



INSTRUMENTATION
TECHNOLOGIES



LIBERA



Network boot experience and code sharing use-cases

Peter Leban

DEELS workshop

Paris, June 2024

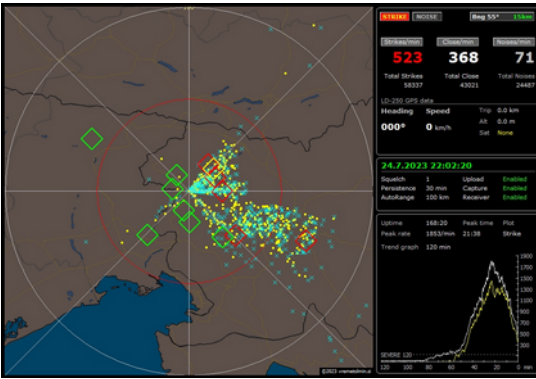
Content

- Weather station update!
- Code sharing at Instrumentation Technologies
- Network boot experience with Libera Brilliance+

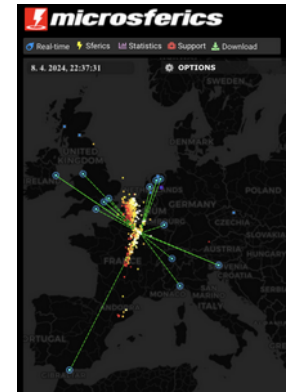
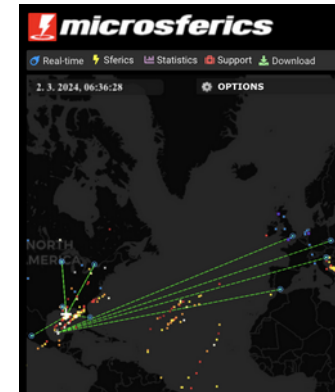
Weather station update

It has grown a lot since the last update in 2019

Long range lightning detector (Slovenia, Italy)



Extra long range lightning detector (Caribbean)

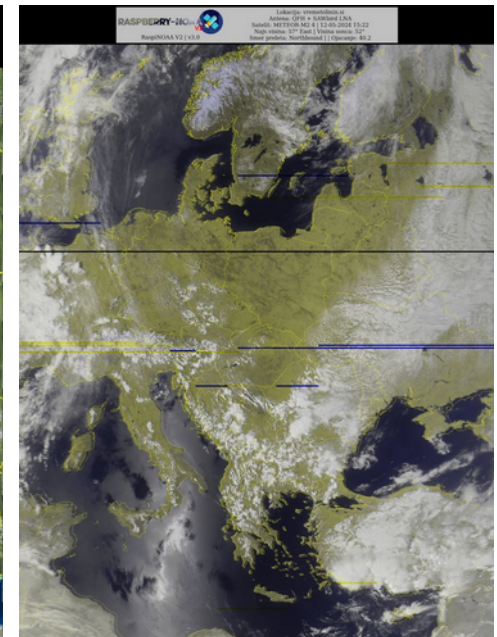
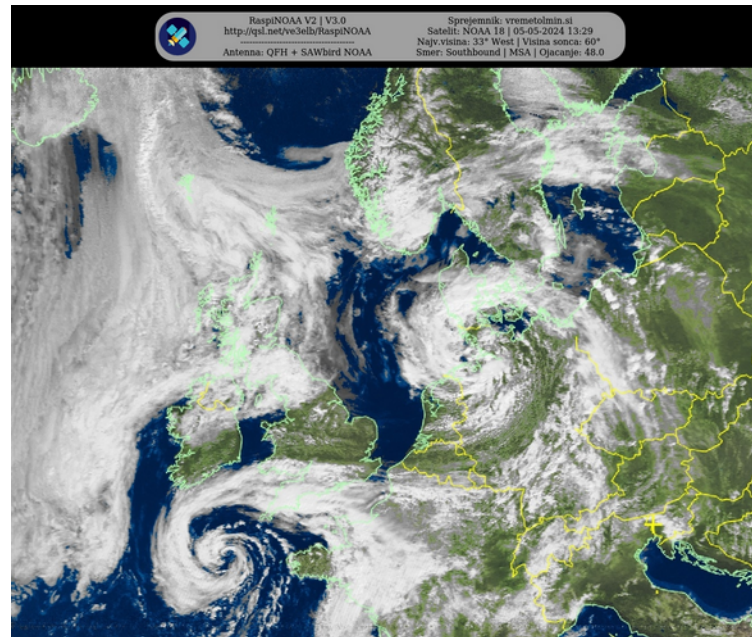


Weather station update

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Weather satellite image receiver

