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Information on Remote Control for the IGLUNA Field Campaign

Luzern, 22. June 2021

Contents

Each team will have Wifi and Ethernet connection and a /24 subnet of IP addresses on both ends (Control Room and Test Bed) connected over a VPN tunnel. Each team has only access to its allocated remote subnet(s). This will ensure that teams control only their modules and do not interact with the neighboring robots.

The address plan for each team and local network restrictions are described in this document.

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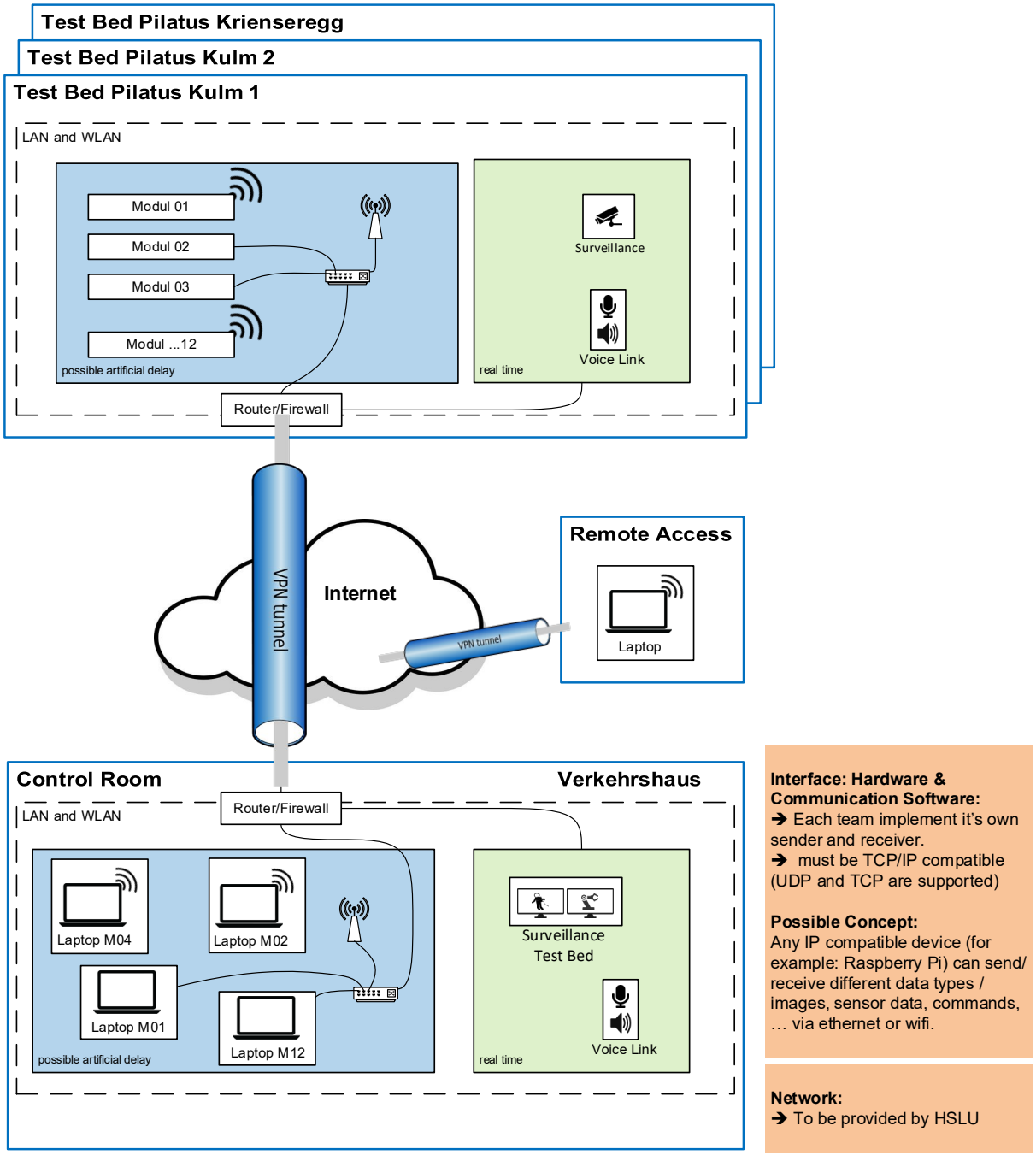
1. Sitemap Overview



Interface: Hardware & Communication Software:
➔ Each team implement it's own sender and receiver.
➔ must be TCP/IP compatible (UDP and TCP are supported)

Possible Concept:
Any IP compatible device (for example: Raspberry Pi) can send/ receive different data types / images, sensor data, commands, … via ethernet or wifi.

Network:
➔ To be provided by HSLU

The Remote Control network features an artificial delay and the ability to trim the available data transfer for the teams while the administrator surveillance and emergency line are in real time. Audio line delay can be adjusted as well.

