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EURO-LABS

EUROpean Laboratories for Accelerator Based Science
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REPORT

WP2.5.C1 REMOTE ACCESS:
DEFINITION OF SCOPE

TASK 1

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Abstract:

The EURO-LABS consortium comprises a large range of accelerator-based experimental facilities with a broad variety of research topics, from fundamental nuclear and hadron physics to medical and space-science applications. For detailed descriptions of the EURO-LABS institutions and their scientific goals, see https://web.infn.it/EURO-LABS/. The "Streamlined and Remote Access" subtask of WP2.5 (Service Improvements) aims to provide enhanced access to EURO-LABS facilities via the development and implementation of a readily-available and comprehensive toolkit. The scope of activities within this framework associated with remote access are defined in this documentation based on the needs and requirements of the partner institutions and the wider EURO-LABS community, which were collected through a web-based survey that took place in early 2023. An analysis of the survey results and an appropriate timeline of activities is also provided.

For more information on EURO-LABS, its partners and contributors please see https://web.infn.it/EURO-LABS/

Delivery Slip

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Executive summary

This document details the scope of activities within EURO-LABS WP2.5.C1 related to remote access (defined as any kind of accessibility to experimental operation from outside of experimental areas). The results of a survey carried out in early 2023 regarding current and future needs for remote access across the EURO-LABS community are given. Finally, a strategy and timeline for the development and implementation of remote-access tools in key areas that were identified via the community survey is outlined.

1. INTRODUCTION

Many research groups within the EURO-LABS consortium have developed remote-access infrastructures in recent years in order to enhance and optimise experimental programmes. "Remote access" is defined in this context as any kind of accessibility to experimental operation from <u>outside of experimental areas,</u> i.e., of relevance to local experts and external participants. Several different aspects of remote operation can be considered, including video- and messaging-based communication platforms, detector monitoring and other diagnostics, data acquisition (DAQ) control, data visualisation and analysis, comprehensive online documentation, online shift scheduling and more.

The advent of the COVID-19 pandemic in 2020 caused a reduction in external participation in many cases due to travel and other restrictions, thus increasing the load on local teams and further enhancing the requirements for improved remote access. Nevertheless, levels of remote access in EURO-LABS institutions vary widely, and many groups have identified a need for new or improved facilities. In addition, no standardised/recommended tools or centralised training opportunities are currently available in the community. The aim of this work <u>is not to replace the requirement for on-site participation,</u> which is crucial to the success of experiments and to the training of young researchers, but to provide a complementary framework to maximise the outcome of the experimental campaigns and opportunities for knowledge exchange.

The key goal of this subtask is to develop and implement appropriate remote-access tools that will be available through a web-based database in order to:
i) minimise required access to experimental areas and minimise travel time for on-call experts,
ii) maximise external participation, and
iii) standardise generally-endorsed approaches and procedures.
These outcomes will lead to a reduced load on expert resources (local and external), early problem recognition and timely intervention, and improved training opportunities of early-career researchers and inter-institutional knowledge transfer, resulting in better exploitation of beamtime and increased scientific output and excellence overall.

The following partner institutions and corresponding representatives will carry out the work within the defined scope:
GSI (lead beneficiary), H.M. Albers
INFN, G. Benzoni
UMCG, P. Dendooven
TU Dresden, T. Kormoll
IFIN-HH, C. Mihai.

The responsible persons listed above form the Remote Access Steering Committee (RASC), which will oversee the project and ensure a timely completion of all tasks within the allocated resources. Full descriptions of the research infrastructures of the partner institutions (GSI, INFN, UMCG, TU Dresden and IFIN-HH) can be found via the EURO-LABS central website at https://web.infn.it/EURO-LABS/participants/.

In order to collect and understand the existing Remote-Access infrastructure available in the EURO-LABS community and to identify the areas in which additional development and implementation is needed, a survey was conducted in early 2023. A full description of the survey and an analysis of the results can be found in Section 2. A complete definition of the project scope based on the survey results, as well as details of relevant timelines, are found in Section 3.

2. EURO-LABS COMMUNITY SURVEY ON REMOTE ACCESS

In early 2023, a web-based survey with the goal of collecting existing remote-access features available within the EURO-LABS community and the requirements for new or improved facilities was distributed via the contact persons responsible for each Research Institution (RI) within WP2 of the EURO-LABS consortium.

2.1. SURVEY DESCRIPTION AND CONTENT

Survey participants were asked to provide the name of their home institution, as well as the facility within which they typically carry out their research activities. The contact details of participants could be optionally included to indicate a willingness to be contacted for more information (see Fig. 1).