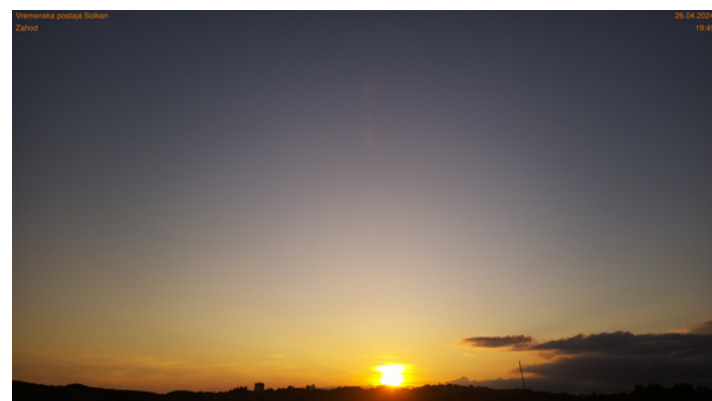
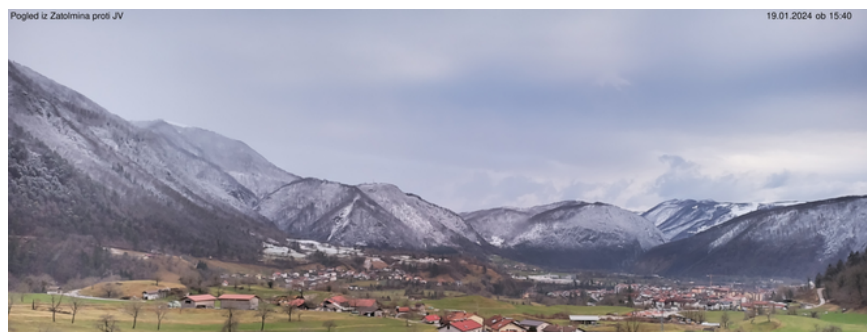
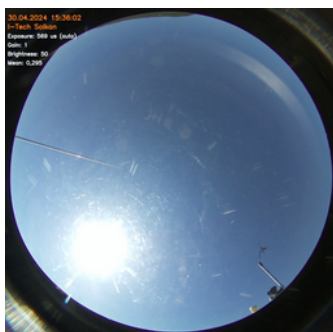
~137 MHz



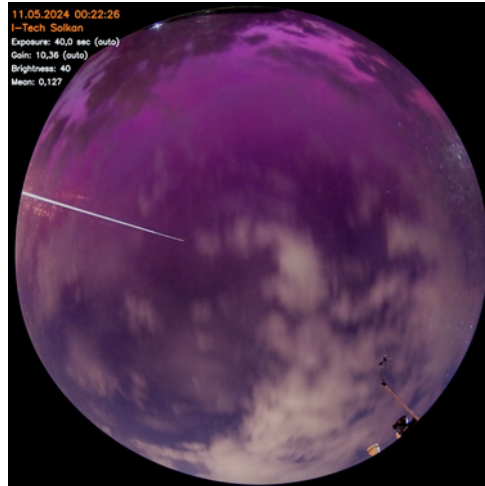
Weather station update

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Cameras: standard, wide angle, fish eye (allsky), night camera



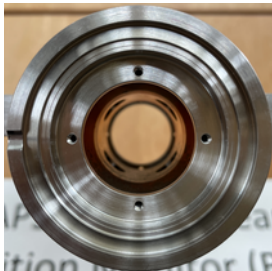
Weather station update



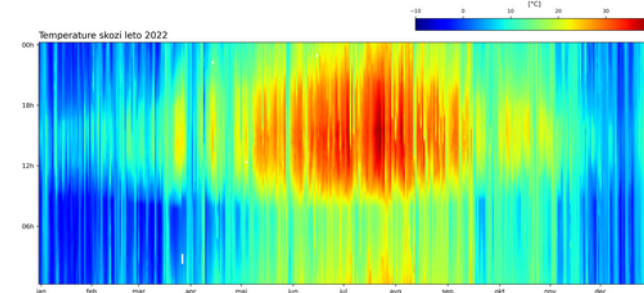
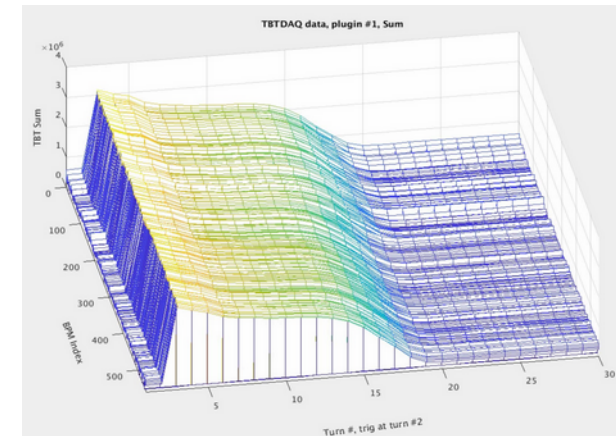
May 10, 2024
Aurora Borealis at 46° latitude

What do “weather” and Libera have in common?

