



Earthworm in the 21st century

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Earthworm (Johnson et al., 1995) is a fully open-source earthquake data acquisition and processing package that is in widespread use throughout the world. Earthworm includes basic seismic data acquisition for the majority of the dataloggers currently available and provides network transport mechanisms and common formats as output for data transferral. In addition, it comes with network seismology tools to compute network detections, perform automated arrival picking, and automated hypocentral and magnitude estimations. More importantly it is an open and free framework in the C-programming language that can be used to create new modules that process waveform and earthquake data in near real time.

The number of Earthworm installations is growing annually as are the number of contributions to the system. Furthermore its growth into other areas of waveform data acquisition (namely Geomagnetic observatories and Infrasound arrays) show its adaptability to other waveform technologies and processing strategies. In this presentation we discuss the coming challenges to growing Earthworm and new developments in its use; namely the open source add-ons that have become interfaces to Earthworm's core. These add-ons include GlowWorm, MagWorm, Hydra, SWARM, Winston, EarlyBird, Iworm, and most importantly, AQMS (formerly known as CHEETAH).

The AQMS, ANSS Quake Monitoring System, is the Earthworm system created in California which has now been installed in the majority of Regional Seismic Networks (RSNs) in the United States. AQMS allows additional real-time and post-processing of Earthworm generated data to be stored and manipulated in a database using numerous database oriented tools. The use of a relational database for persistence provides users with the ability to implement configuration control and research capabilities not available in earlier Earthworm add-ons. By centralizing on AQMS, the RSNs will be able to leverage new developments by easily sharing Earthworm and AQMS modules and avoid the duplication and one-off/custom developments of the past.