Simplified NIF for GN4 Input

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:	Optical broadcast system	**Project Proposer:**	Per Nihlén and Leif Johansson (SUNET)
Project Type: GN4 Phase1 or longer term	GN4 Phase1	**Estimated Project Costs (best effort!)**	
Duration proposed	1 year (Year 1)	Manpower in person-months also identifying specific expertise required	Total of 14 person-months: 4 months of project management/Chair (1 person) 6 month of software development (1 person) 4 months of senior network engineering expertise (2 persons)
Deliverables proposed (If any can be defined at this stage)	Workshop at the GN4 symposium to get guidance from network architects in our community Pilot hardware setup as well as a software module for existing network management system. Report: How to evolve GEANT and NREN networking using optical broadcasts based on standardized components	Hardware and equipment:	3 network devices with 100G coherent interfaces that supports IETF netconf/yang. It is expected that the equipment to be used will be on loan from vendor(s).
Milestones proposed (If any can be defined at this stage)	Presentation of pilot optical broadcast system	Other costs	Travel: 16k€ (4 meetings for 4 persons)

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.

With the emergence of coherent 100G optical technology we have an opportunity to reduce the cost of transporting IP packets by building optical broadcasts which will reduce the amount of technology used for delivering connectivity services thus saving on both capex and opex. Optical Coherent technology allows for a radio-like optical broadcast system on a fiber where sender and receiver can “tune in” the right channel to setup a connection which can be used for provisioning of static connections as well as circuit-on-demand services.

The fact that an optical broadcast system would be technology agnostic in the sense that you could connect layer-1, 2 and 3 equipment as long as using standardized 100G interfaces will give us an opportunity to investigate new and innovative ways of using the technology to deliver services. Deutche Telecom has been investigating this approch in project Terastream[1].

1 https://ripe67.ripe.net/presentations/131-ripe2-2.pdf

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 implement a pilot optical broadcast solution using standard and multivendor equipment that will enable a cost-efficient and rapid way to provision and control 100G connections.
- To implement an SDN-tool to control the optical broadcast by developing a module for an existing network management tool (NMS).
- To reduce the cost both in terms of capex and opex by using less hardware to deliver high speed connectivity services (100G+).
- To actively participate in this emerging and innovative field

This will benefit the NRENs and large international research projects as well as industrial research partners.

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

- An innovative way of optical networking that could be adopted by GÉANT as well as NRENs.
- Influence emerging standards in the IETF and the ITU.

2. Out of Scope

- Building an NMS from scratch
- Utilizing non-standardized APIs and protocols

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.

We envision this work to be done as part of JRA1. A potential risk from not engaging in this work would be to loose some of the influence we have gained over vendors in this space the last decade. We believe this to be a natural evolution of optical systems and merging of layers in the TCP/IP model using less equipment to deliver connectivity services and by that lowering the cost per bit. We now have a real opportunity to influence both standards in the IETF/ITU as well as vendors of networking equipment for this emerging and highly active field

There is a risk that we won't be able to loan the equipment needed for setting up a pilot, to minimize that risk SUNET has already engaged in discussions with vendors of optical, router equipment and large commercial operators.

Another risk would be not to get acces to the right skillsets as this project needs a software developer with an understanding of networking.

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