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OnShape

SmartSheet

NetSuite Plant

NetSuite Field



Plan to Produce & Procure to Pay at a Startup

No Credit and Cash-Up-Front Ordering; Minimal Ability to Keep Inventory; Product Churn



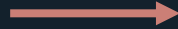
- Little capital, no credit
- Cash up front orders
- Frequently-iterating product
- Small inventory
- 30-day purchase cycle

Plan to Produce & Procure to Pay at a Startup

No Credit and Cash-Up-Front Ordering; Minimal Ability to Keep Inventory; Product Churn



Purchase Home



Submit Orders



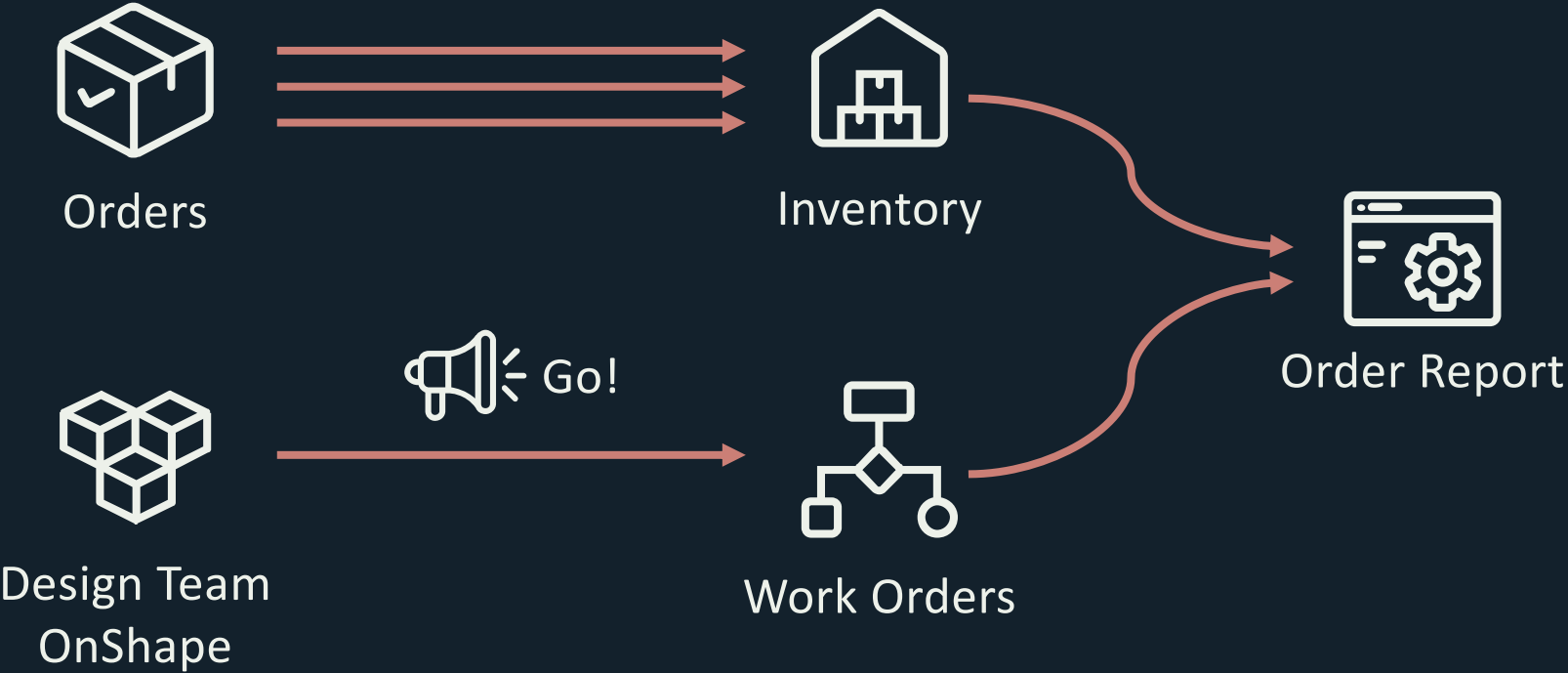
Items in Plant



30 Days

Plan to Produce & Procure to Pay at a Startup

No Credit and Cash-Up-Front Ordering; Minimal Ability to Keep Inventory; Product Churn



