

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:	NaaS general service – Network on Demand	Project Proposer:	Ole Frensdved, NORDUnet/DeIC
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Project Type: GN4 Phase1 or longer term	Proof of concept in Phase 1 Possibly established service in Phase 2	Estimated Project Costs (best effort!)	
Duration proposed	One year	Manpower in person-months also identifying specific expertise required	Total 42 PMs 3 persons at 8 PMs 6 persons at 3 PMs Knowledge on OpenNaaS, BoD and MDVPN desirable
Deliverables proposed (If any can be defined at this stage)	Service Architecture, month 3 (Milestone 1). Cookbook on establishing service at an NREN, month 8 (Milestone 3). Evaluation report, month 11 (Milestone 4).	Hardware and equipment:	HW: 6 small routers, 4 large routers with virtualisation capabilities, 10 virtual servers 100.000 euro
Milestones proposed (If any can be defined at this stage)	M1 Service Architecture agreed. M2 Specification of NaaS server. M3 Cookbook for establishing service point M4 Software development accomplished M5 Evaluation of concept	Other costs	SW development: OpenNaaS extensions to support the service 300.000 euro

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.

When a special purpose network is needed in a wide area context we utilize measures like Virtual Private Networks (VPN), Bandwidth on Demand (BoD) or lightpath services.

Such services are typically terminated at the edge of campus. There is still a network segment between the application endpoint and the service point-of-presence.

This project aim for user controlled configuration/provisioning of the last mile of special purposes networks.

Leveraging on services like Multi Domain VPN and BoD it is suggested to form a proof of concept of a GÉANT service on Network as a Service.

The initiative is based on the current work done in GN3plus JRA2T2 and experience from the FP7 project Mantychore.

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 extend the scope of connection oriented services like Bandwidth on Demand and Multi Domain VPN to an end-to-end service.

Enhancing the value of these services to the end user, and lowering the administrative burden of network administrators.

To innovate a framework for delegating local networking resources to abroad users in a controlled way.

Network administrators are allowing for advanced networking when an application justifies this. Still precautions and procedures apply around handling a dedicated connection. An organized framework with a clear scope will help the administrator making a delegation of resources.

To allow automation within network provisioning and thereby enabling new service innovations and productivity improvements.

Benefit to the community as such.

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

- NaaS server in the local domain
- Delegation of networking resources
- Slicing and aggregation of networking resources
- Virtualisation of networking resources
- Integration with Bandwidth on Demand service
- Integration with Multi Domain VPN service
- Leveraging on OpenNaaS (www.opennaas.org)
- Abstraction of networking resources

2. Out of Scope

- Assigning networking resources to a inter NREN ('global') system
- Building a global repository of resources

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 work is a continuation of Use Case 'Network on Demand' from GN3plus JRA2T2. Ongoing work there is aiming for clarification of several aspects including AAI, delegation, user interface, scheduling of resources. That work is expected to clarify concepts and make a foundation for deciding the service architecture early in the here proposed project.
- Might overlap work done in Testbed as a Service (GN3plus SA2)
- Might overlap project proposal fostered around the services BoD and MDVPN (GN3plus SA3)
- OpenNaaS is being thought of as the platform for NaaS server. OpenNaaS have proved operational quality within the Mantychose FP7 projekt (www.mantychose.eu)
- The here proposed project requires several new functionalities within OpenNaaS. A set of so called extentions need be developed.

Background project information

Copied from JRA2T2 work

Network as a Service, NaaS, formed as a general service for creation of end-to-end network structures by automated provisioning.

This service called Network on Demand, NoD, is extending services like Bandwidth on Demand and Multi Domain VPN with an organized solution for the last mile.

Users are given the ability to provision local and remote networking resources as well as circuits connecting the remote with the local. This results in creation of end-to-end network structures.

A user (probably a network admin) are collecting resources and forming the desired topology including the necessary addressing and routing. Provision of the resulting net is done on demand, when time is appropriate viewed from the application. Decommission of or changes to the network are furthermore the ability of the user. The ability to provision and decommission can be delegated to the application responsible end user.

A network created by NoD is instantly ready for live traffic. The provision and configuration process is counted in minutes.

The demand perspective is appealing to requirements for dynamic structures that either is wanted to disappear and reappear repeatedly or are changing in shape or properties regularly.

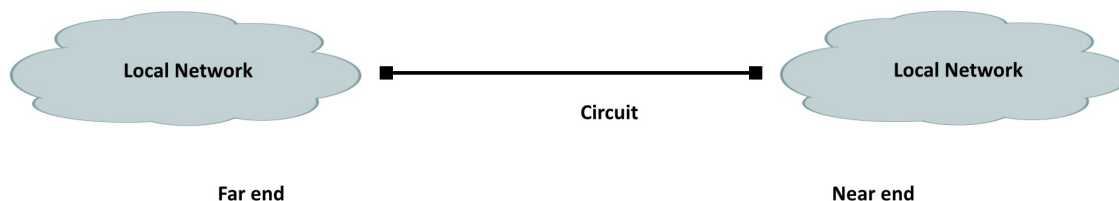
This service implements a system for delegation of networking resources. Through a local NaaS-server the resource owner hand over control of the resource to another person. The resource can be a link, a networking device or a subset of such device. Slicing up resources and delegating only parts is an important aspect.

NoD is in the field of private networks, where normal internet connectivity is not enough.

The reasons for using NoD includes:

- A wish for separation of traffic from normal traffic (Closed community networks for projects or research communities. Overlay networks for operational purposes. Layer 2 connectivity).
- Need for better quality in the connection whether this be guaranteed bandwidth, low latency or low jitter. (Usage of Bandwidth on Demand).

NoD is having a multi domain scope. Building on top of existing circuit services (e.g. BoD, MDVPN), we can simplify the domain model to end sites and circuit provider. The simple example includes two end sites illustrated in the following figure.



An end site could be a university or other customer institution in the NREN world.

Handling the last mile at the end sites are part of the NoD concept. Putting up a trustworthy service where network admins are willing to hand out control of resources is the challenge. This is achieved by placing the NaaS server locally.

When using NoD and wanting to establish a network you need to be in control of all necessary components. The user must be delegated the rights to the resources in question. This includes the ability to create circuits through the circuit provider and possessing rights to resources in the remote end site.

Provision in the different domain scopes is illustrated in the following five figures.

