FutureGrid: An Experimental High-Performance Test-bed

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Computational test-beds - broadly construed to include distributed computers, storage, networks, middleware and software - are very valuable to computer and computational scientists, software developers, cyberinfrastructure deployers, and educators. Scientists can deploy their software and services to measure performance and can also gain experience with the software and services created by others. Computational test-beds provide software developers with a heterogeneous environment to create and test their software. Cyberinfrastructure deployers use test-beds to deploy software and services for evaluation before production deployments on their infrastructure. Finally, computational test-beds can provide environments that are customized to the needs of each class or training course being taught by educators.

Recognizing the value of computational test-beds, the National Science Foundation funded FutureGrid, a distributed test-bed to support usage such as that described above. FutureGrid began operation in 2010 and will continue to operate into at least 2014. FutureGrid supports over 1,200 users performing more than 250 different projects. To support a wide range of projects, FutureGrid provides a variety of cloud, distributed (e.g. grid), and high-performance computing environments atop a heterogeneous set of compute, storage, and networking resources.

The first part of this BOF will provide an introduction to FutureGrid including an overview of its software and hardware environment. We will provide this overview while describing several projects that have used FutureGrid. We will discuss projects that request customized software/hardware configurations and that use our cloud infrastructure to build custom virtualized environments; that use our experimentation tools to perform and record distributed experiments; that deploy and evaluate software and services; perform small-scale development, testing, and optimization of parallel programs; that perform education and training; and finally, that use the cloud, grid, and high-performance computing software and services on FutureGrid for individual learning. In addition, we will ask users that attend to describe their projects and if there are ways that we can change FutureGrid to better meet their needs.

FutureGrid will be operational for a year or more after the XSEDE'13 conference. The second part of this BOF will therefore describe our plans for that year. These plans primarily include refining the FutureGrid software environment, performing additional integration with other test-beds such as GENI, and maintaining the current set of hardware and software. We will request feedback on these plans from users and potential users that attend the BOF.