Order Items

Submit

LOCATION

Sac Plant

VENDOR *

- All -

☐ INCLUDE ITEMS WITH NO PREFERRED VENDOR

☐ INCLUDE ITEMS WHERE VENDOR IS NOT PREFERRED

PARENT ITEM

Time Phased ItemsReorder Point ItemsPlanned

Customize

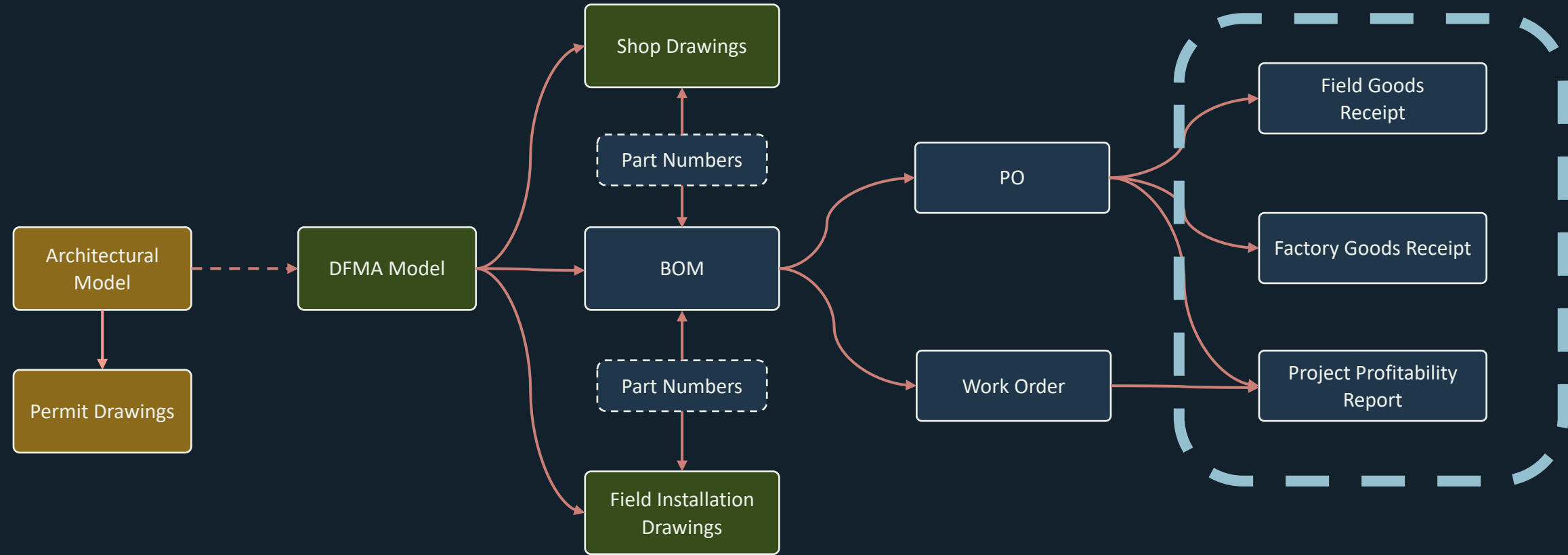
<input type="checkbox"/>	DEPARTMENT	CLASS	ITEM
<input type="checkbox"/>			A284 Uponor Sprinkler Adapter Nut
<input type="checkbox"/>			A423 Uponor Fire Sprinkler Adapter Elbow

