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SODALES

SOftware-Defined Access using Low-Energy Subsystems

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D6.3 Quarterly Report - 02

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

Abstract

The second Quarterly report (M6) describes the evolution of the SODALES project during the period comprised between months 4 and 6 of the project.

SODALES is on track and with little deviations. All the milestones have been achieved and the deliverables are expected to be delivered on time.

From the technical perspective, MS12 “Complete definition of the SODALES architecture and services” is complete and all the architectures and services are being incorporated into D1.1 “SODALES architecture, service catalogue and network specifications”.

Regarding the dissemination of SODALES, further to the ICTON paper accepted during the first reporting period, a poster has been accepted to be presented at the Future Network and Mobile Summit 2013, which will take place in Lisbon, Portugal in July.

From the management perspective, no special actions were taken during this reporting period apart from the normal project coordination. There has been no need to correct any aspect related to the management of the project.

There is a short delay in the delivery of D1.1 SODALES architecture, service catalogue and network specifications, which is now under the final review process.

The SODALES consortium is aware that from month 7th to month 12th the effort required to develop the project will be high, as there are several deliverables due during this period, and therefore more resources will be allocated. Also, WP3 is starting in month 7 so the number of active WPs will be 4 (WP1, WP3, WP5 and WP6).

Document Revision History

Version	Date	Description of change	Authors
1.0	27/05/2013	Initial version	Carlos Bock (i2CAT)

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Figure Summary

1 List of beneficiaries

Participant no.	Participant organization name	Part. short name	Country
1 (Coordinator)	**Fundació i2CAT, Internet i Innovació a Catalunya**	**I2CAT**	**Spain**
2	Portugal Telecom Inovação	PTI	Portugal
3	Ethernity Networks	ETHERNITY	Israel
4	University of Essex	UESSEX	United Kingdom
5	Fraunhofer Gesellschaft e.V.	HHI	Germany

2 Project objectives for the reporting period

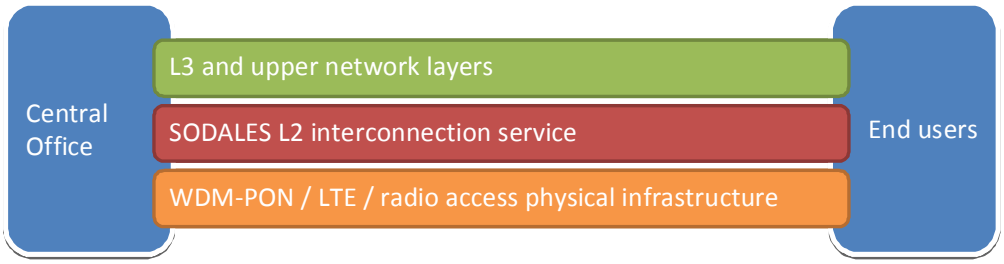
2.1 Overall project objectives

The SODALES project proposes a novel, converged next generation access network that combines optical and wireless access solutions to offer ubiquitous wireless / wired layer-2 access in a ground-breaking network architecture for both open access as well as traditional vertical operators.

2.1.1 SODALES Mission and Vision

The SODALES project (SOftware-Defined Access using Low-Energy Subsystems) aims to converge Layer-2 Ethernet 2 and wireless (LTE, 60-GHz and beyond) over a unique statistical multiplexer over WDM-PON that offers interconnection to fixed and mobile subscribers in a green, simplified, optimized and easy-to-manage access infrastructure.

The SODALES interconnection service integrates a heterogeneous set of different access infrastructures and proposes an innovative layer-1/2 interconnection service that interfaces with the physical substrate for fixed subscribers offering a novel ultra-high bandwidth wavelength-division-multiplexed passive-optical-network (WDM-PON) architecture combined with fixed-radio access, and also offers a standardized interface for long-term evolution (LTE) and beyond mobile users.



SODALES interconnection service across a set of heterogeneous access infrastructures

SODALES takes advantage of the fact that mobile remote base stations (RBSs) require electrical powering in order to incorporate a device called the Active Remote Node (ARN) that will perform advanced multiplexing functionalities. This allows advanced statistical multiplexing and very high network optimization, while simplifying network equipment at the customer premises.

