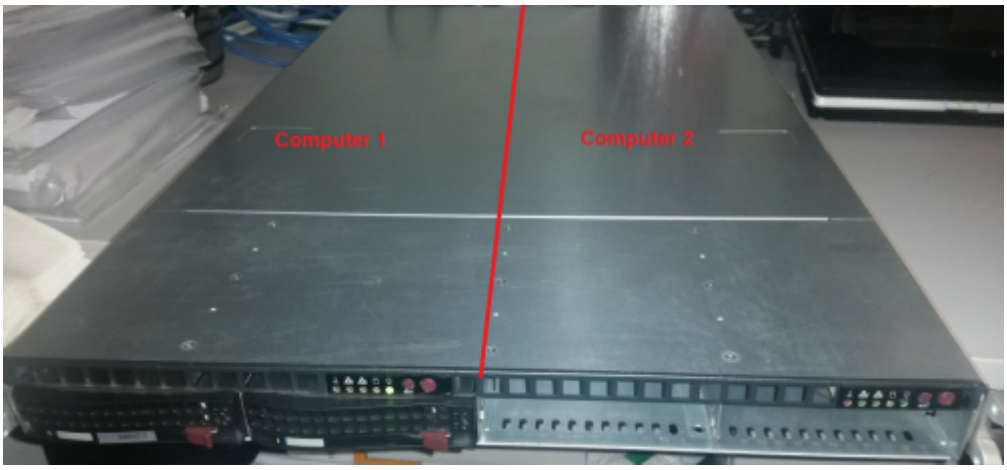
VLBI SysMon Node

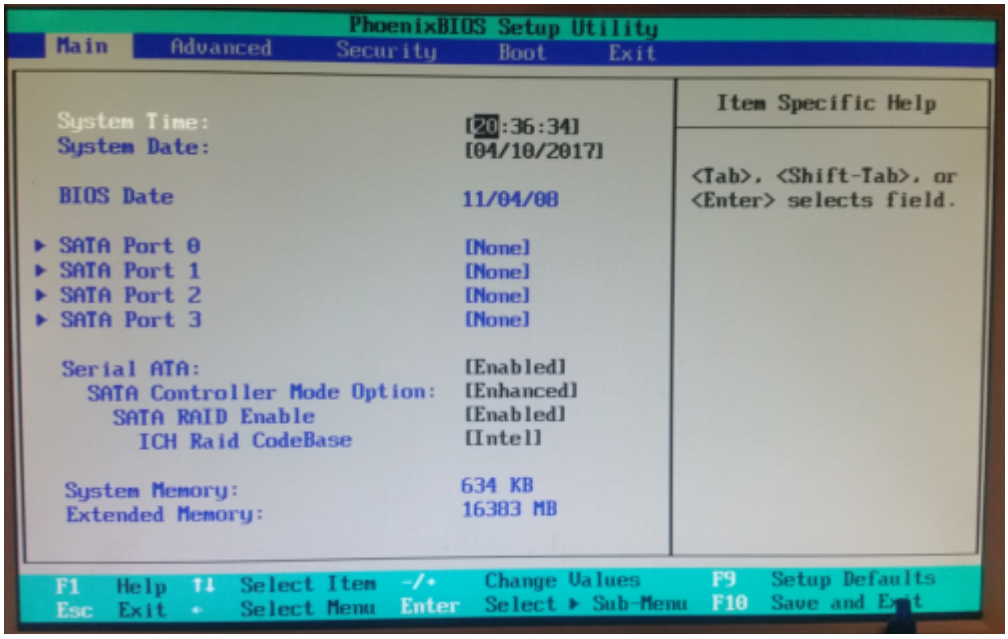
1) Used machines

- The used machines are: Supermicro X7DWT/X7DWT-INF/X7DWT-INF+ with two boards in one one-height slot
- User Manual
- 

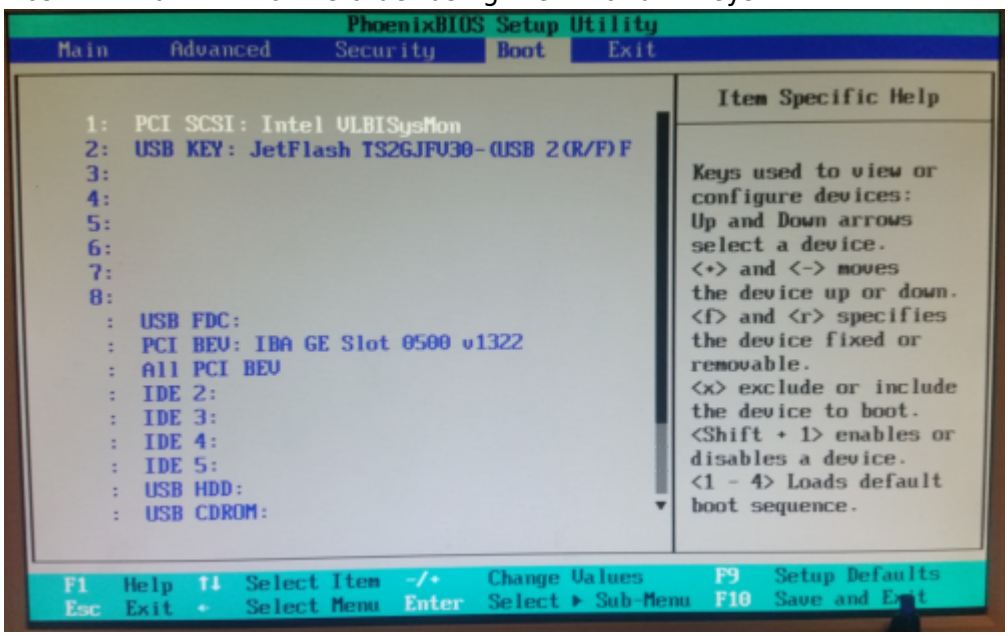
- The completely installed SysMon server looks like this:
- 
- Both computers must be configured in the same way
    - The first is for the internal management (local telescopes)
    - The second is for the external management (other telescopes etc.)

2) Setup the BIOS

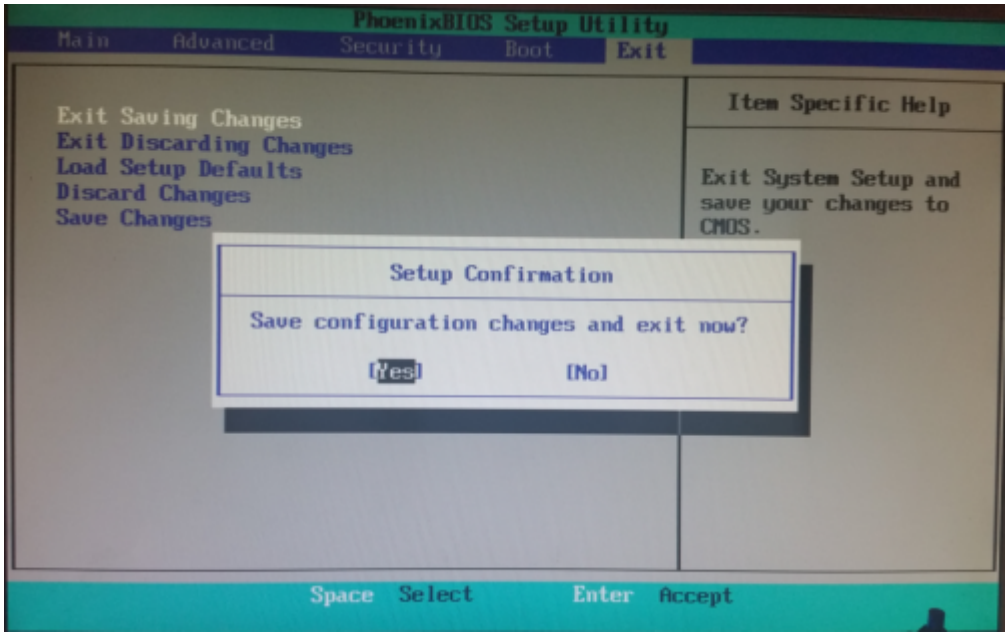
- Open BIOS by pressing “DEL” after startup of the computer
- **Attention: an English keyboard style is used for the following configuration!!!**
- Activate the RAID system in the BIOS
    - See User manual
    - Enable SATA in the “Main” screen of the BIOS system:
        - “Serial ATA: Enabled”
        - “SATA Controller Mode Option: Enhanced”
        - “SATA RAID Enable: Enabled”
        - “ICH Raid CodeBase: Intel” (we use an Intel ESB2 RAID controller)



- Set the right boot order
  - Change into “Boot” screen of the BIOS system using the arrow keys
  - Push “USB KEY” (maybe also “USB FDC” or other USB devices) and “ PCI SCSI: HostRAID#0 ....” into this order using the '+' and '-' keys



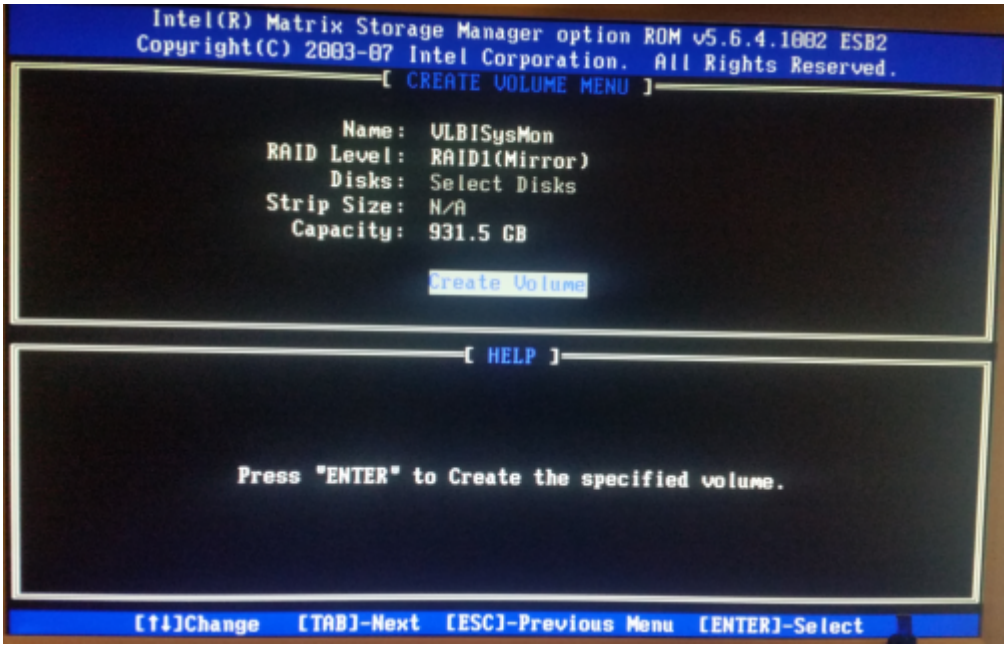
- Exit and save the configuration with all changes using the “Exit” screen

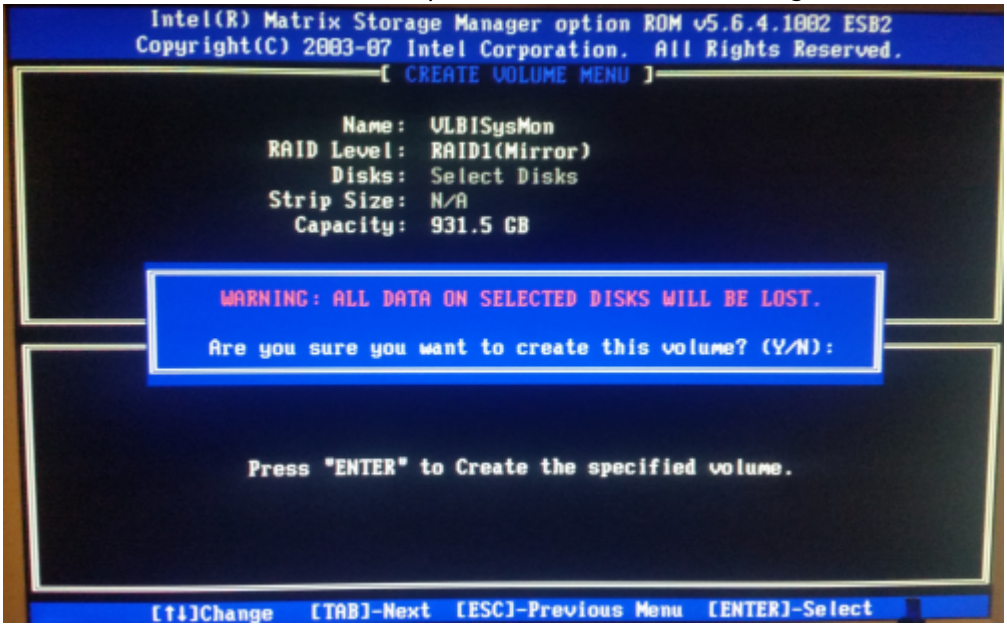


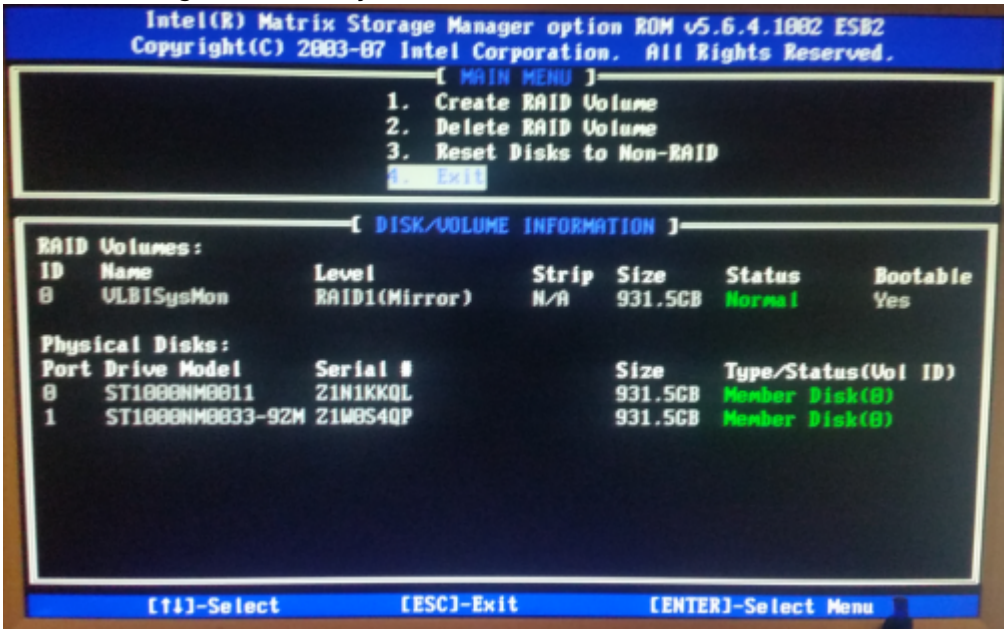
3) Configure the RAID 0

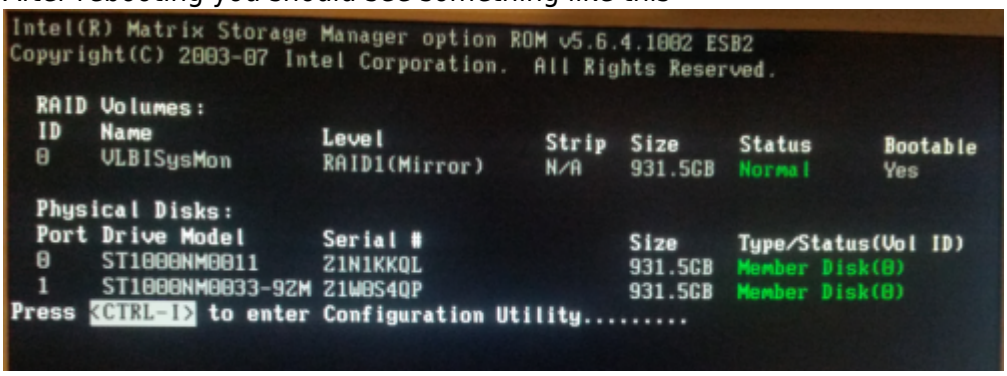
- We use two HDDs with 1TB each as RAID 1 (mirror set) for redundancy on anIntel ESB2 RAID controller.
- **Attention: an English keyboard style is used for the following configuration!!!**
- Open the Intel RAID Configuration Utility using Ctrl+'I'
- Activate the creation of a raid

- Create a mirror set (RAID1) with the name “VLBISysMon” on the existing disks

- 

- Push “Create Volume” and accept the the overwrite warning
- 

- Exit the configuration utility
- 

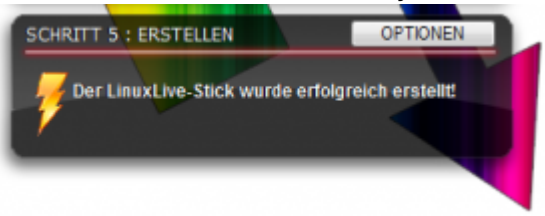
- After rebooting you should see something like this
- 

4) Download Ubuntu and install the ISO on a datastick

Methode Windows PC and LinuxLive USB Creator

- Download Ubuntu from https://www.ubuntu.com/download/desktop on a separate machine, e.g. a Windows PC
- You will get an ISO-image of the installation
- Download "**LinuxLive USB Creator**" from https://www.heise.de/download/product/linuxlive-usb-creator-90060 (do not use UNetbootin because it has some failures with 64-bit Linux/Ubuntu systems; see http://askubuntu.com/questions/544419/cant-run-a-fresh-install-of-ubuntu-14-10-shows-kernel-panick)
- Install LinuxLive USB Creator by double click on the installer program and follow the installation instructions
- Start the program LinuxLive USB Creator and create a Linux USB-stick (a detailed instruction can be found here: https://www.lidux.de/anleitungen/37-ubuntu-1210-usb-stick-installieren-creator)
    - Select the USB-stick on which the image should be installed
    - Select the ISO image of the Linux system
    - Select no "PERSISTENZ"
    - Select the formatting of the stick with FAT32
    - Click on the flash sign to start the installation

- The installation is finished after you see:



- Close the program and dismount the USB-stick

Methode copying the Ubuntu image on a stick

Ubuntu CD and DVD images can now be written directly to a USB stick, which is a very easy way to make a bootable USB stick.