NetSuite MVP System

Core Operations Technology Stack



- Revit
- OnShape
- NetSuite

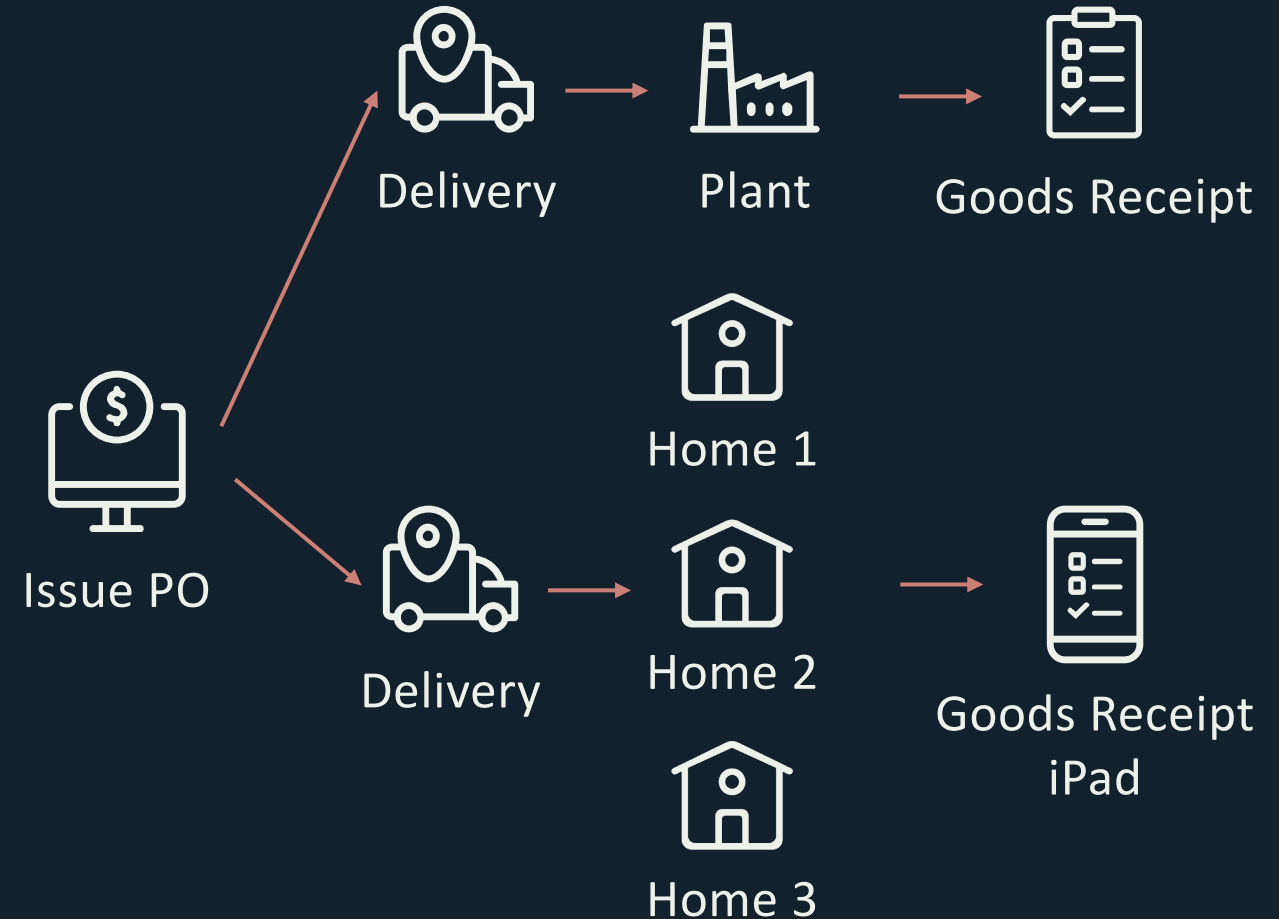


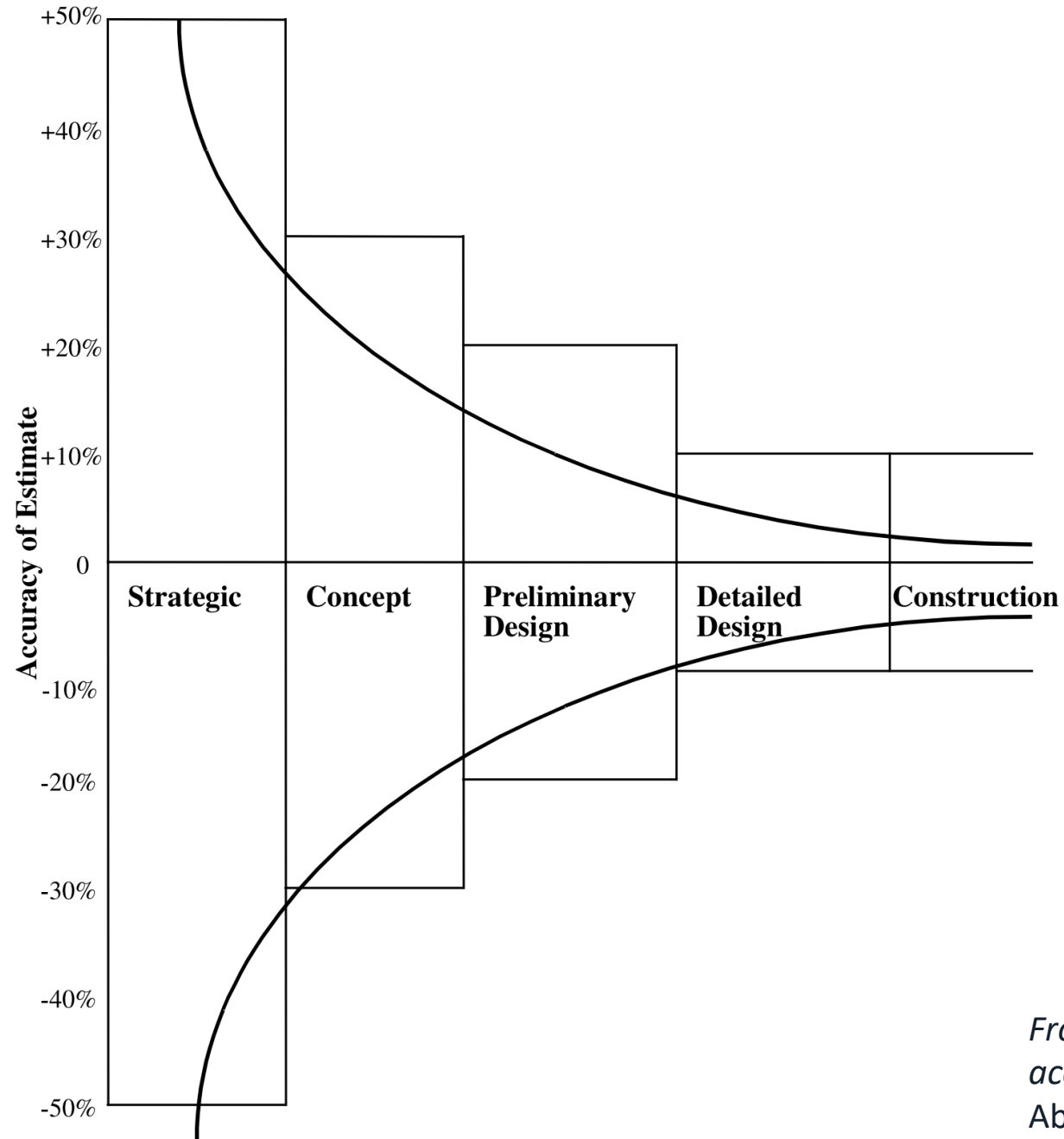
Field Goods Receipt

Tracking Deliveries to Multiple Job Sites



- Jobsites are fluid
- Hard tracking items delivered
- Field receiving with an iPad
- Simplified goods receipt
- Paperwork captured with photo
- Back office alerted to deliveries