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2. Address Plan

Network	Control Room	Test Bed Kulm 1	~~Test Bed Kulm 2~~	TB Krienseregg
IGLUNA-**P01**	172.20.1.0/24	172.30.1.0/24	~~172.28.1.0/24~~	172.29.1.0/24
IGLUNA-**P02**	172.20.2.0/24	172.30.2.0/24	~~172.28.2.0/24~~	172.29.2.0/24
IGLUNA-**P03**	172.20.3.0/24	172.30.3.0/24	~~172.28.3.0/24~~	172.29.3.0/24
IGLUNA-**P04**	172.20.4.0/24	172.30.4.0/24	~~172.28.4.0/24~~	172.29.4.0/24
IGLUNA-**P05**	172.20.5.0/24	172.30.5.0/24	~~172.28.5.0/24~~	172.29.5.0/24
IGLUNA-**P06**	172.20.6.0/24	172.30.6.0/24	~~172.28.6.0/24~~	172.29.6.0/24
IGLUNA-**P07**	172.20.7.0/24	172.30.7.0/24	~~172.28.7.0/24~~	172.29.7.0/24
IGLUNA-**P08**	172.20.8.0/24	172.30.8.0/24	~~172.28.8.0/24~~	172.29.8.0/24
IGLUNA-**P09**	172.20.9.0/24	172.30.9.0/24	~~172.28.9.0/24~~	172.29.9.0/24
IGLUNA-**P10**	172.20.10.0/24	172.30.10.0/24	~~172.28.10.0/24~~	172.29.10.0/24
IGLUNA-**P11**	172.20.11.0/24	172.30.11.0/24	~~172.28.11.0/24~~	172.29.11.0/24
IGLUNA-**P12**	172.20.12.0/24	172.30.12.0/24	~~172.28.12.0/24~~	172.29.12.0/24

Backup only

Control Room	
Static address range	172.20.xx.11 - 172.20.xx.99
DHCP address range	172.20.xx.111 - 172.20.xx.199
Default Gateway	172.20.xx.**1** (Don't use this IP address)

For best flexibility, it's recommended to use DHCP for laptops or workstations at Control Room. However, static addresses are also supported.

Test Bed Kulm 1	
Static address range	172.30.xx.11 - 172.30.xx.99
DHCP address range	172.30.xx.111 - 172.30.xx.199
Default Gateway	172.30.xx.**1** (Don't use this IP address)

Test Bed Kulm 2	
Static address range	172.28.xx.11 - 172.28.xx.99
DHCP address range	172.28.xx.111 - 172.28.xx.199
Default Gateway	172.28.xx.**1** (Don't use this IP address)

Test Bed Krienseregg	
Static address range	172.29.xx.11 - 172.30.xx.99
DHCP address range	172.29.xx.111 - 172.30.xx.199
Default Gateway	172.29.xx.**1** (Don't use this IP address)

Use static address for robots and other lab equipment and DHCP for laptops and workstations.
Note: You will also be able to make use of the DHCP reservation with the new IP Portal, which is probably more flexible and easier to configure than static addresses.

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3. Restrictions

VPN

The connection between Control Room and Test Bed is established with a secure VPN tunnel. A VPN tunnel has some restrictions. Please note the following limitations when implementing your connection:

- The tunnel does not support Broadcast or Multicast between Control Room and Test Bed.
- Maximum MTU size between Control Room and Test Bed is 1300 Bytes.
- Only TCP and UDP segments are supported on the tunnel.

Wifi/Ethernet

The broadcasted Wifi uses WPA2-PSK as a security mechanism for authentication. Please make sure that your devices support WPA2-PSK. Otherwise, your devices won't connect to the Wifi network.

Devices (mobile phones, tablets…) not related to the experiment should connect to the Verkehrshaus or Pilatus wifi in order not to disturb the productive environment. Alternatively, an IGLUNA-Public Wifi is also available, but with very limited bandwidth.

4. Internet Access

To offer a better user experience, an internet access will be provided in both locations, but with reduced bandwidth.

5. Remote Access

An additional access has been developed to control and monitor the experiments from outside the control room (e.g. your hotel).

For remote access you need an OpenVPN Client (download links below). This VPN client will get a DHCP IP address from the subnet below.
The required .ovpn file will be sent to the teams a few weeks before the Field Campaign.

Network	Subnet VPN
IGLUNA-**P01**	172.26.1.0/24
IGLUNA-**P02**	172.26.2.0/24
IGLUNA-**P03**	172.26.3.0/24
IGLUNA-**P04**	172.26.4.0/24
IGLUNA-**P05**	172.26.5.0/24
IGLUNA-**P06**	172.26.6.0/24
IGLUNA-**P07**	172.26.7.0/24

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IGLUNA-**P08**	172.26.8.0/24
IGLUNA-**P09**	172.26.9.0/24
IGLUNA-**P10**	172.26.10.0/24
IGLUNA-**P11**	172.26.11.0/24
IGLUNA-**P12**	172.26.12.0/24

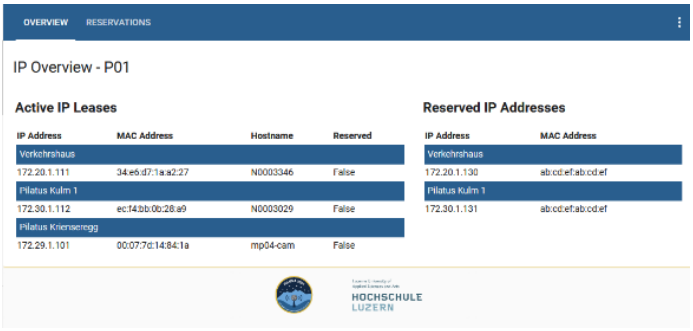
Download OpenVPN Client for Windows [here]
Download OpenVPN for Mac [here]
Download OpenVPN for Linux from your Distro Repository

NOTE this access is only to be used with caution, especially outside working hours when no one is on site.

6. IP Portal

A web portal is provided where teams can view their DHCP reservations and active IP leases.
You are also able to make the IP reservation via the portal.

This simplifies the IP address assignment for the teams and enables the individual registration of DHCP reservations.



URL: https://portal.igluna.lan:8123
Username and password will be sent to the teams directly.

The IP Portal is available from inside the IGLUNA network or by VPN.

7. Wiki

A wiki is provided to answer the frequently asked questions (FAQs).

URL: https://wiki.igluna.lan:2665
No username or password required.

The Wiki is available from inside the IGLUNA network or by VPN.