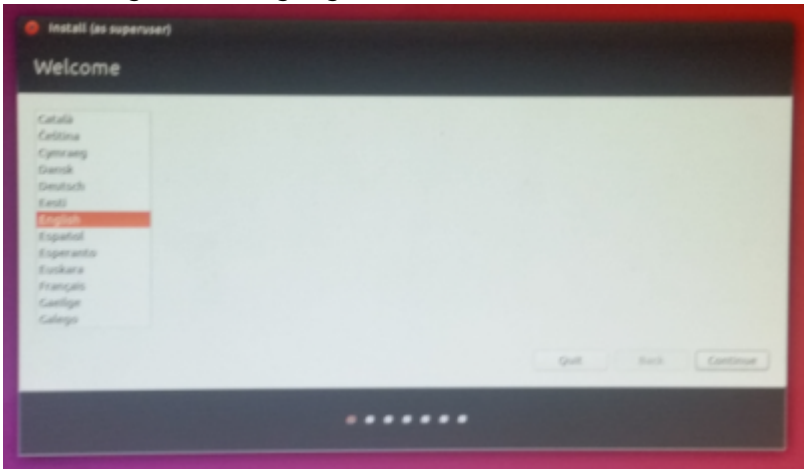
- Simply choose a CD or DVD image that will fit on your USB stick and copy it on a stick with no partitions.

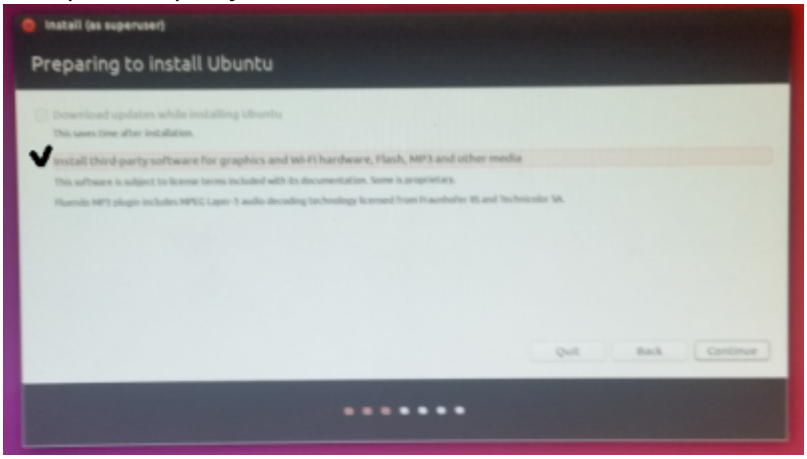
```
#sudo cp ubuntu-17.04-desktop-i386.iso /dev/sdc
```

- Further informations:

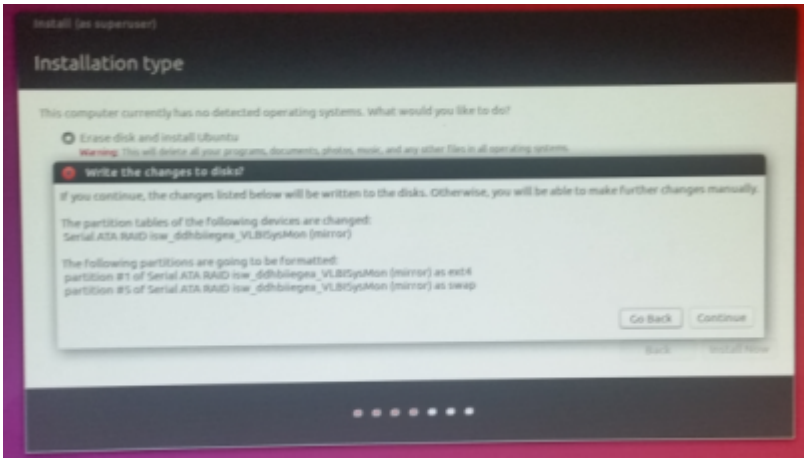
https://help.ubuntu.com/16.04/installation-guide/amd64/ch04s03.html#usb-copy-isohybrid

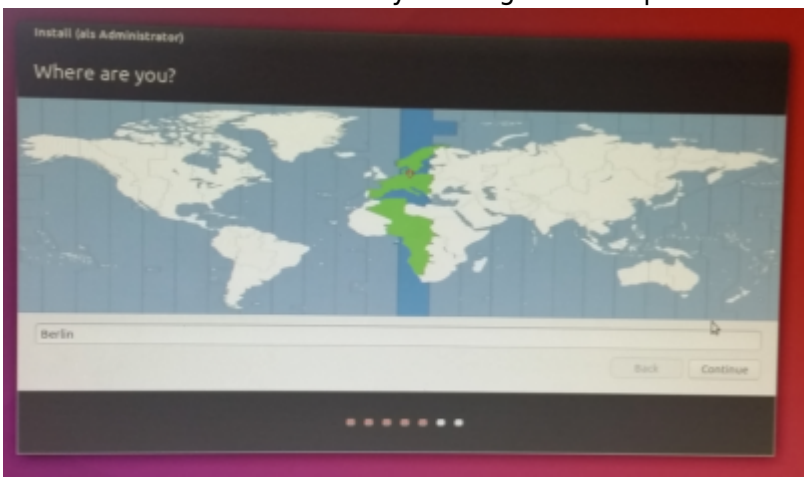
5) Install Ubuntu on the SysMon machine

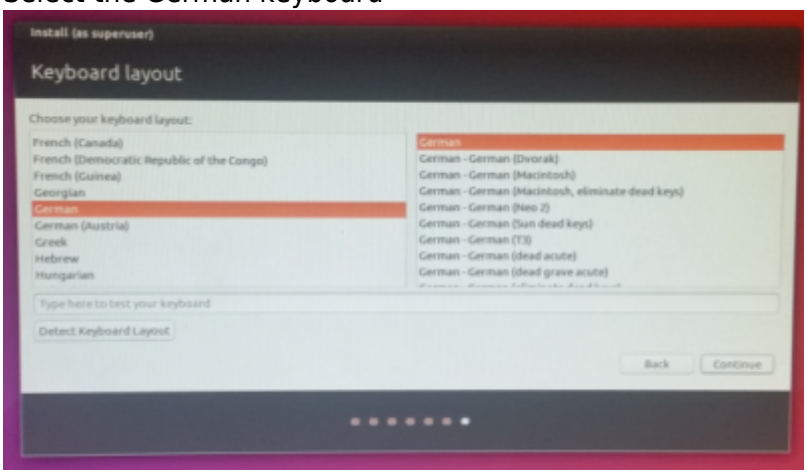
- Insert the stick into a free USB slot
- To connect keyboard and mouse, you need an USB hub, because Supermicro X7DWT just has two USB ports
- 
- Start the PC and select “Install Linux” when prompted
- Select English as language
- 

- Accept third-party software
- 

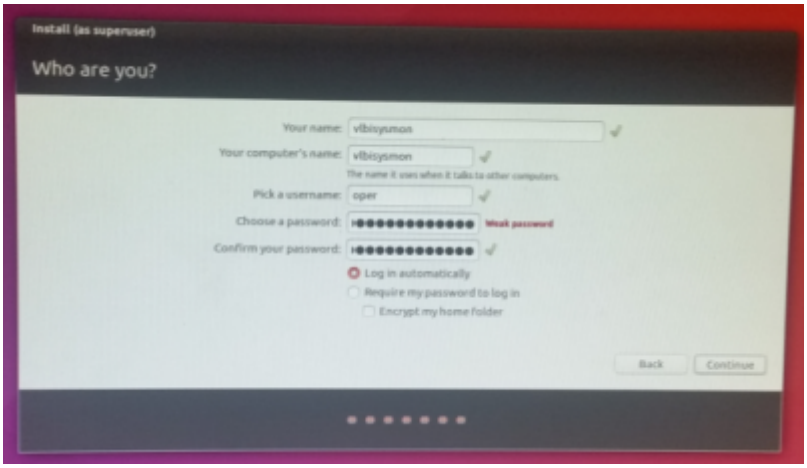
- Select the standard setting “Erase disk and install Ubuntu”. Accept the partitioning request.

- 

- Select “Berlin” as timezone by clicking onto the position of Berlin on the map
- 

- Select the German keyboard
- 

- Create a the personalization with computer name and your name as “vlbisysmon” and a user “oper” with a dedicated password and select the auto-login.

- 

- Then the installation starts
- 

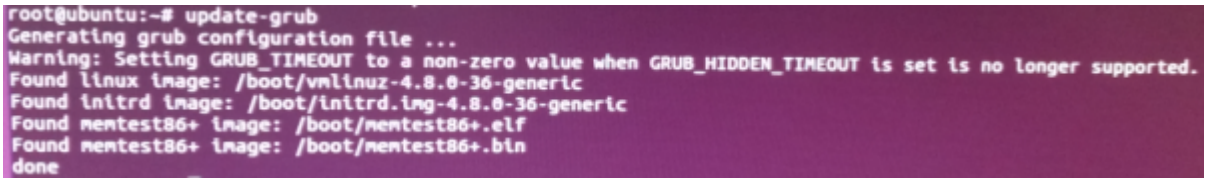
- Reboot the system and keep the USB-stick in the USB-slot
- Reboot with the live system on the stick (Start Linux from the stick)
- Follow the installation of the GRUB bootloader on the RAID (see https://wiki.ubuntuusers.de/GRUB_2/Reparatur/ (German)) for a standard desktop system
  - Open a terminal (search “term” in the programs)
  - Become root
  - ```
    sudo su
    ```

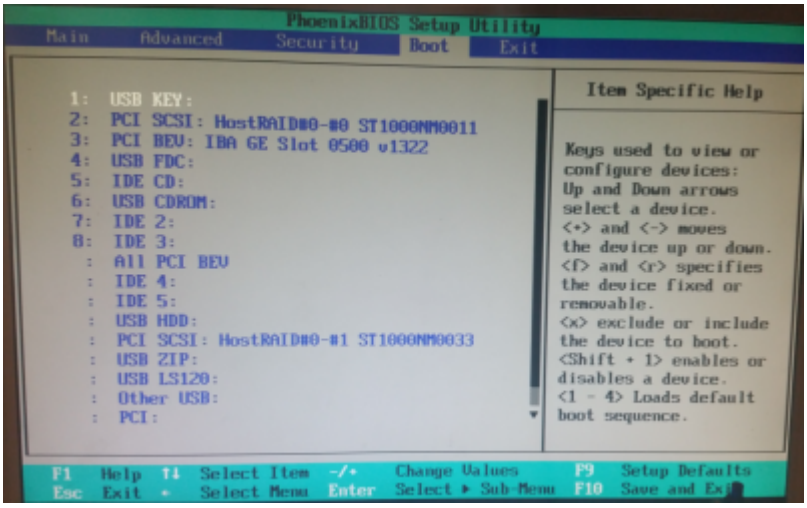
- Mount the RAID to /mnt
- ```
  mount /dev/mapper/isw_ciiaeibbja_VLBISysMon1 /mnt
  (isw stands for Intel Raid Controller; "ciiaeibbja" can be a different string)
  ```

- You can check the RAID (other checks can be found here: https://www.pilgermaske.org/2013/05/dmraid-mainboard-raid-unter-linux-einrichten/ (German)
- ```
  lsblk
  ```

- Mount the required directories for the GRUB installation
- ```
  sudo mount -o bind /dev /mnt/dev
  sudo mount -o bind /sys /mnt/sys
  sudo mount -t proc /proc /mnt/proc
  cp /proc/mounts /mnt/etc/mtab
  ```

- Change into root environment of the installed system on the RAID
- ```
  chroot /mnt /bin/bash
  ```
- Install GRUB (**Attention: the RAID must be used and not a partition on the RAID; this is defined by the device path without an ending number ⇒ not …_VLBISysMon1, but …_VLBISysMon**)
- ```
  grub-install /dev/mapper/isw_ciiaeibbja_VLBISysMon
  ```
- 

- Update GRUB
- ```
  update-grub
  ```
- 

- Exit the changed root privileges
- ```
  exit
  ```
- Reboot the system and extract the USB-stick, so that the system boots from the harddrives. Check bootz order before.
- 

- Open a terminal and become root again
- ```
  sudo su
  ```
- If necessary, set a APT-proxy with “*cat > /etc/apt/apt.conf*”, where the following must be entered (finish with “Ctrl+C”)
- ```
  Acquire::http::Proxy "http://gate-w.wettzell.ifag.de:8000";
  ```

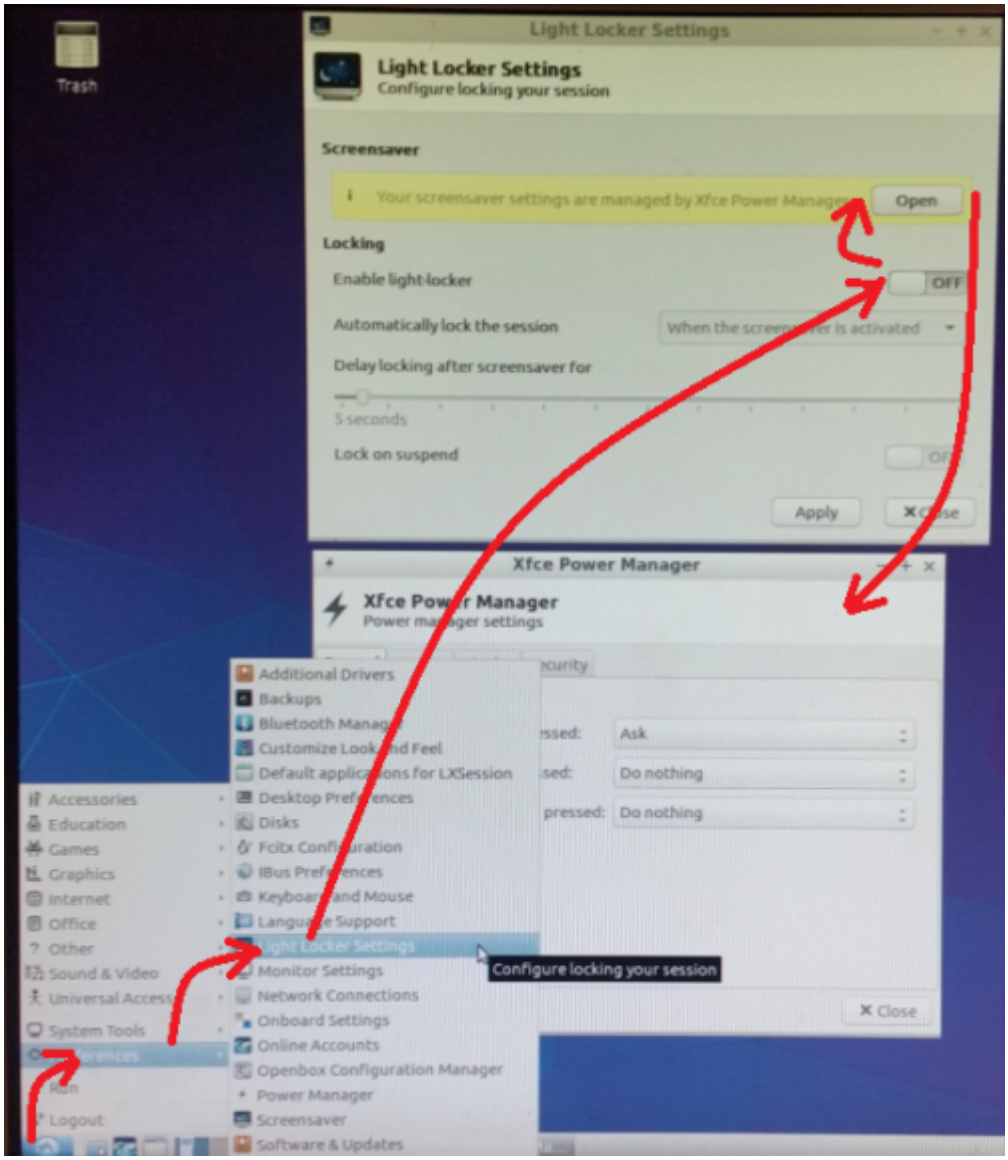
- Update package information

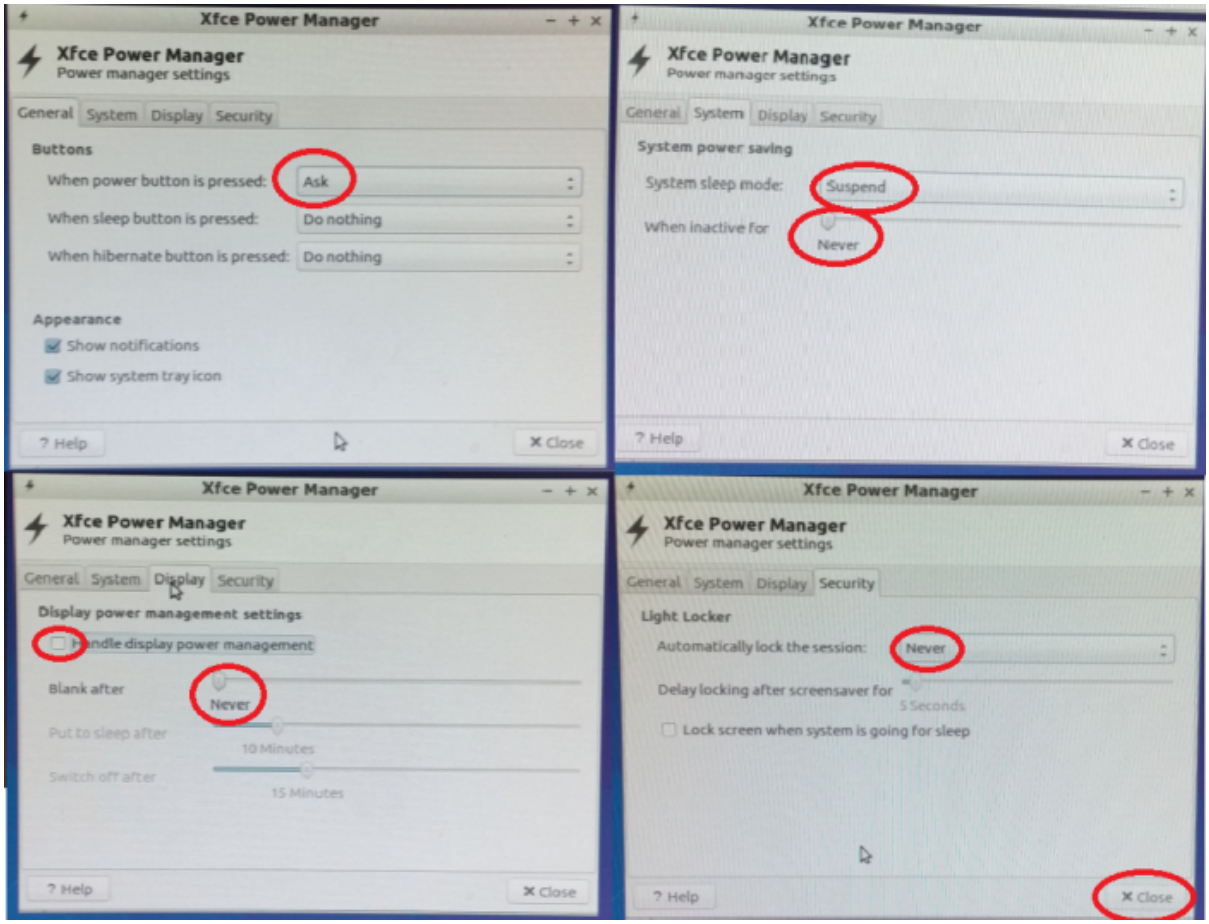
```
apt-get update
```

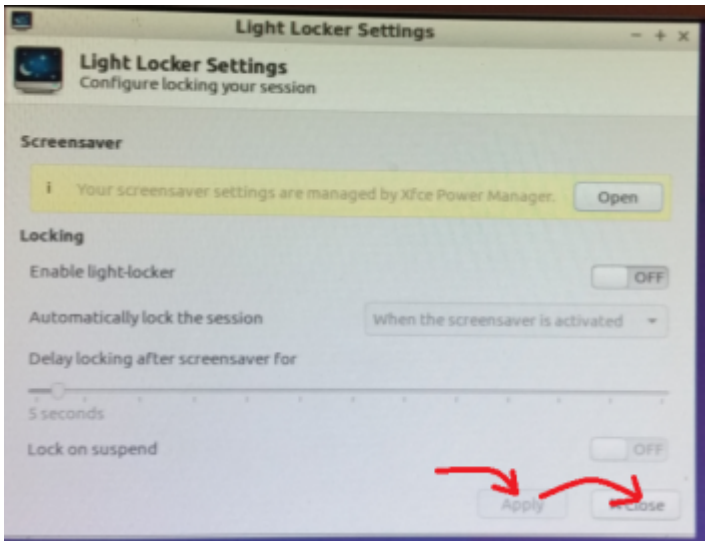
- **Downgrade the desktop environment from “Unity” to a lightweight one, e.g. “LXDE (Lightweight X11 Desktop Environment)“**, (it is still possible to change the environment after log-out and clicking onto the Ubuntu logo over the user login)
  - with ” *sudo apt-get install lubuntu-desktop* ”
  - and set it as default environment:
    - check which environments are available with “ *ls /usr/share/xsessions/* ” and if Lubuntu.desktop exists and
    - edit the default settings file with “ *vi /usr/share/lightdm/lightdm.conf.d/50-ubuntu.conf* ” as root and change it to

