

Research Experiments on the NSFCloud

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A number of our projects will benefit from the research infrastructure of NSFCloud. This position paper briefly describes three of them.

Guanyin. Our NFS-funded project “GUANYIN: a thousand hands with a thousand eyes for distributed software checking” aims to create a checking cloud that records real executions in production environments and thoroughly checks their correctness later. The NSFCloud infrastructure will enable us to (1) evaluate GUANYIN in a large-scale, realistic cloud, and (2) gain control of the full software stack so that we can deploy our record-replay operating system kernels.

Meerkats. Our DARPA-funded “MEERKATS: Maintaining EnterprisE Resiliency via Kaleidoscopic Adaptation and Transformation of Software Services” aims to create a novel architecture for cloud environments that constantly changes along several dimensions, toward creating an unpredictable target for an adversary. A large-scale cloud infrastructure with bare metal access is thus crucial for evaluating the speed, scalability, and security of MEERKATS.

Cloud application optimization. We recently started a new project that aims to optimize both the performance and the monetary cost for applications that use commercial cloud services. The NSFCloud will allow us to emulate various kinds of compute, storage, and database services, and run large-scale experiments with a better control of the service level.