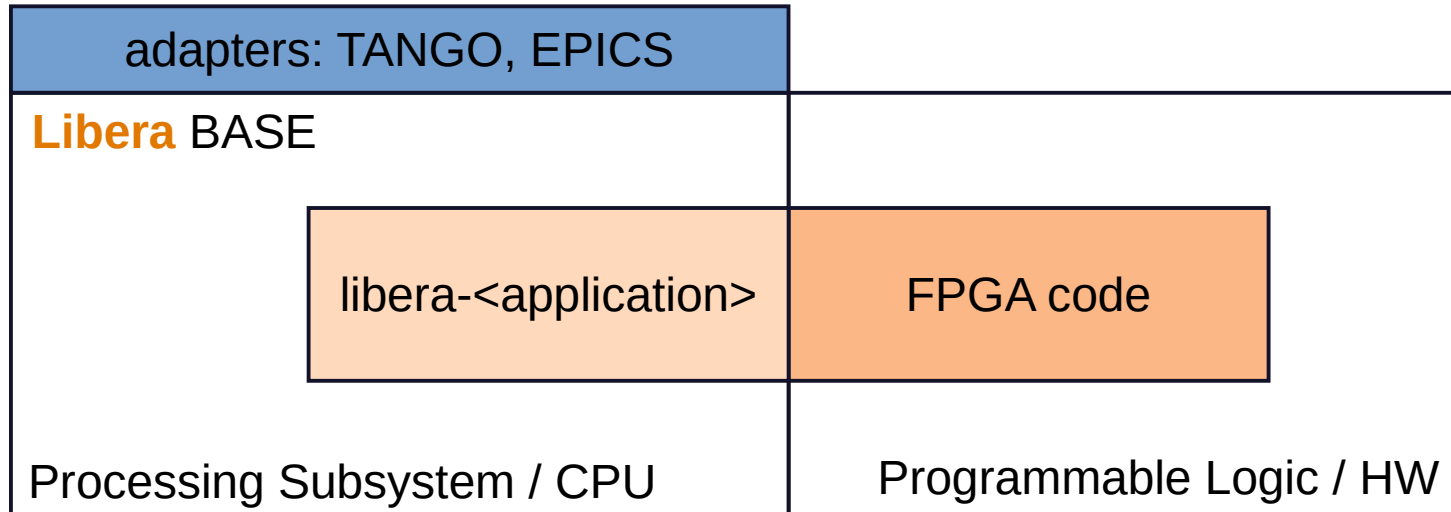
- Data management: capture, process, store
- Data presentation: collect from storage and present in user friendly way
- Code?



Courtesy of Weixing Cheng, Argonne National Laboratory



Libera Software Stack



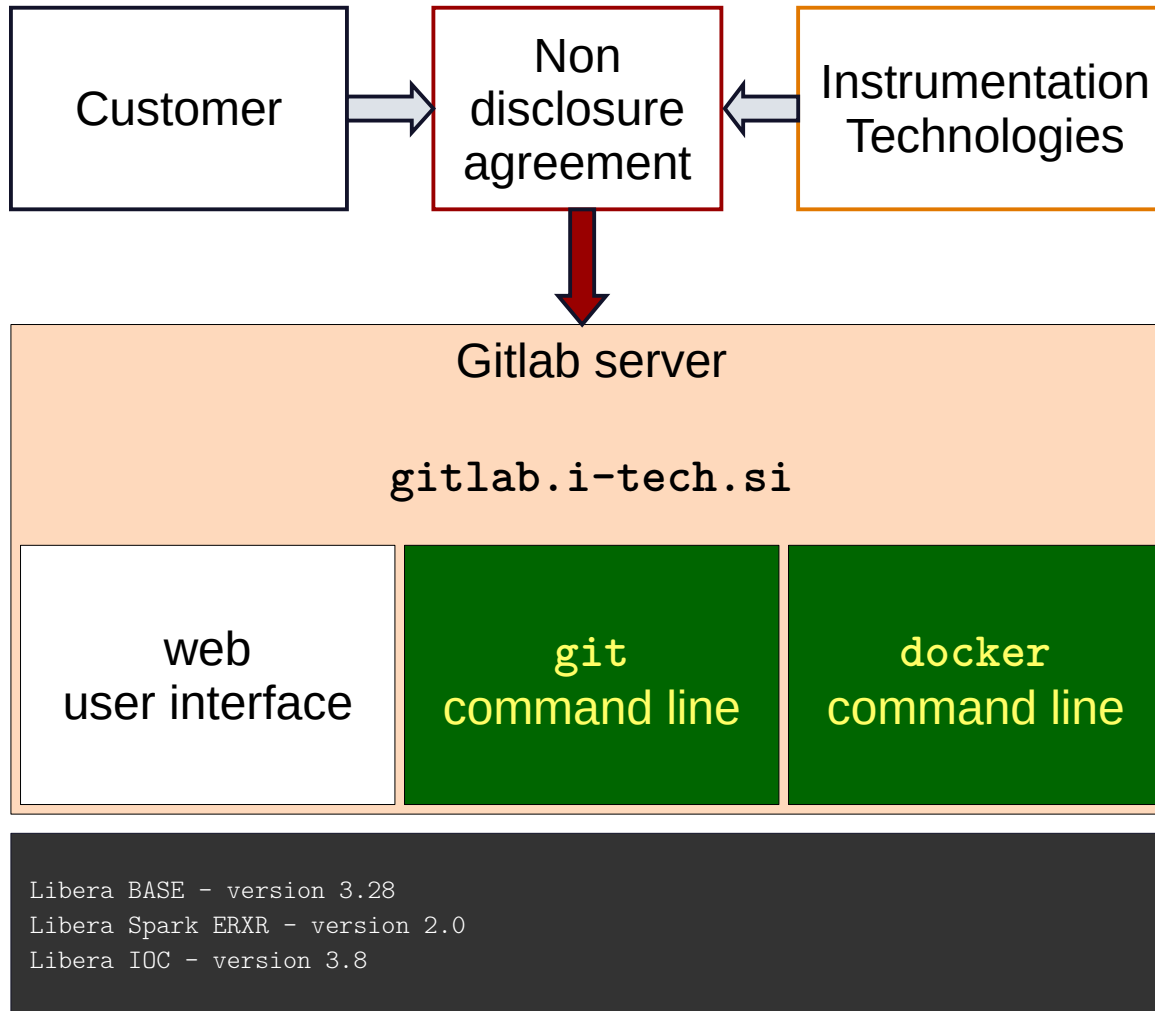
- Libera BASE: framework for applications and client tools
- FPGA: implements real-time functionality
- Application: implements non-realtime functionalities
- Adapters: various interfaces for control systems