```
[SeatDefaults]
user-session=Lubuntu
```

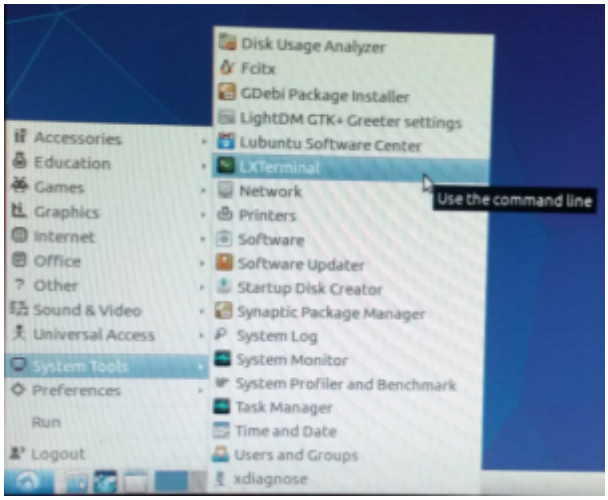
- Reboot
- (Maybe it is necessary to change “update-apt-xapi”-settings, which updates the software database regularly and takes a lot of CPU time)
- **Set all parameters in the screensaver** in the menu **Start menu → Preferences → Light Locker Settings** and follow the instruction in the images below


Trash
Light Locker Settings
Light Locker Settings
Configure locking your session
Screensaver
Your screensaver settings are managed by Xfce Power Manager
Open
Locking
Enable light-locker
OFF
Automatically lock the session
When the screensaver is activated
Delay locking after screensaver for
5 seconds
Lock on suspend
Apply
Xfce Power Manager
Xfce Power Manager
Power manager settings
Additional Drivers
Backups
Bluetooth Manager
Customize Look and Feel
Default applications for LXSession
Desktop Preferences
Disks
Fcitx Configuration
IBus Preferences
Keyboard and Mouse
Language Support
Light Locker Settings
Monitor Settings
Network Connections
Onboard Settings
Online Accounts
Openbox Configuration Manager
Power Manager
Screensaver
Software & Updates
Accessories
Education
Games
Graphics
Internet
Office
Other
Sound & Video
Universal Access
System Tools
Logout
Ask
Do nothing
Do nothing
Configure locking your session
Close

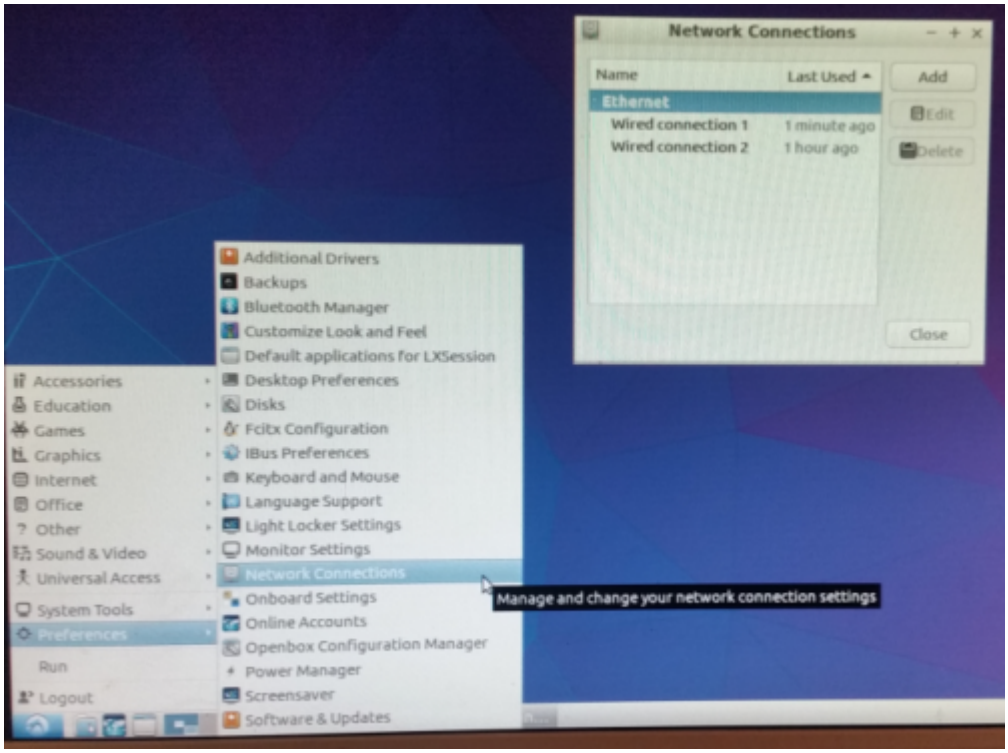




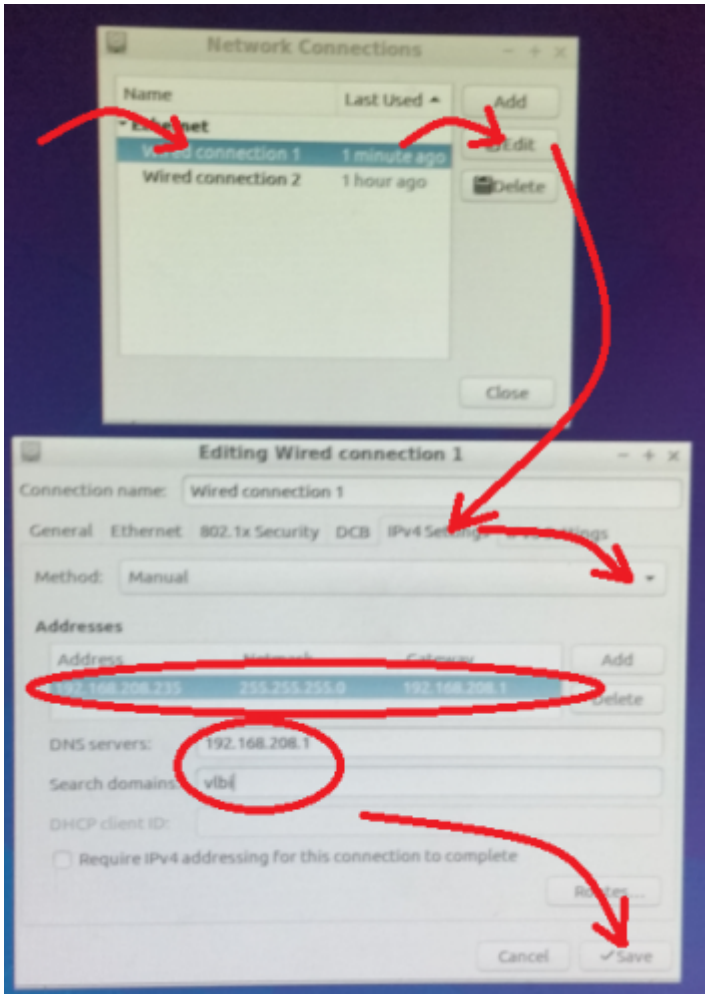
- **Set the network**
  - Open a terminal (“LXTerminal”) using the start menu

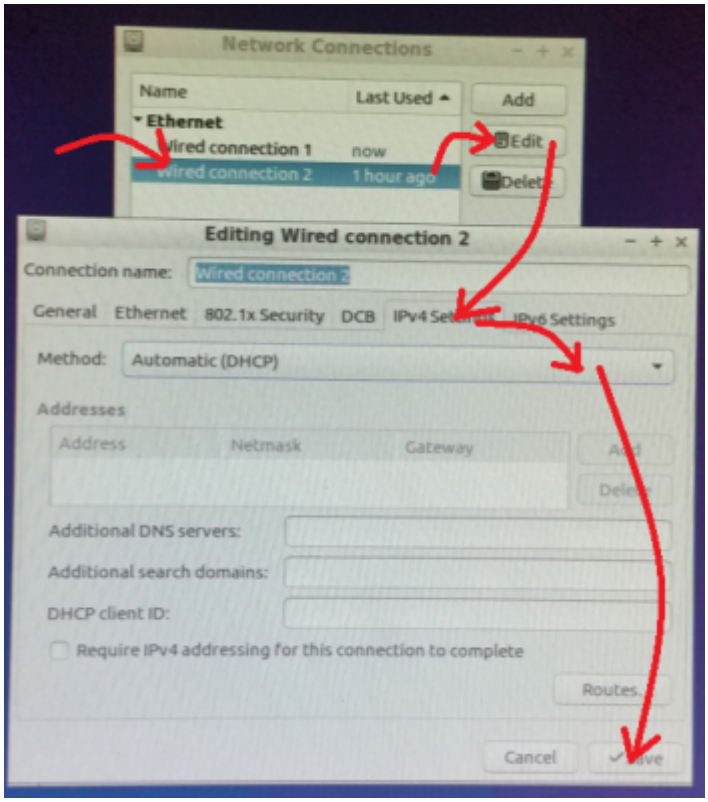


- Become root with “*sudo su*”
- Set hostname if not already correct: “*vi /etc/hostname*” and set it to “vlbisysmon”
- Open the “Network Connections” dialog (under the LXDE (Lightweight X11 Desktop Environment) it is in the **Start menu → Preferences → Network Connections**)

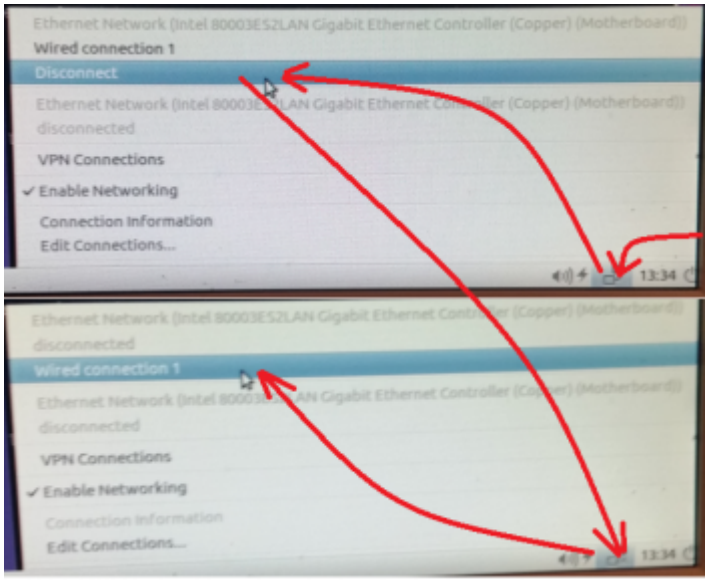


- Each server has two network interfaces. The first one gets a static IP setting with an fixed IP from the IP-table (see IP-addresses of the "vlbi" network) and the second gets a DHCP setting (this can be let as it is in the standard installation)

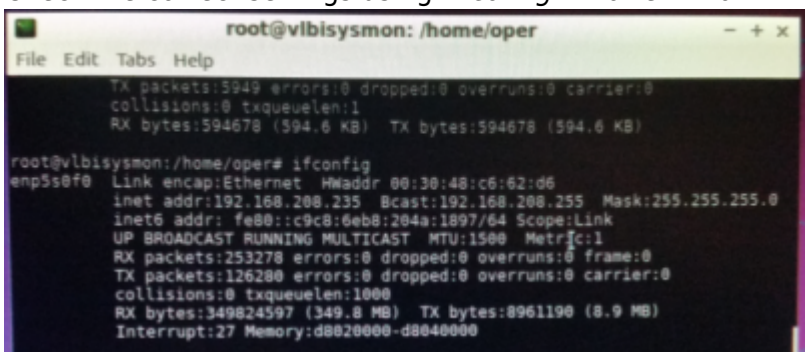




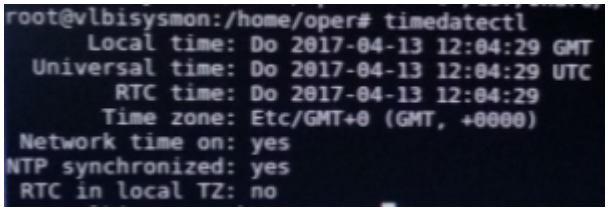
- Disconnect the wired connection and connect again



- Check the correct settings using "*ifconfig*" in a terminal



- **Set clock to UTC (GMT+0)**
  - First set the time and timezone in the desktop with **Start menu → System tools → Time and Date**
  - Set hardware clock to UTC (as user "root"): "*vi /etc/default/rcS*" and set line "*UTC=yes*"
  - Run "*timedatectl set-local-rtc 0* "
  - Set localtime to GMT+0: "*rm /etc/localtime*" and "ln -s /usr/share/zoneinfo/Etc/GMT+0 /etc/localtime"
  - Check it with "*timedatectl*". You should see something like this:

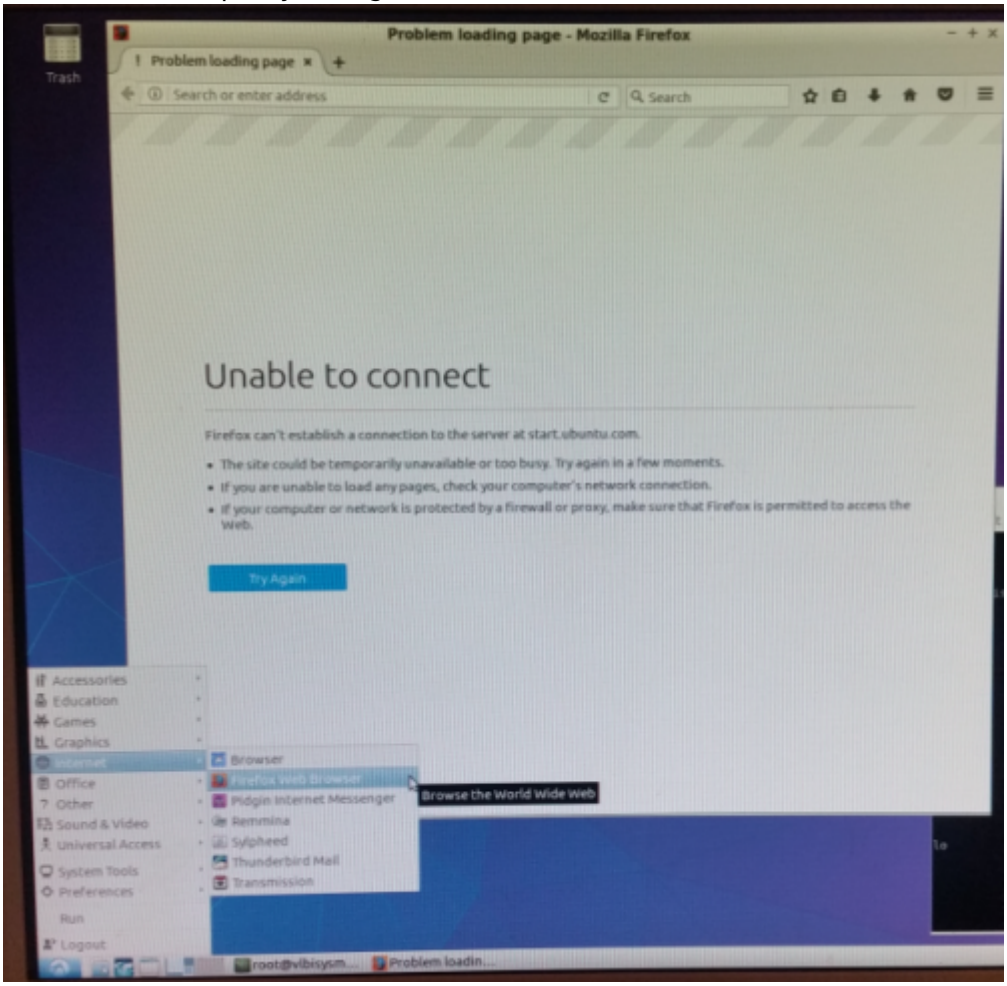


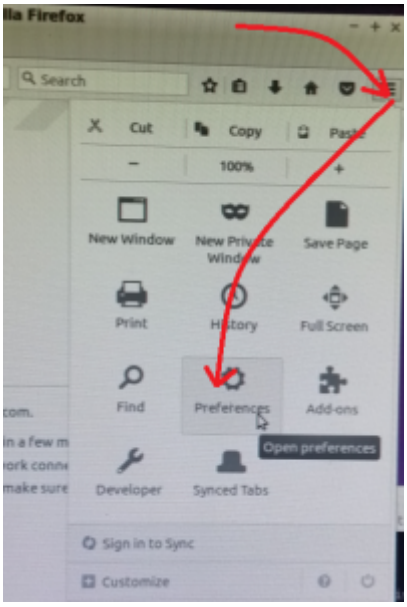
- **Activate NTP**
  - "*apt-get install ntp*"
  - "*apt-get install ntpdate*"
  - Set local NTP servers for "ntpdate": "*vi /etc/default/ntpdate*"
    - Set line "*NTPSERVERS= "192.168.208.4 192.168.208.5"*" (delete the existing NTPSERVERS line)
  - Set local NTP servers for "ntpd": "*vi /etc/ntp.conf*"
    - Set line "*server 192.168.208.4*"
    - Set line "*server 192.168.208.5*"
    - Set all existing server lines as comments (starting '#')
    - Set all existing pool lines as comments (starting '#')
  - Set current time once
    - " */etc/init.d/ntp stop*"

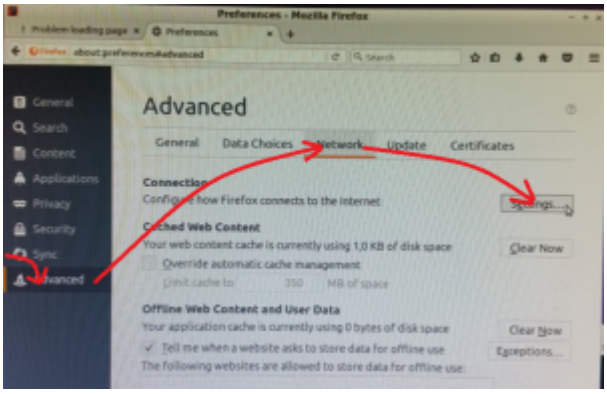
        - "*ntpdate -s 192.168.208.4*"
