

# MakerSpace Badging System

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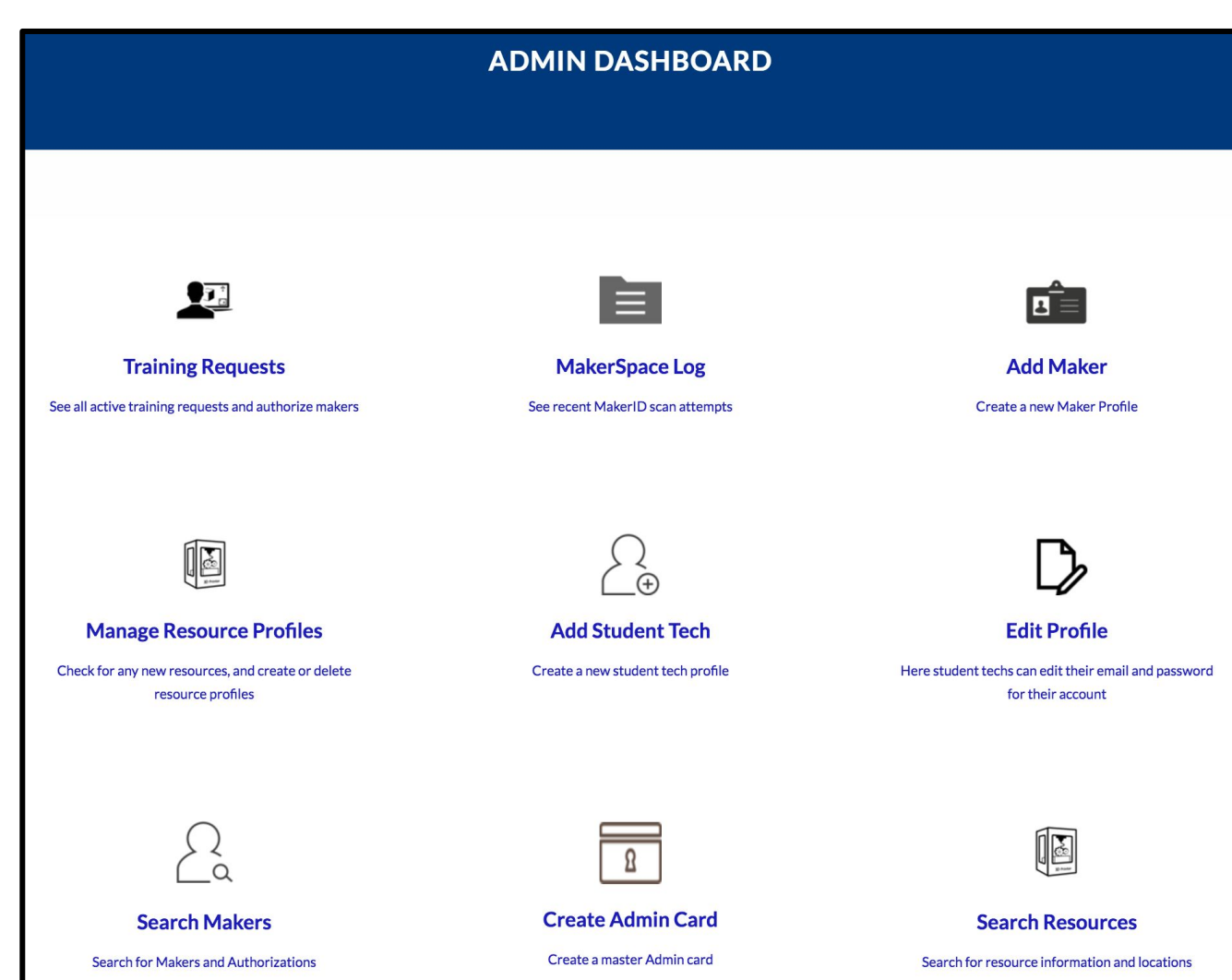


