034115

PHOSPHORUS

Lambda User Controlled Infrastructure for European Research

Integrated Project

Strategic objective:
Research Networking Testbeds

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Standardization Activities

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PU	Public	PU
PP	Restricted to other programme participants (including the Commission	
RE	Restricted to a group specified by the consortium (including the Commission	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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0 Executive Summary

Due to its state-of-the-art multi-architecture and multi-technology approach, the Phosphorus project expects a profitable interaction with GN2 (JRA3), GLIF, GGF, single NRENs' research initiatives and standardization bodies (e.g. IETF, OIF, ITU-T, GLIF, GGF). This interaction could be carried out:

- At an informational level, i.e. reporting developments and results to the NREN policy committee, organising meetings with NRENs technical staff
- At the project management level, i.e. by including NRNEs' and their users into Phosphorus's advisory Board
- In the form of critical feedbacks on standard tracks, i.e. pinpointing specific issues of new standards that need to be solved;
- By cooperating on standard tracks, i.e. proposing enhancements to architectures/solutions for the deployment of Grid-GMPLS in a multi-technology, multi-domain and multi-operator environment
- By contributing to best practices documents in GLIF

All these activities may result in: (1) IETF Internet Drafts possibly targeted to a number of IETF Working Groups; (2) contributions to the standardization activities of the Global Grid Forum, the IEEE and the ITU-T. A preliminary report on the planned contributions to standard bodies is given in this deliverable.

1 Chapter 1 Collection of information

In order to collect information for this deliverable a mail was send out on the general assembly list asking the members of the collaboration to deliver information on planned contributions and activities of Phosphorus in standardization organisations. These activities are particularly important since we try to let different networks inter-work on control and service plane in order to deliver hybrid services, and obviously we aim for open standards.

1.1 Information requested

The following information was requested:

1. subject
2. person/partner leading this STD effort in that organisation
3. Standards organistation where contribution is made
4. Working/research group
5. Role in that organisation
6. Any other information.

The received information is presented in the next chapter.

2 Chapter 2 Collected information

2.1 Grid Optical User Network Interface

Subject
Grid Optical User Network Interface (G.OUNI): an interface for Grid Network architectures
Person/partner leading this STD effort in that organisation
Georgios Zervas, Reza Nejabati, Dimitra Simeonidou, University of Essex (UESSEX), N. Ciulli (NXW)
Standards organization where contribution is made
OGF
Working/research group
Grid High-Performance Networking Research Group (GHPN-RG)
Role in that organisation
Georgios Zervas is editor, Reza Nejabati is editor, Dimitra Simeonidou is chair of GHPN
N.Ciulli is co-author of some of the current RG draft documents
Any other information.
Abstract *GHPN-RG Description: The Grid High-Performance Networking Research Group focuses on the relationship between network research and Grid application and infrastructure development. Two specific goals of the GHPN-RG are identifying a) grid application requirements and implementations that are not supported or understood by the networking community and b) advanced networking features that are not being utilized by grid applications.

G.OUNI The technological evolution shaped the promise for a new technological era and an emergent roadmap to the Grid Networking infrastructure. This drives the need for the support of number of distinct layered architectural models across geographical organizational boundaries, heterogeneous environments with different policies, service provisioning systems, control and transport planes as well as security standards.
This document suggests a set of functionalities for a Grid Optical User Network Interface (G.OUNI) to serve distributed heterogeneous, dynamic Grid network environments. The G.OUNI will act as a Grid network service control interface between Grid users/applications/resources and Grid network service provisioning systems (i.e., Middleware, GMPLS transport network, NRPS). The goal of this work is to identify the various functionalities required to support Grid services and applications. The

G.OUNI should embrace the OGF standard activities to provide extensions to already existing and defined UNI standards (OIF, IETF).

2.2 Grid Optical Burst Switched Networks

Subject
Grid Optical Burst Switched Networks (GOBS)
Person/partner leading this STD effort in that organisation
Reza Nejabati from UEssex
Standards organization where contribution is made
OGF
Working/research group
Grid High-Performance Networking Research Group (GHPN-RG)
Role in that organisation
editor of the draft and co-author
Any other information.
Abstract *GHPN-RG Description: The Grid High-Performance Networking Research Group focuses on the relationship between network research and Grid application and infrastructure development. Two specific goals of the GHPN-RG are identifying a) grid application requirements and implementations that are not supported or understood by the networking community and b) advanced networking features that are not being utilized by grid applications.