The rationale behind this service from the business point of view is the following:

- It has been widely accepted that fibre-to-the-home (FTTH) is the only passive access infrastructure platform (backhaul, mobile- and fixed final-drop) that will be able to support present and future applications;
- To meet the fast increasing data services, mobile operators need to upgrade their network frequently and operate multiple-standard network, including GSM, WCDMA/TD-SCDMA, however this results in causing operators to have more complex and costly plans for network expansion and upgrading
- In order to achieve a viable business model, transversal infrastructure sharing is key;
- Mobility is an essential functional application, as is convergence of fixed and mobile services.
- Services are ubiquitous and need to be delivered independently of the physical substrate and final-drop segment;
- Centralized signal processing greatly reduces the number of sites for equipment room needed to cover the same areas, which will enable to handle in a more central location the support for many cellular technologies
- To reduce operational expenditure (OPEX) and capital expenditure (CAPEX), integration of wired and wireless services is essential.

Turning to future technical expectations, we are adopting the following hypotheses:

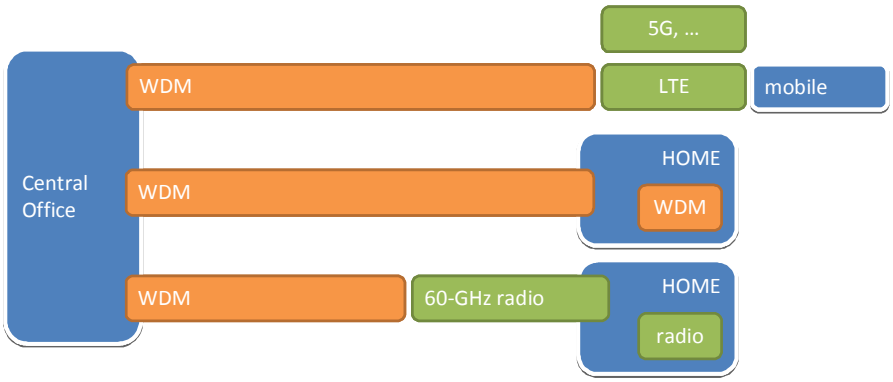
- WDM-PONs are the most-likely evolutionary next step in deployed FTTH next-generation optical access (NGOA), that are best able to offer 10 Gb/s and beyond to end-users;
- 60-GHz radio access is emerging as the key alternative technology solution for fixed access in locations where fibre is difficult (economically, logistically, topologically etc.) to deploy as the final-drop segment;
- 4G (LTE) and beyond mobile radio services will require fibre mobile backhaul infrastructure;
- To offer high data-rates in a mobile environment, the size of the coverage cells (femto/pico/micro) need to be small, with the concomitant requirement for higher numbers of remote base stations (RBSs) or active remote nodes (ARNs);
- ARNs, RBSs and antennas will require remote powering – such that the existence of small active routing elements in remote field locations is not an issue; it is even advantageous, since remote control & management (C&M) functionalities and operations become more practically possible;
- Low power consumption and energy-efficiency at all of the end-user sides, head-end and ARNs/RBSs are essential to keep ICT power consumption low and maintain a minimized carbon footprint.

In addition, the other following requirements are also becoming increasingly critical:

- Although fibre is the preferred choice when deploying new infrastructure, in brownfield sites this can often be a non-viable technical solution, so that an alternative bonding technology needs to be developed;
- Infrastructure sharing technology solutions and other associated novel business models need to be developed in order to successfully (i.e. economically sustainably) offer the massively wide-spread and ultra broadband services that European citizens are increasingly anticipating. At present, the development and deployment of such infrastructures is taking a significantly longer time than is desirable from a societal point of view, and this is also affecting European global competitiveness and productivity;

- Simplification of the provisioning and management in next-generation access (NGA), especially with the evolution towards open access networking, is key to the massively widespread deployment of ultra broadband networks and the stimulation of a dynamic and competitive environment to promote sustained technology and Internet service innovation.