Code Share - Libera instruments

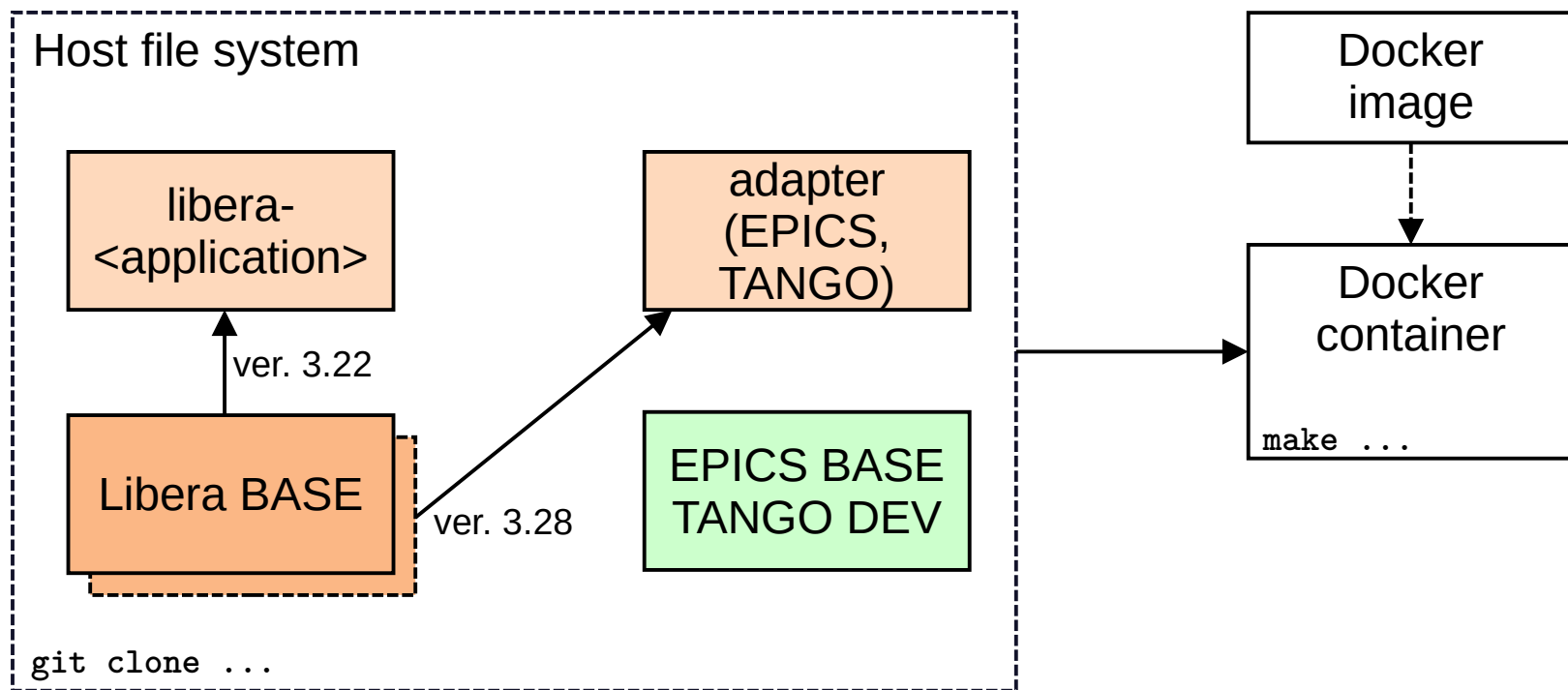
Versions of Libera BASE, libera-<application> and adapters are not the same
Adapters and libera-<application> could link with different Libera BASE version!

