SEVENTH FRAMEWORK PROGRAMME

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Abstract:

This document is the first deliverable of the WP24 “Topical Project on Edge-to-core adaptation for hybrid networks”. This report contains the planned activities into the BONE project.

There are twenty-three partners involved in this workpackage and fourteen joint activities are proposed. Moreover, seven mobility actions are planned during the two years of the project.

Keyword list:

Disclaimer

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1. Executive Summary

This document is the first deliverable of the work package “Edge-to-core adaptation for hybrid networks”. As the title of this deliverable says, this report contains the planned activities into the BONE project.

There are 25 partners involved in this workpackage and 14 joint activities are proposed. The topics covered by this work package are most of the hybrid technologies including: OBS/OPS architectures, synchronous traffic over optical technologies as well as the provisioning of IP services over WDM technologies. Moreover, this work package will pay attention to the QoS provided by these hybrid technologies.

2. Introduction

The main objective of the work package “Edge-to-core adaptation for hybrid networks” is to address the issues that concern edge-to-core node adaptation in hybrid networks. This first deliverable defines the activities planned into this “Network of Excellence”.

In section three, this report provides a list of the partners involves in the work package as well as the joint activities in which they are involved. In section four, it focuses on the description of the joint activities. Finally, the last section concludes this report.

3. Participants

There are twenty five partners collaborating in this work package. Table 1 shows the list of participants and the number of the joint activities, in which they are involved. A detailed description of the joint activities is provided in the following chapter.

Partner No	Member	Joint Activities
2	TUW	10
5	TUB	7
7	USTIKR	9
8	COM	11
10	TID	1,3,4,5,9
11	UAM	3,12,13,14
12	UC3M	12
13	UPC	1,8,10,14
14	UPCT	7
15	UPVLC	2
17	FT	10
19	AIT	1,7
21	RACTI	2,4,5,8
23	UOP	13
27	FUB	6
28	ISCOM	11
29	POLIMI	14
32	DEISUNIBO	4,5,10
33	UNIMORE	4,5
34	UNIROMA1	6
37	IT	11
41	KTH	10
42	BILKENT	4,5,8
47	UEssex	2,13
48	USWAN	10,14

Table 1: Work package participants and their joint activities

4. Joint Activities

This chapter describes the joint activities that will be carried out in this work package. The following table shows key information about these joint activities:

No	Joint Activity Title	Responsible person	Participants	Mobility Action	Dead-line
1	OBS routing algorithms for resilient and dynamic network scenarios	Miroslaw Klinkowski (mklinkow@ac.upc.edu)	UPC, TID, AIT		M24
2	Evaluation of video transmission over OBS networks for different assembly schemes	Tito Raúl Vargas (tivarher@iteam.upv.es)	UPVLC, RACTI, UEssex	Yes (3)	M24
3	End-to-end multi-layer switching algorithm for IP over WDM networks	Víctor López (victor.lopez@uam.es)	UAM, TID		M24
4	Dynamic Multi-Queue Burst Assembly schemes for TCP performance enhancement	Kostas Ramantas (ramantas@ceid.upatras.gr)	UNIBO, RACTI, TID, UNIMORE, BILKENT	Yes	
5	New assembly schemes taking into account the number of flows and their flow window size.	Kostas Ramantas (ramantas@ceid.upatras.gr)	UNIBO, RACTI, TID, UNIMORE, BILKENT	Yes	
6	The OTDM Add-Drop technique to overcome granularity problems in optical networks	Vincenzo Eramo (vincenzo.eramo@uniroma1.it)	UNIROMA1, FUB		M24
7	Traffic conditioning and congestion control in OBS/OPS networks	Pablo Pavón (pablo.pavon@upct.es)	UPCT, TUB, AIT		M24
8	Survey on QoS differentiation Mechanisms for OBS	Nail Akar (akar@ee.bilkent.edu.tr)	BILKENT, UPC, RACTI		M12
9	Design and evaluation of a periodic OBS burst reordering model for TCP throughput estimation	Sebastian Gunreben (sebastian.gunreben@ikr.uni-stuttgart.de)	UST-IKR, TID		M13
10	Optical buffering technologies survey	Hisao Nakajima (hisao.nakajima@orange-ftgroup.com)	FT, TUW, DEIS-UNIBO, UPC,		M24
11	Analisys of the effects of erbium amplification in burst/packet networks	Giorgio Maria Tosi Beleffi (giorgio.tosibeleffi@comunicazioni.it)	ISCOM, IT	Yes	M24
12	Synchronous traffic and OBS	David Larrabeiti (dlarra@it.uc3m.es)	UC3M		M13
13	Benchmarking of network architectures for guaranteed service provisioning	Alexandros Stavdas (astavdas@uop.gr)	UoP, UEssex, UAM	Yes	M24
14	Advanced optical amplifier for OBS/OPS transmission	Marcelo Zannin (m.da-rosa-zannin.397006@swansea.ac.uk)	USWAN, UAM, UPC, POLIMI		M24

