Abstract
Energy Harvesting Active Networked Tags (EnHANTs) are small, flexible devices that are attached to objects to allow the networking of various objects. The testbed is a prototype created for easy debugging and testing of functionalities. The previous software framework for the MCUs has been carrying too much overhead and requires an overhaul. The testbed now includes a revamped framework that allows for an easy to understand software system.

Overview
• The EnHANTs framework serves as the software interface for which to program the system’s behavior. The new framework emphasizes modularity and ease of further development.
• The testbed currently runs TinyOS, an operating system created for microcontrollers. TinyOS relies on a programming language called nesC.
• nesC is a C-like language with higher layer abstractions that allow for modules, components and configurations.
• Below is a sample TinyOS application with modules and configurations.

Previous Framework
• The previous EnHANTs framework utilized a custom designed software architecture called Fennec Fox which created many abstractions on top of the TinyOS tool chain.
• The Fennec Fox software stack is shown in the figure below.
• As is visible, the Fennec Fox Control unit couples the whole system together providing a management abstraction depicted as Mgmt below.
• FF also adds a new compiler called SwiftFox which preempts the TinyOS compilation.
• Due to the additional overhead added by FF, and the amount of computation required to run the system, we decided it would be best to take a different approach.

New Framework
• The new framework modeled after a traditional network stack, allowing for communication to take place without unnecessary overhead.
• The complete network stack is shown below.
• The framework allows for easy integration of different implementations of the various networking layers.

Future Work
• Optimize the control and monitoring framework.
• Update the GUI to be better integrated with the new framework.
• Reduce computation done by the MCU to allow for a faster system.