## Project Goal

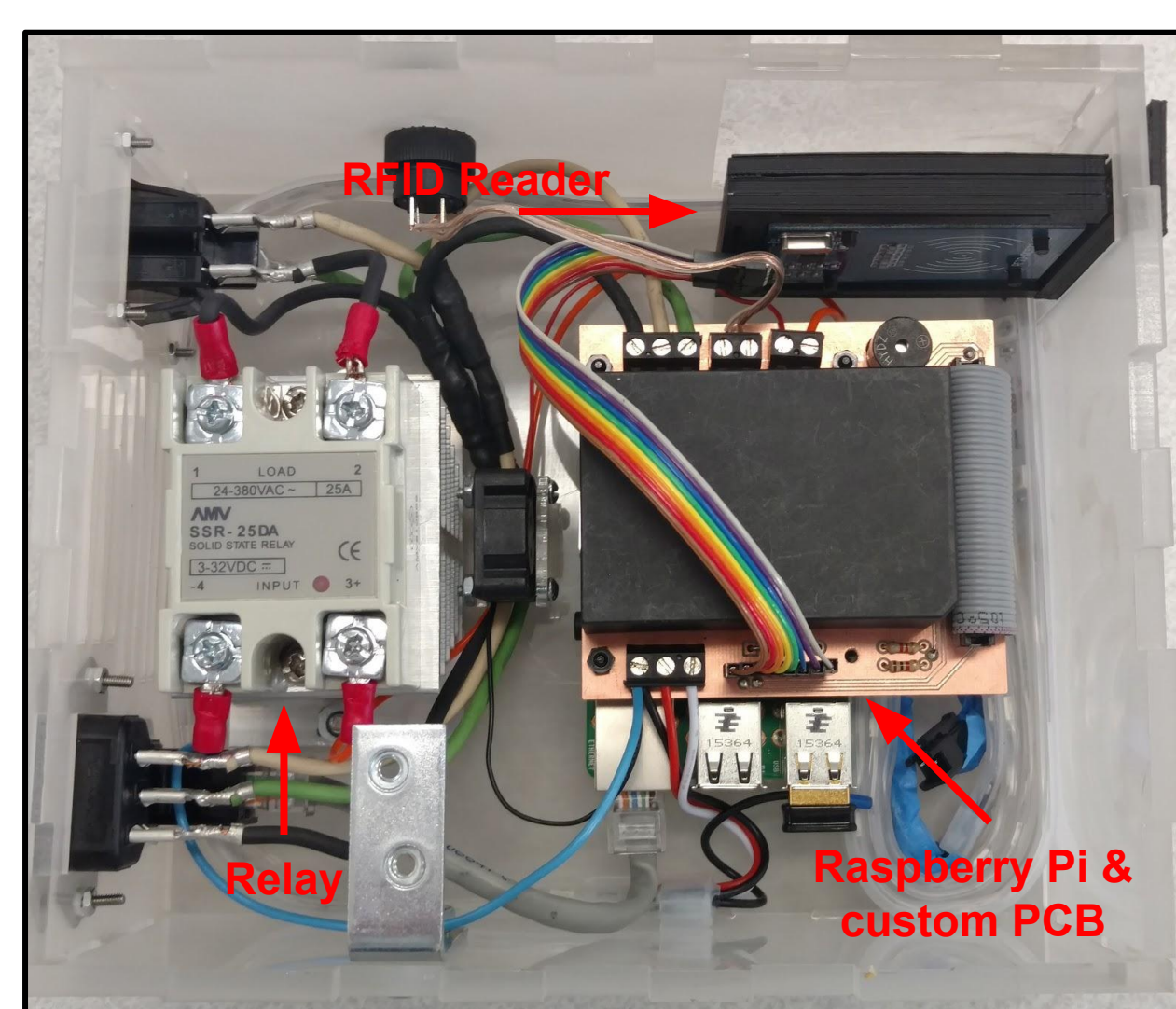
Create a smart badging system that monitors usage and controls access of various Bucknell Makerspace resources. The system will allow users to easily set up training to utilize resources and create a safe working environment. Additionally, the system should be easily scalable and maintainable by support systems on campus. Admins and Student Techs will be able to configure the system with an easy to use web interface.