Table 2: Summary list of the planned joint activities

As it is depicted in the above table, fourteen joint activities with seven mobility actions are planned for this work package. The duration of most of the joint activities covers the two years of the project.

4.1 OBS routing algorithms for resilient and dynamic network scenarios

Participants: UPC, TID, AIT

Responsible person (please include email):

Miroslaw Klinkowski (UPC) mklinkow@ac.upc.edu

Anna Tzanakaki (AIT) atza@ait.edu.gr

Óscar González de Dios (TID) ogondio@tid.es

Description (max 1 page):

Optical Burst Switching is widely investigated in the last 10 years. Several topics have been extendedly (and successfully) covered: contention resolution, node architecture, burst assembly, interaction with transport layer (like TCP), and routing algorithm. One important aspect is slightly or even no considered in the past: the effect of the dynamic traffic due to demand variation, churns or/and (most important) failures to the network performance. All these factors strongly impact a network where the buffering is very limited and several congestion situations can arise everywhere. The control layer should take into account these factors.

In this JA we will propose several mechanisms, mainly routing algorithms but also congestion controls at the edge node, which may move or limit some flows in an OBS network subject to dynamic traffic situations (failure included).

Targeted call for papers:

Conferences: ONDM 2009, ICTON 2009

Journals: JON, OSN, PNC, JLT

Deadline: M24

Any other activities that may serve to assess the JA performance (teaching material, joint experiments, etc):

This activity will be in close interaction with JA “Benchmarking of network architectures for guaranteed service provisioning”.

4.2 Evaluation of video transmission over OBS networks for different assembly schemes

Participants: UPVLC, RACTI/UPatras, UEssex

Responsible person: Tito Raúl Vargas tivarher@iteam.upv.es, Salvador Sales, ssales@dcom.upv.es, Juan Carlos Guerri, jcguerri@dcom.upv.es, Kostas Ramantas ramantas@ceid.upatras.gr, Kyriakos Vlachos, kvlachos@ceid.upatras.gr, Reza Nejabati rnejab@essex.ac.uk.

Description:

Optical Burst Switching has been proposed to be a technology for implementing the next generation optical Internet, and since the rapid increment that has been experimented the traffic of new applications, such as video on demand, VoIP, Grid computing, etc, that have real time, QoS, and bandwidth constraints, it is important to evaluate the performance of the real time traffic over OBS networks.

The main objective of the work, in this joint activity, will be to evaluate video transmissions (adaptive, scalable and multi-description) over OBS networks for different assembly schemes.

RACTI/UPatras will provide expertise in the OBS ns-2 code, and in implementation of different assembly strategies, while **UPVLC** will provide expertise in objective and subjective video evaluation, knowledge in video codecs, and providing the necessary video traces files and, **UEssex** will provide a video streaming capable OBS test-bed than will be used to test and evaluate performance of the video transmissions over OBS networks with different aggregation and burst assembly algorithms.

