On combining GUI desktop GIS with computer clusters & cloud resources, the role of programming skills and the state of the art in GUI driven GIS HPC applications

Sebastian M. Ernst
pleiszenburg.de - Independent Scientific Services, Germany (ernst@pleiszenburg.de)

The Free and Open Source Software (FOSS) ecosystem around Geographic Information System (GIS) is currently seeing rapid growth – similar to FOSS ecosystems in other scientific disciplines. At the same time, the need of broad programming and software development skills appears to become a common theme for potential (scientific) users. There is a rather clear boundary between what can be done with Graphical User Interface applications such as QGIS only on the one hand side and contemporary software libraries on the other hand side – if one actually has the required skillet to use the latter. Practical experience shows that more and more types of research require far more than just rudimentary software development skills. Those can be hard to acquire and distract from the actual scientific work at hand. For instance the installation, integration and deployment of much desired software libraries from the field of high-performance computing (HPC) for e.g. general-purpose computing on graphics processing units (GPGPU) or computations on clusters or cloud resources is very often becoming an obstacle on its own. Recent advances in packaging and deployment systems around popular programming language ecosystems such as Python enable a new kind of thinking, however. Desktop GUI applications can now much more easily be combined with the mentioned type of libraries, which lowers the entry barrier to HPC applications and the handling of large quantities of data drastically. This work aims at providing an overview of the state of the art in this field and showcasing possible techniques.