

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

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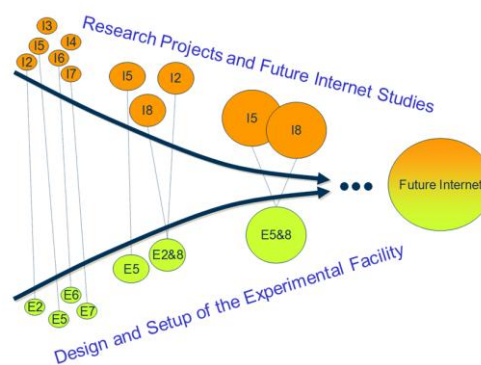
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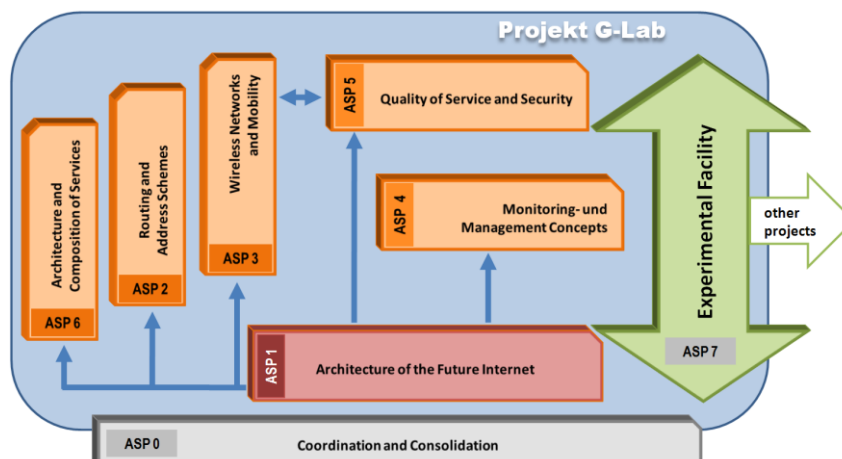


G-Lab: Vision of the Future Internet

- ▶ Closing the loop between *research* and *real-world experiments*
- ▶ Provide an **experimental facility** for studies on architectures, mechanisms, protocols and applications towards Future Internet
- ▶ Investigate interdependency of theoretical studies and **prototype development**



General Workpackages / Research Areas



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G-Lab Environment

► Testbed:

- Real not simulated
- Specific purpose
- Focused goal
- Known success criteria
- Limited scale

Not sufficient for clean slate design

► Experimental facility:

- Purpose:
 - explore yet unknown architectures
 - expose researchers to real thing
 - breakable infrastructure
- Larger scale (global?)
- Success criteria: unknown



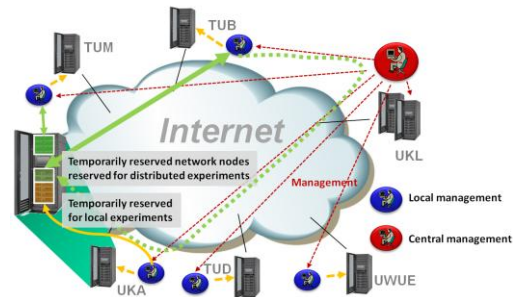
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G-Lab Environment

- ▶ **Full control over the resources**
 - Reservation of single resources
 - Elimination of side effects
 - Testing scalability
- ▶ **Exclusive resource reservation**
 - Testing QoS / QoE
 - Decentralized Resources can be independently used
 - Tests on the lower layers of the network without affecting the “life” network
- ▶ **Extended functionality**
 - New technologies (Wireless, Sensor,...)
 - Interfaces to other testbeds (G-Lab, PlanetLab Japan, WinLab, ...)