Targeted call for papers: 1 joint paper

IEEE ICC 2009

Deadline: M24

Planned mobility actions:

One Ph.D student from UPVLC, will visit RACTI/UPatras (four weeks). The exchange propose will be to evaluate video transmission over OBS networks by simulation together with one Ph. D student from RACTI/UPatras.

Two mobility actions: from UPatras/UPVLC to UEssex. Goal: Experimental validation of the simulation results at UEssex test-bed. Dates for this mobility action will be specified at the JA meeting during ICTON 2008.

Any other activities that may serve to assess the JA performance (teaching material, joint experiments, etc):

Improvement of OBS ns2 simulator with new modules for the video evaluation using different assembly schemes algorithms.

Mobility actions between Ph.D students to exchange knowledge and gain experience about traffic from applications with needs of transmitting real-time data over OBS networks.

4.3 End-to-end multi-layer switching algorithm for IP over WDM networks

Participants: UAM, TID

Responsible person (please include email):

Víctor López (UAM) victor.lopez@uam.es

Juan Fernandez Palacios (TID) jpfp@tid.es

Description (max 1 page):

Current backbone networks are migrating to an IP over WDM architecture. In such scenario, it is necessary to manage both optical and electronic physical layers. However, traditional transport functionalities, such as traffic engineering, switching and restoration, are carried in the IP/MPLS layer. In the light of this, we defined a multilayer mechanism that trades off a QoS metric (delay) and techno-economic aspects. Such mechanism follows the Bayesian decision theory, and is tested with a set of representative case scenarios.

This joint activity will continue the research in this topic to extend the functionalities of such algorithm, to an end-to-end scenario. To carry out this task, not only the local information of each node is necessary, but also the information in the overall network. This activity must define the model for this end-to-end delay and integrate this model into the Bayesian decisor algorithm.

Moreover, the architecture of the algorithm may be evaluated. A centralized approach should define a new entity to take the decision for the path or a distributed approach should analyze the mechanisms to take the decision.

Targeted call for papers:

Conferences: IEEE GLOBECOM 2008, ONDM 2009, ICTON 2009

Journals: PNC, JLT

Deadline: M24

4.4 Dynamic Multi-Queue Burst Assembly schemes for TCP performance enhancement

Participants: UNIBO, RACTI/UPATRAS, TID, UNIMORE, BILKENT

Responsible person (please include email):

Kostas Ramantas (RACTI) ramantas@ceid.upatras.gr

Description (max 1 page):

TCP is the de-facto standard for data transmissions in today's internet, so the transportation of TCP traffic over future OBS networks is very likely. The performance of TCP over OBS networks has been studied in previous works where it has been observed that the burst assembly process at the edge nodes has a significant impact on the end-to-end performance of TCP, mainly because it introduces an unpredictable delay that challenges the window mechanism used by TCP protocol for congestion control. Dynamic burst assembly algorithms have been proposed in the literature to address this deficiency, that dynamically changes the assembly time. However, the problem of determining an optimal timer value is still considered open. Part of the problem's complexity lies in the fact that the TCP flows assembled in one burst are heterogenous, in terms of their bandwidth requirements. So they are not served well by a fixed assembly timer, which is common for all TCP flows with a common destination. It has been observed that TCP flows with small congestion windows require small Tmax values, which helps the TCP window rise faster (due to small delay penalty). On the other hand, TCP flows with large congestion windows see performance benefits when a large timer value is used.

Congestion window size is an absolute criterion of TCP performance, so it is clear that it should be taken into account by burst assembly algorithms. In this joint activity we are investigating multi-queue burst assembly algorithms. Each queue has a different timer value, and TCP agents are assigned to queues according to their instant congestion window. We will investigate efficient algorithms for performing this task dynamically, responding to burst losses as well as traffic statistics. We will also investigate scheduling and fairness issues regarding the multi queue data transmission. Proposed algorithms will be verified through simulation. A real-world network scenario will be modelled, including hundreds of active TCP agents. A dedicated simulator will be implemented for this in the ns-2 framework.

