

Time/Frequency service and infrastructure incubator study

1. **Name and Organisation** This proposal has been developed by Guy Roberts and Domenico Vicinanza from GÉANT
2. **Title** – Time/Frequency service and infrastructure incubator study
3. **Rationale**

Background:

The CLONETS-DS project is nearing the completion in the upcoming weeks and is preparing to publish its findings. We believe that the findings present a compelling case for constructing a time/frequency network to interconnect European National Metrology Institutes (NMIs). The report proposes that this time/frequency network should offer novel time services to the European research community, as well as support services that could potentially be provided to users beyond the research and education (R&E) community.

Incubator objective:

It is important for the European NREN community that momentum gained in the CLONETS-DS work is not lost. The incubator should be a bridging activity towards building a European time-frequency infrastructure.

The forthcoming European Commission (EC) Work Programme already outlines the possibility, that the upcoming GN5-2 project may receive funding to develop and deliver a time-frequency service, or at the least, provide the essential underlying infrastructure. Further, CLONETS-DS has already identified potential requirements, services, and delivery models that could be developed as part of a collaborative effort with National Research and Education Networks (NRENs), GÉANT, and NMIs.

In order to meet the Commission's funding requirements the CLONETS-DS use cases should be further elaborated to include a business case and sustainability model.

Given that this may be a substantial new project with long-term sustainability implications, a clear path forward for GÉANT is needed. This clarity will not only be necessary for the respective communities to comprehend and agree upon their contributions and roles, but also is required as input for the specification of future GÉANT proposals and main strategic decisions as to the work plans need to be decided by end Q4 2023.

In summary, we recommend the establishment of an incubator to prepare an assessment of the work required to develop such a service, specifically focusing on constructing the necessary arguments needed to pass the 'start development gate' as outlined in the Product Lifecycle Management (PLM) process. If the incubator proves successful, the current GN5-1 project should then assess whether it can initiate development in 2024, subject to the availability of the necessary funding.

Scope:

The incubator will not repeat the work carried out in CLONETS-DS but, will prepare the groundwork needed for the next steps to be funded.

It should be noted that the scope of work for this incubator study will not be to create a full sustainability model for the whole of the CLONETS-DS but will rather define a first stage (*pathfinder*) and consider options for funding this. The role of the *pathfinder* is to prove the technology, architecture and business case that has been described in the CLONETS-DS.

Deadlines:

The incubator report should be completed by the end of Q4 2023.

4. **Output** – The incubator will prepare a report addressing the outputs needed to initiate a formal development phase containing:
 - Take the architectural design and operational model defined in CLONETS-DS and then identify two or more NRENs that can build *pathfinder* links for CLONETS-DS design.
 - Prepare a business case including development cost and long-term investment and operational cost projections for the *pathfinder*.
 - bring together stakeholders (NRENs and NMIs) that will be involved in building the *pathfinder* and get commitments to commit manpower and resources (assuming funding is forthcoming)
 - develop a high-level design for the *pathfinder* and
 - Prepare a roadmap, to show the way forward after the *pathfinder*.

5. **Users** – The results of the work defining the potential for a time frequency network in Europe would involve the following stakeholders:

Users:

- The metrology scientists
- National Metrology Institutes (NMIs)
- NRENs
- GEANT
- other service users as defined in the CLONETS-DS use cases

Governance:

- The GN5 Oversight Committee to help decide whether the formal development phase could already start in GN5-1 (eg in 2024)
- The CTO workshops to be held in Sept/Oct 2023 to assess the level of GÉANT/NREN interest in being part of the delivery model
- The GÉANT Project Planning Committee (GPPC)

6. **Value** – A strong business case and roadmap will provide the information needed to secure funding. The value that this work will bring is to ensure the European NREN and

community can effectively leverage the work of CLONETS and begin the building of a European time-frequency network.