Taking into account all the points listed above, SODALES aims to develop an advanced interconnection service using WDM-PON, legacy cellular technologies (GSM, WCDMA...) and 60-GHz radio for fixed users and LTE and beyond for mobile users, offering a standard L2 Ethernet-based interface to enable a multiplicity of network providers to supply services and applications across a unified access platform that will support transmission of multiple cellular wireless technologies, 60 GHz radio, and data services over economical aggregation platform.



SODALES global overview of its unified, massively widespread and ultra broadband access platform

2.1.2 SODALES summary of objectives

The fundamental SODALES objective is to develop and assess a NGOA network to offer a scalable FTTH and mobile mass market access solution, minimising TCO, supporting new business models and allowing co-operations among different stake holders, by developing compatibility and standard interfacing for fixed and mobile radio access.

The following measurable and verifiable objectives are listed, including the expected date to be achieved

Technical objectives

- MS 51 Establish the conditions of the ARN physical layer and design the ARN to fulfil compatibility with fibre and mobile access networks (Month 12)
- MS 31 Design the interfaces to offer advanced OAM at the ARN, CPE and CO to allow easy provision, control of management of bit stream access in open-access multi-operator networks (Month 12)
- MS 41 Develop a low-cost 10 Gb/s demarcation CPE that can be used for fibre and 60-GHz radio access (Month 24)
- MS 32 Include backbone network features into access systems (Month 22)
- MS 33 Offer a unified C&M plane that offers standard northbound interfaces for service provision, OAM and fault management for both, fixed and mobile services (Month 24)

Technical challenges

- MS 51 Apply statistical multiplexing adaptation to pure point-to-point standard interfaces (Month 12)
- MS 21 Solve packet-to-TDM synchronization and management issues to allow real fixed-mobile convergence (Month 12)
- MS 51 Integrate with off-the-shelf components and modules (Month 12)
- MS 42 Define, design and construct an overall prototype concept (Month 28)
- MS 12 Define physical and logical interfaces and to specify their functionalities (Month 6)
- MS 14 Determine the optimum network architecture for up- and down-stream transmission capacity (Month 18)

Demonstration and validation challenges

- MS 41 Implement the proposed solutions in an experimental prototype for evaluating the performance of the solutions as a whole (Month 24)
- MS 41 Verify operation within lab network (Month 24)
- MS 43 Test the stable prototype in a live field environment. Key factors to look at besides functional testing are ease and cost of deployment and maintenance (Month 32)
- MS 65 Provide an open specification and driving information exchange with other European operators and EU projects and contribute to Standardization bodies (Month 36)

2.2 Project objectives for the reporting period

Apart from the on-going technical work of the project, no specific technical objectives were planned to be achieved during the second reporting period of the project. At present, the SODALES project has two active technical WPs (WP1: Network and Hardware architecture and WP5: Dissemination, Standardisation & Techno-Economics), further to the management WP (WP6).

The following milestone was scheduled during this reporting period:

- MS12: Complete definition of the SODALES architecture and services

This milestone has been achieved and the complete architecture and service catalogue of SODALES has been developed and will be included in D1.1 SODALES architecture, service catalogue and network specifications, which is at present being finalised. This deliverable was due at the end of Month 6 (April 2013) and is now under the final review and is expected to be delivered by the first half of June 2013.

WP5 Dissemination, Standardisation & Techno-Economics started in February 2013.

From the management perspective (WP6), there were no scheduled milestones.

3 Work progress and achievements during the period

3.1 Project structure

The SODALES work plan is structured around six major activities in order to match the project objectives:

- Analysis and technical definition of the SODALES network architecture
- Study and specification of the subsystems and the physical and switching layer
- Study and design of the SODALES control and network management plane
- Prototyping and Validation of the SODALES interconnection service in the lab and in a real environment
- Dissemination, standardization and techno-economics activities
- Coordination and project management

All work packages are organized to create a proof-of-concept platform at the end of the project, and this will be used to prototype the key challenges of the project. Table 1 lists the work packages (WP1 to WP6).

