

# Idea for GN4

**Purpose:** This NIF form is to be used for the submission of New Ideas suggested for inclusion in the GN4 Phase1 and beyond proposals. Budget estimates, information about objectives, impact, benefits, etc. as well as scope must all be supplied.

**Submit to:** pmo@GÉANT.net by January 31st, 2014 with the subject label starting: GN4Input

## Overview

**Project Name:** European Low Latency High Quality Collaboration (LLHQ) - Best Practice

**Project Proposer:** Otto J Wittner, UNINETT  
(GARR and CESNET are “in the loop” as required partners)

**Project Type:** GN4 Phase1 or longer term

GN4 phase 1

**Duration proposed** 1 year

**Deliverables proposed (If any can be defined at this stage)** Best practice reports and at least one innovative demonstration.

**Milestones proposed (If any can be defined at this stage)** ¾ year: Demonstration

### Estimated Project Costs (best effort!)

**Manpower in person-months also identifying specific expertise required** 12 (1 for chair, 3 for each partner, 2 for planning next phases)

**Hardware and equipment:** Experimental access network technology: € 12 000

**Other costs** Travel: € 15 000 (3-4 trips)

## 1 Background and Reasoning

*Provide background information and the context of the project. Explain the reason for the project. What do you want to be different? What do you hope to improve? Why is the project needed? This should be the reason for the project, not the solution.*

As traditional video conferencing (VC) has evolved from systems based on tailored high cost hardware installed in dedicated rooms towards more light weight of-the-shelf equipment with software clients applied in any location, the awareness of the potential of such tools has increased among users.

Not surprisingly, the increased availability, low cost and easy-of-use of light-weight VC tools does not come for free. Audio and video quality has been sacrificed, however only to such an extent that simple conversations, informal social events and less formal meetings may still take place successfully applying the tools.

A group of users have emerged, and they are growing, which attempt to apply light weight VC tool for communication intensive applications, e.g. for musical collaboration. Obviously they struggle.

GEANT and NRENs are already developing and demonstrating alternative low cost solutions for this group communication intensive users. GARR and CESNET have developed license fee and open source software (LOLA and Ultragrid) which enable off-the-shelf PC hardware to deliver the low latency and high quality video and audio streams required by the users. CESNET has also developed hardware solutions which trade off complex and expensive codecs in end user equipment with high network bandwidth. The eMusic Open call project in GN3+ is demonstrating how these low cost end systems may utilise the GEANT's Bandwidth on Demand service.

However, currently, to get the new low cost low latency high quality systems into operation before a communication session can start, a certain amount of time and skill are required. As bandwidth demands are usually high, getting the necessary access network in place can be a significant challenge. As echo cancelling and other stabilising audio processing operations may degrade audio quality, they are normally omitted, and hence make carefull tuning and placement of microphones, monitors and speakers necessary. Due to high bandwidths between cameras and displays/projectors placement and cabling can be challenging as well as light source design.

## 2 Objectives, Impact and Benefits

*Provide one or more bullet points to briefly describe the primary objective(s) of the project in terms of the desired outcomes. This should be expressed in the form: 'To ensure...', 'To implement...', 'To service...', 'To improve...', 'To innovate...', 'To optimize...', 'To save...', etc. For each objective mention the benefits to identified stakeholders (e.g. end-users, NRENs, large international research projects, industrial research partners, high level education, etc.) should be mentioned. A description of the expected overall impact must also be provided.*

- To prepare to service users which require low latency high quality AV communication tools, in particular performing communities at universities
- To produce sources for best practice information within the area
- To demonstrate alternatives for high bandwidth access networks in musical collaboration
- To find and develop measurement techniques to measure experience end-to-end latency
- To prepare a long term activity proposal for GN4 year 2-5

## 3 Scope

*Describe the areas expected to be covered or impacted by the proposed activity, such as organisational areas, systems, processes, resources.. i.e. what is 'in scope'. This is not a list of what will be done but identifying the services, areas or what, will be affected.*

*Also please enumerate specific items which although they could perhaps be related are intentionally not addressed by your proposal ("Out of Scope").*

### 1. In Scope

- Survey, document and harmonise information about current low cost low latency high quality AV systems and their usage.
- Suggest improvements to today's systems to ease adoption by the GÉANT user community
- Experiment and gain knowledge about high capacity radio beam and free space optics access network technologies applied in musical collaboration settings.
- To design digital and analogue equipment for latency measurements of audio and video streams, and establish a (publicly available and open) database to collect latency statistics.

### 2. Out of Scope

- Strive towards interoperability between the tools
- Develop new competing low-latency transmission tools

## 4 General Information

*Outline any potential issues, risks, dependencies, assumptions, constraints and limitations or any other points that may be useful to help assess the proposal.*

This NIF proposal assumes resource contributions from GARR and CESNET.

This NIF proposal supplements a NIF proposal to be suggested by CESNET. While this NIF addressing low latency challenges related to access networks and end user environment, CESNETs NIF addresses low latency challenges in the backbone network. Both NIFs may very well be combined into a larger activity.

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