- ZIP: difficult to track versions, only for one-way exchange
- **Gitlab:**
 - designed for collaborative development, tracking multiple versions, open source tool
 - suitable for large number of users
 - Docker image registry

Code Share - how to use it



Code Share - building from sources

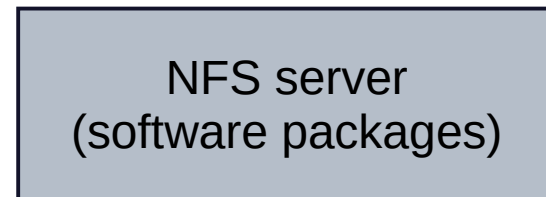
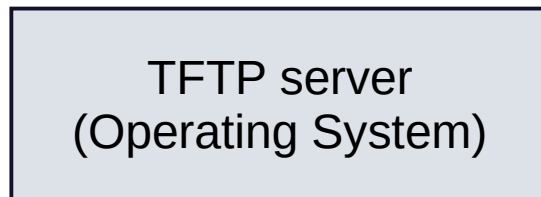
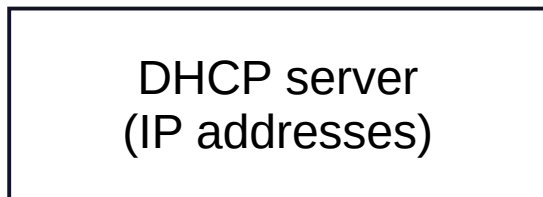


Code Share - opinion?

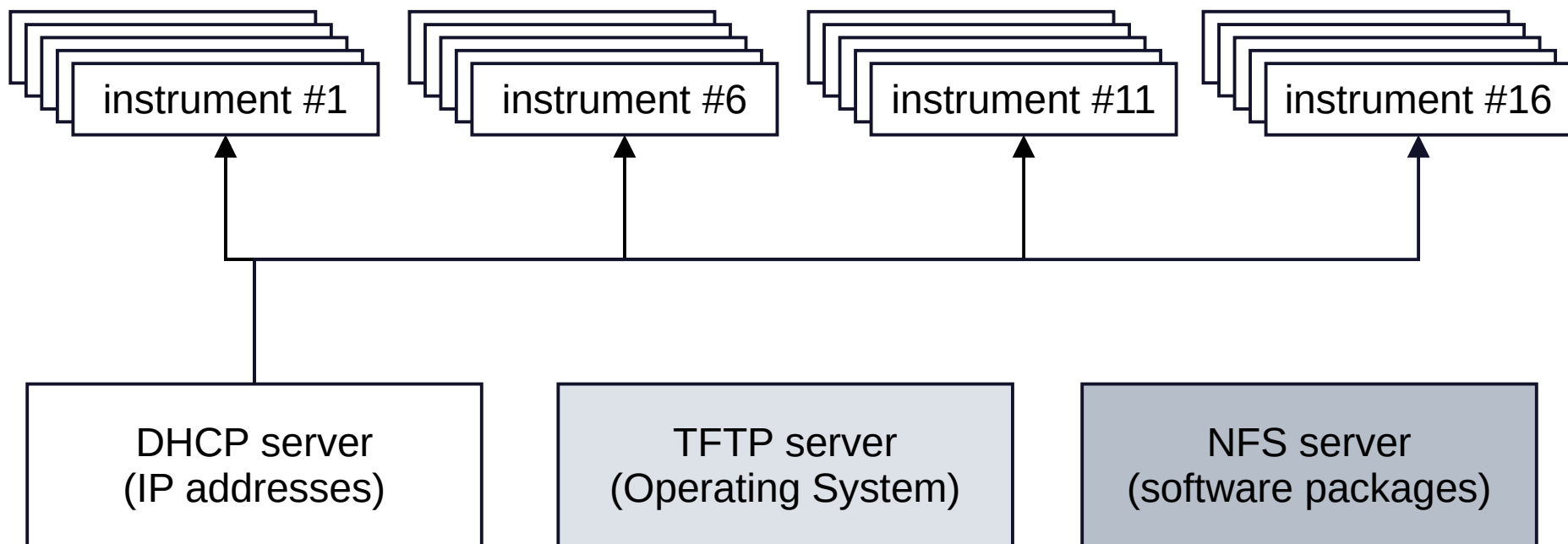
- Code shared with quite some users already (ZIP)
- Successful builds of EPICS interface with added extensions
- Latest success with TANGO interface and libera-<application>