## Implementation

- Created *Smart Tech Box* to control power to MakerSpace resources
- Assigned RFID cards to Makers allowing them to turn on the *Smart Tech Boxes*
- Created a WordPress backed WebApp allowing Admins and Student Techs to manage Makers, resources, training
- Entire system backed by MySQL database

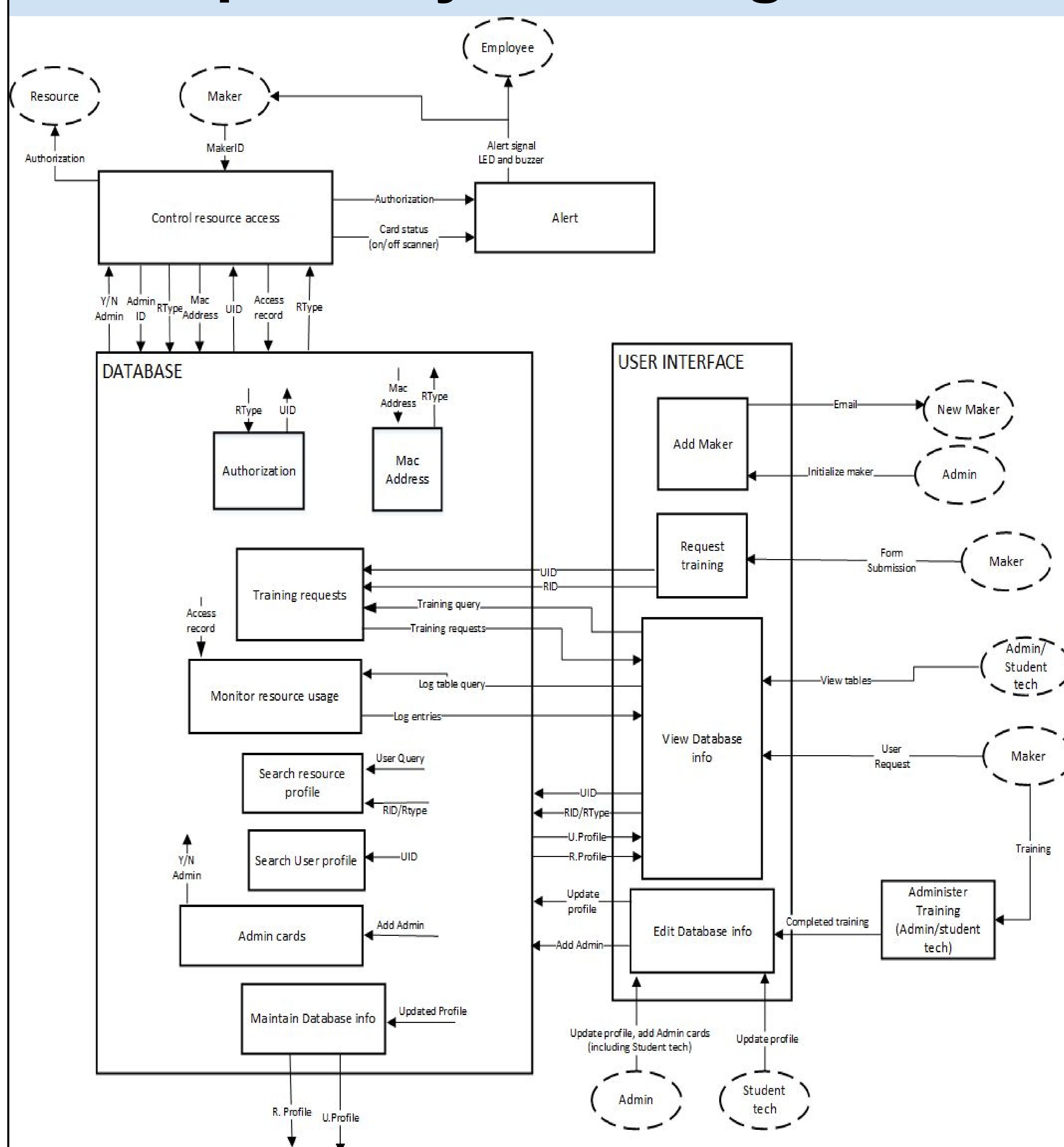