        - " */etc/init.d/ntp start*"
    - Check NTP status
        - " *ntpq -p*"

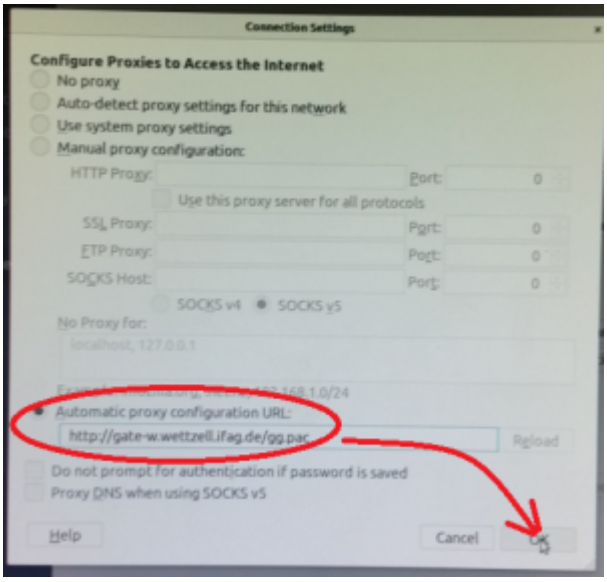
6) Costomize Linux software for system monitoring

6.1) Firefox browser

- Add "Automatic proxy configuration URL" in the Firefox internet browser
- 

- 

- 

- 

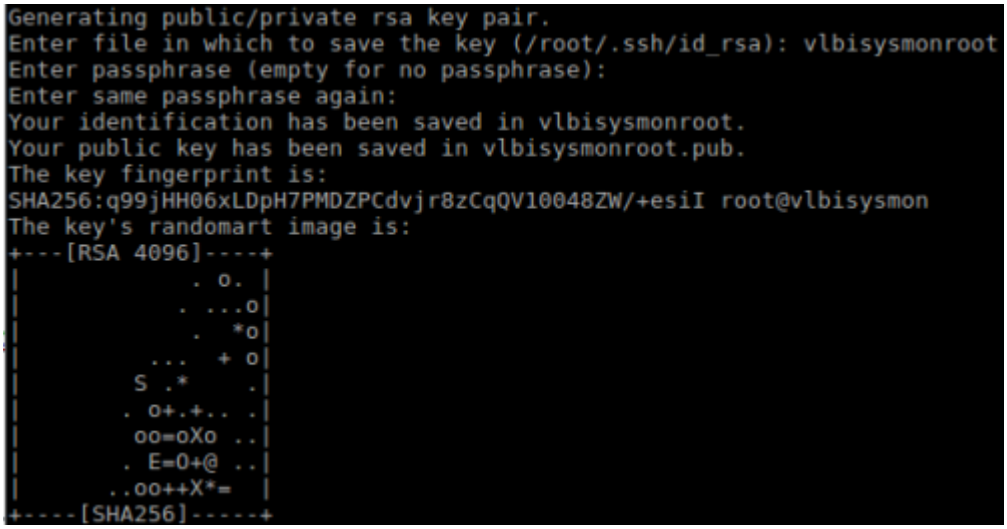
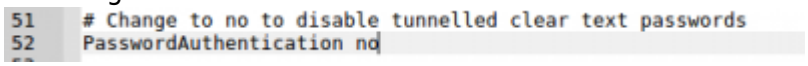
- If another browser should also be used, do the same setting there.

6.2) SSH server

- Install a SSH server with "*apt-get install ssh*" (or as minimum "*apt-get install openssh-server*")
- Install "autossh" to automatically restart SSH sessions and tunnels with "*apt-get install autossh*"
- **Hint: Getting X11 forwarding through ssh working after running su**
  - Run "*xauth list $DISPLAY* " to get the cookie of the SSH connection, e.g. "*somehost.somedomain:10 mit-magic-cookie-1 4d22408a71a55b41ccd1657d377923ae* "

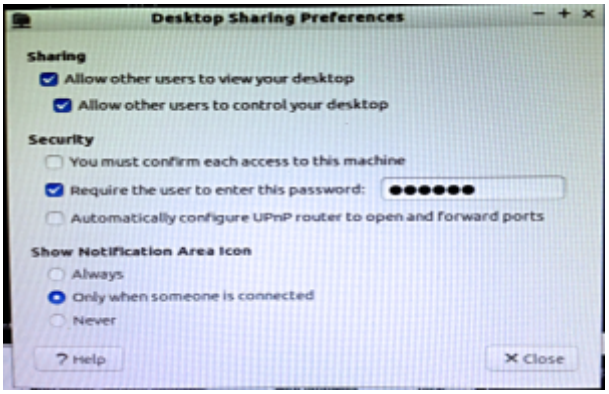
- Change user with “*sudo su*”
- Run “*xauth add «<cookie» ”*, e.g. “*xauth add somehost.somedomain:10 mit-magic-cookie-1 4d22408a71a55b41ccd1657d377923ae ”* to add the forwarding cookie to the new user
- Create an SSH key for user “oper”, using “*ssh-keygen -b 4096 ”* and save it to file “*vlbisysmonoper*” (

  vlbisysmonoper.zip

)
- 
```
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa): vlbisysmonroot
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in vlbisysmonroot.
Your public key has been saved in vlbisysmonroot.pub.
The key fingerprint is:
SHA256:q99jHH06xLDpH7PMDZPCdvjr8zCqQV10048ZW/+esiI root@vlbisysmon
The key's randomart image is:
+---[RSA 4096]----+
|            . o. |
|           . ...o|
|            .  *o|
|         ...  + o|
|        S .*    .|
|       . o+.+.. .|
|        oo=oXo ..|
|       . E=O+@ ..|
|      ..oo++X*=  |
+----[SHA256]-----+
```
- Install the new key file “*ssh-copy-id -i vlbisysmonoper.pub oper@192.168.208.236 ”*
- The new key is installed at “ */home/oper/.ssh/authorized_keys ”*
- Permit password authenication by editing “ */etc/ssh/sshd_config ”* and activate the following line with “no”
- 
```
51  # Change to no to disable tunnelled clear text passwords
52  PasswordAuthentication no
```
- Restart ssh daemon with “ */etc/init.d/ssh restart*”
- From now on login is only possible using “*ssh -X -i vlbisysmonoper oper@192.168.208.236 ”*
- Note: If you want to use the key with Putty on Windows, you have to use the program “puttygen” to convert the key to a *.ppk file in the Putty format. Open “puttygen” and follow the menu “File” ⇒ “Load private key” and open the private key generated before. It converts the key. Save the new key by pushing on the button “Save private key” and store it as “vlbisysmonoper.ppk”. Then open Putty and create a new connection. Open the menu “SSH” ⇒ “Auth” and add the new private key in *.ppk format.

6.3) Vino VNC server

- Configure the “Desktop Sharing Preferences” by calling “*vino-preferences*” as user “oper” (define a VNC password: here “+oper!”)

- 

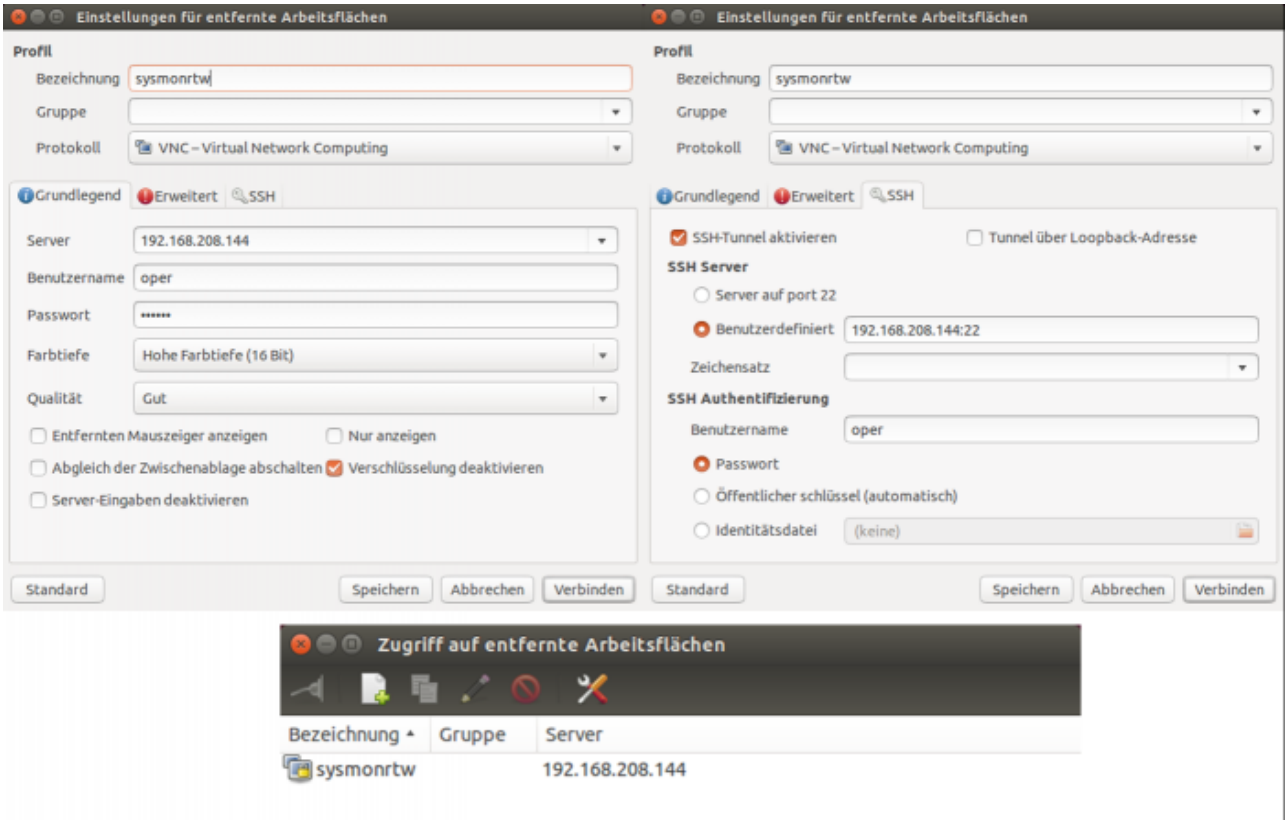
- Disable encryption, to easily allow the access with all VNC clients, with "*gsettings set org.gnome.Vino require-encryption false*"
- Create a new directory (if not yet available) as user "oper": "*mkdir /home/oper/Software* " and "*mkdir /home/oper/Software/vino_vnc* "
- Change into the new directory with "*cd /home/oper/Software/vino_vnc* "
- Create a start script "vinovnc.sh" with an editor in the new folder and add the following content:

