

German Laboratory (G-Lab) - A Research and Experimentation Facility for the Future Internet

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I. ABSTRACT

The G-Lab project (<http://www.german-lab.de/>) has started in 2008 as a distributed joint research and experimentation project for Future Internet studies and development. Initially this project was distributed across six universities in Germany. In its first phase the project defined major fields of research from architectural questions to routing, mobility and security. Also included was the construction of the experimental facility itself. This Germany-wide research and experimental facility is now used to investigate the interplay between the capabilities of new network technologies and the requirements of emerging applications. The advantage of this approach is that the experimental facility is under full control of the researchers and their projects. Therefore G-Lab avoids the situation that the platform providers offer their services but nobody is going to use it.

II. GERMAN LABORATORY (G-LAB)

A. The G-Lab Approach

As a joint research project between six universities the G-Lab consortium follows a spiral approach where research projects and experiments can fertilize each other (see Figure 1). Such an

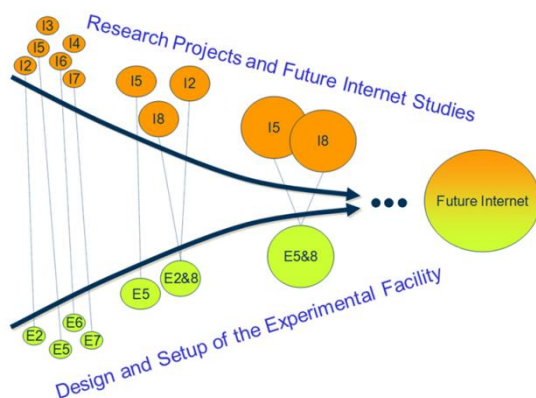


Figure 1. G-Lab Spiral Approach

approach can be utilized for a “clean slate” approach as well as for “evolutionary” studies. Moreover the project is closely related to worldwide research approaches such like PlanetLab, GENI, OneLab and other projects in Japan and Korea.

B. The Project

The G-Lab project consists of eight work packages including administration (WP0) and the experimental facility (WP7). Beside this infrastructure-related WPs the project covers the following research questions:

- architectural concepts for the Future Internet,
- routing and addressing,
- mobility and wireless networks,
- monitoring concepts and management concepts,
- quality of service and security,
- service-architectures and service composition.

It is clear that all these questions are closely related to each other and require a close cooperation and coordination between the conducting organizations.

C. The Experimental Facility

The experimental facility consists of 169 network nodes distributed over six sites in Germany (59 nodes in Kaiserslautern, 10 nodes in Berlin, 25 nodes in all other sites). All nodes are Intel-based dual quad core systems assembled by Sun Microsystems.

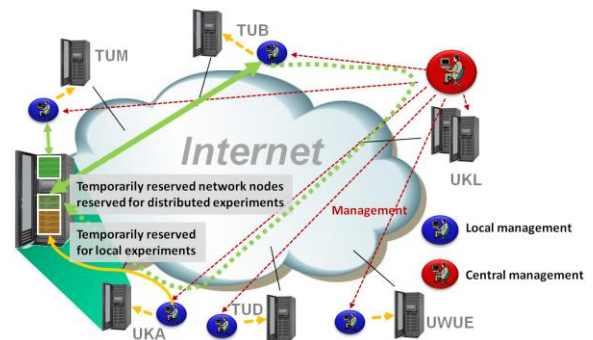


Figure 2. Topology of the Experimental Facility

They are inter-connected by gigabit switches from Cisco. The central node is located in Kaiserslautern and responsible for distributing the relevant boot images (PlanetLab as a default boot image) to the sites head nodes, but it is also possible to create “custom” boot images for related projects). Moreover the experimental facility will be under full control (e.g. network and system load) of the central node so that all experiments can be performed under well-defined and repeatable conditions. This will improve the quality of the running experiments. Extensions of the platform features are planned for the next project phase.