- Gitlab access established with few laboratories so far
- **Opinion, interest, comments?**

Network booting

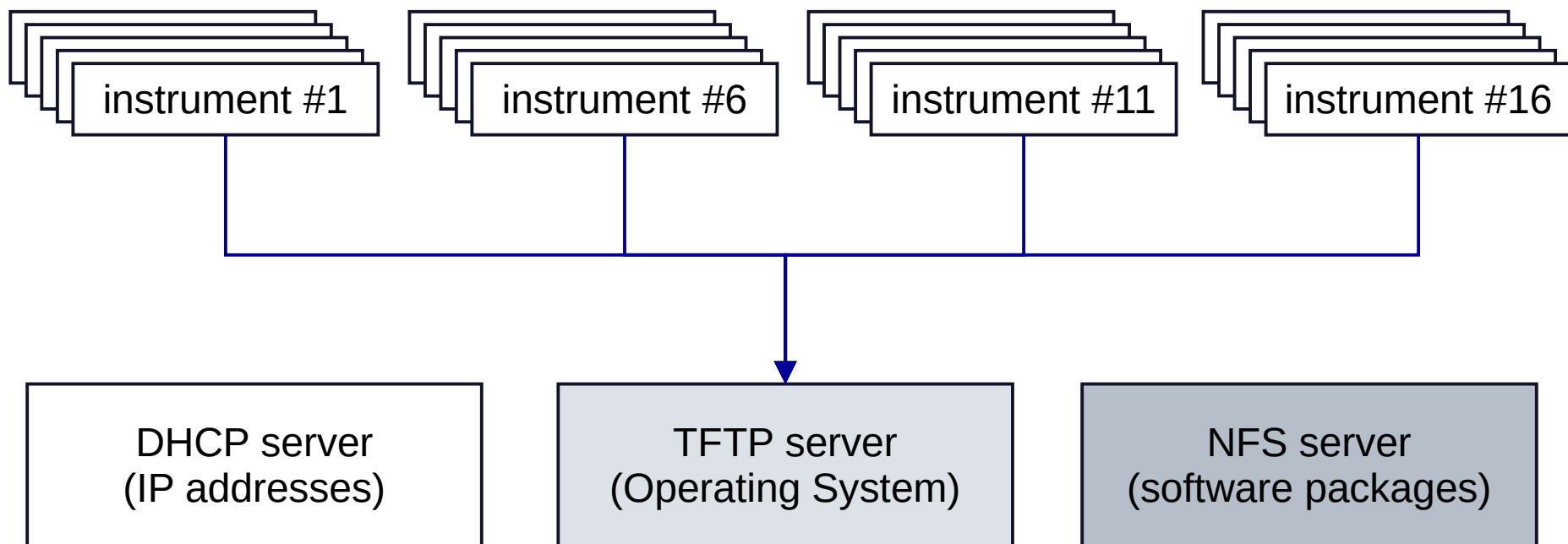


Network booting



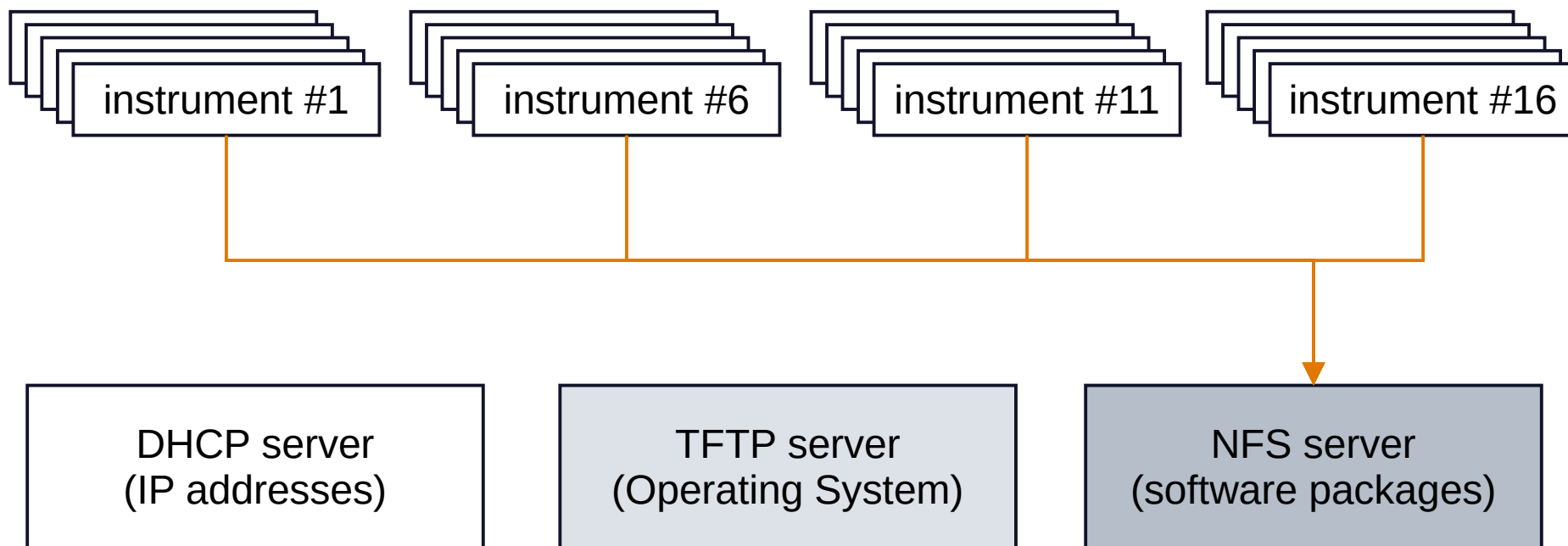