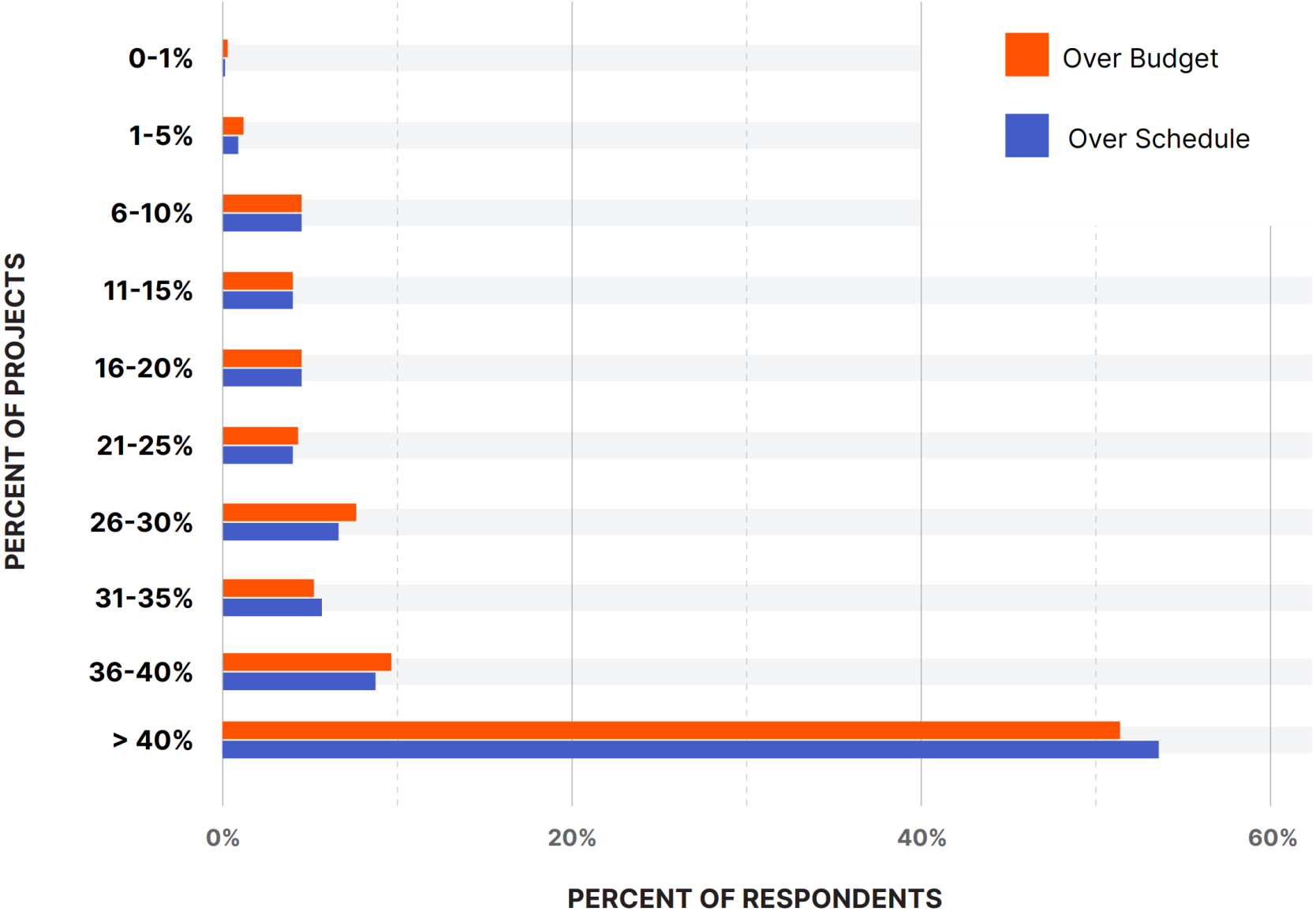




±50%

From: Estimating the cost of capital projects: an empirical study of accuracy levels for municipal government projects.
AbouRizk, Babey, and Karumanassery. 2011

Average Percentage of Projects Going Over Budget and Over Schedule



*Don't know responses not shown here.

