

Convert an Industry-Leading Native App to React Native

sdmay19-02



Team Members:

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Walter Seymour

<u>Client: Buildertrend</u>

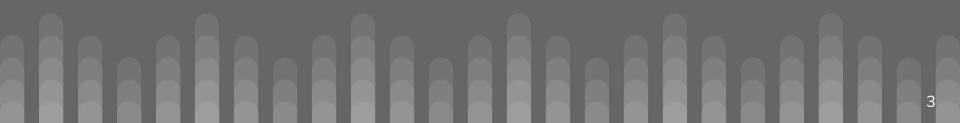
Jake Johnson Rich Kalasky Daric Teske

Faculty Advisor:

Mai Zheng



Introduction



About Our Client

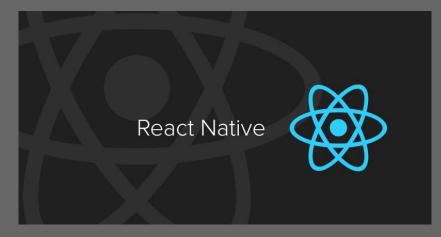


- Buildertrend provides a cloud-based construction management software
- Service includes, web and mobile applications for both Android and iOS
- **#1 Software** for home builders and remodelers

Problem Statement

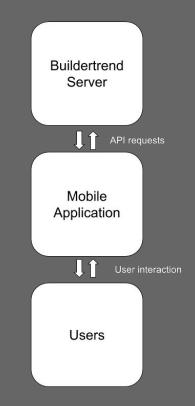


- Buildertrend currently has development teams for both iOS and Android applications
- Must develop, maintain, and test on both platforms
- React Native eliminates the need for development on two separate platforms





Conceptual Sketch





Requirements



Functional Requirements

- Users must be able to log in and out of their existing accounts
- User must must have access to all layers of project management
- Connect to Buildertrends servers and APIs
- Replicate subsets of project management

Non-Functional Requirements BUILDERTREND

- Consistency The application must replicate Buildertrend's current application with no major UX differences between platforms
- Usability The mobile application should be perform similar to native solutions
- Maintainability Code should be easy to understand for future developers



System Design & Development

BUILDERTREND

System Constraints

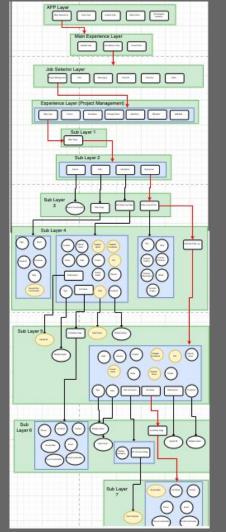
- Required use of React Native Framework
- Functionality needed to replicate Buildertrend's current app
- Integration with pre-existing technology
- Labor and time



Overview of Design

Login View	Loading View		Redux Store	
		equest rface		
Main Expe	erience	·		
NavBar V	/iew	Job S	Selector View	
	Curren	t Task		

Layered Architecture







APP Lawr		
APP Layer Attente Lerine Antine Mattine Matter		Select Job 🗸
Main Experience Layer textures anterior texture	APP Layer	Home
Job Belector Layer	Main Experience Login View Loading View Redux Store API Request Interface	Project Management
Experience Layer (Project Management)		
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Sub Layer 1		Daily Logs To-Do's Schedules Change Ord
Sub Layer 2		
ter te Atle Beye		
Sub Layer	Main Experience Layer	Selections Warranty Job Info
Sub Layer		
Sub Layer 4	NavBar View Job Selector View Current Task	Files
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		Photos Documents Videos
		Photos Documents videos
Sub Layer 5		Messaging
		Wessaying
	Job Selector Layer	
	Project Management Files Messaging Financial Directory Sales	Comments Messages
Bib		
		Financial
Side Layer		🖩 📰 Ş 🚃 🖸
		Budget Bills/POs Owner Invoi Bids