Table 1: SODALES work packages

WP No.	WP content
WP1	Network and hardware architecture
WP2	Subsystems and physical layer
WP3	Control plane and network management
WP4	Prototypes and Validation
WP5	Dissemination, Standardisation & Techno-Economics
WP6	Project management

During this reporting period, as scheduled, the following Work Packages were active:

- WP1: Network and hardware architecture
- WP5: Dissemination, Standardization & Techno-Economics
- WP6: Project management

	MM	11/12	12/12	01/13	02/13	03/13	04/13	05/13	06/13	07/13	08/13	09/13	10/13
	#	1	2	3	4	5	6	7	8	9	10	11	12
WP1: Network and Hardware Architecture	62			M1.1			M1.2				M1.3		
T1.1 General SODALES architecture	23						D1.1						
T1.2 ARN modeling and roadblocks	15									D1.2			
T1.3 OAM and control plane building blocks	11									D1.3			
T1.4 Simulations and validations	13												
WP2: Subsystems and Physical Layer Definition	62												M2.1
T2.1 ARN switching fabric design and interfacing	15												D2.1
T2.2 WDM/radio CPE demarcation unit	15												
T2.3 Headend L2 interface	23												
T2.4 L2 interface design for LTE and legacy services	9												
WP3: Control Plane and Network Management	47												M3.1
T3.1 Control Plane service requirements	7									D3.1			
T3.2 OAM parameters	9												D3.2
T3.3 Control Plane Design	9												D3.3
T3.4 Control Plane implementation and validation	22												
WP4: Prototypes and Validation	60												
T4.1 Prototype concept	16												
T4.2 Prototype implementation and lab validation	16												
T4.3 Lab and Field service validation	28												
WP5: Dissemination, Standardisation & TechnoEconomics	32												M5.1
T5.1 Dissemination	8												D5.1
T5.2 Standardization	11												
T5.2 Technoeconomics	13												D5.2
WP6: project management	18	M6.1											
T6.1: Establishing the project management procedures	0,5	D6.1											
T6.2: Performing the project management duties	17,5			D6.2			D6.3			D6.4			D6.5
	281												

SODALES progress in M6

Note that

- WP3 Control Plane and Network Management is starting in M7 and
- WP2 Subsystems and Physical Layer Definition in M9,

which means that the consortium has already started to plan the start of these two WPs.

3.2 Effective manpower allocated during the reporting period

Each institution has allocated the following manpower to the development of the SODALES project:

- Fundació i2CAT, Internet i Innovació a Catalunya 6.6PM
- Portugal Telecom Inovação 3.4PM
- Ethernity Networks 4PM
- University of Essex 3.6PM
- Fraunhofer Gesellschaft e.V. 1PM

This effort has been allocated in the different active WP as described in the following sections.

3.3 WP1: Network and hardware architecture

The WP1 Network and hardware architecture defines the architecture, business model and service offering of the SODALES network.

This work package has the following objectives:

- To determine the optimum network architecture and detect transmission limitations and services
- To efficiently model the Active Remote Node (ARN)
- To define the OAM and control plane requirements for an open access environment
- To define the synchronization mechanisms for legacy radio and TDM services

To achieve the objectives above, the WP1 is segmented into the following four tasks:

Task T1.1: General SODALES architecture

- Task leader: UESSEX
- Contributing partners: PTI, i2CAT, ETHERNITY and HHI
- Success criteria: A report (D1.1) that describes the SODALES devices, architecture and service catalogue

Task T1.2: ARN modeling and roadblocks

- Task leader: UESSEX
- Contributing partners: I2CAT, ETHERNITY and HHI
- Success criteria: A report that models the ARN, its technical performance (average & peak bandwidths, latencies/jitter, packet-drop ratios, modular radio interfacing, energy-efficiency & power dissipations), limitations and possible implementations.

Task T1.3: OAM and control plane building blocks

- Task leader: ETHERNITY
- Contributing partners: PTI and I2CAT
- Success criteria: A report that identifies OAM and control plane parameters relevant for an open access service operator

Task T1.4: Simulate architectures

- Task leader: I2CAT
- Contributing partners: UESSEX and HHI

- Success criteria: A report that identifies all the limitations of the SODALES architecture and the physical layer.

The global objective of WP1 is to define all the architectural and logical aspects of SODALES to feed into the WP that will implement the prototypes to demonstrate the SODALES services.