1. DHCP assigns the IP addresses and tells where the TFTP server is.

Network booting



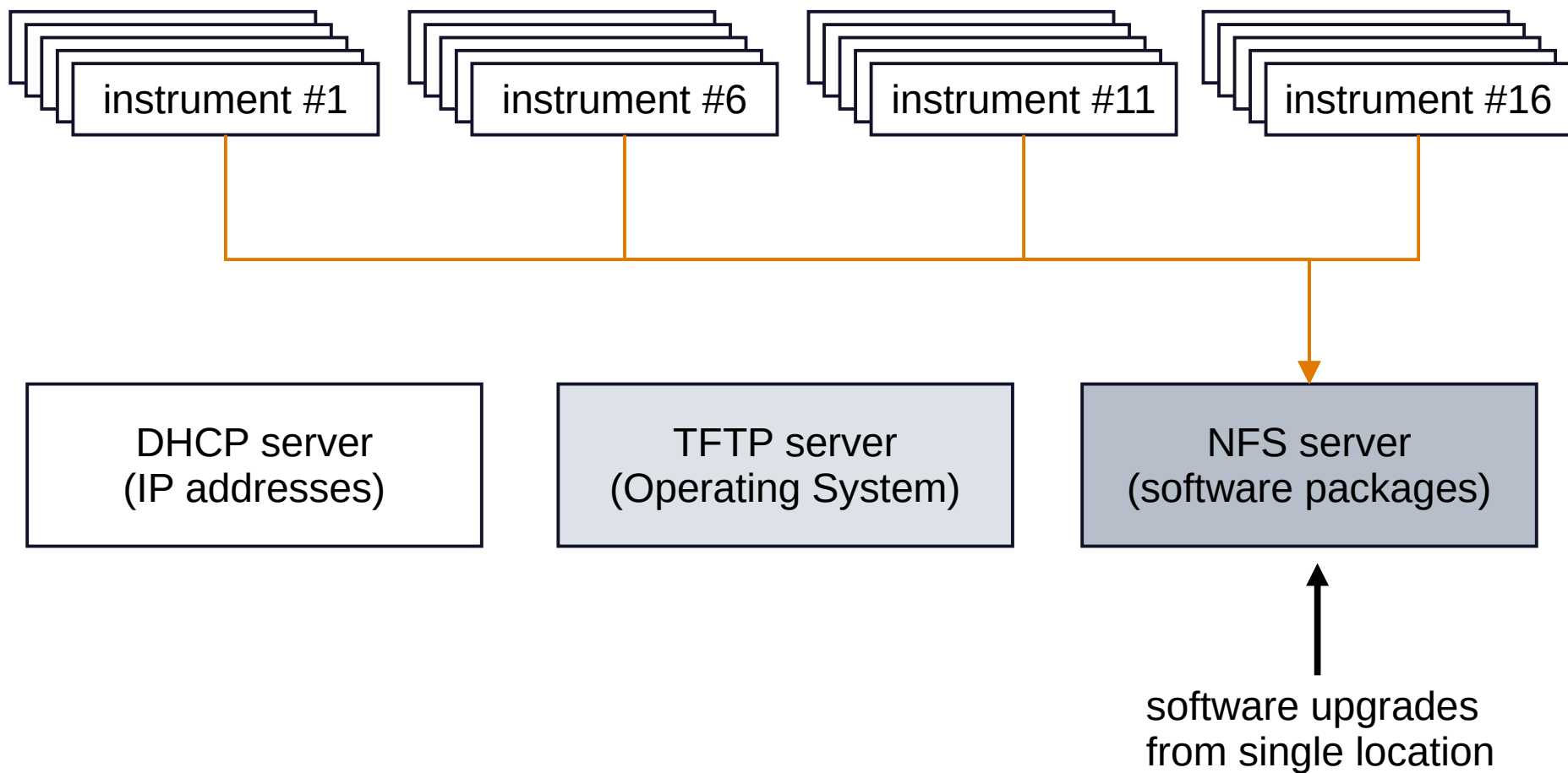
1. DHCP assigns the IP addresses and tells where the TFTP server is.
2. OS loads, TFTP server contains information where the software is (NFS server).