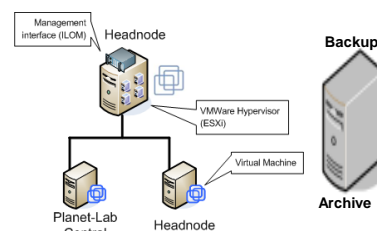
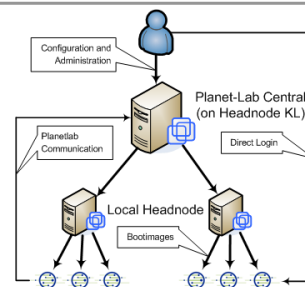


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Cluster Usage

- ▶ **Structure of G-Lab Cluster**
 - PLC advises the site headnodes
 - Headnodes: Distribution of bootimages to the worker nodes
 - PlatLab communication between the PlanetLab nodes and PLC
 - Configuration and resource allocation by PLC
 - User can login to the nodes directly
- ▶ **Headnode KL**
 - Virtual machines
 - Services are organized in virtual machines
 - Plant-Lab Central
 - Headnode (including Nagios)
 - Updates can be organized by changing the virtual machines.
- ▶ **Backup/Archive**
 - Snapshot of the virtual machines

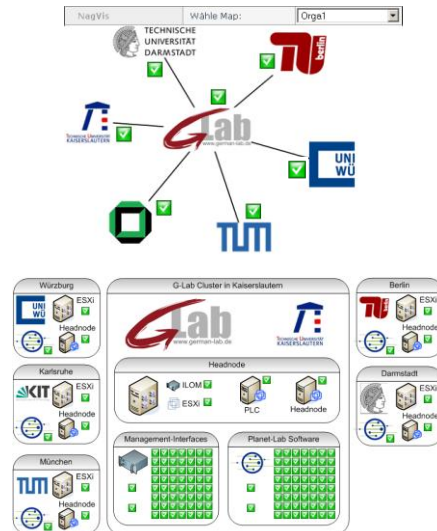


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Cluster Monitoring

- ▶ **Based on Nagios**
 - Gets a birds-eye view of the operational state of the G-Lab infrastructure.
 - Each site can be monitored
- ▶ **Monitoring**
 - To monitor the G-Lab infrastructure components,
 - including system metrics, network protocols, applications, services, servers, and network infrastructure.
 - Alerting
 - Response
 - Reporting
 - Maintenance
 - Planning



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G-Lab Association

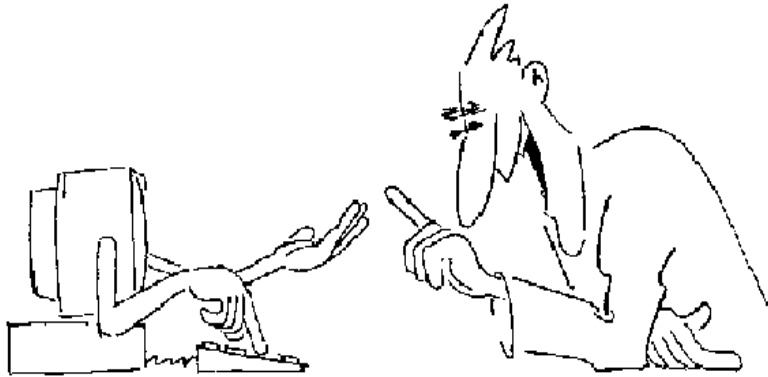
- ▶ To create sustainability
- ▶ Based on a mutual understanding
- ▶ Who will become a member?
 - Individual membership or
 - Institutional membership
- ▶ Public Relations
- ▶ Consulting:
 - Workshops
 - Politics (BMBF, EU, ...)
 - Courseware
 - Presentations
 - Services
- ▶ G-Lab Clearing House



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Questions?



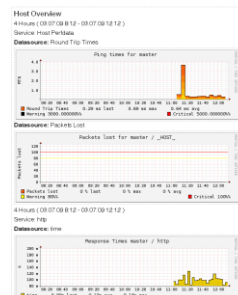
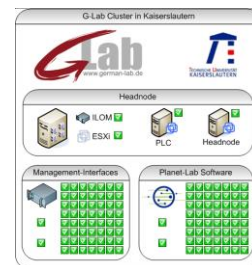
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Cluster Monitoring

- ▶ **Head Node**
 - Management interface (ILOM)
 - Virtualized (VMWare ESXi)
 - Planet-Lab Central (PLC) as VM
 - Headnode System as VM
- ▶ **Worker Nodes**
 - Management interface
 - Hardware state
 - PlantLab Software
 - Reachability
- ▶ **Monitoring Overview**
 - Response time of PLC (ping)
 - Packet loss 0%
 - Response time of PLC (http)
 - Will be recorded for each node and each site



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