3.3.1 Overall WP1 achievements

At this stage, the active tasks are T1.1 and T1.2 and T1.3. The task T1.1 was finished in Month 6 and the deliverable D1.1 is now being completed.

SODALES now has a complete diagram with the architectures and functional blocks (MS11) and the service catalogue (MS12). Both milestones are strategic because they define the roadmap that will be followed during the entire project and matches technically and from the business perspective what SODALES aims to develop.

For the SODALES consortium, MS12 is very important because defines how the SODALES users (service providers and final customers) will interact with the infrastructure.

T1.2 and T1.3 are now in the middle of their development and the initial developments of the building blocks of the ARN, together with the OAM specifications have been presented for internal discussion.

3.3.2 Individual achievements related to WP1

3.3.2.1 I2CAT

i2CAT tasks have been focussed on matching the optical layer architectures with the service catalogue. This comprises the definition of the required devices and interfaces in order to support the catalogue.

Open Access is one of the targets of the project and therefore full specifications of the end points are mandatory in order to have a clear roadmap to develop SODALES successfully and consistently.

I2CAT duties have been concentrated on matching the design of the network with the operation and business requirements of service providers to prevent future misalignments between the platform design and its operation in an Open Access environment.

I2CAT has also reviewed the OAM parameters that need to be taken into consideration for the development of WP3 and that are being defined in Task T1.3: OAM and control plane building blocks.

3.3.2.2 PTI

PTI involvement in WP1 has been focused on the study of the practical implementation of the SODALES architecture, especially of the optical elements such as ROADMs and AWGs.

PTI has also analysed the coexistence of the legacy aggregation with packet-based networks and TDM networks such as SDH.

3.3.2.3 Ethernity Networks

Ethernity contributed to the definition and creation of D1.1 on architecture, service catalogue and network specifications and specifically on C-RAN architecture, OAM definition and specification of the ARN CPE.

Ethernity also invested in definition of the CPE related to WP1 on Pin out definition and synthesis of FPGA code to fit to the new pin out and CPE hardware architecture, furthermore Ethernity spend additional resources on WP3 on Specification related to interaction between ENET API and upper layer software application stuck from Aricent

3.3.2.4 University of Essex

Task T1.1: General SODALES architecture

The first milestone MS11 (delivery date: M3) was successfully submitted to the Commission in March 2013 (M4).

As part of its experimental plan towards high bandwidth wireless final-drop technologies (between ONU and ARN), UEssex has been sourcing components, i.e. mixers and amplifiers and looking into experimental set up construction possibilities for the 60 GHz interface. In addition, UEssex has been investigating 60GHz antenna design, array behaviour and beam-forming techniques. For the 24 GHz interface, UEssex has purchased a commercial Tx-Rx system and is in the process of setting up an experiment to investigate NLOS performance in multi-path rich environments.

UEssex has been editing and putting together the contributions from the other project partners for the first deliverable D1.1, and is expecting to finish this around the end of May'13/beginning of June'13.

Task T1.2: ARN Modeling and roadblocks (Leader: UEssex)

Task T1.3: OAM and control plane building blocks (Leader: ETHERNITY)

These two tasks are both now current, and each have deliverables (D1.2 & D1.3) due at Month 9. Once the deliverable D1.1 is complete, the necessary work and write-up will need to be intensively pursued.

3.3.2.5 Heinrich Hertz Institute

HHI contributed specifically to section 3.1 on convergence with inputs on backhaul requirements for LTE-Advanced including direct backhaul and CPRI. Moreover, HHI conducted a literature study concerning the service offered for legacy mobile radio (GSM, 3G), where circuit switched technology is used while HSPA and LTE use packet-switched backhaul.

In preparation of WP2 (Subsystems and Physical Layer Definition), HHI conducted some fundamental research on energy-efficient waveforms applicable to next generation optical networks (PON). The new approach is based on an extension of SC-FDMA known from the cellular LTE standard. We found a method to generate SC-FDMA waveforms having an absolutely constant envelope while maintaining the high flexibility of multiuser scheduling in the frequency domain. The system concept is the same as OFDMA-PON but waveforms have zero peak-to-average power ratio (PAPR) now, which is of advantage for optical transmission

compared to radio. Therefore, we embedded GMSK and also π/2-BPSK modulation seamlessly into the SC-FDMA processing and extend the already existing transmission modes with new modes useful at low SNR. Negligible envelope fluctuation enables us to increase the modulation index and to work with higher splitting ratios in the optical access network.

