4.B.2. Monitoring Networks of Sensors: Applying Cloud Tools to Sensor Networks

Wireless sensor networks (WSNs) act as gateways between the physical and the digital worlds. The increasing computing power, memory, storage and multi-modal network connectivity (Wi-Fi, Bluetooth, cellular) of WSNs, as well as decreasing prices of smart portable devices (tablets and smart phones) make them an excellent choice as a data acquisition platform for field-deployed sensors. However, due to the remote and often harsh environments in which these sensors are embedded and the large number of services (data acquisition, storage, processing, and transmission) running on these smart phones, a manual inspection of performance and service failures is not possible. To that end, the goal of this project was to monitor state-of-the-health of a deployed hardware platform (smart phone, and sensors) as well as critical services in an automated and scalable fashion.

We employed the INCA (<http://inca.sdsc.edu>) framework to monitor failures and performance issues with services deployed on a cellphone platform running Android OS. INCA is framework developed at UC San Diego that detects Grid infrastructure problems by executing periodic automated, user-level testing of Grid software and services. For this project, we adapted the INCA framework to monitor services on a resource-constrained, field-deployed cellphone running Android OS that acts as a data acquisition platform. This will allow domain scientists and cyberinfrastructure developers to monitor the failures and performance degradations in services, which in turn can then be used to appropriately restart or upgrade services in a scalable manner.

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