

# Operation and Sustainability Concepts of the G-Lab Experimental Facility

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The goal of the G-Lab project is not limited to explore theoretical possibilities and novel ideas but also to use experimental approaches to verify the derived results while using the experimental facility. To investigate the functional aspects of novel Internet architecture approaches (e.g. routing, addressing, control, & management aspects) and their interaction with each other is such an intricate task which could not be validated only by analytical research and methods. In this part of the G-Lab project an experimental facility is built, on which new and innovative distributed simulation and emulation procedures are developed to verify proposed ideas in the entire G-Lab project.

In the working group 7 (Experimental Facility), a distributed experimental facility is built up and managed. This platform provides a facility to G-Lab working groups (e.g., 1-6) to test their proposed approaches and ideas for the future Internet architecture. This platform is distributed over different locations within Germany such as, Kaiserslautern (Central), Wuerzburg, Berlin, Muenchen, Karlsruhe, and Darmstadt. Every designated location has one responsible person. After vigorous scrutiny, Sun Microsystems and Cisco have been selected as hardware provider for the facility. The first version of platform was available at 01.03.2009 and first experiments took place at the commencement of April. In the experimental facility the PlanetLab software is used for the management of distributed resources. The whole network of the platform is distributed into individual clusters at six different locations. Each location has its own head node in addition to a corresponding number of normal nodes. The head node is responsible for the management of a cluster location and it is not available for experimental purpose. On the head node following services are running.

- Administration of the local network segment using DHCP
- Provision of boot images for the associated nodes
- Monitoring of hardware and software of all local nodes

and the external connection

- Administration of access to the management interfaces of the local nodes
- Administration of access to the head node

The head node in Kaiserslautern has some additional services such as centralized administration of the PlanetLab infrastructure. For ease of maintenance different software modules have been developed one for central administration and one for tasks of head node. The monitoring of the entire infrastructure is also the part of the goal, the software Nagios is being used for this task. This monitoring information can be visualized on the web site of the respective head node. In addition, the status information of nodes is stored in log files and can be evaluated centrally. Thus, it is possible to review a complete status history of participated nodes. Besides in case of a problem or failure the responsible person will be informed via e-mail so the problem could be handled promptly.

To ensure the sustainability and continuous development of the platform one G-Lab-Association will be founded. The association will be joined by the partners of the industry and first and second phase of the project though others could also take part in it. The participation in the association will be given special attention in the announcement of the second phase. In the past months there were several conversations, especially with industrial partners, in order to clarify whether such a platform could be used under the commercial terms and conditions. It has been experienced that manufacturers are interested and forced by quality control services to test and verify their products in a “real” environment before bringing it into the market. Which gives a developed platform extra importance in commercial market besides many infrastructure providers also shown the interest to test their product in “post-IP” environment.