Targeted call for papers:

Photonic Network Communications (Springer Publisher)

IEEE GLOBECOM conference (http://www.comsoc.org/confs/globecom/2008/)

Deadline:

Planned mobility actions:

Kostas Ramantas (Phd student from RACTI) will visit TID for 2 weeks.

4.5 New assembly schemes taking into account the number of flows and their flow window size.

Participants: UNIBO, RACTI/UPATRAS, TID, UNIMORE, BILKENT

Responsible person (please include email):

Kostas Ramantas (RACTI) ramantas@ceid.upatras.gr

Description (max 1 page):

The performance of TCP over OBS networks has been studied in previous works where it has been observed that the burst assembly process at the edge nodes has a significant impact on the end-to-end performance of TCP, mainly because it introduces an unpredictable delay that challenges the congestion control mechanism. Additionally, one burst loss in OBS is followed by multiple segment losses, which adversely affects performance. It has been observed that for every TCP variant, if a certain threshold of consecutive segment losses is exceeded, a timeout event occurs. This leads to performance degradation, and can be responsible for TCP agent synchronization.

Dynamic burst assembly algorithms that have been proposed in the literature dynamically change the assembly timer according to traffic statistics. They do not take into account the number of TCP flows per burst, or the TCP agents congestion window, which is an absolute criterion of TCP performance. It has been observed that TCP flows with small congestion windows require small Tmax values, which helps the TCP window rise faster (due to small delay penalty). On the other hand, TCP flows with large congestion windows see performance benefits when a large timer value is used.

In this joint activity we are investigating novel burst assembly algorithms, that take into account the number of flows per burst, as well as the TCP agent's instant congestion size. Our objective is to limit the number of different TCP flows per burst, which will consequently limit the effect of burst losses. multi-queue burst assembly algorithms. All proposed algorithms will be verified through simulation. A real-world network scenario will be modelled, including hundreds of active TCP agents. A dedicated simulator will be implemented for this in the ns-2 framework.

Targeted call for papers:

IEEE GLOBECOM conference (http://www.comsoc.org/confs/globecom/2008/)

IEEE/OSA Journal of Lightwave technology

Deadline:

Planned mobility actions:

Kostas Ramantas (Phd student from RACTI) will visit UNBO for 2 weeks (in April-May).

4.6 The OTDM Add-Drop technique to overcome granularity problems in optical networks

Participants: UNIROMA1, FUB

Responsible person:

Vincenzo Eramo Vincenzo.Eramo@uniroma1.it

Description (max 1 page):

UNIROMA1, FUB will address topics regarding the traffic aggregation in access networks by evaluating the technological and economic aspects connected to the utilization of the optical technology in the implementation of the access section of a multilayer IP network. In particular, the project will be focused on the secondary network, i.e. that network section that interconnects the backbone with the distribution networks handling the final users. Both Wavelength Division Multiplexing (WDM) and the Optical Time Division Multiplexing (OTDM) techniques will be considered. The key feature offered by the OTDM is the possibility of subdividing the bandwidth available on a wavelength defining a number of optical channels at lower bit rates able to carry information directly emitted by users. Therefore, the OTDM technique offers the means to solve the problem of the granularity gap between the flows handled in the access section and in the backbone of the network due to the difference between the bit rates available on a single wavelength and those required by users. The OTDM approach can also make use of Add-Drop intermediate nodes to have a more efficient implementation of a specific logical topology over a physical topology, minimizing wavelengths needed.

In particular the following three activities will be carried out:

-In the first research activity the alternatives arising from the joint application of OTDM and WDM techniques in a multilayer IP network will be studied. In particular availability and performance of OTDM Add-Drop nodes will be evaluated.

-In the second research activity, for each alternative, it will be defined: i) the path routing strategies able to achieve an efficient use of the network capacity; ii) the path protection and restoration strategies to be applied in case of network faults; iii) requirements on the network control plane for the dynamic control of the OTDM/WDM optical paths.