*GOBS As Grid applications evolve, the need for user controlled network infrastructure is apparent in order to support emerging dynamic and interactive services. Examples of such applications may be high resolution home video editing, real-time rendering, high-definition interactive TV, e-health and immersive interactive learning environments. These applications need infrastructures that makes vast amount of storage and computation resources potentially available to a large number of users. Key for the future evolution of such networks is to determine early on the technologies, protocols, and network architecture that would enable solutions to these requirements. In an attempt to address this problem, in this draft novel network paradigms and solutions based on the optical burst switching are discussed.

2.3 Firewall Issues

Subject
Firewall Issues
Person/partner leading this STD effort in that organisation
Inder Monga - Nortel Networks, Leon Gommans - UvA
Standards organization where contribution is made
OGF
Working/research group

Firewall Issues Research Group (FI-RG)

Role in that organisation

Co-chair(s)

Any other information.

Performs research on existing and new methods to protect Grid resources for malicious events arriving from the network and vice versa.

2.4 Network Markup Language

Subject

Network Markup Language, an ontology for hybrid network infrastructure

Person/partner leading this STD effort in that organisation

Paola Grosso, Bert Andree, Cees de Laat (UvA)

Standards organization where contribution is made

OGF

Working/research group

NML-WG

Role in that organisation

Paola Grosso is co-chair, Bert Andree is to be co-author on spec's
Cees de Laat is Area Director for Infrastructure.

Any other information.

Hybrid networks offer end users a mix of traditional connections and new optical services in the form of dedicated lightpaths. These must be requested in advance and are currently configured on demand by the operators. Because lightpaths are circuit switched, the user must be aware of the topology and of the techniques involved in the provisioning. Once connected, they offer a high-speed, low-level connection to the requested destination. The working group will provide an extensible schema to describe computer networks. This schema should provide an abstraction layer for networks, specifically hybrid networks. Such a schema can be used to create inter-domain network graphs at various abstraction levels, to provide an information model for service discovery, and to facilitate lightpath provisioning.

2.5 The G^{2}MPLS architecture

Subject

The G^{2}MPLS architecture, a Network Control Plane approach for Grid Network Services.

Person/partner leading this STD effort in that organisation

N. Ciulli (NXW), D. Simeonidou (UESSEX)

Standards organization where contribution is made

Open Grid Forum

Working/research group

GHPN RG

Role in that organisation
D. Simeonidou is chair of GHPN RG and author/editor of GFDs and draft specs.
N.Ciulli is co-author of some of the current RG draft documents.
Any other information.
This activity will disseminate to the GHPN community and to the wider OGF community the relevant concepts of the G^{2}MPLS architecture, in order to achieve validation of the research approach and progress towards a consensus in the Grid standardization fora.
The activity will be framed within the context of joint GHPN/GLIF work on collecting, reporting and analyzing experimental experiences in Grid and Optical Networks. This framework started in a BoF held in SupoerComputing 2006 International Conference (SC'06).

2.6 Framework for coexistence of Grids and GMPLS

Subject
Framework for the coexistence of Grids and Generalized Multiprotocol Label Switching networks.
Person/partner leading this STD effort in that organisation
N. Ciulli, G. Carrozzo (NXW)
Standards organization where contribution is made
Internet Engineering Task Force
Working/research group
CCAMP-WG
Role in that organisation
N.Ciulli is co-author of a current CCAMP draft spec, and both N. Ciulli and G. Carrozzo are co-authors of past individual contributions to the IETF.
Any other information.
This activity is a kick-off discussion about Grid Network Services within the IETF CCAMP, which leads the protocol specifications related to the GMPLS architecture.
The rationale for this effort is to meet the emerging users' requirement to support advanced and demanding research activities (Grids) through intelligent optical networks, and the contribution aims to frame emerging requirements for the migration of the Grid Network Infrastructures from a Management Plane-based paradigm to a pure Control Plane approach, such as GMPLS.

2.7 Service Level Agreements

Subject
Language and protocol for Service Level Agreements for e.g. Scheduling and Resource Management
Person/partner leading this STD effort in that organisation
Oliver Wäldrich, Wolfgang Ziegler (FHG)
Standards organization where contribution is made
OGF
Working/research group

GRAAP-WG

Role in that organisation

Wolfgang Ziegler is co-chair, Oliver Wäldrich is a member
both contribute to the spec

Any other information.