In SODALES, our new method is applicable for elastic traffic management in the backhaul from higher aggregation nodes to the ARN, where WDM in combination with a flexible multiple access scheme is proposed enabling dynamic wavelength and bandwidth management among multiple ARNs. A paper has been written and submitted to a special session on wireless and optical networks.

3.4 WP2: Subsystems and Physical Layer Definition

This work package focuses on:

- The definition of physical and logical interfaces of the proposed scenarios and specification of their functionalities. In order to avoid the development of entirely new interfaces it is foreseen to reuse established and standardised interfaces (e.g. Ethernet, WDM, etc.)
- The definition of the WDM and radio interfaces
- The definition of the Layer 2 interface at the Headend to interconnect with ISPs
- The definition of the Layer 2 interface at the ARN (for LTE and legacy services)
- Provide the interfaces both, hardware and software, for the SODALES platform

WP2 is divided into four tasks, listed below:

Task T2.1: ARN switching fabric design and interfacing

Define and specify the physical layer interfaces at the ARN for WDM, especially the transceiver form factor (e.g. SFP+), the optical parameters (wavelength, power, etc.). Define and specify the Layer 2 functions required for MEF support and OAM parameters.

Task leader: UESSEX

Contributing partners: ETHERNITY and HHI

Task T2.2: WDM/radio CPE demarcation unit

Design and specify the interfaces for the WDM CPE demarcation unit and for the radio counterpart. Reuse of components will be one of the requirements in order to archive cost-effectiveness.

This demarcation unit will be totally compatible with the ARN interfaces and will offer a L2 MEF port and OAM functions to the end subscriber.

The implementation is based mainly on off-the-shelf standardized components and modules; any new design will be avoided. Implement improvements and/ or redesigns after initial test, if necessary.

The radio interface design will also be used for the ARN.

Task leader: ETHERNITY

Contributing partners: UESSEX and HHI

Task T2.3: Headend L2 interface

Define and specify the interfaces to deliver traffic to Service Providers. This interface will be at the Head End and will offer MEF specifications to the operators side and adapt the SODALES specifications downstream.

Task leader: ETHERNITY

Contributing partners: UESSEX and HHI

Task T2.4: L2 Interface Design for LTE and Legacy Services

Define and specify the interfaces to deliver traffic to L3 RBS at the ARN and also to offer an Ethernet interconnection point for legacy services (CATV, DSL technologies). This interface will offer MEF specifications to the operators' side and adapt the SODALES specifications to the SODALES network. Synchronization is required to support legacy services.

Task leader: HHI

Contributing partners: ETHERNITY and UESSEX

3.4.1 WP2 preparation

WP2 is starting on M9. HHI is the WP coordinator and during M8 (June 2013) will set up the procedures to start with the development of the different tasks, milestones and deliverables within the WP.

T2.1 is the only task starting on M9.

3.5 WP3: Control Plane and Network Management

The objectives of this work package are:

- To define the SODALES control plane service requirements from the operator and equipment perspectives.
- To design the OAM logical interfaces to be implemented and transferred to the control and management plane for Service Operator access

- To design the complete control plane that fulfils the SODALES requirements and is able to control the SODALES equipment
- To implement and validate the proposed control and management plane

WP3 is divided in four tasks, matching the objectives presented above:

Task 3.1: Control Plane Service Requirements

This task will define the requirements from the NP perspective to efficiently design the SODALES control and management plane. This includes the full specification of the CO, ARN and CPE objects, with the interfaces and modules to interact with the hardware.

Task leader: PTI

Contributing partners: i2CAT

Task 3.2: OAM Parameters Design for E2E service delivery

This task will implement OAM parameter transmission and provision configuration from the CO, ARN and CPE to make it compatible with SODALES control plane, preserving the OAM parameters that will be transferred to the SPs for monitoring and control purposes. This task will include Northbound interface complete parameterization in order to obtain the data form the objects and transfer it to the higher level OSS/BSS systems.