- In the third research activity the proposed alternatives will be compared on the basis of performance and cost criteria, when both unicast and multicast traffic are taken into account.

Targeted call for papers:

1 paper for JLT, 1 paper for JON for each year

1 paper for ECOC, 1 for OFC, 1 for ICTON each year.

Deadline: M24

4.7 Traffic conditioning and congestion control in OBS/OPS networks

Participants: UPCT, TUB, AIT

Responsible person (please include email):

Pablo Pavón Mariño Pablo.Pavon@upct.es

Description (max 1 page):

The objective of this JA is the design and evaluation of traffic conditioning and congestion control schemes suitable for OPS/OBS network. The research focuses on OPS/OBS networks, with a DiffServ QoS scheme. Research milestones could be:

- Definition and testing of a set of DiffServ techniques for OPS/OBS networks: special focus on traffic conditioning at ingress nodes for OPS/OBS network, scheduling at intermediate nodes. Design of suitable congestion control techniques in OPS/OBS networks, to be implemented mainly in the edge-node.
- Evaluation of end-to-end to loss performance of different techniques. Parameter tuning.
- Contribute in network optimization (capacity and routing planning) in DiffServ OPS/OBS networks. Study the problem from a network optimization (planning) perspective: the aim is to include routing and capacity decisions in an optimization problem which calculates the traffic routing, and/or obtains the conditioning/congestion parameters.

Targeted call for papers:

1 Journal (JON, OSN, PNC, JLT) and 1 conference paper (ONDM 2009, ICTON 2009)

Deadline: M24

4.8 Survey on QoS differentiation Mechanisms for OBS

Participants: BILKENT, UPC, RACTI, AIT

Responsible person (please include email):

Nail Akar (Bilkent) akar@ee.bilkent.edu.tr

Description (max 1 page): Various QoS differentiation mechanisms have been proposed for optical burst switching networks. These mechanisms include the offset-, length-, and preemptive dropping-based schemes for one-way signaled systems and reservation duration-based schemes for two-way signaled OBS networks. In this joint activity, we aim at putting together a survey on QoS differentiation schemes for OBS networks which describes the recent E-Photon One/Bone research in this area. The study carried out within this JA focuses on not only burst level differentiation but also transport layer throughput when upper layer protocols such as UDP and TCP take action. We target a survey paper that will be submitted to a journal.

Targeted call for papers:

Journals: IEEE Communications Magazine, Computer Networks

Deadline: M12

Any other activities that may serve to assess the JA performance (teaching material, joint experiments, etc): We carry out joint simulation experiments using a common scenario but each partner focuses on a separate aspect of QoS differentiation.

4.9 Design and evaluation of a periodic OBS burst reordering model for TCP throughput estimation

Participants: UST-IKR, TID

Responsible person (please include email):

Sebastian Gunreben sebastian.gunreben@ikr.uni-stuttgart.de

Description (max 1 page):

OBS contention resolution schemes of buffering, deflection routing and multi-path routing may cause disorder delivery of bursts. Since each data burst is aggregated from multiple packets, burst disorder delivery also implies special packet disorder pattern, which influences the higher layer protocol performance.

The basic TCP congestion control suffers from the packet reordering as it may interpret out-of-sequence packets as lost. If the duplicate acknowledgment (dup-ack) threshold at the sender is exceeded, the fast retransmit algorithm is triggered, which decreases TCP throughput.

The activity will focus on the design of an analytic TCP throughput model for burst reordering. The starting points will be the multi-layer analysis on optical burst reordering [REFCL] and the TCP over OBS periodic loss model. The model will be evaluated by simulation.

The final results will lead to the deduction of network design guidelines to increase TCP throughput. Moreover, the conclusion of the study will evaluate routing strategies and congestion resolution schemes in respect to the expected TCP throughput.