```
#!/bin/bash
/usr/lib/vino/vino-server > /dev/null 2> /dev/null &
```

- Change the access rights of the new script with "*chmod 744 ./vinovnc.sh* "
- Create a desktop starter file with "*vi /home/oper/.config/autostart/vinovnc.desktop* " and add the following context (it can also be created with the program "lxshortcut"):

```
[Desktop Entry]
Type=Application
Name=Vino VNC server
Comment=Automatic start of the VINO VNC server
Exec=/home/oper/Software/vino_vnc/vinovnc.sh
Terminal=false
```

- Test the automatic start: log-out and -on again, which should start the application (test it with "*ps ax | grep vino*")
- The VNC Ports are: **5800** and **5900**
- An example configuration of a remote VNC client can look like the following setup for the Ubuntu "Remmina Remote Desktop Client" (similar settings can also be used for other VNC clients, like "Real VNC" under windows or xvnc4viewer under Linux; just if a tunneling is required, it must be set manually, using a separate SSH client)



6.4) Editor geany

- Install geany using the command "*apt-get install geany*"

6.5) GNU g++ compiler

- Install g++ using the command "*apt-get install g++*"

6.6) Subversion

- Install Subvserion as root with "*apt-get install subversion*"

6.7) PostgreSQL 9.5

- "*apt-get install postgresql-9.5*"
- The PostgreSQl database is then at " */var/lib/postgresql/9.5/main*"
- The PostgreSQL configuration is then at " */etc/postgresql/9.5/main/postgresql.conf*" (to find the current location of the configuration file use "*ps ax | grep postgres*", which prints the complete calling arguments of the server including the "config_file" parameter, e.g. "*/usr/lib/postgresql/9.5/bin/postgres -D /var/lib/postgresql/9.5/main -c config_file=/etc/postgresql/9.5/main/postgresql.conf* ")
- Enable remote access
  - "*vi /etc/postgresql/9.5/main/postgresql.conf*" and enable "*listen_addresses = 'localhost*'" and "*port = 5432*"
  - "*vi /etc/postgresql/9.5/main/pg_hba.conf*" and enable "host all all 127.0.0.1/32 trust"

```
# Database administrative login by UNIX sockets
local   all         postgres                            trust
# TYPE  DATABASE    USER        CIDR-ADDRESS            METHOD
# "local" is for Unix domain socket connections only
local   all         all                                 trust
# IPv4 local connections:
host    all         all         127.0.0.1/32            trust
# IPv6 local connections:
host    all         all         ::1/128                 trust
# Zabbix database access
local   zabbix      zabbix                              md5
```

- Restart PostgreSQL with " */etc/init.d/postgresql stop*" and " */etc/init.d/postgresql start*" (" */etc/init.d/postgresql-8.4 restart*" my not work correctly
- Test the connectivity with " *psql -h 127.0.0.1 -p 5432 postgres postgres*" (quit with Ctrl-D)
- For the programming simple_psqlquery can be used
- Further documentation can be found on http://www.postgresql.org/docs/9.5/static/index.html
- Install the PostgreSQL library for the compiler using "*apt-get install libpq-dev*"

6.8) Wettzell System Monitoring Software (SysMon)

- The software can be found on the Wettzell Subversion repository http://xsamba.wtz/svn/vlbi/trunk/code/vlbisysmon/
- Create a directory "Software" in the home directory of the user oper with "*mkdir /home/oper/Software* "
- Change into the new directory and fetch the SysMon source with the Subversion command "*svn co http://xsamba.wtz/svn/vlbi/trunk/code/vlbisysmon/* "
- Connect to PostgreSQL using " *psql -h 127.0.0.1 -p 5432 postgres postgres*" (quit with Ctrl-D)
- Create role and database:
  - "*CREATE ROLE sysmon ENCRYPTED PASSWORD '+sysmon!' SUPERUSER NOCREATEDB NOCREATEROLE NOINHERIT LOGIN CONNECTION LIMIT 100;*"
  - "*CREATE DATABASE sysmon WITH OWNER=sysmon;*"
- Test the connectivity to the new database with " *psql -h 127.0.0.1 -p 5432 sysmon sysmon*" (quit with Ctrl-D)
- Change into directory of Wettzell SysMon software and build the individual components which you want to use

```
cd /home/oper/Software/vlbisysmon/main/sysmon_sender/make
make build
cd /home/oper/Software/vlbisysmon/main/sysmon_backup/make
make build
```

6.8) Apache web server

- Install Apache2 as root with "*apt-get install apache2*"

6.9) PHP

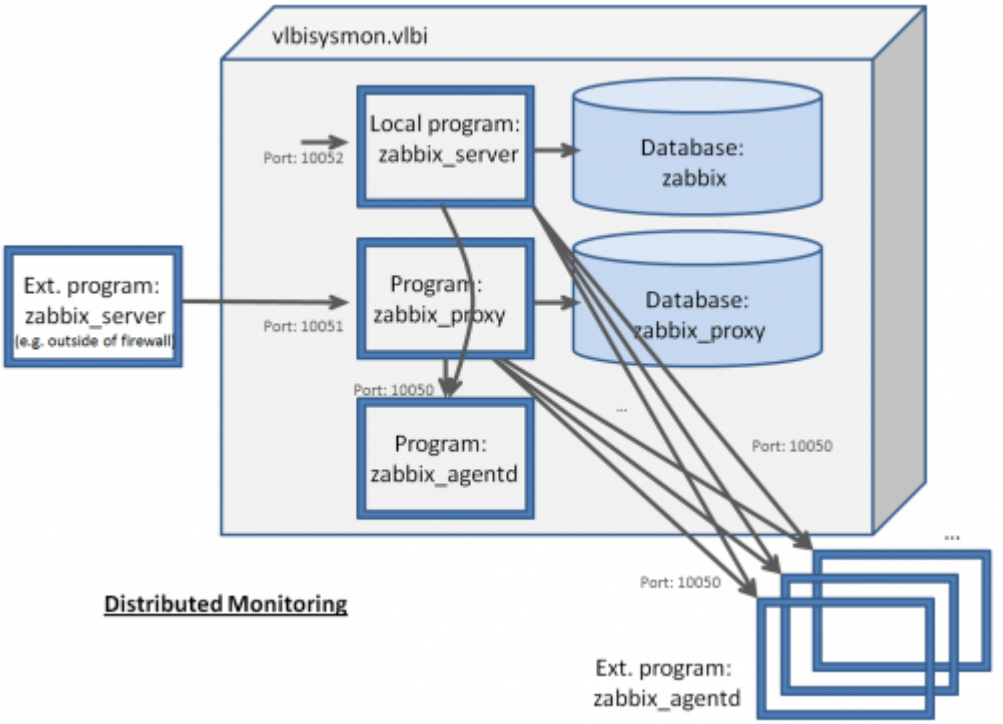
- "*apt-get install php libapache2-mod-php php-mcrypt*"

6.10) automake

- "*apt-get install automake*"

6.11) Zabbix

- Idea of a distributed monitoring concept (the map as Powerpoint file)



- A basic manual can be found here: https://www.zabbix.com/documentation/2.2/manual
- Install the Zabbix software using
  - "*apt-get install zabbix-server-pgsql* "
  - "*apt-get install zabbix-agent* "
  - "*apt-get install zabbix-frontend-php* "
- Create log file folders
  - "*mkdir /var/log/zabbix-server* "
  - "*mkdir /var/log/zabbix-agent* "
  - "*mkdir /var/log/zabbix-proxy* "
  - "*chown zabbix:zabbix /var/log/zabbix-server* "
  - "*chown zabbix:zabbix /var/log/zabbix-agent* "
  - "*chown zabbix:zabbix /var/log/zabbix-proxy* "
- Add "zabbix" user to "oper" group
  - ```
    adduser zabbix oper
    ```
- Configure the server with "*geany /etc/zabbix/zabbix_server.conf* "
    ```

```
ListenPort=10052
DBHost=localhost
DBName=zabbix
DBUser=zabbix
DBPassword=zabbix
LogFile=/var/log/zabbix-server/zabbix_server.log
ExternalScripts=/home/oper/Software/vlbisysmon/bin/
```

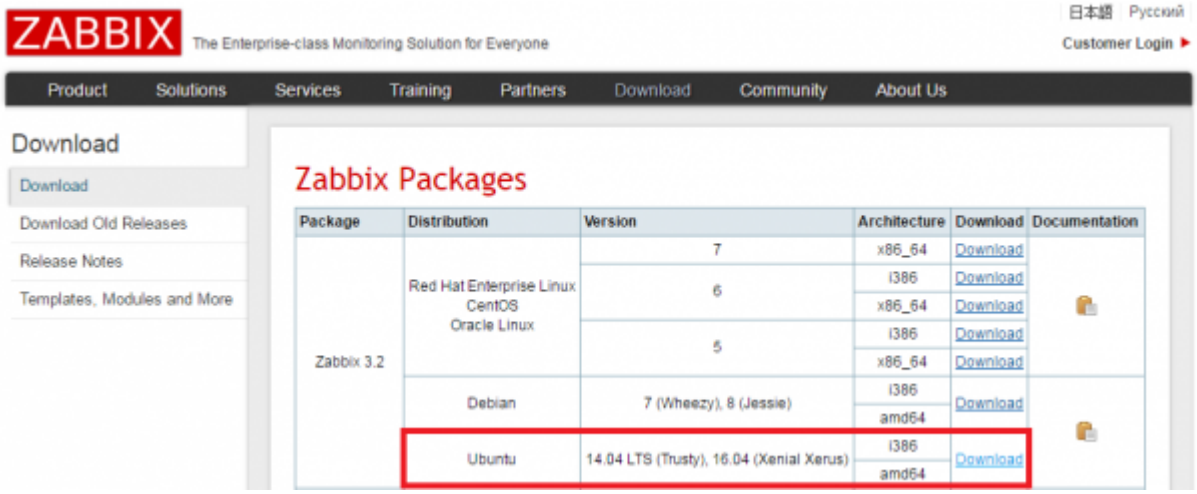
- Create the zabbix database after connecting with " psql -h 127.0.0.1 -p 5432 postgres postgres" (quit with Ctrl-D)

```
CREATE USER zabbix WITH PASSWORD 'zabbix';
CREATE DATABASE zabbix OWNER zabbix;
```

- Create the zabbix proxy database after connecting with " psql -h 127.0.0.1 -p 5432 postgres postgres" (quit with Ctrl-D)

```
CREATE USER zabbix_proxy WITH PASSWORD 'zabbix_proxy';
CREATE DATABASE zabbix_proxy OWNER zabbix_proxy;
```

- Download the Zabbix sources which fit to the Zabbix installation of the operating system: e.g. for Ubuntu 16.04. LTS it is Zabbix 2.4.7 (to check, start "*zabbix_server*" with "*DebugLevel=3*" in the configuration file " */etc/zabbix/zabbix_server.conf* " and read the log file at " */var/log/zabbix-server/zabbix_server.log* ", which is also defined in the configuration file of the server):
  - zabbix_3.2.4.orig.tar.gz
  - or download from http://www.zabbix.com/download.php to the directory /home/oper/Software/ and extract the package with "*tar -zxvf zabbix_3.2.4.orig.tar.gz*"



- Change into folder /home/oper/Software/zabbix-3.2.4/database/postgresql and run (see https://www.zabbix.com/documentation/3.2/manual/appendix/install/db_scripts) for the server

```
psql -h 127.0.0.1 -p 5432 -U zabbix zabbix < schema.sql
# stop here if you are creating database for Zabbix proxy
psql -h 127.0.0.1 -p 5432 -U zabbix zabbix < images.sql
psql -h 127.0.0.1 -p 5432 -U zabbix zabbix < data.sql
```

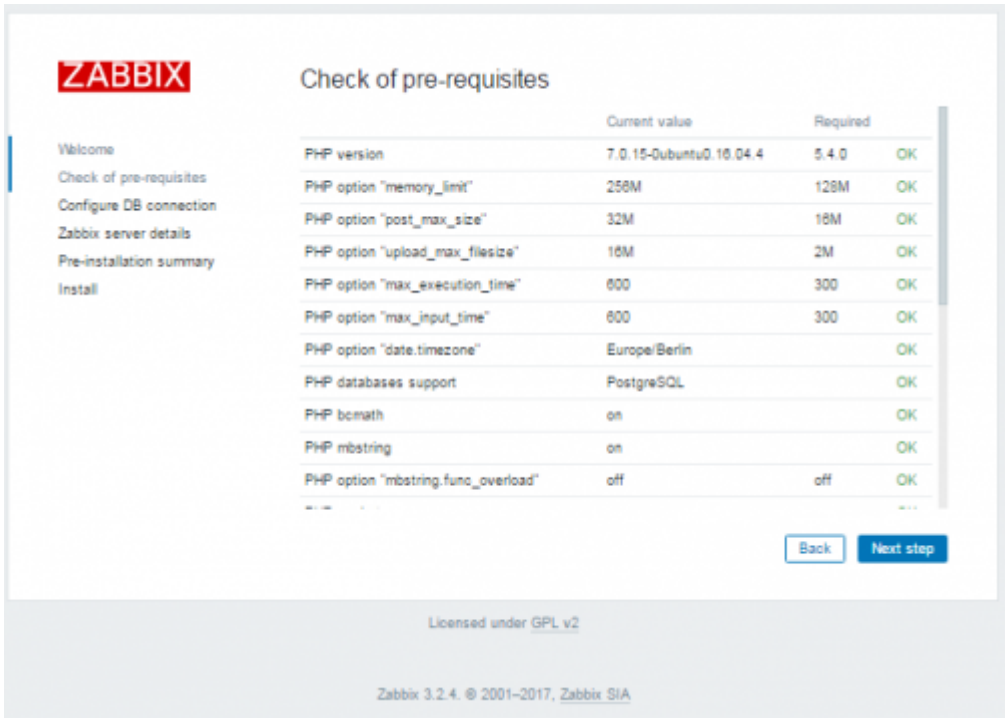
- and for the proxy

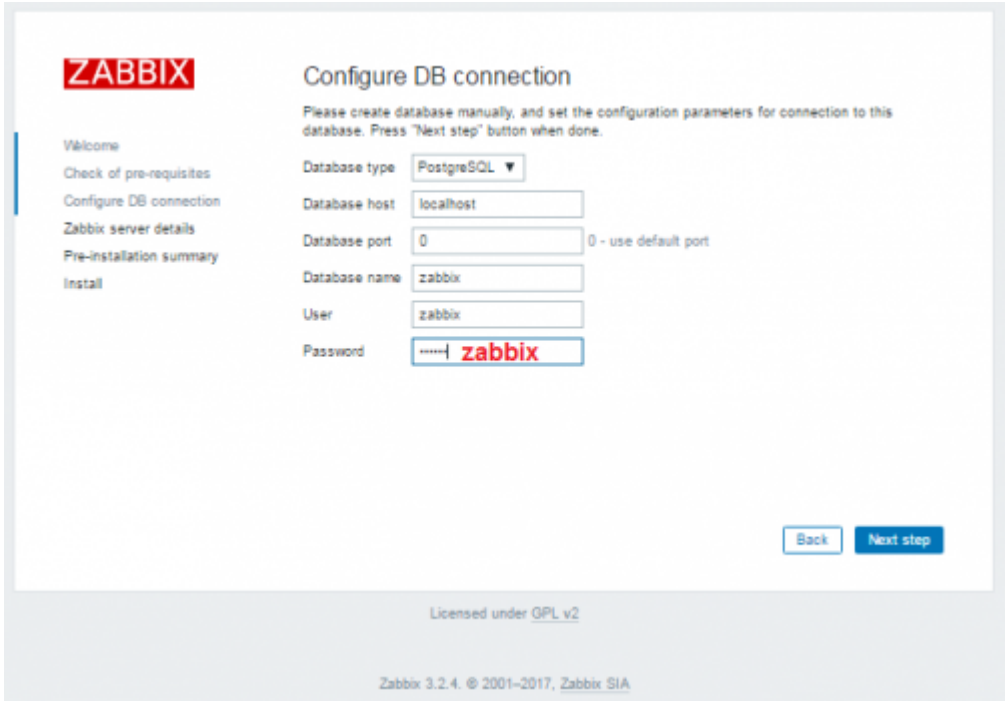
```
    psql -h 127.0.0.1 -p 5432 -U zabbix_proxy zabbix_proxy < schema.sql
```

- Restart Zabbix server process
  - " */etc/init.d/zabbix-server stop* "
  - " */etc/init.d/zabbix-server start* "
- Configure PHP with "*geany /etc/php/7.0/apache2/php.ini* " and restart the Apache2 server with " */etc/init.d/apache2 stop* " and " */etc/init.d/apache2 start*"

```
    [Date]
    ; Defines the default timezone used by the date functions
    date.timezone = Europe/Berlin
    max_execution_time = 600
    post_max_size = 32M
    memory_limit = 256M
    mbstring.func_overload = 0
    upload_max_filesize = 16M
    max_input_time = 600
```

- Create Web front-end as root
  - " *cd /var/www* "
  - " *mv /var/www/html/ /var/www/html_original* "
  - " *chown -R www-data:www-data /var/www/html_original* "
  - " *mkdir html* "
  - " *cp -R /home/oper/Software/zabbix-3.2.4/frontends/php/* ./html/.* "
  - " *chown -R www-data:www-data /var/www/html* "
  - Restart the Apache2 server with " */etc/init.d/apache2 stop* " and " */etc/init.d/apache2 start*"
  - Open a browser and connect to "http://127.0.0.1" and follow the instructions (if the configuration file cannot be saved automatically, then download it and save it at /var/www/html/conf/.
  - 


