Team A6

Rip Lyster, Niko Gupta, Richard Deng

Add your 12 slides after this slide… [remember, 12 min talk + 3 min Q/A]

For more information about formatting or importing slides see:
https://gsuite.google.com/learning-center/products/slides/get-started/

Make sure to cover:
- Use Case
- Requirements
- Solution Approach
- Testing, Verification and Metrics
- Tasks and Division of Labor
- Schedule

Use Cases (Home)

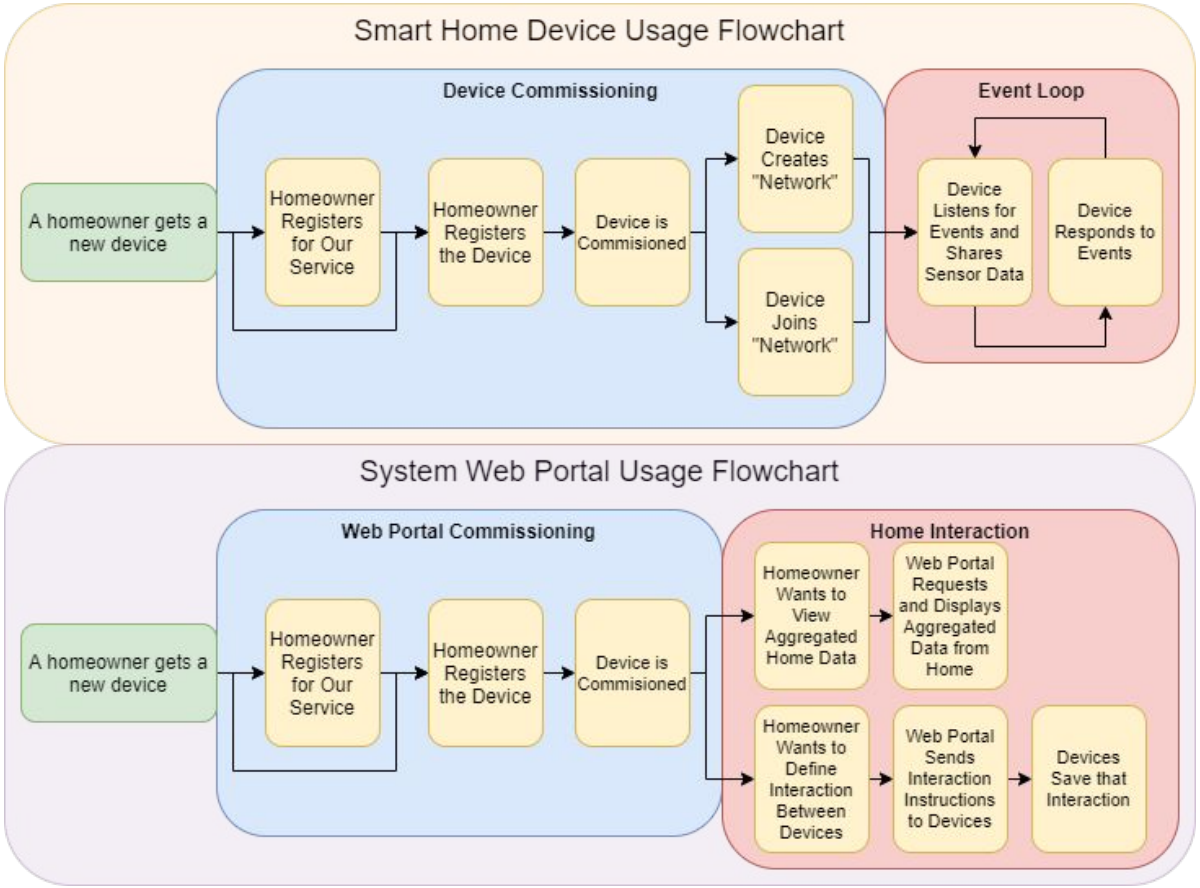
- In house data storage — more private
- No central hub — cheaper, more fault tolerant
- Can access smart home even if servers go down
  - Alexa offers localized home support
  - If you aren't home, and samsung_smart_aws goes down, you're in trouble. However our solution hosts it at your home, so you can still access it
- From device manufacturers point of view, less load on their servers since enterprise settings generate more data / require more compute

- Not part of project: in the future, our platform could be used to provide other functionality, such as extended storage and compute

Scope

- Only for home applications
- Nothing to do with businesses and business smart building solutions
- # of devices to scale to is not a requirement because we don’t have unlimited funds to test large amount of scaling

System Workflow



Requirements

Description	Requirement	Justification
Command to Action Latency	<100 ms	< 0.1s considered “instantaneous” Industry standard specification https://ecfsapi.fcc.gov/file/6520222942.pdf
New device commission time	< 3 minutes	Industry leading iot devices have software setup times >= 3 minutes
Internet Protocol	IPv6	IPv6 industry standard, IPv4 addressing shortage https://www.micrium.com/iot/devices/
Device Specifications	4 Core CPU, 400 gb memory	Redis storage device requirements (1 year data persistence, replication dimension >= 2)

Requirements

Description	Requirement	Justification
Cost	< $75	Phillips Hue $55, non commodified parts and capable base
Power Outage Resiliency	< 10 seconds data lost	Nodes back up every ten seconds; therefore no more than ten seconds of data should ever be lost
Internet Resiliency	no lost functionality	If the network disconnects from the internet, the system should still function fully.

Solution Approach

- Smart Home devices connected to each other on a network
- Pick 2-3 devices to demonstrate Smart Home interactions
  - “If my alarm goes off, I want my lights to brighten over 5 minutes”
- Distributed datastore on those Smart Home devices

Testing, Verification, and Metrics

- Testing Resiliency
  - Chaos engineering (taking down devices in network, check memory for any differences)
- Testing Device Commission Time
  - Add device to network
    - Time “software connection time”
    - Reset devices and repeat to ensure time does not increase with # of devices on network
- Testing IoT device logic
  - Unit tests for each device
  - Connect devices, set up interaction
    - Inject input to one device, observe behavior in the other

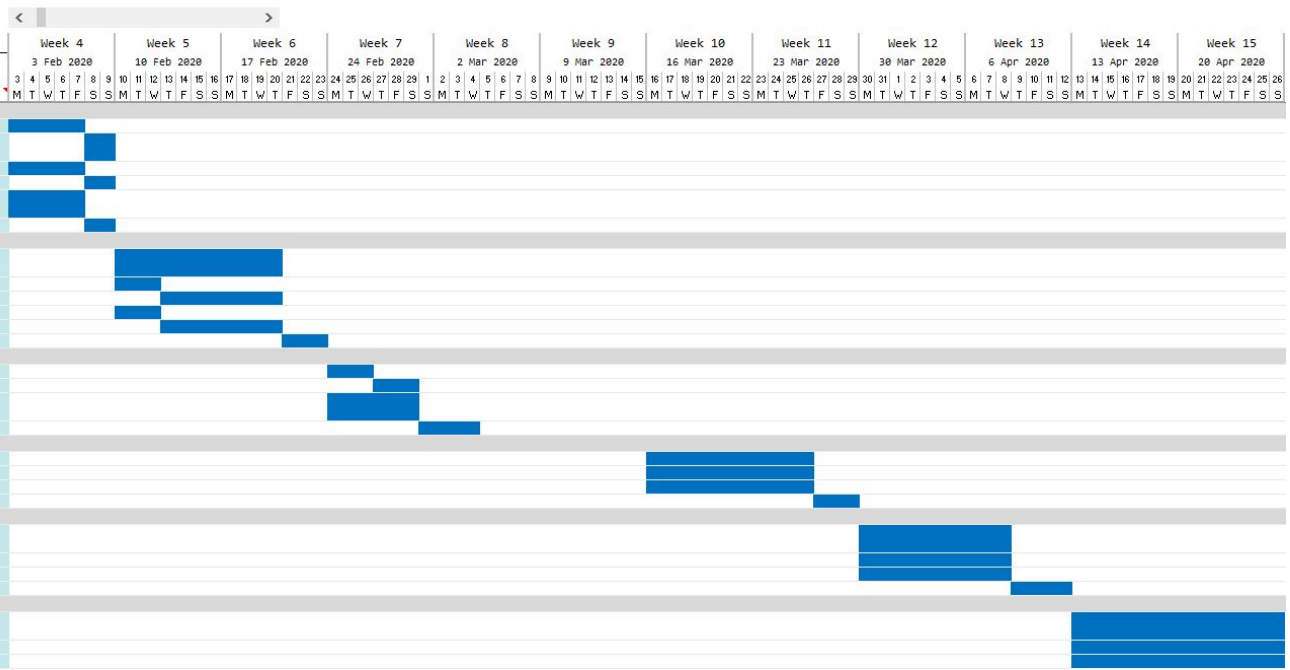
Schedule and Task Division

221 Bums Capstone Project Schedule

Rip Lyster, Richard Deng, Niko Gupta

Project Start Date: 1/13/2020 (Monday) | Display Week: 4

WBS	TASK	LEAD	START	END	DAYS	% DONE
1	**Research Design Elements**					
1.1	Research Decide on Devices	Rip	Mon 2/03/20	Fri 2/07/20	5	0%
1.1.1	Decide what interactions those devices will have	Rip	Sat 2/08/20	Sun 2/09/20	2	0%
1.2	Research Storage System for Devices	Richard	Mon 2/03/20	Fri 2/07/20	5	0%
1.2.1	Decide on Storage System	Richard	Sat 2/08/20	Sun 2/09/20	2	0%
1.3	Research Interaction System for Devices	Niko	Mon 2/03/20	Fri 2/07/20	5	0%
1.3.1	Decide on Interaction System	Niko	Sat 2/08/20	Sun 2/09/20	2	0%
2	**Build Main Systems**					
2.1	PCB Design and Order for MVP Devices	Rip	Mon 2/10/20	Thu 2/20/20	11	0%
2.2	Webapp Framework Design Decisions	Everyone	Mon 2/10/20	Wed 2/12/20	3	0%
2.2.1	Webapp Framwork Demo	Richard	Thu 2/13/20	Thu 2/20/20	8	0%
2.3	Interaction Layer Design Decisions	Everyone	Mon 2/10/20	Wed 2/12/20	3	0%
2.3.1	Interaction Layer Demo	Niko	Thu 2/13/20	Thu 2/20/20	8	0%
2.4	Design Presentation Work	Everyone	Fri 2/21/20	Sun 2/23/20	3	0%
3	**Integrate Main System**			-		
3.1	Test PCB	Rip	Mon 2/24/20	Wed 2/26/20	3	0%
3.2	Write PCB Interaction Layer	Rip	Thu 2/27/20	Sat 2/29/20	3	0%
3.3	Integrate Webapp and Interaction Layer	Niko & Richard	Mon 2/24/20	Sat 2/29/20	6	0%
3.4	Integrate PCB and Interaction Layer	Everyone	Sun 3/01/20	Wed 3/04/20	4	0%
4	**Second Iteration of System**			-		
4.1	Decide and Design Final Devices	Rip	Mon 3/16/20	Thu 3/26/20	11	0%
4.2	Design and Build Commissioning	Niko	Mon 3/16/20	Thu 3/26/20	11	0%
4.3	Design Detailed Interaction Builder	Richard	Mon 3/16/20	Thu 3/26/20	11	0%
4.4	Free Space, Extra Time	Richard	Fri 3/27/20	Sun 3/29/20	3	0%
5	**Second Integration Phase**			-		
5.1	Integrate New PCBs with Interaction Layer	Rip	Mon 3/30/20	Wed 4/08/20	10	0%
5.2	Integrate Commissioning to Webapp	Niko	Mon 3/30/20	Wed 4/08/20	10	0%
5.3	Create Demo Interactions	Richard	Mon 3/30/20	Wed 4/08/20	10	0%
5.4	Free Space, Extra Time	Everyone	Thu 4/09/20	Sun 4/12/20	4	0%
6	**Time Padding**			-		
6.1	Working on Project Report/Presentation	Everyone	Mon 4/13/20	Sun 4/26/20	14	0%
6.2	Work on Finalizing Demo	Everyone	Mon 4/13/20	Sun 4/26/20	14	0%
6.3	Work on Added Features	Everyone	Mon 4/13/20	Sun 4/26/20	14	0%



Conclusion

- Things are becoming smarter / connecting to the web
- Small bits of compute / storage are cheap and prevalent
- The whole is greater than the sum of its parts — it’s time to use IoT networks for more than just IoT