Targeted call for papers:

Broadnets 2009, GlobeCom 2009, ICTON 2009, ONDM 2009.

Deadline: M13

4.10 Optical buffering technologies survey

Participants: FT, TUW, DEIS-UNIBO, UPC, USWAN, KTH

Responsible person:

Hisao Nakajima, hisao.nakajima@orange-ftgroup.com, Karin Ennser, k.ennser@swansea.ac.uk

Description (max 1 page):

The lack of random access optical buffer (or memory) is the one important bottleneck for the implementation of meshed topology OBS networks within a practical operation scheme. The activity aims at surveying advanced optical buffering technologies, e.g. photonic band-gap devices, slow-light devices, nonlinear devices, which will potentially help the realisation of random access optical buffers in the future. The timeline may include not only the far future (when?) but also the near future (~2010). Practically the activity will consist in making a table of different technologies and establishing a forecast on each of them. The precise content and work plan should be defined discussing with participants. Possible steps are as follows:

- Establish a list of criteria for the evaluation (performance, feasibility, integration, cost, etc.),

- Testing the list with a few examples to validate the list,

- Collect information on different candidate technologies,

- Assessment of technologies according to the list and establish a forecast (and comments).

Targeted call for papers:

Photonics in Switching and WOBS 2009

Deadline: M24

4.11 Analisys of the effects of erbium amplification in burst/packet networks

Participants: ISCOM, IT, COM

Responsible person (please include email):

Giorgio Maria Tosi Beleffi (giorgio.tosibeleffi@comunicazioni.it)

Antonio Teixeira (Teixeira@ua.pt)

Description (max 1 page):

Remote lumped and distributed amplification in packet/burst oriented metro/access networks represent a new key point of attraction in the Metro-Access scenario to increase the reach. The high levels of QoS requested, for multimedia applications and broadband services, in such amplified networks determine the needs of distorsion avoidance. ISCOM in collaboration with IT (Instituto de Telecomunicacoes) will focus on cascaded EDFAs, SOAs and Raman response to bursts/GEthernet data flows and on optical burst receiver issues.

Targeted call for papers:

IEEE/OSA Conferences, ECOC09, ICTON09, OFC10

IEEE/OSA Journals, JLT, JON, RLO

Deadline: M24

Planned mobility actions: A mobility action between ISCOM and PT will be carried out.

4.12 Synchronous traffic and OBS

Participants: UC3M, UAM

Responsible person (please include email):

David Larrabeiti (dlarra@it.uc3m.es)

Description (max 1 page):

One of the main hinders to the real deployment of OBS is burst loss. It is hardly believable that a next-generation optical networking technology created to improve the efficiency of switching and transmission can succeed with loss figures that are only acceptable at very low utilization rates. The issue is not easy to address due to current optical buffering limitations among others.

A case where loss is especially unacceptable is the transport of synchronous legacy SDH connections over OBS. This has led some authors to propose a hybrid burst-switched pseudo-circuit-switched exploitation of the OBS network. The impact of this approach is a decrease of effective capacity and an increase of loss for background non-synchronous traffic. This JA focuses on this question and studies the possibilities of auxiliary electronics to deal with low class bursts.

Targeted call for papers:

GlobeCom 2009, ICTON 2009, ONDM 2009.

Deadline: M13

4.13 Benchmarking of network architectures for guaranteed service provisioning

Participants: UoP,UEssex, DEIS-UNIBO, UAM, UPC

Responsible person: Dr. Fanis Oprhpanoudakis (fanis@uop.gr)

Description (max 1 page):

The aim of this Joint Activity is to benchmark various networking solutions allowing for reconciliation between dynamic resource allocation and guaranteed end-to-end network performance.