ZABBIX
Check of pre-requisites
Welcome
Check of pre-requisites
Configure DB connection
Zabbix server details
Pre-installation summary
Install
Current value
Required
PHP version 7.0.15-0ubuntu0.16.04.4 5.4.0 OK
PHP option "memory_limit" 256M 128M OK
PHP option "post_max_size" 32M 16M OK
PHP option "upload_max_filesize" 16M 2M OK
PHP option "max_execution_time" 600 300 OK
PHP option "max_input_time" 600 300 OK
PHP option "date.timezone" Europe/Berlin OK
PHP databases support PostgreSQL OK
PHP bcmath on OK
PHP mbstring on OK
PHP option "mbstring.func_overload" off off OK
Back
Next step
Licensed under GPL v2
Zabbix 3.2.4. © 2001–2017, Zabbix SIA


ZABBIX
Configure DB connection
Please create database manually, and set the configuration parameters for connection to this database. Press "Next step" button when done.
Welcome
Check of pre-requisites
Configure DB connection
Zabbix server details
Pre-installation summary
Install
Database type PostgreSQL
Database host localhost
Database port 0 0 - use default port
Database name zabbix
User zabbix
Password zabbix
Back
Next step
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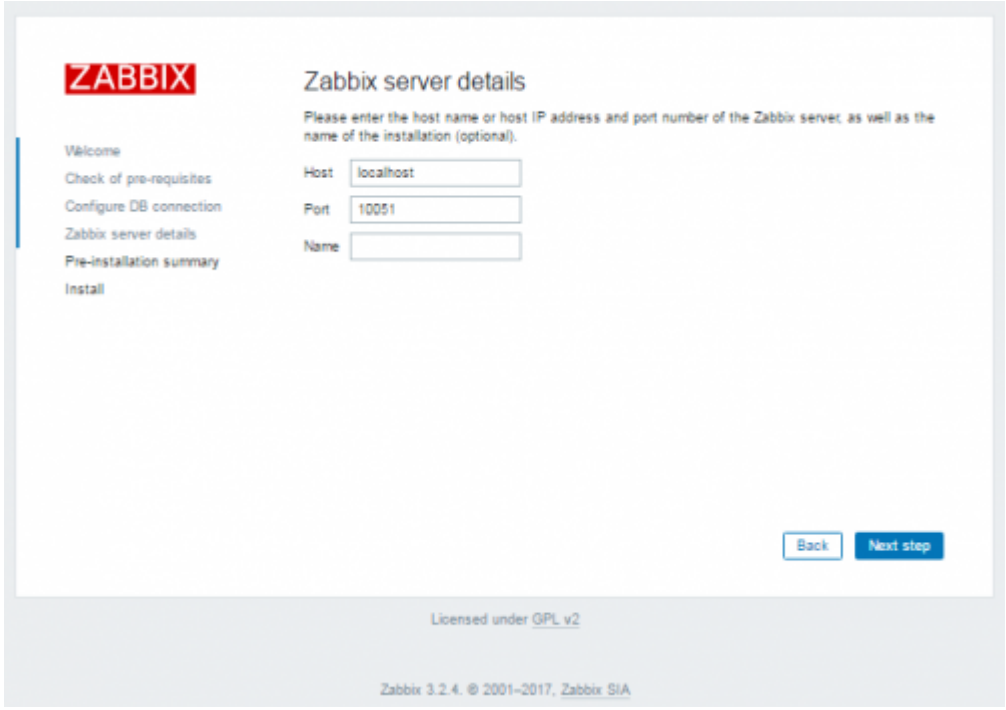
ZABBIX
Zabbix server details
Please enter the host name or host IP address and port number of the Zabbix server, as well as the name of the installation (optional).
Welcome
Check of pre-requisites
Configure DB connection
Zabbix server details
Pre-installation summary
Install
Host localhost
Port 10051
Name
Back
Next step
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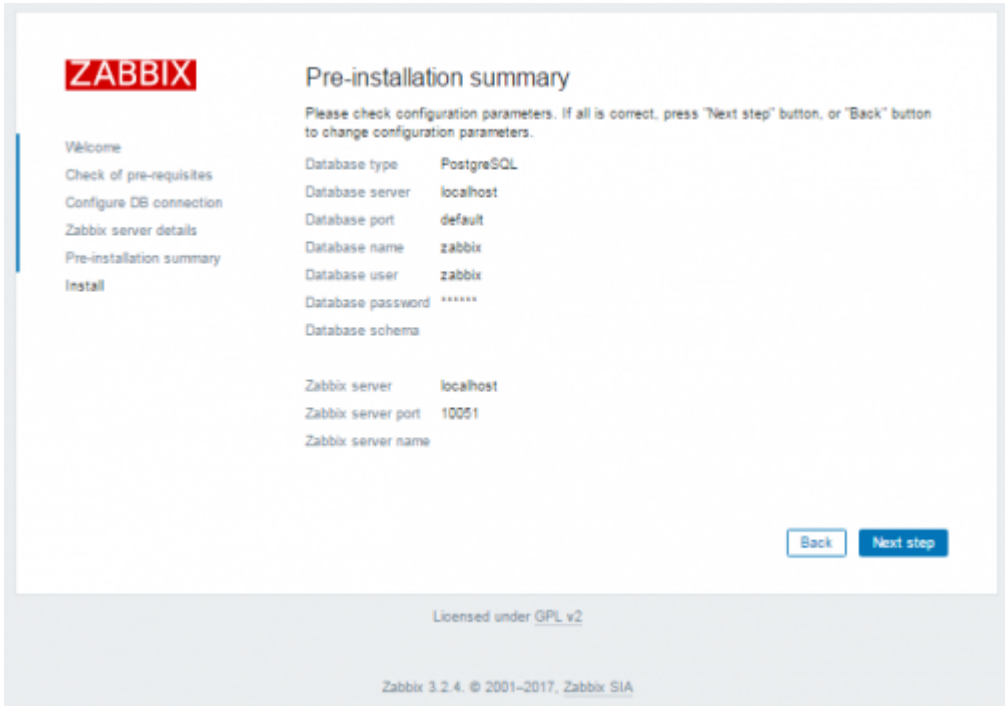
ZABBIX
Pre-installation summary
Please check configuration parameters. If all is correct, press "Next step" button, or "Back" button to change configuration parameters.
Welcome
Check of pre-requisites
Configure DB connection
Zabbix server details
Pre-installation summary
Install
Database type PostgreSQL
Database server localhost
Database port default
Database name zabbix
Database user zabbix
Database password ******
Database schema
Zabbix server localhost
Zabbix server port 10051
Zabbix server name
Back
Next step
Licensed under GPL v2
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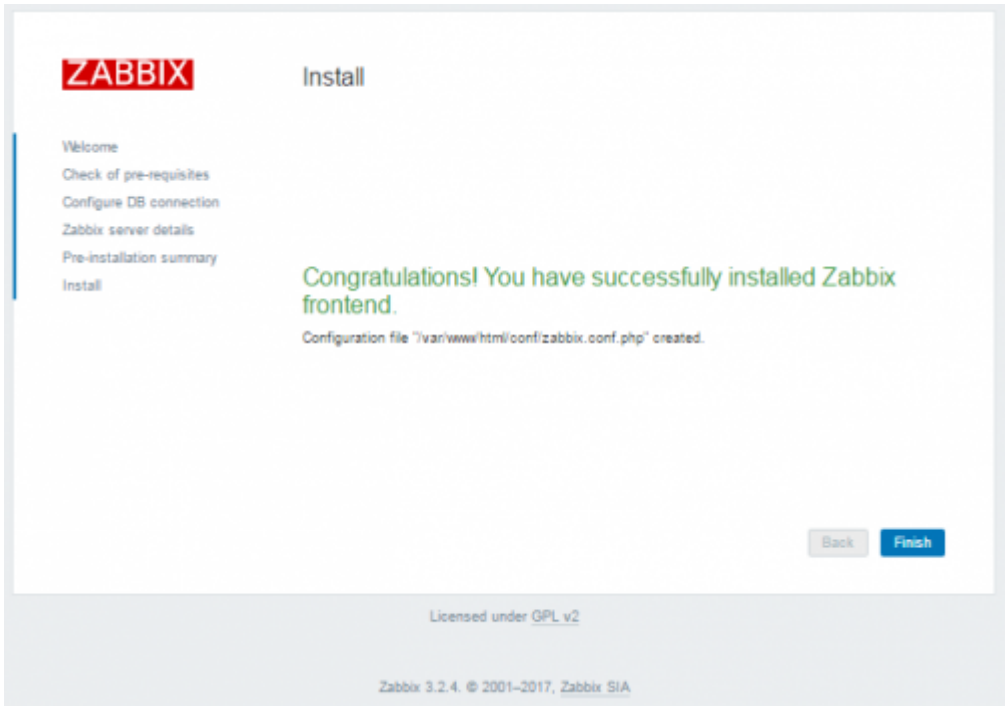
ZABBIX
Install
Welcome
Check of pre-requisites
Configure DB connection
Zabbix server details
Pre-installation summary
Install
Congratulations! You have successfully installed Zabbix frontend.
Configuration file "/var/www/html/conf/zabbix.conf.php" created.
Back
Finish
Licensed under GPL v2
Zabbix 3.2.4. © 2001–2017, Zabbix SIA

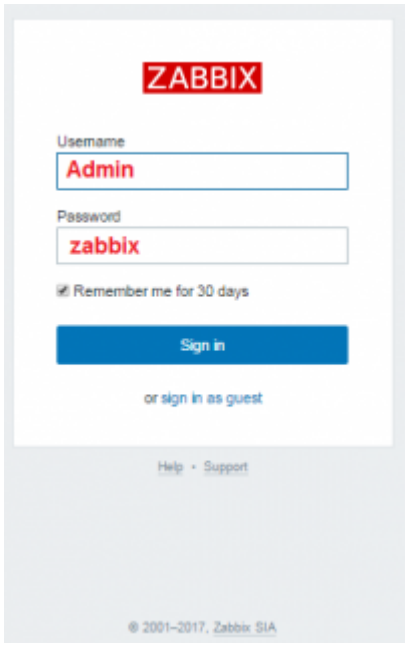
ZABBIX
Username
Admin
Password
zabbix
Remember me for 30 days
Sign in
or sign in as guest
Help • Support
© 2001–2017, Zabbix SIA

