Offloading Smartphones to the Cloud via Platform Virtualization
Diploma- / Master Thesis

In this thesis you will prototype a mechanism to offload and synchronize computation from a smartphone to the nearby cloud using platform virtualization and emulation. The idea is to create a portable image of the whole smartphone software/operating system stack, which can then run virtualized on the smartphone itself as well as emulated within the cloud. Such a mechanism has several benefits; it allows, for instance, to:

- Seamlessly offload resource-intensive tasks from the phone to the cloud
- Transparently switch between different phone personalities (e.g., office and private personality) with help from the cloud
- Provide a working copy of the user’s smartphone environment that is independent of the hardware and can be run in the cloud

The basic smartphone architecture for the prototype should be Android, for which hardware is already available. Key issues to be tackled are:

- Exploring related work and existing prototypes (see references below)
- Developing a virtualization/emulation-based environment to host a smartphone software stack in the cloud and on the smartphone
- Prototyping methods to synchronize smartphone-VM with its counterpart in the cloud

Prerequisites:
Must be familiar with operating systems structures. Must be willing to develop and debug OS and low-level code for a fairly complex software environment. Having attended the course System Design and Implementation, or knowledge of smartphone architectures and virtualization are a big plus.

References

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