Fig. 1 Excerpt of EURO-LABS Survey on "Service Improvements on Remote Access"
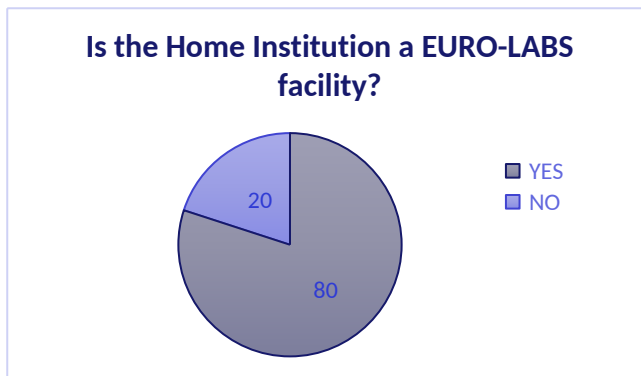
Participants from non-EURO-LABS institutions were asked to provide a brief description of their home institution, or to provide a URL of a website containing the relevant information.

Answers to the following questions could then be provided in a free text field:
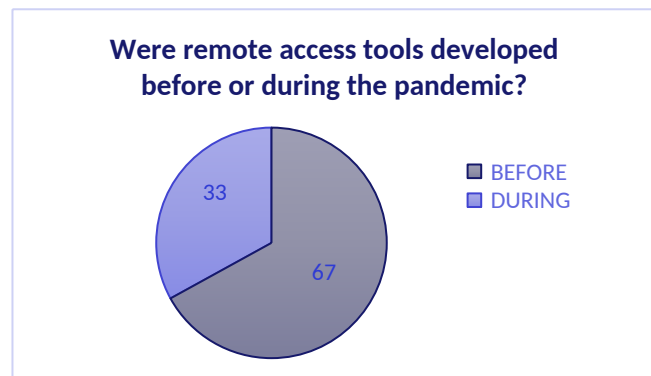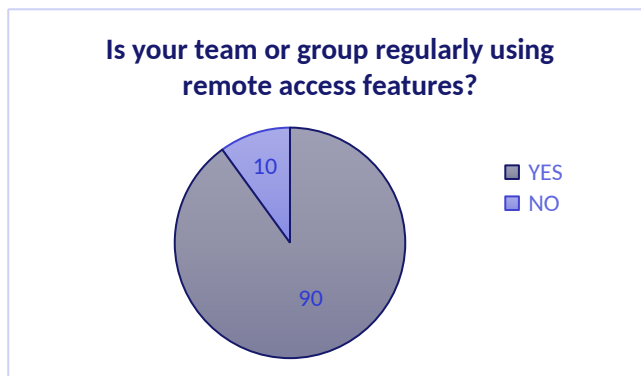
- Is your team or group regularly using remote-access features for daily business and/or beamtimes? If so, please provide a brief description (e.g. Grafana-based detector monitoring, Zoom connection...)
- When was remote infrastructure developed? Was this available also before the Pandemic Crisis? Is it still available/used?
- Do you see a need for improving the remote-access capabilities of your research infrastructure? If so, please provide a brief description of the requirements.
- If you are a User of an external research infrastructure, can you please describe any service improvements you would benefit from? (If applicable).

In addition, participants were invited to provide any supplementary comments or relevant information.

2.2. SURVEY RESULTS AND ANALYSIS

A total of 20 participants from 14 different institutions completed the survey. 80% of participants indicated a EURO-LABS facility as their home institution. 95% of participants indicated that the experimental activities of their group are all or partially carried out at EURO-LABS facilities.

90% of participants indicated that their team or group regularly uses remote-access features for daily business and/or beamtimes. Of those 90%, 67% answered that the tools were already partially developed before the COVID-19 pandemic.
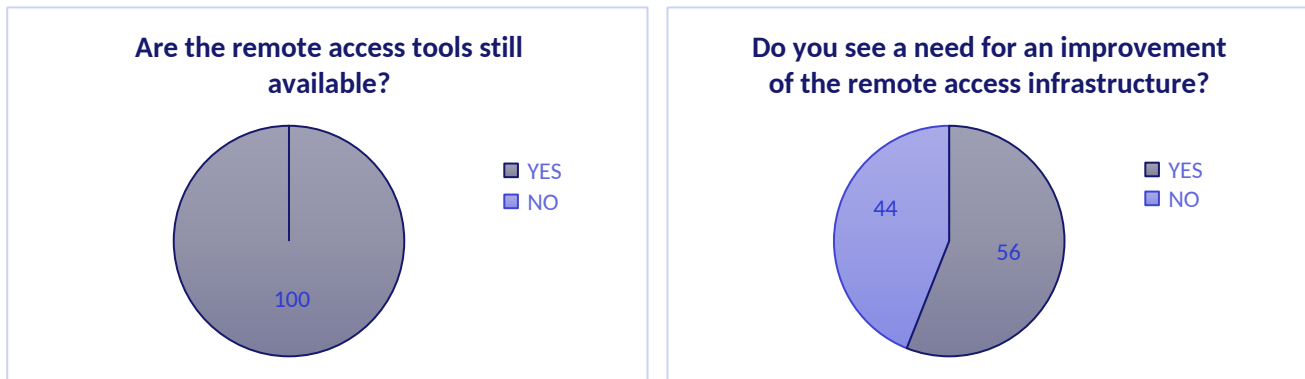
For the 90% of participants who were regularly using remote-access tools, 100% were still available at the time of survey completion. Overall, 56% of the respondents felt there was a requirement for improved or enhanced remote-access tools at the institutions they are actively involved with.

