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Computer Skills

Overview

As a research scientist, I have interdisciplinary interests between geophysics and the broad field of scientific computing; I own a solid theoretical background in applied and engineering seismology, together with several advanced technical and IT skills. In the following, a summary of the most relevant experiences I gained on the matter is presented.

Programming

I have advanced understandings in programming with low- and high-level languages, including a good proficiency with **ANSI C, PYTHON** and **MATLAB** languages, and some past although minor experiences with C++ and FORTRAN, which I am nevertheless eager to improve in the future, if useful.
I gained platform-specific know-hows of GNU/Linux system programming, including some experiences with multi-threading and (to a lesser extend) socket programming. I had several previous experiences with low-level visualization libraries (e.g. SVGALib, XLib) and graphical-user-interface toolkits (GTK+ and CAIRO, MATLAB GUI). I implemented several GUI software tools, such as a multiplatform (Linux, Window and OSX) package for the analysis of soil structure interaction based on C/GTK+ and a MATLAB toolbox for three-component f-k array analysis, to cite some. I also wrote C hardware-specific software, such as a multithread-based driver for real-time waveform display of MEMS accelerometers, now in use for the Seismo@School exhibition at the FocusTerra Museum of ETH.

Science/Seismological Software

I have familiarity with most common seismological tools, including **OpenQuake**, **Geopsy**, SAC, PQL, SOFI and WPP, to cite some. I am principal developer of the GEM's Site Response Toolkit (**OQ-Srtk**, under active development) and the new Earthquake Catalogue Toolkit (**OQ-Catk-Lite**). I am also contributor of the GEM's OpenQuake Hazard Library. I am presently familiarizing with the ObsPy implementation of the SEEDLink communication protocol, however still in an early stage of experimentation.

System Administration and Productivity Tools

I have advance proficiency with **GNU/Linux** and **OSX** system administration, including Bash scripting, networking and file system management (local or remote via SSHFS, SMB etc.). I also have experiences with office and editing tools such as LateX, GMT and some basic HTML programming skills. I commonly use virtualization and emulation tools for cross-platform testing, such as VMWARE, VirtualBox, WINE and CygWin. I have some basic knowledge of databases using the PyMySQL APIs for data storage/query (client side).

High Performance Computing Interests

After my diploma, I developed a personal interest in parallel and distributed computing. I invested my time experimenting with a self-build Beowulf cluster the message passing (LAM/MPI), load balancing (openMOSIX, a kernel patch for distributed computing on computer farms) and distributed file system (e.g. MSF, SSHFS). These early experiments were again oriented to develop strategies for massive processing of ambient vibration recordings.
During my PhD studies, I took part to the 16th summer school of parallel computing in Bologna (certified). Within my postdoctoral research activity, I had the possibility to use several HPC tools for signal processing (a parallel implementation of high-resolution f-k analysis of noise recordings), surface wave inversion (using a parallel implementation of the conditional Neighborhood algorithm) and waveform modeling (with finite-differences code).
I am nevertheless willing to acquire new experiences in high-performance computing, as for the new challenge of the CUDA GPU's parallel programming.