Today, many solutions have been proposed ranging from OBS and OPS to two-way reservation, etc offering a certain degree of dynamic resource allocation and/or guaranteed end-to-end performance. All these solutions have strengths and weaknesses in terms of the corresponding switching techniques, control plane implementation, resource allocation efficiency, ability to groom a dynamically changing traffic profile etc. Next generation dynamic core and metro networks should facilitate efficient traffic aggregation, grooming and switching at appropriate time scales, efficient utilization of optical hardware resources (taking also into account trends like T-MPLS, PBT etc. and extending them into the optical realm) whilst ensuring bounded end-to-end delay, very low optical packet/slot loss, differentiate handling according to priorities etc.

It is imperative to compare these approaches against each other in order to be able to identify the pros and cons of each solution as a first step towards a transportation platform converging circuits and packets. The scope of this JA is to propose prominent networking solutions and benchmark their performance in terms of resource utilization, packet-loss rate and delay and to investigate specific aspects of the corresponding implementations. UoP and UEssex are proposing a slotted and frame synchronous network operation supporting traffic aggregation and efficient coordinated network-wide control and switch scheduling. This solution is named CANON.

Taking into account the above, the corresponding research topics are addressing the thematic are of both WP11 (Traffic engineering & congestion resolution, Control plane for fast resource allocation according to the user needs and proposed activity OXS-TP) as well as WP24 (Polymorphic networks: comparison between Optical Burst/Packet Switching and Optical Circuit Switching, Optical Packet Switching: adaptation issues, packetization, traffic shaping, asynchronous-synchronous etc).

Targeted call for papers:

Conferences: ICC, Globecom, ONDM, ECOC

Journals: JSAC, JLT, JON, OSN

Deadline: M24

Planed mobility actions: Personnel from UoP will visit UEssex in the second half of the year.

Any other activities that may serve to assess the JA performance (teaching material, joint experiments, etc): this activity will be in close interaction with JA “OBS routing in dynamic and resilient optical networks”

4.14 Advanced optical amplifier for OBS/OPS transmission

Participants: USWAN, UAM, UPC, POLIMI

Responsible person (please include email):

Marcelo Zannin (m.da-rosa-zannin.397006@swansea.ac.uk), Karin Ennser (k.ennser@swansea.ac.uk), Davide Careglio (Careglio@ac.upc.edu), Josep Polé-Pareta (pareta@ac.upc.edu), Javier Aracil (javier.aracil@uam.es), StefanoTaccheo (stefano.taccheo@fisi.polimi.it)

Description (max 1 page):

Burst amplification may cause severe impairments due to amplifier gain excursions caused by large signal input power fluctuations. A promising technique is the use of gain clamped techniques such as optical feedback to minimize the amplification impairment of OBS/OPS traffic. As recently reported when the traffic frequency is near the amplifier cavity frequency a nonlinear chaotic behavior may occur. A more in depth study is necessary to assess the impact of such impairment in realistic traffic profiles.

A key aspect of the JA is to bring together expertise of OBS/OPS transmission and of advanced optical amplifier. The JA will also benefit from real-data traffic provided by UPC from the Catalan Network. Relevant issues will be considered as inter-arrival time, burst duration statistics and typical burst traffic data. We will investigate the performance in case of WDM burst traffic and relate the power fluctuations to bit-error-rate measurements. A more detailed traffic profile will be analyzed considering cascade of nodes. Optical packet switching technologies and performance will be considered.

Targeted call for papers:

IEEE/OSA Conferences, such as ECOC08, ICTON2008, OFC09, etc.

IEEE/OSA Journals, such as JLT, JON, etc

Deadline: M24

Any other activities that may serve to assess the JA performance (teaching material, joint experiments, etc): Joint experiment will be carried to integrate the expertise of the group.

5. Conclusions

The proposal of joint activities and their research criteria adequately cover all the planned research objectives for this work package indicated in the BONE technical annex. If these planned activities follows the steps described in their proposal, this work package will fulfill the objectives defined in the project proposal.

Publications in international conferences and journals are almost assured thanks to the amount of partners and their expertise. Moreover, mobility actions, which will be carried out into this work package, will increase the interaction among the research groups involved in the work package, which is a secondary objective of this Network of Excellence.