The current version of the spec (WS-Agreement) can be found here:
https://forge.gridforum.org/sf/go/doc6091?nav=1
It will be submitted to the OGF editor in January.

2.8 Scheduling Architecture

Subject

Definition of a scheduling architecture and its components

Person/partner leading this STD effort in that organisation

Oliver Wäldrich, Wolfgang Ziegler (FHG)

Standards organization where contribution is made

OGF

Working/research group

GSA-RG

Role in that organisation

Wolfgang Ziegler and Oliver Wäldrich are members and
contribute to the documents of the group

Any other information.

The published document on use-cases can be found here:
https://forge.gridforum.org/sf/docman/do/listDocuments/projects.gsa-rg/docman.root.published_documents

2.9 Selection Services

Subject

Providing protocols and interface definitions for the Selection Services portion of the Execution Management Services (EMS) part of the Open Grid Services Architecture

Person/partner leading this STD effort in that organisation

Oliver Wäldrich, Wolfgang Ziegler (FHG)

Standards organization where contribution is made

OGF

Working/research group

OGSA-RSS-WG

Role in that organisation

Oliver Wäldrich and Wolfgang Ziegler are members

Any other information.

The current draft of the specification can be found here:
https://forge.gridforum.org/sf/docman/do/listDocuments/projects.ogsa-rss-wg/docman.root.current_drafts

2.10 Domain Network Resource Manager

Subject

Domain Network Resource Manager interface to standardize

Person/partner leading this STD effort in that organisation

Gigi Karmous-Edwards US partner (MCNC)

Standards organization where contribution is made

GLIF

Working/research group

GLIF Control Plane working group

Role in that organisation

Gigi Karmous-Edwards, Chair of GLIF Control Plane working group

Any other information.

The GLIF Control Plane working group is focused on bringing automation to setting up lightpaths in a Grid environment across global Grid resources. Towards that goal we are starting to build key requirements for standard interfaces (APIs) for users to use to request all Grid resources (compute, instruments, and network). We demonstrated a simple interface during the GLIF Tokyo meeting. For the network resources being requested, a second interface is required, since lightpaths traverse multiple administrative domains (this differentiates Grid compute resources from Grid network resources), another standardized interface is necessary. One that gets implemented by domain network resource managers to help set up a lightpaths or partial lightpath. During the Tokyo GLIF meeting we demonstrated a simple version of this interface and were able to create a lightpath over multiple administrative domains.

3 Conclusions

This deliverable gives an overview of the contributions of several partners in standards organisations. One notable organisation, GLIF, was not mentioned because that is not a standards organisation. however, it is a community where several partners contribute in the control plane group, work that is fundamental for prototyping the work which is brought to the standards organisations.

4 References

[GLIF] www.glif.is

[IETF] www.ietf.org

[OGF] www.ogf.org

[OIF] www.oif.org

5 Acronyms

[CCAMP-WG]	Common Control and Measurement Plane (ccamp) Charter
[EMS]	Execution Management Services
[FHG]	Fraunhofer-Gesellschaft
[FI-RG]	Firewall Issues Research Group
[G.OUNI]	Grid Optical User Network Interface
[G2MPLS]	Network Control Plane approach for Grid Network Services.
[GHPN-RG]	Grid High-Performance Networking Research Group
[GMPLS]	Generalized Multi Protocol Label Switching
[GLIF]	Global Lambda Integrated Facility
[GOBS]	Grid Optical Burst Switched Networks
[GRAAP-WG]	Grid Resource Allocation Agreement Protocol WG
[GSA-RG]	Grid Scheduling Architecture RG
[IETF]	Internet Engineering Task Force
[MCNC]	Microelectronics Center of North Carolina
[NML-WG]	Network Markup Language
[NRPS]	Network Resource Provisioning System
[NXW]	Nextworks
[OGF]	Open Grid Forum
[OIF]	Optical Internetworking Forum
[OGSA-RSS-WG]	OGSA Resource Selection Services WG
[SC'06]	Super Computing 2006
[UESSEX]	University of Essex
[UNI]	User to Network Interface
[UvA]	Universiteit van Amsterdam