Record to Report

Projects & Project Profitability Report

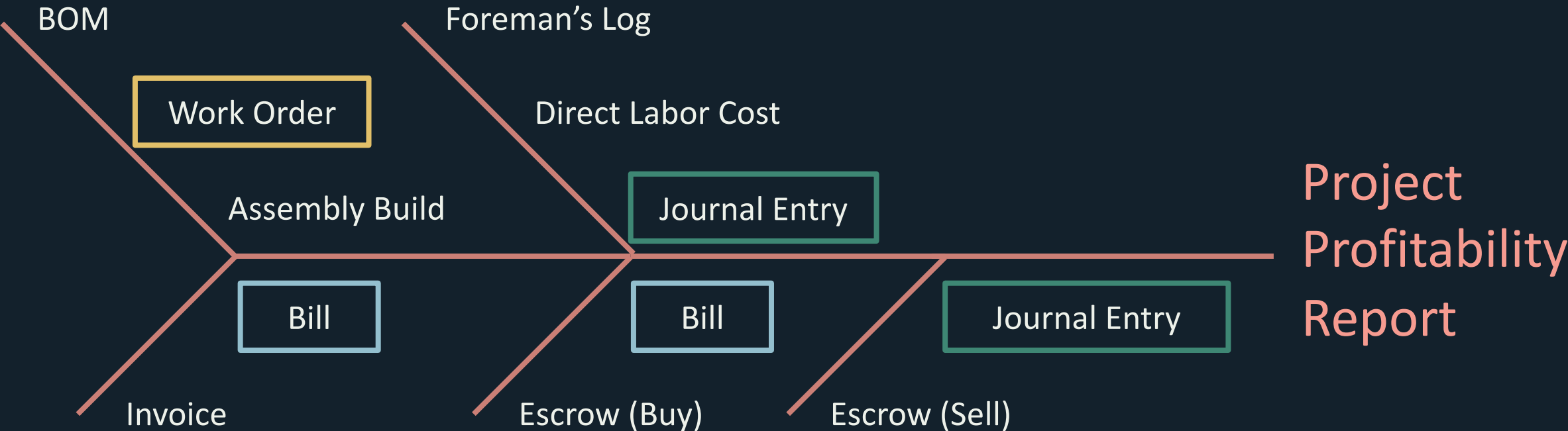
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Report Tagging Method

Project

Customer

Name





Technical Hurdles



Part Numbering and Next Part Number

Unique Part Numbering Scheme Required Custom SuiteScript

^^ ^^ ^^ ^^ ^^ ^^

- SuiteScript generates new item numbers
- Design, engineering, architecture, and back-office create items in parallel
- Based on custom search and 1-page script