The remote-access tools were split into the following categories based on the responses of the participants describing the existing infrastructure available at the various facilities, ranked by the usage percentage (given in the second column):

Description of Tool	Percentage of respondents
Video-based communication platforms (e.g. Zoom, Teams)	70%
Remote DAQ Control	45%
E-Log	40%
Grafana-based monitoring	35%
VPN/Anydesk access	30%
Data visualisation and/or analysis	25%
Remote Control of Hardware (e.g. LN2 filling systems, HV control, other diagnostics)	25%
Online shift scheduling or other documentation	15%
Message-based communication platforms (e.g. Slack, Mattermost)	15%

Suggested developments for existing remote-access facilities for the 56% of participants who saw a need for improvement included the general standardisation and more widespread implementation of tools that are accessible to off-site collaborators (i.e., outside of local network), increased used of E-Logs and online shift scheduling, as well as increased access to detailed documentation. Improved data visualisation and analysis tools were also desired, in addition to the availability of off-site DAQ

control. Poor stability of connections to remote-access tools was also highlighted as being problematic. It was also noted by one respondent that virtual access to theoretical calculations as planned in the THEO4EXP workpackage in the EURO-LABS framework would be beneficial.

3.   DEFINITION OF SCOPE AND TIMELINES

The survey results detailed in Section 2 indicate that the majority of EURO-LABS infrastructures have established tools that enable remote access either before or during the COVID-19 pandemic, and that all of those tools are still available. Slightly more than half of the community sees a need to improve existing access or to establish new tools. To provide the required support and enable these developments, the following key steps will be carried out within the WP2.5.C1 framework:

i) Completion of Technical Roadmap (lead beneficiary INFN)

Developments in a number of areas were highlighted by the survey. In order to optimise the resources (FTE and travel) distributed amongst the partner institutions listed in Section 1, a comprehensive roadmap will be produced. It will detail key development areas that were emphasised by the community, assessing them for technical feasibility, cost and ease of implementation and ordering them by criticality.

ii) Establishment of Remote-Access Toolkit Database (lead beneficiary GSI)

A user-friendly, easily-accessible database will be constructed in order to contain all information on the remote-access tools (including recommended hardware information, open-source and in-house firmware and software, instructional documentation and scripts). The central EURO-LABS website is foreseen as the access point for the database, which will be comprehensively managed and will facilitate the addition of tools developed for the duration of the EURO-LABS project.
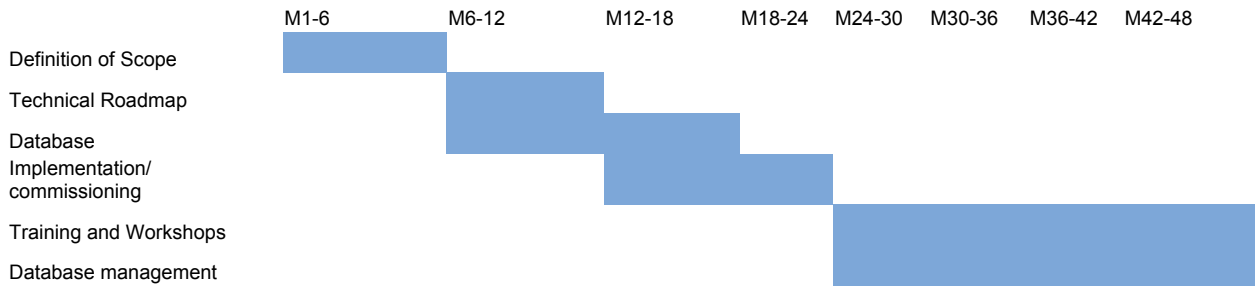
iii) Implementation and Commissioning of Remote-Access Tools (lead beneficiaries UMCG and IFIN-HH)

The selected technical and operational features detailed in the Technical Roadmap will be implemented at the UMCG and IFIN-HH facilities. The expertise and experience gained during the implementation phase will be accessible to the user community through detailed documentation and instructional material contained within the database, and the establishment of a cross-institutional working group.

iv) Training, Observation and Feedback (lead beneficiary INFN)

Support with implementation of the Remote-Access tools will be provided via hands-on training at user facilities and through the organisation of dedicated workshops.

The timeline of activities can be seen in the following Table.

	M1-6	M6-12	M12-18	M18-24	M24-30	M30-36	M36-42	M42-48
Definition of Scope								
Technical Roadmap								
Database Implementation/ commissioning								
Training and Workshops								
Database management								

ANNEX: GLOSSARY

Acronym	Definition
DAQ	Data Acquisition
ELog	Electronic Logbook
HV	High Voltage
LN2	Liquid Nitrogen
RI	Research Institution
RASC	Remote Access Steering Committee