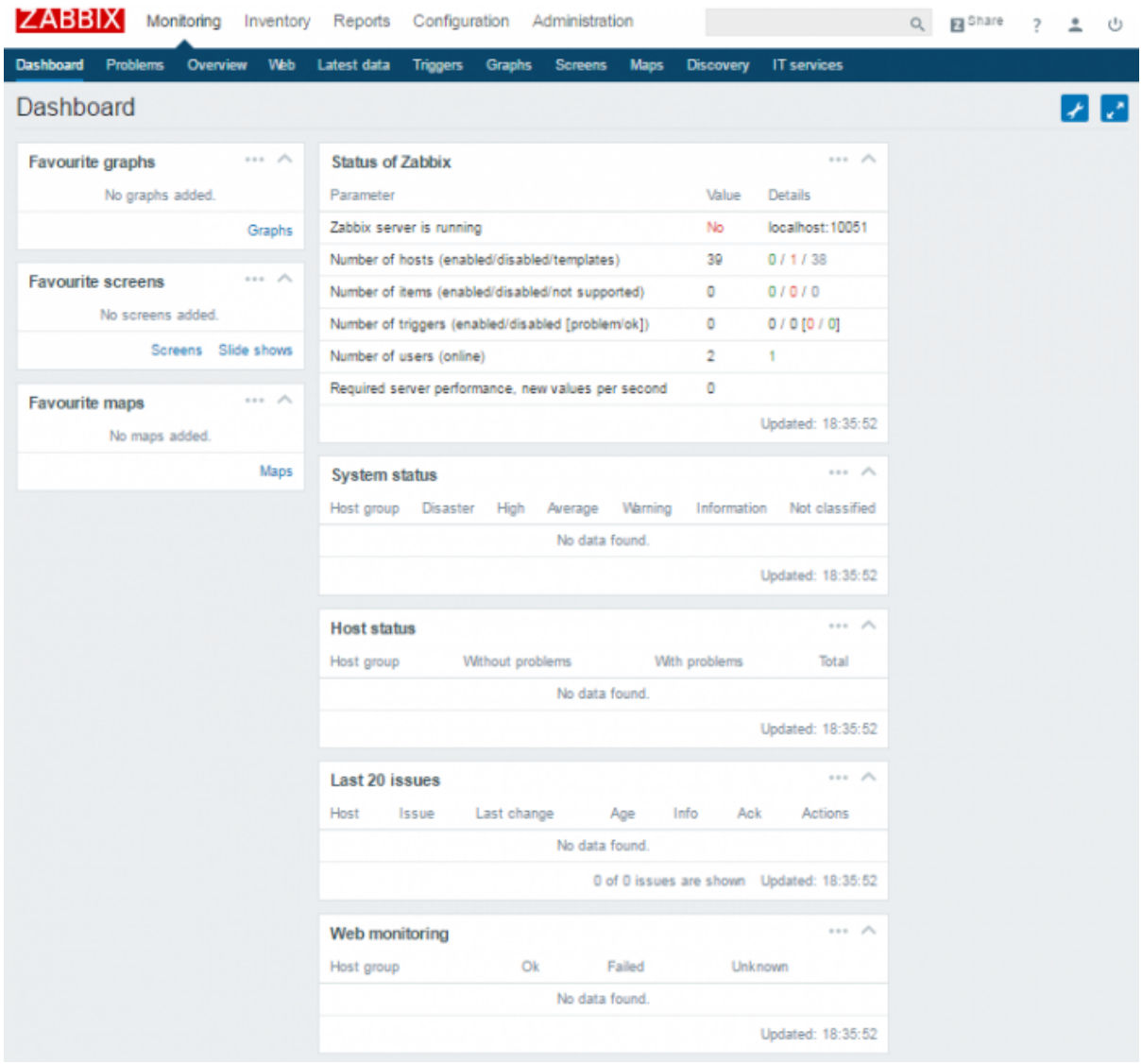

- Prepare manual Zabbix installation

```
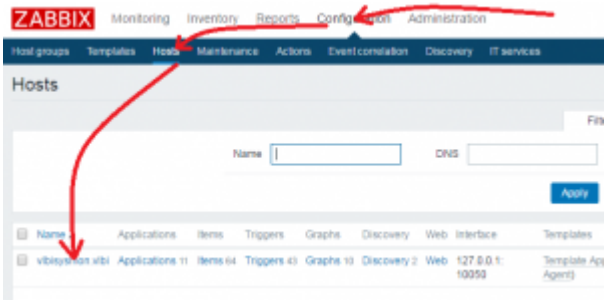
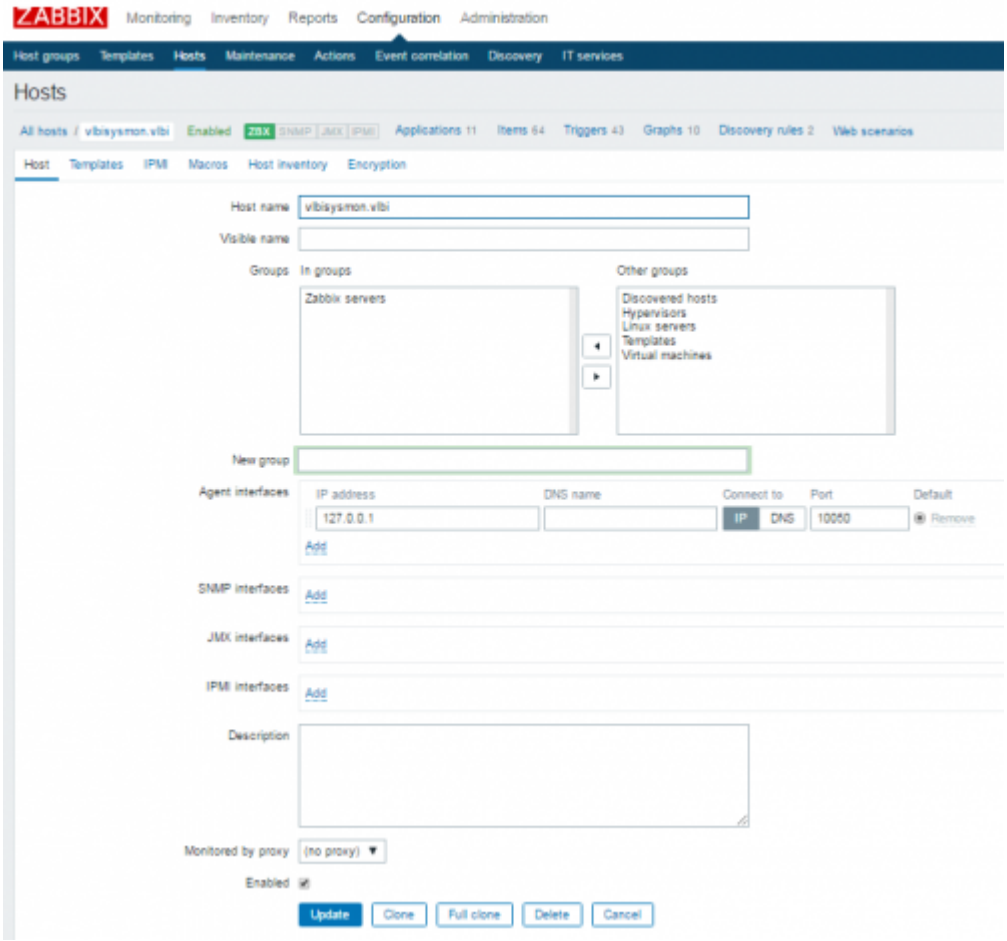
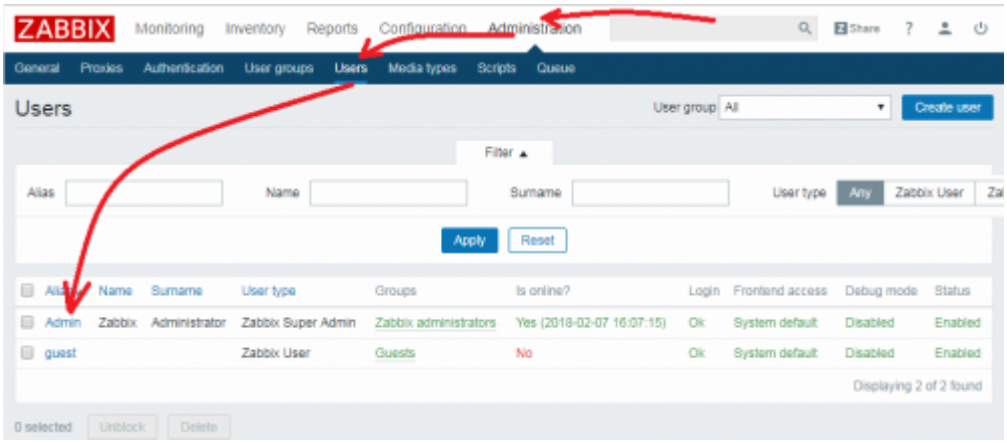
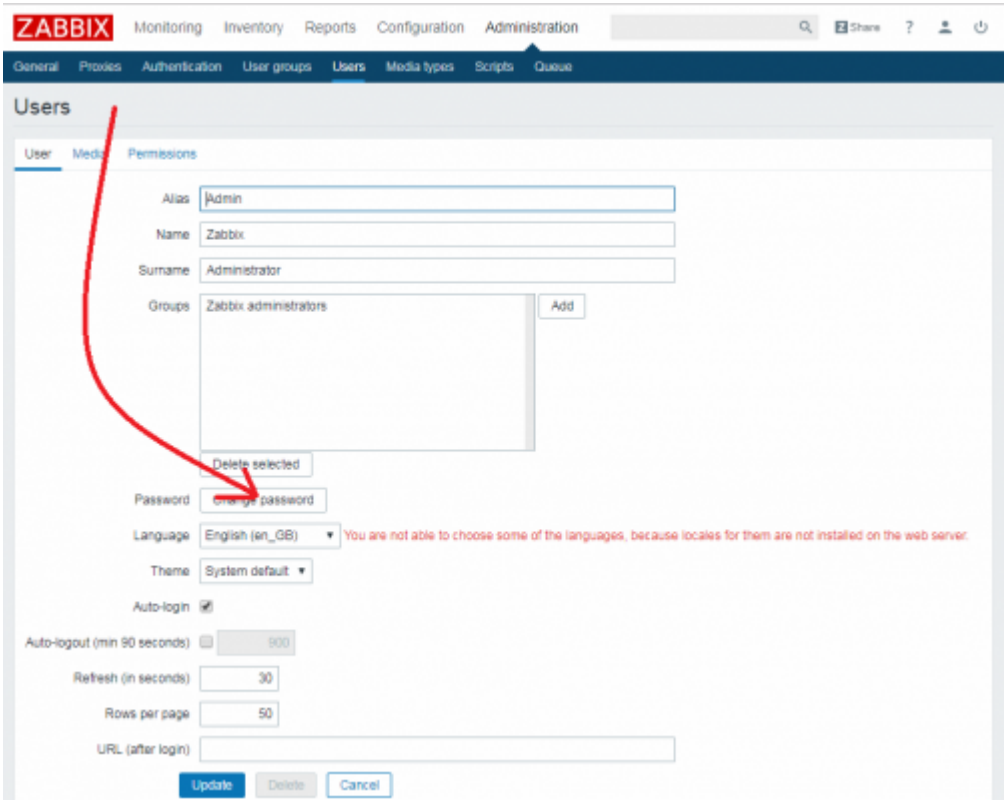
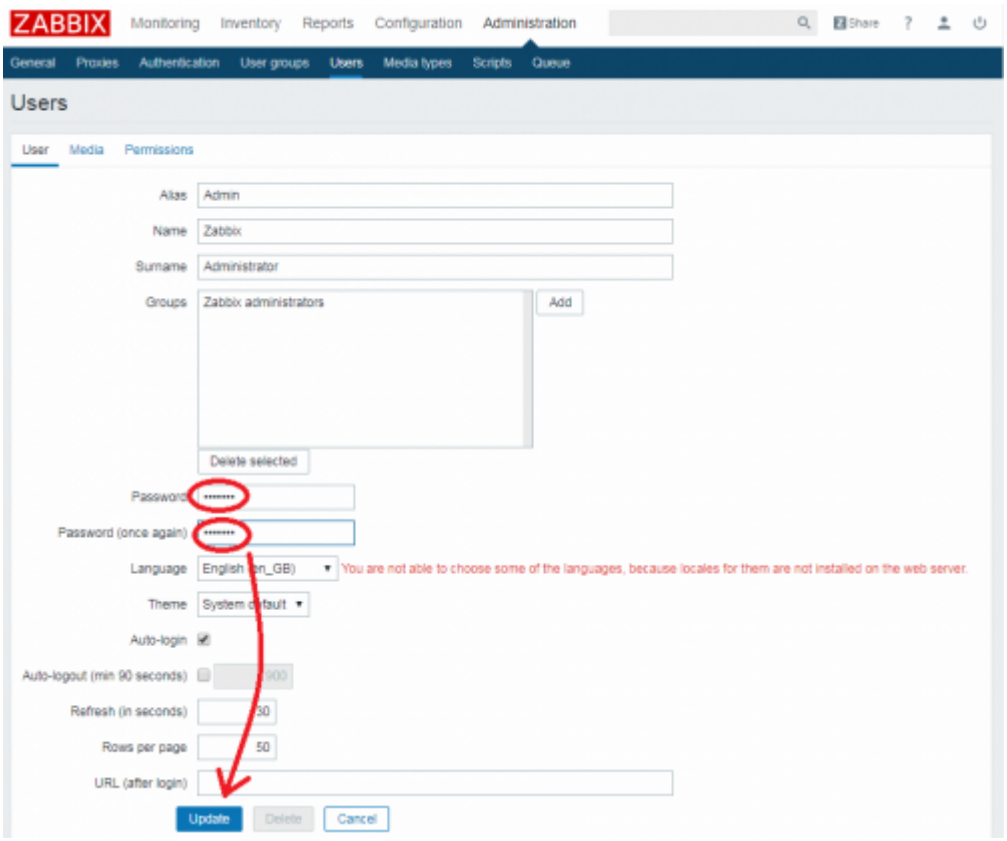
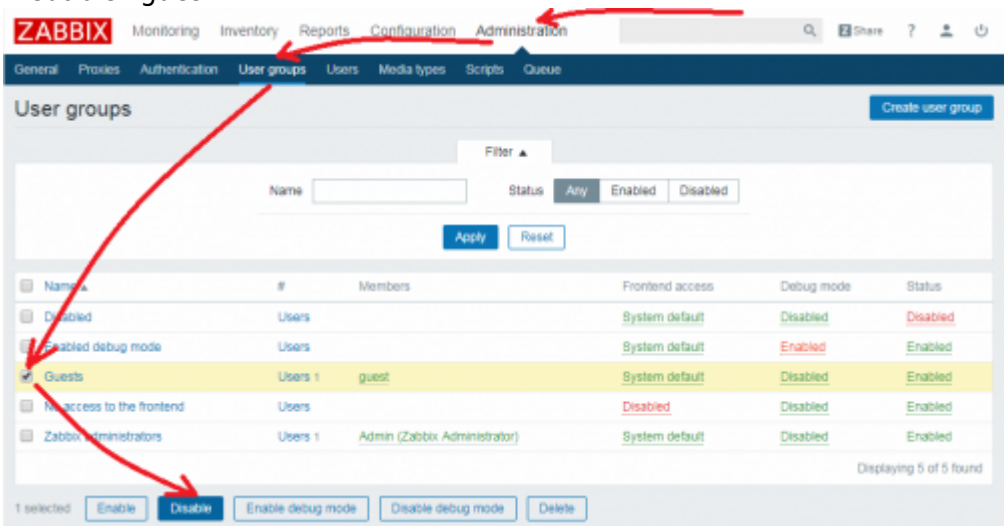
sudo apt-get install libsnmp-dev
```

- Update the “zabbix_server” and “zabbix_agent” to the latest version
  - Change into directory “ */home/oper/Software/zabbix-3.2.4/* ”
  - Run a configuration

```
    ./configure --enable-server --enable-agent --enable-proxy --
with-postgresql --with-net-snmp
```

- Build the server and agent

```
    make
```

- Copy server, agent and proxy to /usr/sbin

```
    mv /usr/sbin/zabbix_server /usr/sbin/zabbix_server_2.4.7
    cp /home/oper/Software/zabbix-3.2.4/src/zabbix_server/zabbix_server
/usr/sbin/zabbix_server
    mv /usr/sbin/zabbix_agentd /usr/sbin/zabbix_agentd_2.4.7
    cp /home/oper/Software/zabbix-3.2.4/src/zabbix_agent/zabbix_agentd
```

```
/usr/sbin/zabbix_agentd
    cp /home/oper/Software/zabbix-3.2.4/src/zabbix_proxy/zabbix_proxy
/usr/sbin/zabbix_proxy
```

- Create a new configuration file for the proxy
- ```
    cp /home/oper/Software/zabbix-3.2.4/conf/zabbix_proxy.conf
  /etc/zabbix/.
  ```
- and edit it with "*geany /etc/zabbix/zabbix_proxy.conf* "
  - ```
    DBHost=localhost
    DBName=zabbix_proxy
    DBUser=zabbix_proxy
    DBPassword=zabbix_proxy
    ProxyMode=1 # Passive => Server fetches data
    LogFile=/var/log/zabbix-proxy/zabbix_proxy.log
    ```
- Create a soft-link to the original configuration files
- ```
    ln -s /etc/zabbix/zabbix_server.conf
  /usr/local/etc/zabbix_server.conf
    ln -s /etc/zabbix/zabbix_agentd.conf
  /usr/local/etc/zabbix_agentd.conf
    ln -s /etc/zabbix/zabbix_proxy.conf
  /usr/local/etc/zabbix_proxy.conf
  ```
- Create a shell script to test startup of server using "*geany /usr/sbin/zabbix_server.sh* " and change the mode to allow the execution of the script
  - ```
    #!/bin/bash

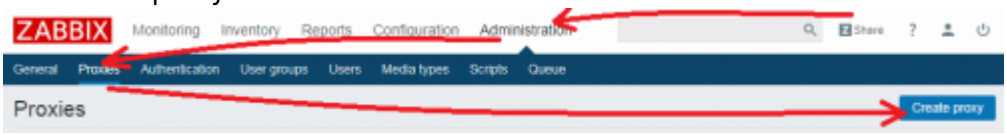
    /usr/sbin/zabbix_server -c /etc/zabbix/zabbix_server.conf
    ```
  - "*mode 755 /usr/sbin/zabbix_server.sh* "
- Create a shell script to test startup of proxy using "*geany /usr/sbin/zabbix_proxy.sh* " and change the mode to allow the execution of the script
  - ```
    #!/bin/bash

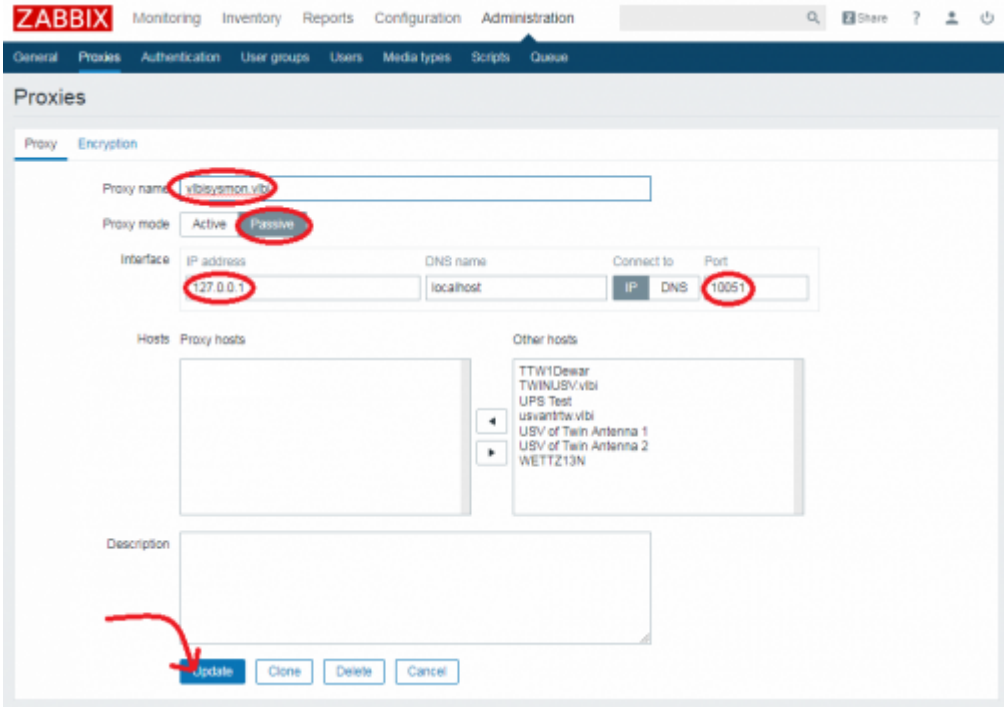
    /usr/sbin/zabbix_proxy -c /etc/zabbix/zabbix_proxy.conf
    ```
  - "*mode 755 /usr/sbin/zabbix_proxy.sh* "
- Stop agent and server
- ```
    /etc/init.d/zabbix-server stop
    /etc/init.d/zabbix-server start
    /etc/init.d/zabbix-agent stop
    /etc/init.d/zabbix-agent start
  ```

- Change server name using “*geany /etc/zabbix/zabbix_agentd.conf* ”
- ```
  Hostname=vlbisysmon.vlbi
  ```
- Change hostname to “vlbisysmon.vlbi” also in the Web interface
- 

- 

- Change password of user “Admin”
  ```

- 
ZABBIX
Monitoring
Inventory
Reports
Configuration
Administration
General
Proxies
Authentication
User groups
Users
Media types
Scripts
Queue
Users
User group All
Create user
Filter
Alias
Name
Surname
User type
Any
Zabbix User
Apply
Reset
Alias
Name
Surname
User type
Groups
Is online?
Login
Frontend access
Debug mode
Status
Admin
Zabbix
Administrator
Zabbix Super Admin
Zabbix administrators
Yes (2018-02-07 16:07:15)
Ok
System default
Disabled
Enabled
guest
Zabbix User
Guests
No
Ok
System default
Disabled
Enabled
Displaying 2 of 2 found
0 selected
Unblock
Delete
- 
ZABBIX
Monitoring
Inventory
Reports
Configuration
Administration
General
Proxies
Authentication
User groups
Users
Media types
Scripts
Queue
Users
User
Media
Permissions
Alias
Admin
Name
Zabbix
Surname
Administrator
Groups
Zabbix administrators
Add
Delete selected
Password
Change password
Language
English (en_GB)
You are not able to choose some of the languages, because locales for them are not installed on the web server.
Theme
System default
Auto-login
Auto-logout (min 90 seconds)
900
Refresh (in seconds)
30
Rows per page
50
URL (after login)
Update
Delete
Cancel

- 

- Disdable “guest”
- 

- Create the proxy for the localhost in the Web interface
- 

- 

- This proxy **must** now be used to access agents etc., because it is also used by other external Zabbix servers to forward data in distributed systems. **Attention: All data items which are just collected by a local Zabbix server and not by the proxy cannot be forwarded to external Zabbix servers outside of firewalls!!!**
- **Possible error situations**
  - Error log: *zabbix_agentd [8394]: Can't recreate Zabbix semaphores for IPC key 0x7a028449 Semaphore ID 196608. Operation not permitted.*
    - Remove the semaphore manually *ipcrm -S 0x7a028449*
  - Error log: *zabbix_server [56363]: cannot attach to existing shared memory: [13] Permission denied*
    - The program was started before using another user ⇒ always start programs with same user; maybe reboot to solve this problem
  - Data do not arrive at the zabbix_server
    - Stop the zabbix_server, zabbix_proxy and zabbix_agentd; start the zabbix_proxy; start the zabbix_server; start the zabbix_agentd

7) Create an HTTP file archive

- Create a directory in the web space of the already existing Apache server to store historic monitoring data there as files

```
mkdir /var/www/html/monitoring_archive
chown -R www-data:www-data /var/www/html/monitoring_archive
chmod -R 777 /var/www/html/monitoring_archive
```

- The structure of the archive can be individual but suggested is a folder structure in the following way: monitoring control point ID, year, month, individual day file, e.g.

```
TTW1Dewar
|-> 2017
|    |-> 01
```

```
    |    |    |-> 20170101TTW1Dewar.txt
    |    |    |-> 20170102TTW1Dewar.txt
    |    |    |-> 20170103TTW1Dewar.txt
    |    |    |-> 20170104TTW1Dewar.txt
    |    |    |-> ...
    |    |-> 02
    |    |-> 03
    |    |-> 04
    |    |-> ...
    |-> 2018
    |-> 2019
    |-> ...
   Meteo
   ...
```

- Each program for the individual monitoring control point must take care on the individual structure itself.