PART NUMBERING

NEXT PART NUMBER

A62N

Items

#

PAGE INDEX

1 - 10

Items List •

NetSuite as PLM System

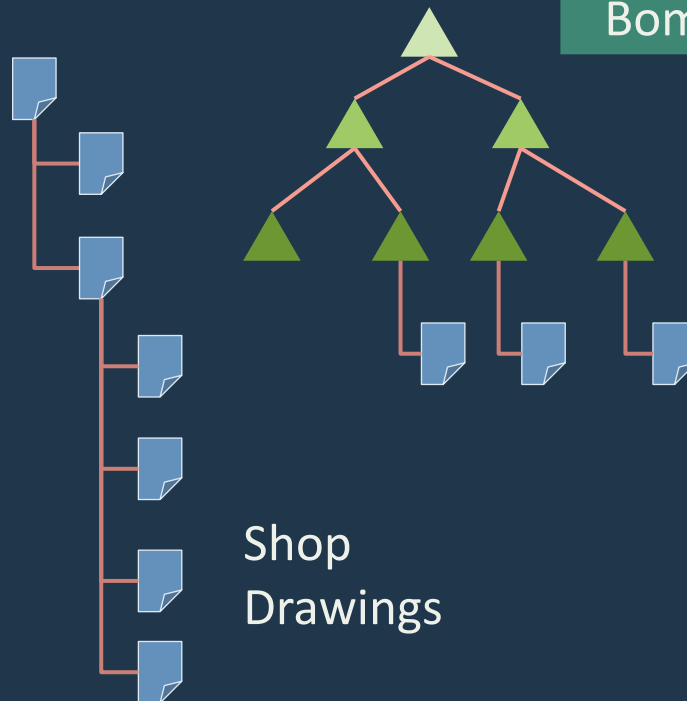
Simplifying Aro's Systems Architecture



- Custom fields enable PLM functionality
- Documents (PDFs) are uploaded to linked folder
- Design & Engineering teams trained on NetSuite
- No need for separate PLM and NetSuite integration

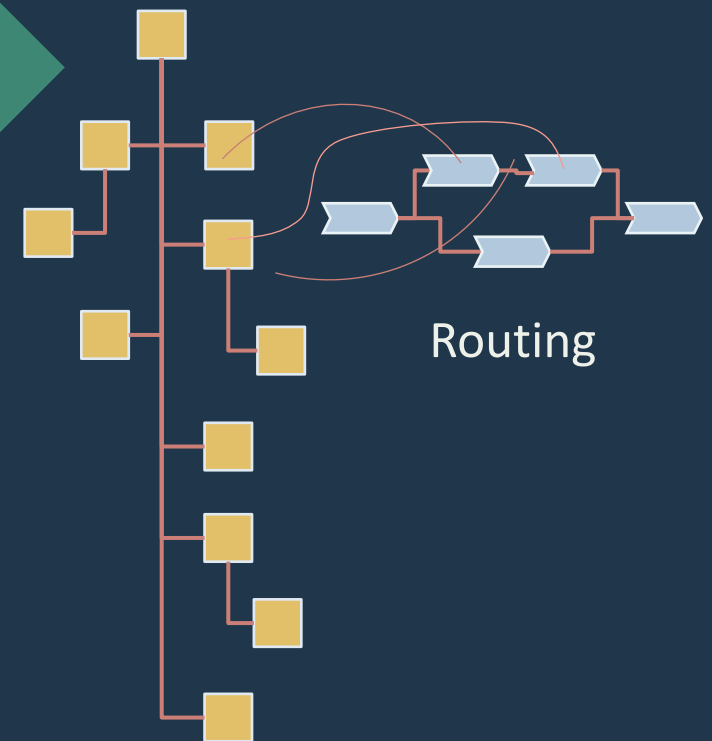
PDM / PLM Layer

Product Structure
Engineering BOM (EBOM)



ERP Layer

Manufacturing BOM (MBOM)



OnShape to NetSuite Link

Bomber C# Parser Converts Onshape EBOM into a NetSuite MBOM



- Step 1: pre-parser in Visual Studio
 - Converts OnShape LF and SF Units
 - Creates Plant and Field BOM revisions based on preferred location
 - Two-step process due to limitation of the NetSuite REST API
 - Generates multiple JSON files per BOM revision
- Step 2: Server-Side SuiteScript BOM Parser
 - Parses 50-item JSON file, creates BOM revision
 - Sets component yield

OnShape to NetSuite Link

Bomber C# Parser & SuiteScript Uploader

^ ^ ^ ^ ^ ^ ^



Bomber C# App



NetSuite OAuth 2 Login



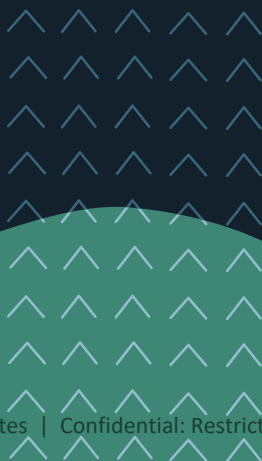
NetSuite



OnShape to NetSuite Link

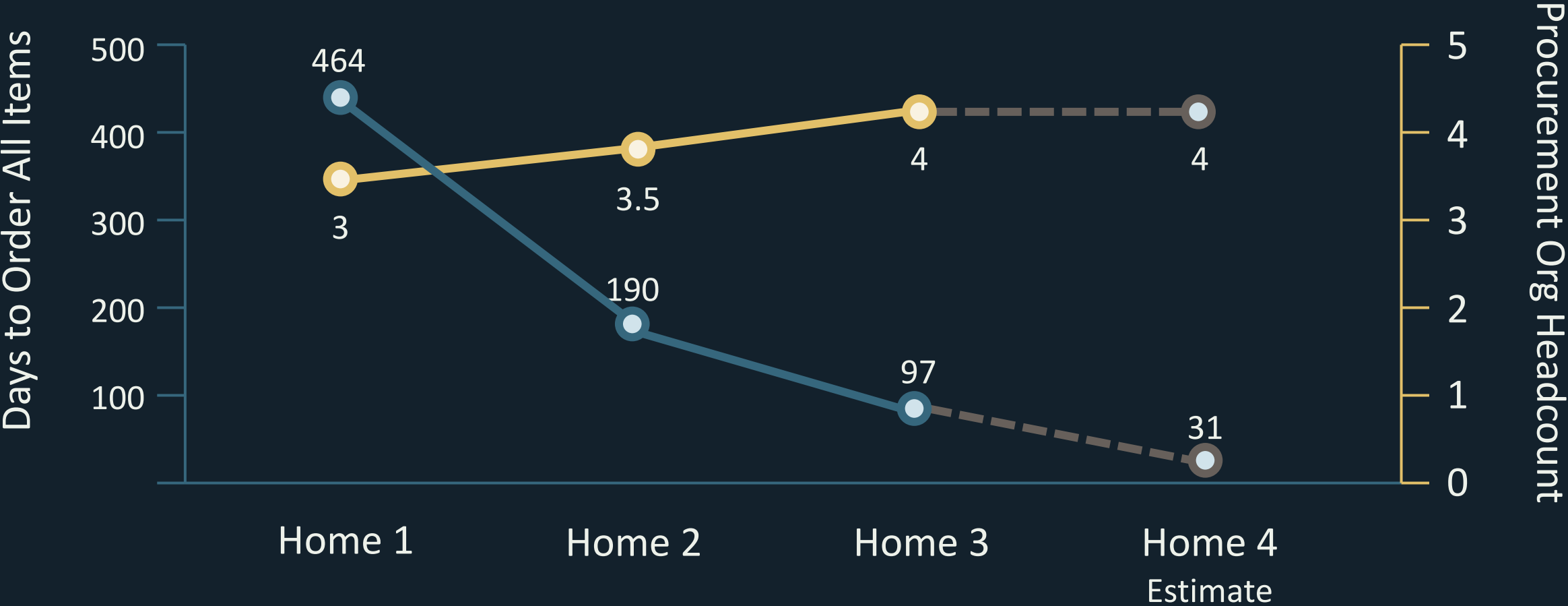


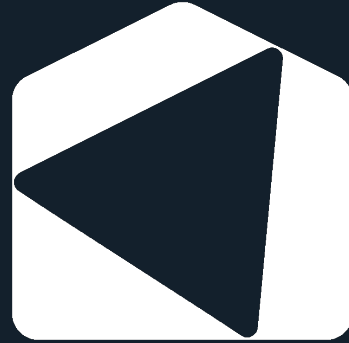
Results



Order Time Improvements

Reduction in Order Time Without an Increase in Headcount





ARO
HOMES

Thank You

patrick@aro.homes



SuiteWorld



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NETSUITE