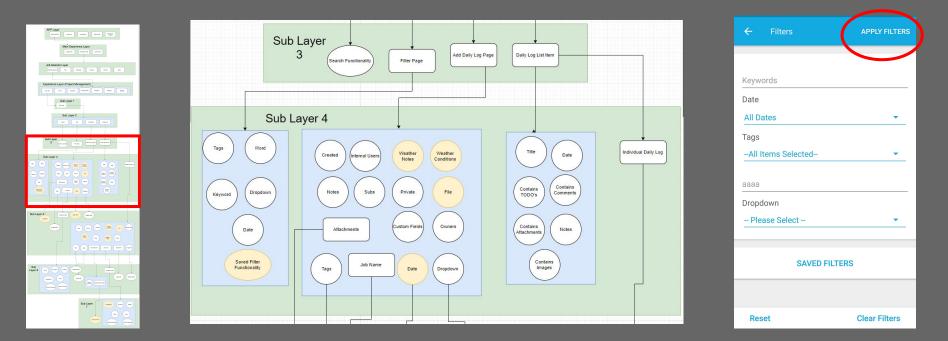
Overview

14

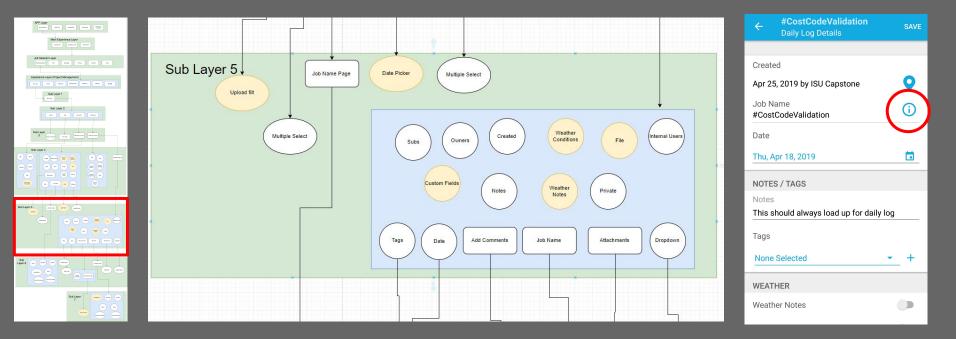


	Experience Layer (Project Management)	
Main Department Layer		Search
	Daily Logs To-Do's Schedules Change Orders Selections Warranty Job Info	#CostCodeValidation 12-10-2019 by ISU Capstone This is a super test
	Sub Layer 1	#CostCodeValidation 8-17-2019 by ISU Capstone Heck no
	Sub Layer 2	#CostCodeValidation 4-27-2019 by ISU Capstone this is a test
	Search Filter Add Button Display List	#CostCodeValidation 4-25-2019 by ISU Capstone Ih
		#CostCodeValidation 4-18-2019 by ISU Capstone



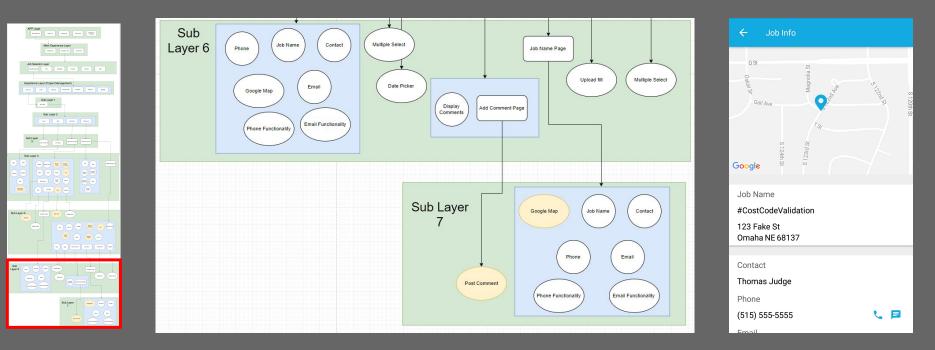






Overview





Overview



Implementation

Hardware & Software Platforms Buildertrend

- Hardware: Smart Phones & Macbooks
- Android Studio/XCode: Simulation
- TypeScript
- Jest and React Test Renderer
- Redux

- Gitlab
- TSLint
- Yarn
- Charles
- React Native



Our Approach

- Break it into three steps:
 - Initial Prototype
 - Structured Prototype
 - Final Prototype