Admin WebApp Interface

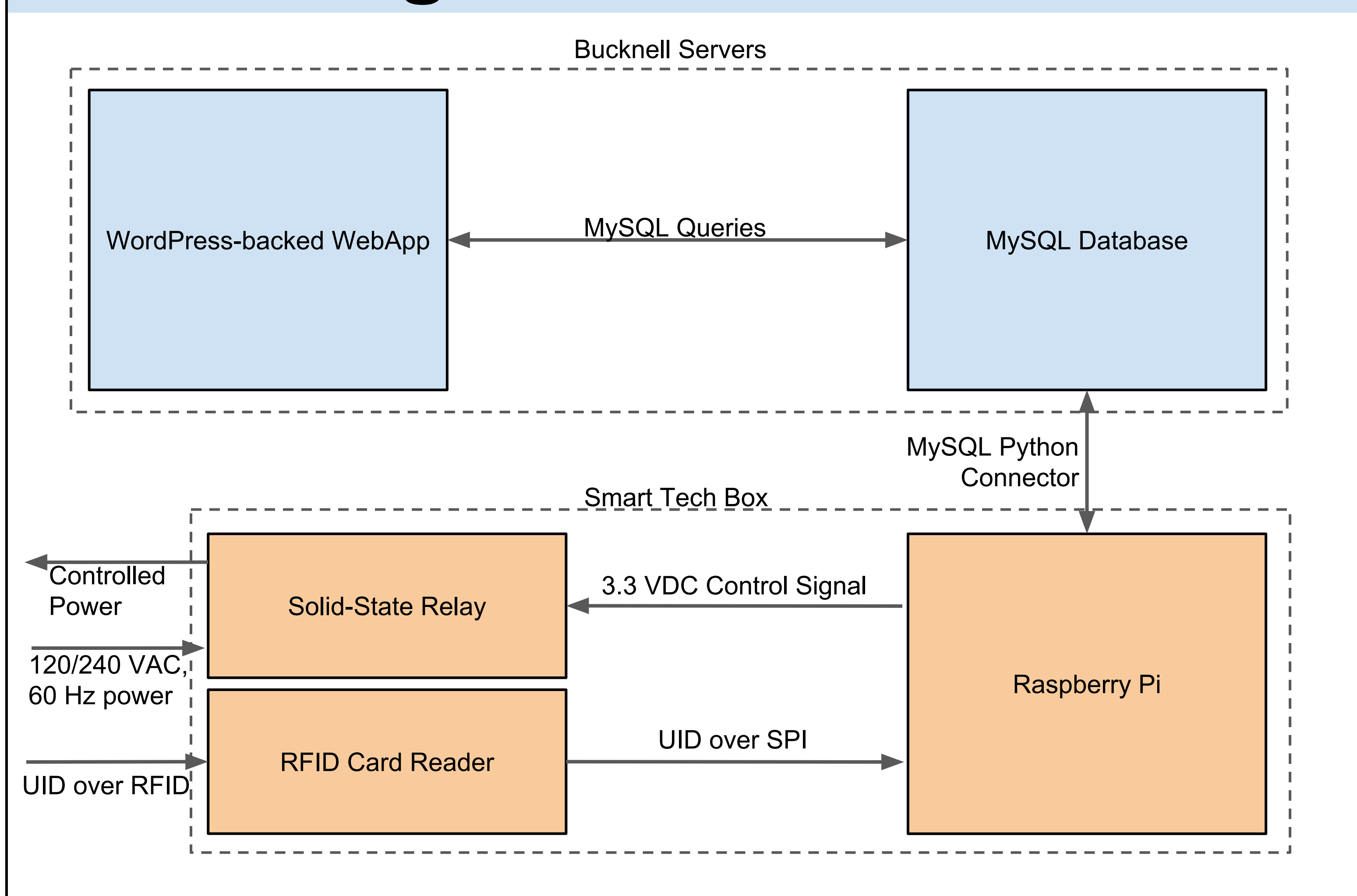


Smart Tech Box

## Conceptual System Diagram



## Block Diagram

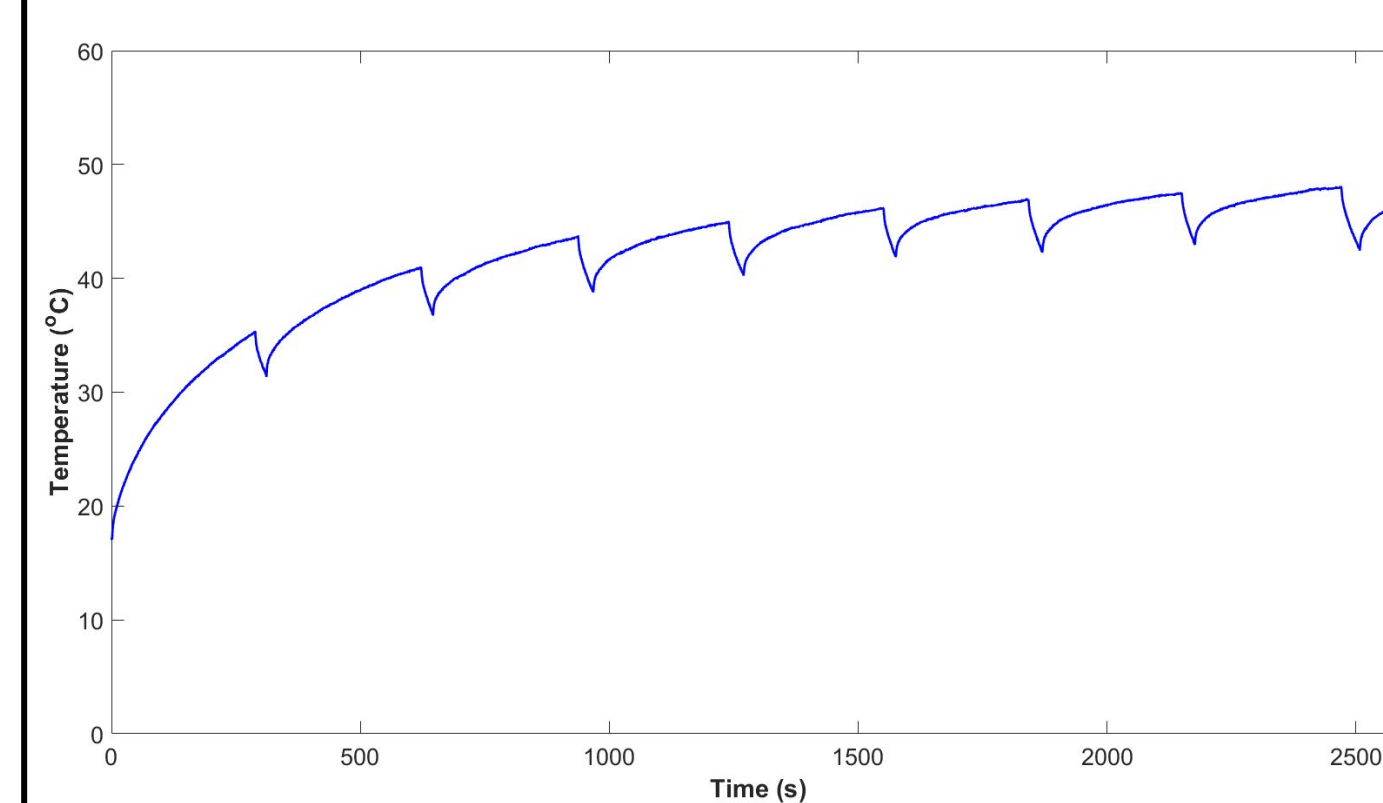


## Technical Results

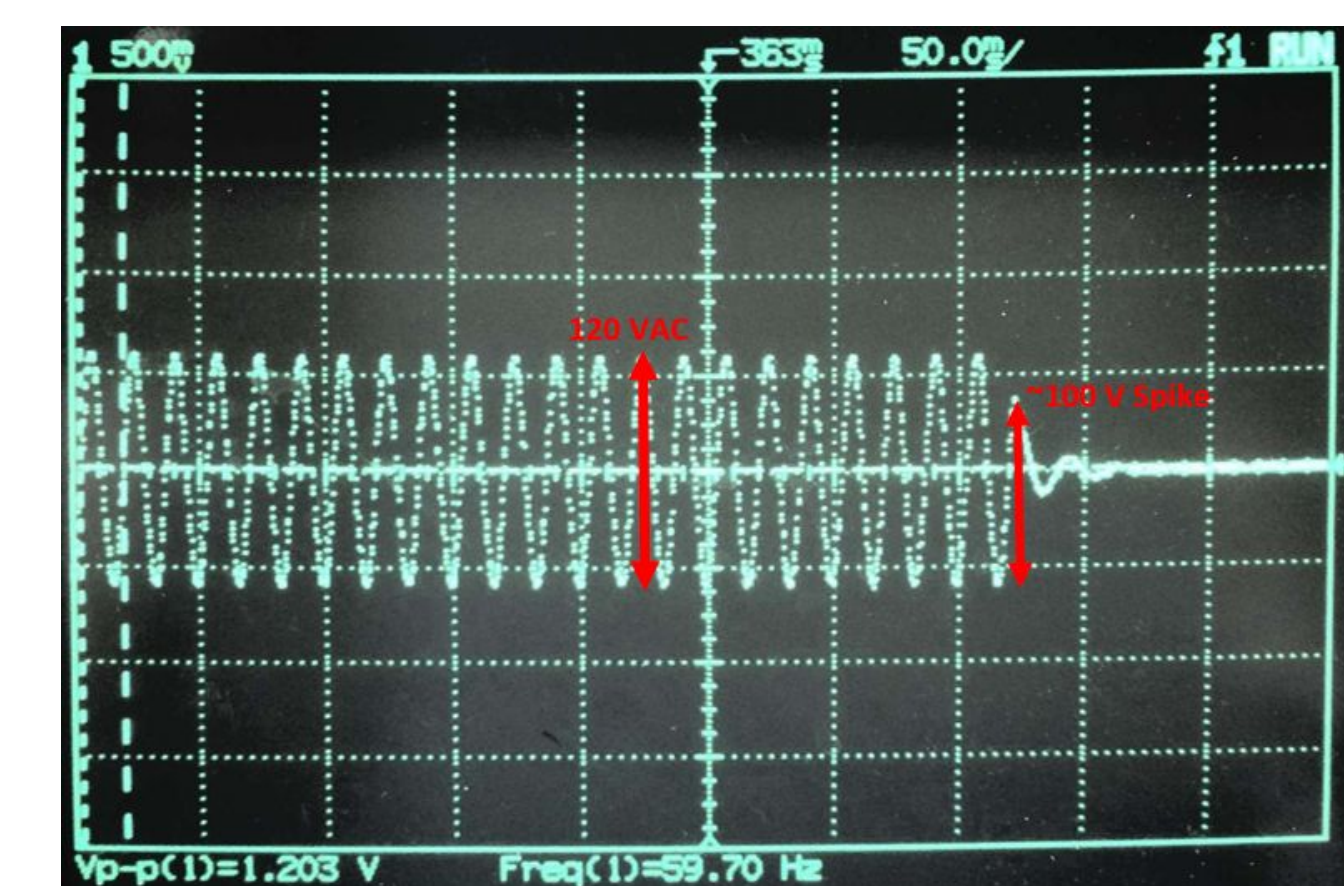
- Smart Tech Box rated at 120/240 VAC loads at 15 Amps
- WebApp handles over 100 simultaneous users without visible slow-down
- Max 10 GB of log data (~5 years heavy usage)
- Authentications execute in less than 1 second
- Smart Tech Box peak power draw of 8 W without load

## Load Testing

Our system is going to be subject to very inductive and high current loads such as power tools. As such, we needed to measure the heat dissipation and voltage spikes of both of these types of loads.



Temperature of Heatsink vs. Time - 12 A Load



4 Industrial AC motors switched at 1 Hz measuring inductive spike

## Acknowledgements

Prof. Alan Cheville, Prof. Michael S. Thompson, Prof. Phillip Asare, Matt Lamparter, Prof. Margot Vigeant, Jeremy Dreese, Bucknell L&IT, Bucknell PDL