Network booting

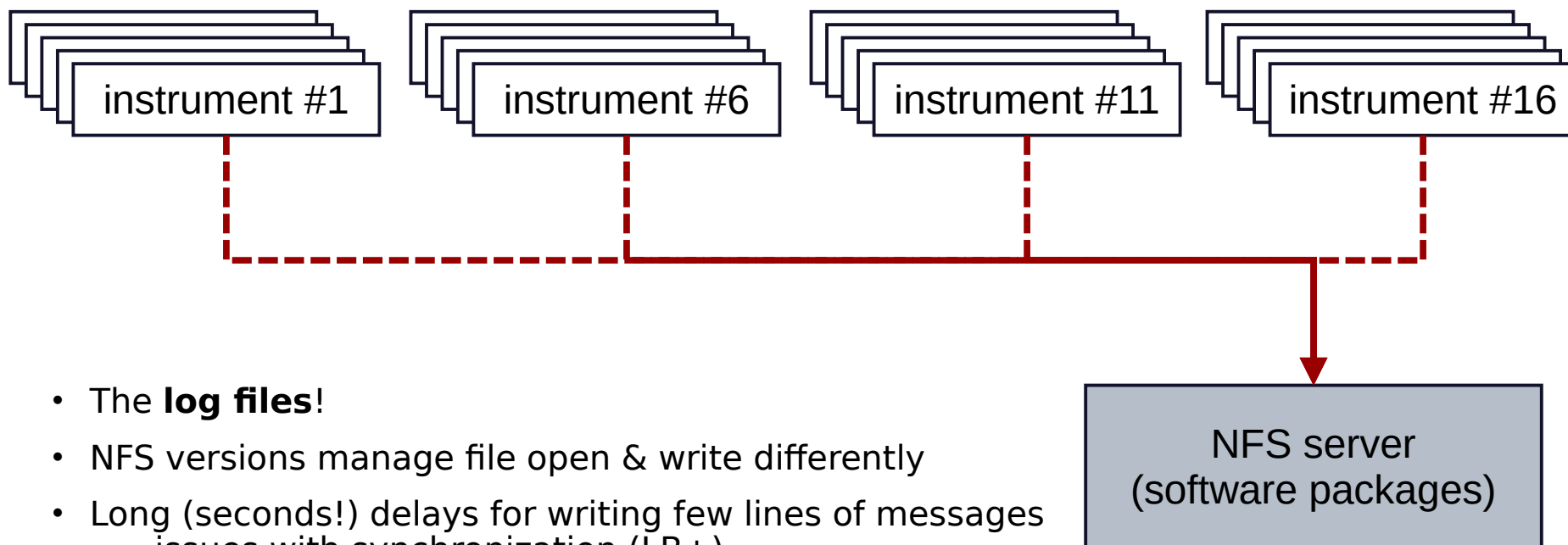


1. DHCP assigns the IP addresses and tells where the TFTP server is.
2. OS loads, TFTP server contains information where the software is (NFS server).
3. Software loads, instruments become available for use

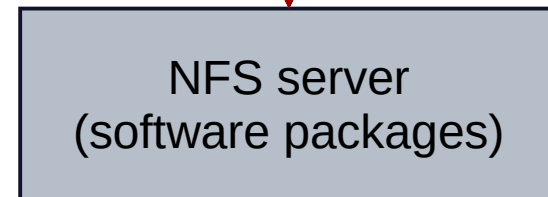
Network booting



Network booting - issues



- The **log files!**
- NFS versions manage file open & write differently
- Long (seconds!) delays for writing few lines of messages
 - issues with synchronization (LB+)
- Solutions:
 - 1) Removed unnecessary log messages during time-sensitive operations
 - 2) Use older NFS version
 - 3) Move logging to local storage?
 - 4) Other opinion or experience?**



Conclusion

- Code sharing environment established, ready for collaboration
- Users already use **custom builds** of EPICS, TANGO and even application software
- Network boot for Spark/BLM operational for many years
- **U-boot issue** (boot from another network segment) has been resolved just recently
- LLRF and Brilliance+ (Platform B) network boot introduced one year ago, take care of network environment