Initial Prototype

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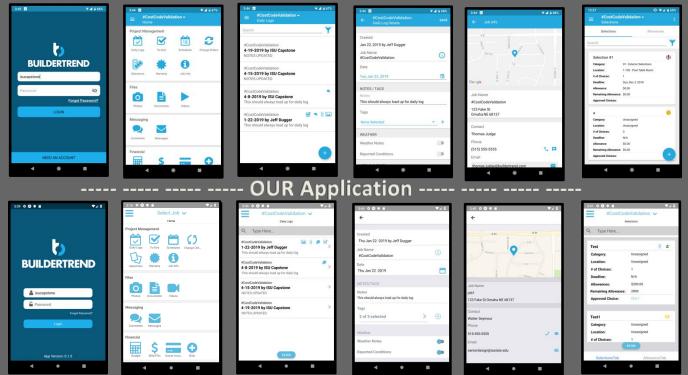
Structured Prototype

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Final Prototype

----- Buildertrend's CURRENT Application -----





Final Prototype

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Best Practices

- Ticket tracking
- Code Reviews
- Code formatting standards

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Discussion 54	Commits 25	Changes	23



Testing



Test Plan

- Continuous Integration (automated testing)
 - Unit testing (component based)
 - Functional testing (component interactions)
 - Integration Testing
 - Connection to servers
- Manual testing



Software Used

- Jest
 - Testing framework for Typescript
 - Snapshot testing for regression testing
- React Test Renderer
 - Provides a testing environment



Project & Risk Management

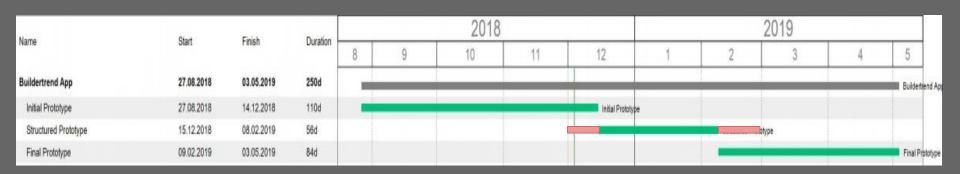
Task Responsibilities



- Frank Backend Service
 Coordinator
 - Login/Logout
 - Integration with BT backend
- Victor Project Designer
 - Architecture Implementation
 - React Navigation
 - Redux Store
- Kyle Communications Lead
 - Ambassador for Client
 - Arranges meetings

- Mich UI Developer
 - Implements UI Components
 - UI Styling
- Lucas UI Developer
 - Implements UI components
 - UI Styling
- Walter UI Developer
 - Implements UI Components
 - UI Styling





- Three prototypes (mentioned earlier)
- Our Prototypes began to blend together
- Structured Prototype took longer than expected

Risks & Mitigation



- Relying on captured HTTP requests (Anticipated)
 - Mitigated using Charles and confirmed with our client
- Lacking Understanding of React Native Framework (Anticipated)
 - Took time to learn and read documentation
- Large UI changes on an actively developed application (Actual)
 - Discussed new expectations with Buildertrend

Lessons Learned



- Meet consistently with all affiliated members of the project
 - Keeps all members up to date
 - Keeps the project on correct track
- Separate platforms are essential for organization
 - Slack/Gitlab for code
 - Groupme for project management
 - Google Applications for important documents



Conclusion

Future Work



- Final code handoff and final meeting this week
- Buildertrend has all of our contact information and we are willing to help clear up any confusion
- Full-time developers at Buildertrend will be taking our existing project and investigate the pros and cons of React Native as a replacement plan



Closing Remarks

- We are really grateful to have had such an amazing team, client, and advisor!
- Thank you to lowa State for connecting us with a company in the industry!
- Thank you all for coming out to help support the senior design program at ISU!



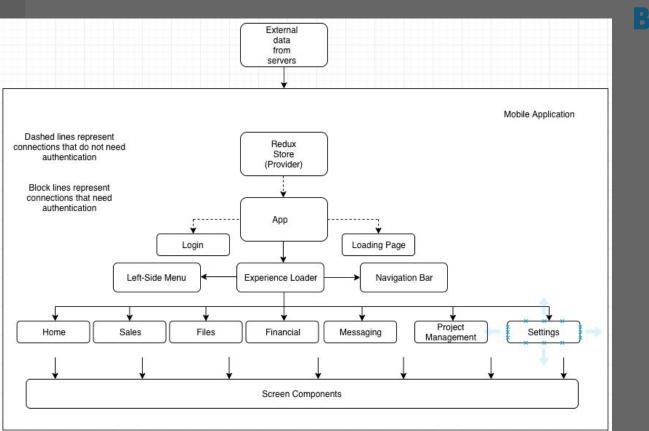
Thank You!



Questions?

39

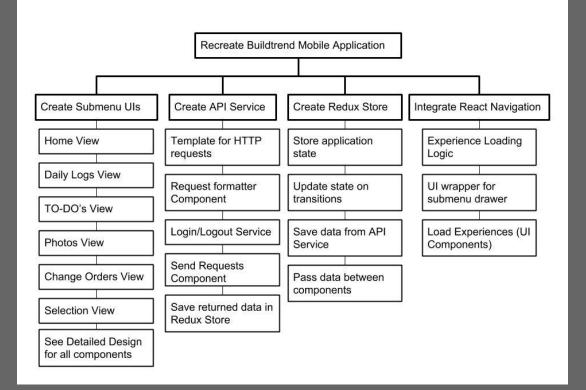
Conceptual Sketch



BUILDERTREND

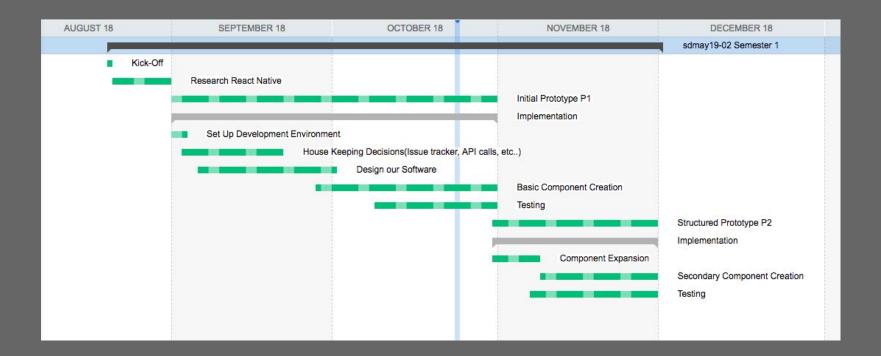
Functional Decomposition





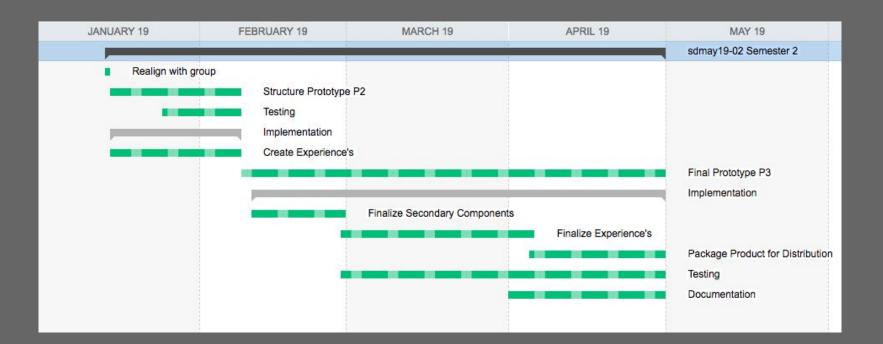
Gantt Chart Semester 1





Gantt Chart Semester 2





Detailed Design



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Mair	n Experience				
lavE	Bar View Job Sele	ector View			
	Current Task				1
			[[]	Schedules	Photos
	Home View	Daily Logs View	TO-DOs View	View	View
	Change Orders View	Selections View	Warranty View	Job Info View	Messages View
	Documents View	Videos View	Comments View	Comments View	Budget View
	Bill/POs View	Bill/POs View Owner Payment View		Contacts View	Subs View
	Internal Users	Directory View	Lead Opportunity View	Lead Activities View	