7. **Team** – The following people are proposed to contribute to this team:
Guy Roberts guy.roberts@geant.org (GEANT)
Domenico Vicinanza domenico.vicinanza@geant.org (GEANT)
Harald Schnatz Harald.Schnatz@ptb.de (Independent consultant, 1 day per week. Details to be confirmed subject to Harald's availability)
Wojbor Bogacki wojbor@man.poznan.pl (PSNC)
Krzysztof Turza kturza@man.poznan.pl (PSNC)
Josef Vojtech josef.vojtech@cesnet.cz (CESNET)
Vladimir Smotlacha vs@cesnet.cz (CESNET)
8. **Time** – 3-6 months. The report must be ready in time for the CTO workshops and for the GPPC to receive as part of its planning for GN5-2.
9. **Resources** - Which resources and budget are needed for this project:
 - a. Manpower: an average of 3 months for each of the 5 participants, totalling 15 months.
 - b. Equipment: no equipment is needed for this work.
 - c. Travel budget: 6,000 Euros for travel to a face-to-face meeting at the launch of the incubator, and if needed for supporting field investigations/trials.
10. **Intellectual Property Rights (IPR)** - As a proposer I declare that my submission is not infringing any IP rights of others.
 - a. Does any code or previous work exist that is a subject of an existing IPR? No
11. **Information about gathering and processing any personal data**
 - a. Will you be processing any personal data for this project? No
12. **Contribution to an existing GÉANT project service** - Will it create or contribute to an existing GÉANT project service? If yes, please specify which one.

GEANT Vereniging currently does not offer any time/frequency service, however several NRENs do. For example, RENATER is a partner in the REFIMEVE project which provides time/frequency to the French R&E community. PSNC, SWITCH and CESNET also provide existing time/frequency services. As described in the CLONETS-DS report, a European time/frequency infrastructure will need to be well integrated with these existing services.

13. **Organisations supporting the proposal** - To be filled for each organisation:

GEANT:

- a. Name: Guy Roberts guy.roberts@geant.org
- b. Organisation: GEANT
- c. Will you implement the work results in your own organisation? Yes

- d. How much of an FTE will your organisation dedicate to work on this project?
Around 6 months (2x3 months).
- e. Would you work on this proposal even if not being paid from the GN5-1 project?
Yes

PSNC:

- a. Name: Wojbor Bogacki wojbor@man.poznan.pl
- b. Organisation: PSNC
- c. Will you implement the work results in your own organisation? Yes
- d. How much of an FTE will your organisation dedicate to work on this project?
Around 6 months (2x3 months).
- e. Would you work on this proposal even if not being paid from the GN5-1 project?
Yes, time-frequency is a core service for PSNC, we plan to contribute to building the CLONETS infrastructure.

CESNET:

- a. Name: Josef Vojtech josef.vojtech@cesnet.cz
- b. Organisation: CESNET
- c. Will you implement the work results in your own organisation? Yes
- d. How much of an FTE will your organisation dedicate to work on this project? In the range 4-6 months
- e. Would you work on this proposal even if not being paid from the GN5-1 project?
Yes, time-frequency is an important service for CESNET and we are part of the CLONETS consortium and committed to long-term support for this activity.

PTB:

- a. Name: Jochen Kronjaeger jochen.kronjaeger@ptb.de
- b. Organisation: PTB
- c. Will you implement the work results in your own organisation? Only indirectly, the business cases are to secure funding for the NRENS, so PTB would be an indirect beneficiary. As member of the National Metrology Institute (NMI) community, PTB will definitely benefit from any emerging time-frequency infrastructure created by the NRENS, for this reason we are supporting this incubator.
- d. How much of an FTE will your organisation dedicate to work on this project? none
- e. Would you work on this proposal even if not being paid from the GN5-1 project?
Yes, we are currently actively seeking ways to build time-frequency infrastructure in Europe. For example, PTB are currently carrying out an investigation in participation with CERN to understand how we can support CERN's time-frequency needs. We expect that the outputs of the incubator study could help build the infrastructure needed to meet these needs.