8) Change HTTP to HTTPS

- See: http://lab4.org/wiki/Zabbix_Webftontend_%C3%BCber_HTTPS_verschluesseln
- **Create an SSL certificate (or buy one)**
  - Create a new directory for the new certificates and change to this
  - ```
    mkdir -p /etc/ssl/certs/zabbix-server
    cd /etc/ssl/certs/zabbix-server
    ```
  - Create private key (you have to enter a pass phrase) and delete password
  - ```
    openssl genrsa -des3 -out server.key 2048
    openssl rsa -in server.key -out server_nopw.key
    ```
  - Sign certificate
  - ```
    openssl req -new -key server_nopw.key -out server.csr
    ```
  - ```
    You are about to be asked to enter information that will be
    incorporated
    into your certificate request.
    What you are about to enter is what is called a Distinguished
    Name or a DN.
    There are quite a few fields but you can leave some blank
    For some fields there will be a default value,
    If you enter '.', the field will be left blank.
    -----
    Country Name (2 letter code) [AU]:DE
    State or Province Name (full name) [Some-State]:Bayern
    Locality Name (eg, city) []:Bad Koetzting
    Organization Name (eg, company) [Internet Widgits Pty Ltd]:TUM
    Organizational Unit Name (eg, section) []:FESG
    ```

```
 Common Name (e.g. server FQDN or YOUR name) []:192.168.208.236
(future IP or alias)
 Email Address []:alexander.neidhardt@mytum.de

 Please enter the following 'extra' attributes
 to be sent with your certificate request
 A challenge password []:
 An optional company name []:
```

- Create self-signed certificate

```
 openssl x509 -req -days 999 -in server.csr -signkey
server_nopw.key -out server.crt
```

- **Activate SSL in Apache**
  - Activate SSL module

```
 a2enmod ssl
```

  - Activate port 443 in the Apache configuration */etc/apache2/ports.conf* and add

```
 <IfModule mod_ssl.c>
    Listen 443
 </IfModule>
```

  - Change to directory /etc/apache2/site-enabled

```
 cd /etc/apache2/site-enabled
```

  - Create symbolic link

```
 ln -s ../site-available/default-ssl.conf default-ssl.conf
```

  - Create a virtual host by editing /etc/apache2/sites-available/default-ssl.conf; add something like this:

```
 <IfModule mod_ssl.c>
 <VirtualHost _default_:443>
        ServerAdmin webmaster@localhost
        ServerName zabbix.example.com
        SSLEngine On
        SSLCertificateFile /etc/ssl/certs/zabbix-server/server.crt
        SSLCertificateKeyFile /etc/ssl/certs/zabbix-
server/server_nopw.key
        DocumentRoot /var/www/zabbix/
 </VirtualHost>
 </IfModule>
```

  - Deactivate HTTP

```
 a2dissite 000-default
```

  - Change listen ports to avoid port 80 in /etc/apache2/ports.conf

```
#Listen 80
```

- Restart Apache server

```
/etc/init.d/apache2 restart
```

- **Install curl for web page monitoring**

```
apt-get install curl
```

9) Specific setup for the Wettzell vlbisysmon-PCs

- Wettzell VLBI-systems use the complete Wettzell suite of SysMon. It is available here: http://xsamba.wtz/svn/vlbi/trunk/code/vlbisysmon/
- All standard installation folders and files of Zabbix are deleted, because everything is contained in "*/home/oper/Software/vlbisysmon*"
- It contains the folders:
  - "**bin**": all executable binarys and script files after compilation and building
  - "**control**": all configuration files
  - "**main**": all main programs of the Wettzell SysMon suite
  - "**make**": a general Makefile to build and install the central vlbisysmon-PC with Zabbix-server, -proxy, and -agentd
  - "**scripts**": the central start script and all other scripts (usually as externals to the VLBI script folder)
  - "**sensor_hardware**": all code parts running on a separate sensor hardware
  - "**sensor_proxies**": all clients connecting to sensor servers to get data and copying them to SysMon
  - "**sensor_servers**": all sensor servers connecting to a hardware, reading data and offering them usually with an RPC interface
  - "**sensors**": all interface code files to communicate to the sensor hardware (client side); usually used by sensor servers to read data
  - "**ssh_draft**": SSH files, like private keys to automatically connect to other servers
  - "**zabbix**": Zabbix releases which are used on the system
- To build and install the VLBI SysMon system do the following steps
  - Create a folder "*Software*" in the home directory of user "*oper*"
  - Change into this folder

```
svn co http://xsamba.wtz/svn/vlbi/trunk/code/vlbisysmon/
```

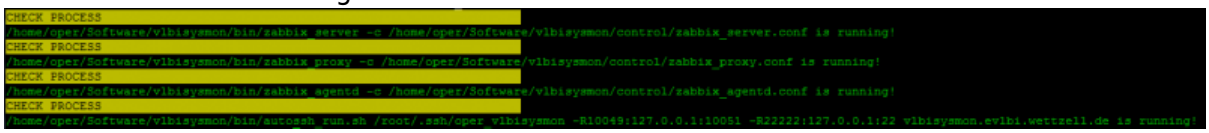
```
cd ./vlbisysmon/make
```

  - Build and install the code

```
make
make install
```

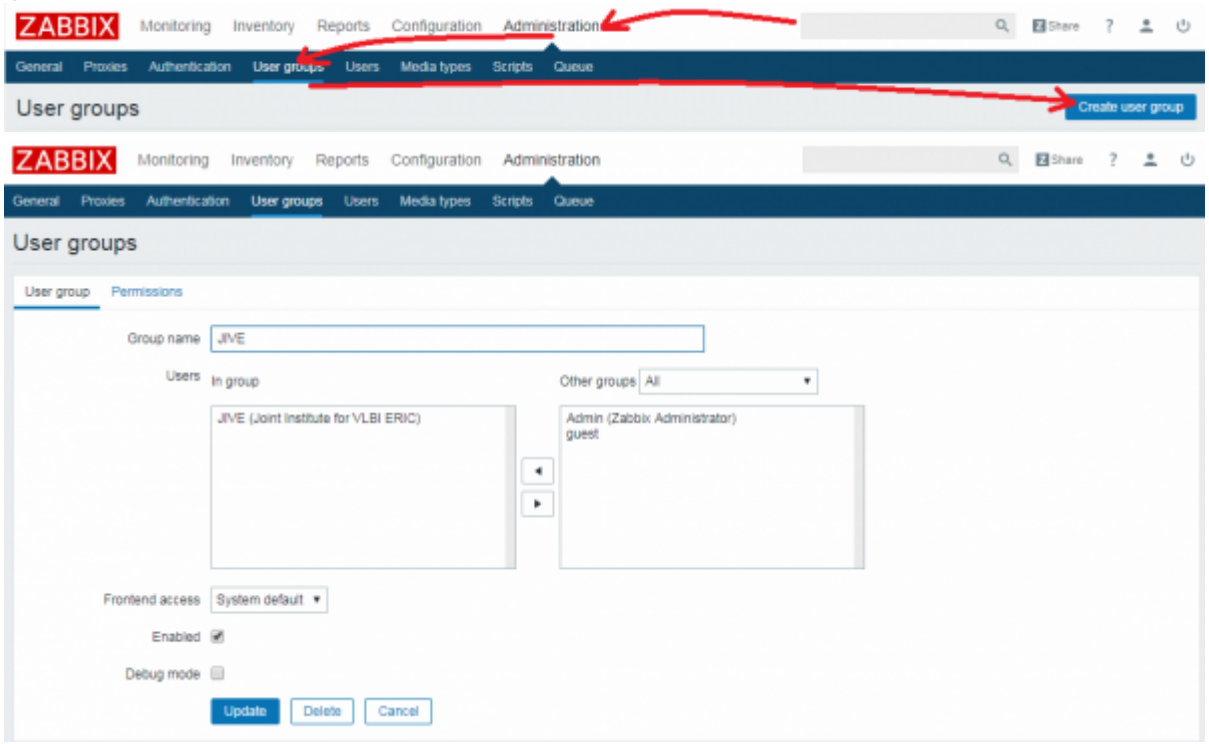
  - Now everything is prepared for a start
- To start all servers run

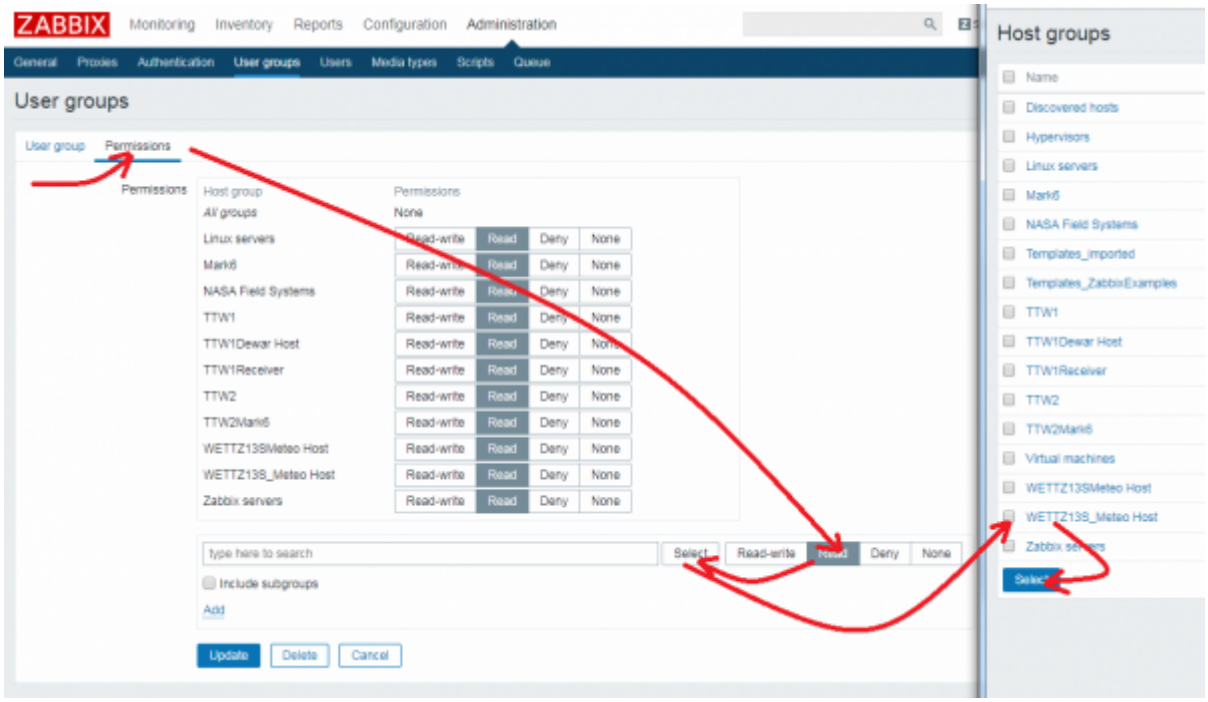
    - `/etc/init.d/vlbisysmon_server start`

- To check if all servers are run enter
    - `/etc/init.d/vlbisysmon_server check`
    - You should see something like this:
    - 

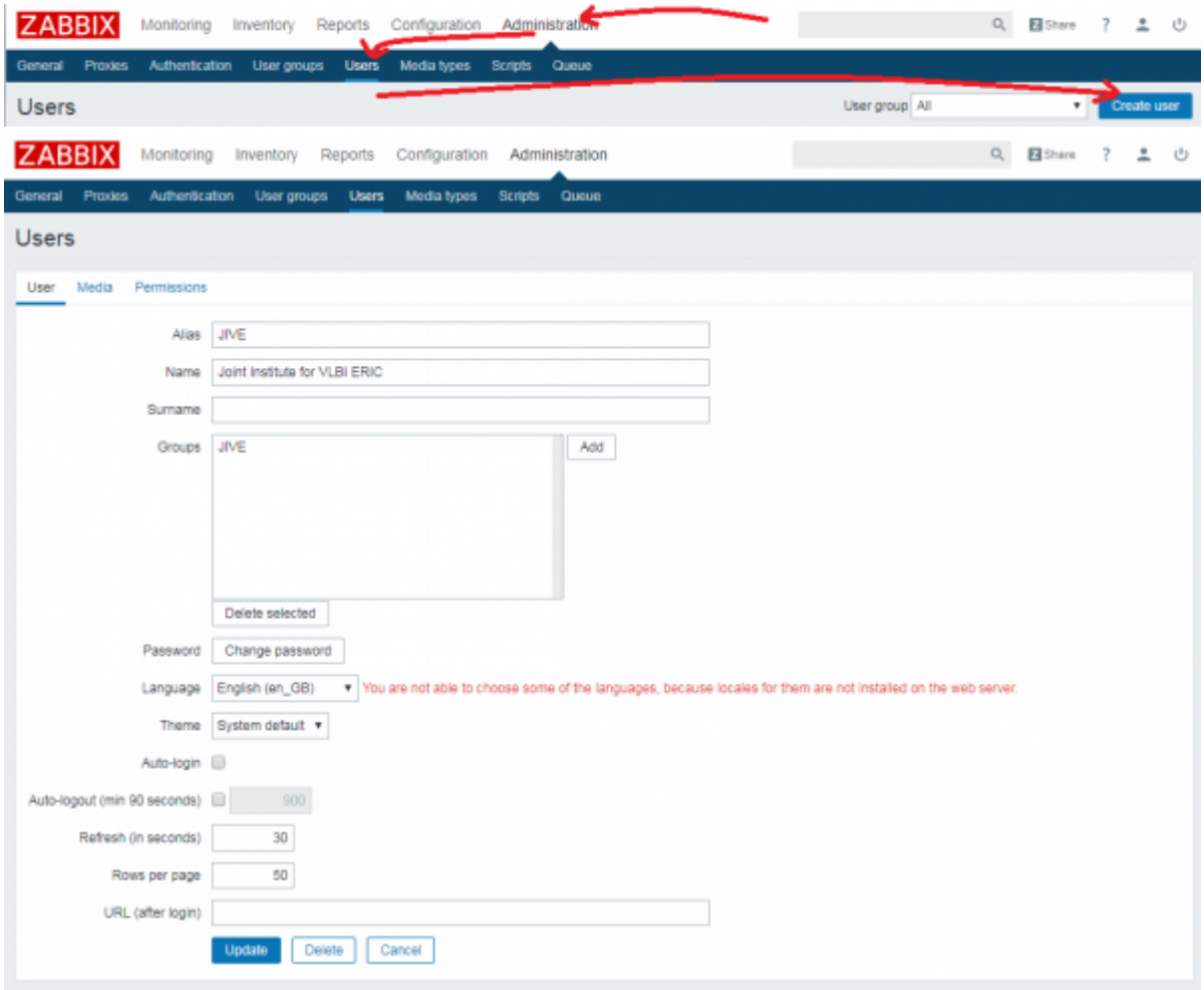
- To stop all servers enter
    - `/etc/init.d/vlbisysmon_server stop`

10) Create ZABBIX users for different purposes

- The following users are created on the centralized system monitoring machine
    - Admin (Zabbix Super User: administrator)
    - oper (Zabbix User: Wettzell operator)
    - JIVE (Zabbix User: Jumping JIVE EVN network manager)
    - maybe different other users one per site (Zabbix User: site operator)
- Before a user can be created, it is necessary to create a suitable user group with defined access rights (a user group and therefore a user has no rights at all after pure creation)
- A group can be created like this
    - 



- A user can then be created doing the following steps (defining a name, the group membership, password, etc.)



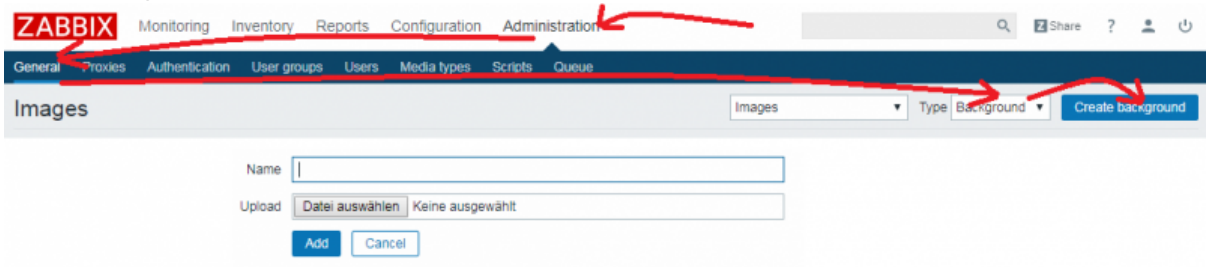
11) Install additional images

- The monitoring center uses additional background images:

- world_sw_4000_2000.png
- world_sw_2000_1000.png
- world_sw_1000_500.png

- stationmap_wettzell_2800_2100.png
- stationmap_wettzell_1400_1050.png

- Background images can be installed with:



- The monitoring center uses additional icon images (icons always require the sizes 24, 48, 64, 96, 128 pixels):
  - 24 , 48 , 64 , 96 , 128 
- Icon images can be installed with: