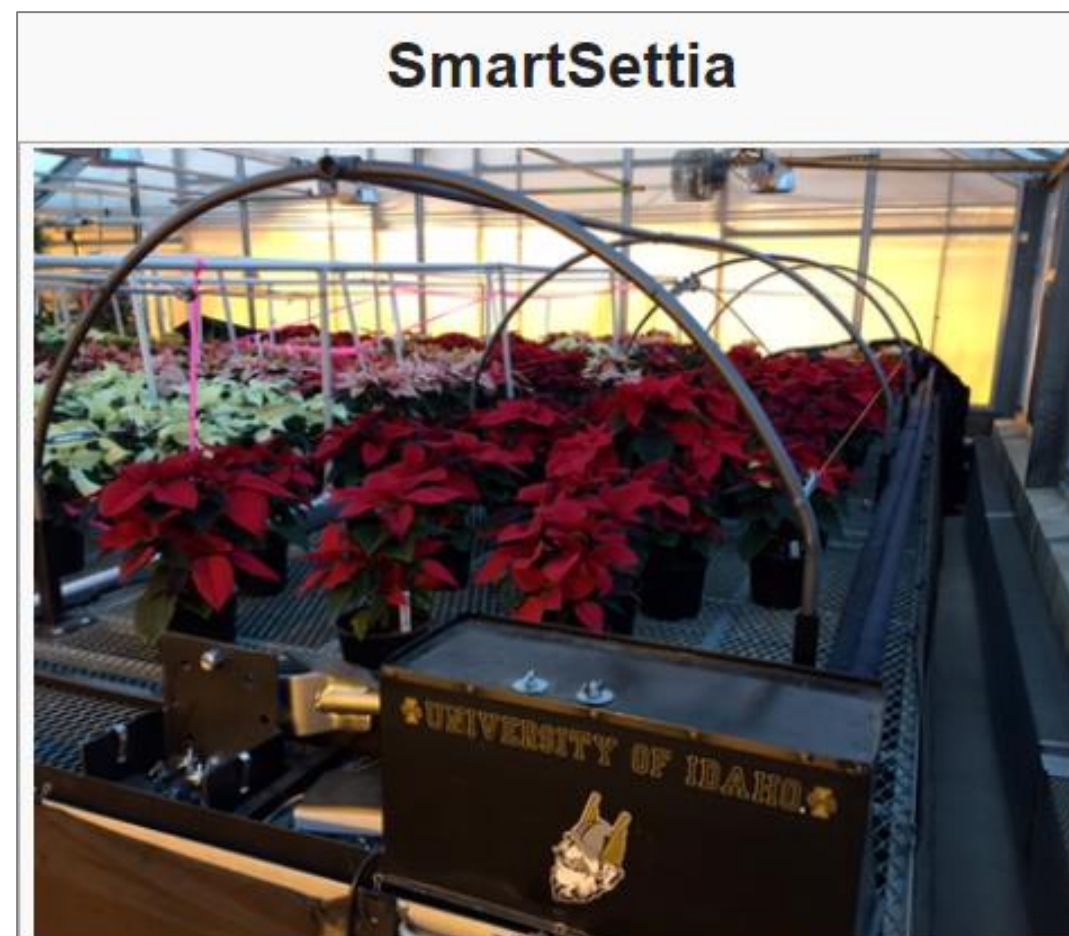
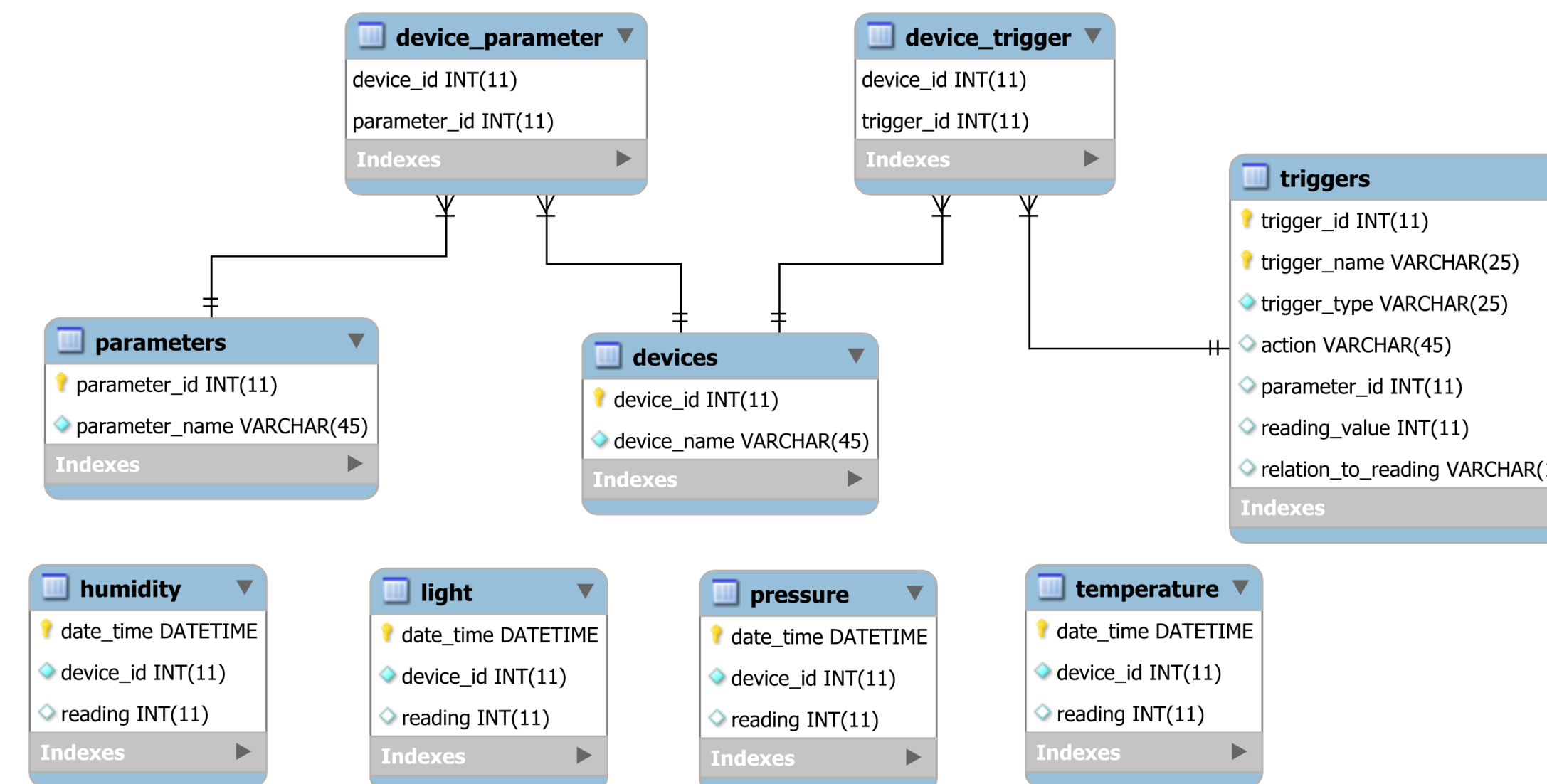


BACKGROUND

Inspired by two previous projects that enabled light exposure control & parameter monitoring of a poinsettia growing system. We aim to expand on those projects by offering more features & stronger security.



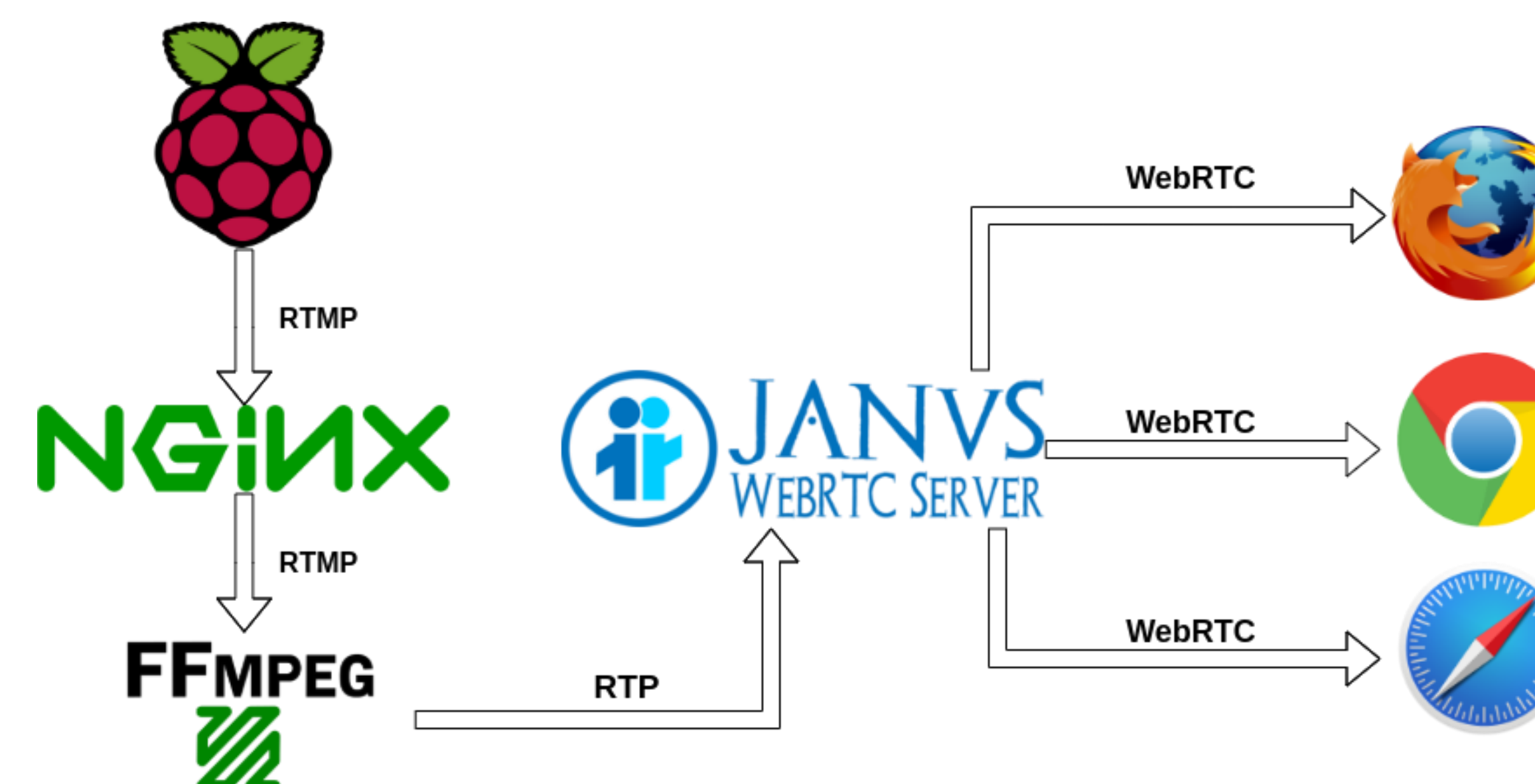
DATABASE SCHEMA



VALUE PROPOSITION

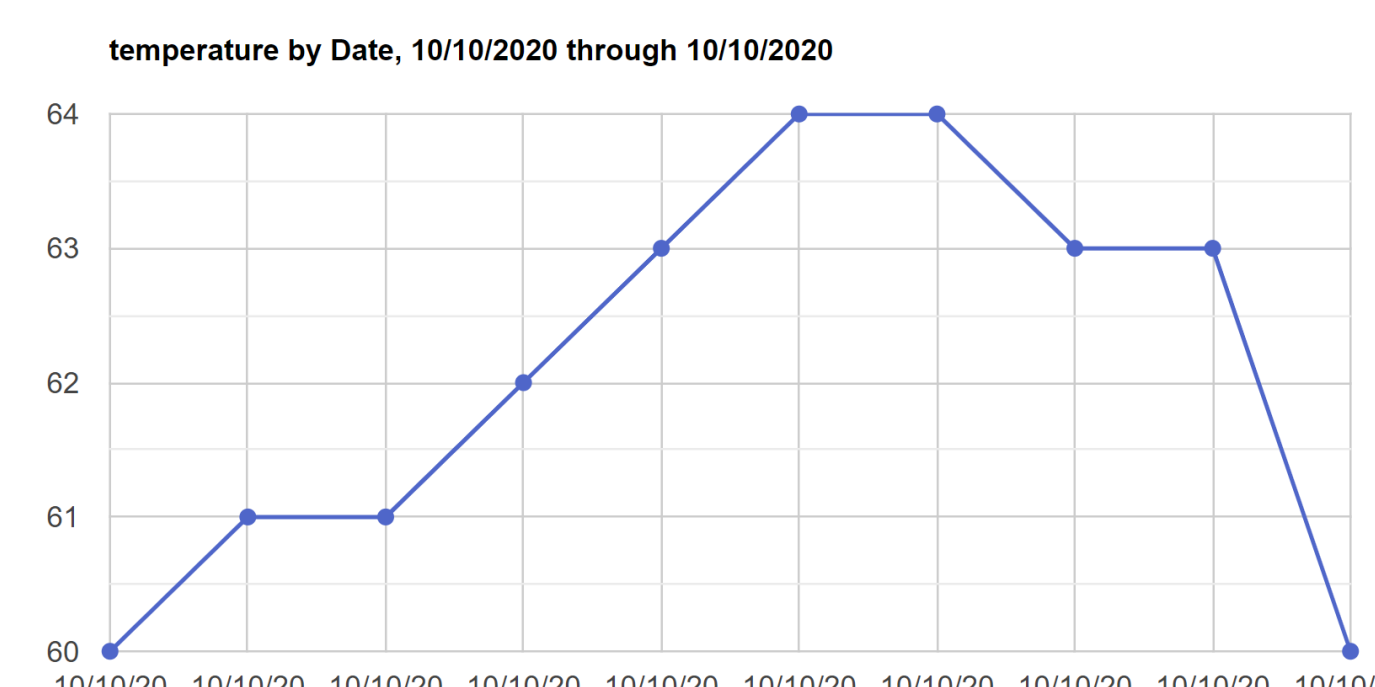
There are more devices connected to the Internet today than ever before and many of them were developed without information assurance in mind. Lightweight Internet of Things, or IoT, devices are even worse, often incapable of implementing standard security features like encryption due to hardware limitations. However, there is a growing need to securely gather measurement data for both research and agricultural purposes using IoT devices. Our goal was to build a system that uses state-of-the-art security protections to guard sensitive measurement information. Besides being secure, this system also offers more flexibility in measuring any type of data, including photo and video.

VIDEO STREAMING



USER INTERFACE

Silo Systems Lab Companion					
Biolab		Currently logged in as silosystems@si.io (Manage Log out)			
Device ID	Device Nickname	Sensor ID	Sensor Type	View Data	Download Data
1	Biolab Pi	2	pressure	View Data	Download Data
1	Biolab Pi	1	temperature	View Data	Download Data
1	Biolab Pi	3	humidity	View Data	Download Data
1	Biolab Pi	4	light	View Data	Download Data
2	Chemlab Pi	3	humidity	View Data	Download Data
2	Chemlab Pi	2	pressure	View Data	Download Data



VALIDATION

Requirement	Result	Recommendation
System can record at least 1 time- and location-stamped numerical sample per second	Passed	
System can record photos and videos at 10 or more frames per second	Passed	
System can respond to at least 25 programmable triggers per device	Passed	
User can see and visualize data with no more than a 10 second delay	Passed	
User can upload/download data	Pending (Not yet implemented)	Use Google Cloud Storage to allow user to store multimedia files.

CONCLUSION

This system is ready to be deployed anywhere remote data gathering is needed. Possible use cases include on-campus biology and chemistry labs, greenhouses, and more.

Ideas for future development:

- I Add more chart types for viewing data
- I Create mobile application for on-the-go monitoring
- I Leverage AI to identify trends in gathered data
- I Build a simpler interface for managing multiple sites

SPECIAL THANKS TO:

- I Bruce Bolden – Lead Instructor
- I Dr. Dev Shrestha – Sponsor

KEY REQUIREMENTS

- I Record date/time/location with each sample
- I Capture photos & videos at > 10 fps
- I Receive & process real time data with < 10 seconds latency
- I Support multiple user accounts & up to 10 sites
- I Support at least 20 users per site