Task leader: ETHERNITY

Contributing partners: I2CAT

Task 3.3: Control Plane Design

This task will specify the interface between IEEE 802.11 and UWB-PON and the interface between IEEE 802.16 and UWB-PON. The main consideration here is the frame conversion and network segmentation. The SODALES control plane needs to virtually isolate CPEs assigned to different ISPs so the can manage their customers independently form the other operators. This allows each operator to manage a slice of the network and to control de OAM parameters that they want, enhancing the control of the virtual infrastructure by the ISP. Fed by: WP3 (Task T3.1 and T3.2)

Task leader: I2CAT

Task 3.4: Control Plane Implementation and Validation

This task will take the results from the previous tasks of this WP to implement and validate the Management and Control Plane. This development will be first validated on i2CAT EXPERIMENTA facility to be later validated on SODALES lab and real network validators. SCRUM and LEAN management methodologies will be applied in order to optimize development costs and simplify the project management and reporting.

Task leader: I2CAT

Contributing partners: PTI

3.5.1 WP3 preparation

WP3 starts on M7, after the fulfilment of MS12. I2CAT is the WP leader and has already started to organize T3.1 Control Plane service requirements implementation. PTI is the task leader.

During the next reporting period WP3 will start its planned work on the control plane and network management.

Specifically, T3.1 the work will initiate by defining the control and management plane requirements and equipment interfaces aligned with the architecture provided in WP1. The outcomes of this task will be reflected in the deliverable D3.1, which will be also prepared during this period and delivered in M9.

T3.1 starts on M7 and ends on M9 and deliveries D3.1, which is also due on M9.

3.6 WP5: Dissemination, Standardization & Techno-Economics

WP5 has the following objectives:

- Disseminate the research developed in the SODALES framework
- Contribute to Standardization bodies
- Analyse the techno-economics of SODALES. Key factors to look at, besides functional testing, is ease and cost of deployment and maintenance.

WP5 is divided in three tasks, matching the objectives presented above:

Task T5.1: Dissemination

Dissemination of the work is key to give visibility to the SODALES concept. UESSEX is the leader of this task. Relevant conferences and journals are targeted to have the maximum impact in this field.

Mainly the academic partners, with small contributions from PTI, develop this task.

Task leader: UESSEX

Contributing partners: PTI, i2CAT and HHI

Task T5.2: Standardization

Due to the industrial vision of the consortium, Standardization is one of the key objectives of the SODALES initiative. This task, coordinated by ETHERNITY, contributes to Standardization bodies with the developments carried on during the research stages.

Standardization bodies and organizations like the Metro Ethernet Forum are targeted in this task.

Task leader: ETHERNITY

Contributing partners: PTI and I2CAT

Task T5.3: Techno-economics

This task analyses the SODALES concept from the economic point of view. Mainly industry driven, it analyses the SODALES blocks to find a viable business model for the commercial exploitation of the SODALES network.

Task leader: PTI

Contributing partners: ETHERNITY, I2CAT, USSEX, HHI

3.6.1 Overall WP5 achievements

At present, T5.1 Dissemination is the only active one. T5.2 Standardization and T5.3 Techno-economics start in M7, once the SODALES architecture is perfectly defined. This will means that effort on this WP will increase for the next reporting period.

Three SODALES papers have already been accepted:

- C. Bock, S. Figuerola, M.C. Parker, S.D. Walker, V. Marques, V. Jungnickel, K. Habel, D. Levi; "Convergent Radio and Fibre Architectures for High-Speed Access"; IEEE ICTON International Conference on Transparent Optical Networks 2013, Cartagena, Spain, 24th – 27th June
- C. Bock, S. Figuerola, M.C. Parker, S.D. Walker, V. Marques, V. Jungnickel, K. Habel, D. Levi; "Convergent optical-wireless network for ultra-high speed fixed and radio access"; Future Network and MobileSummit 2013, Lisbon, Portugal, 03rd – 05th July
- V. Jungnickel, K. Manolakis, S. Jaeckel, M. Lossow, P. Farkas, M. Schlosser, V. Braun, Backhaul Requirements for Inter-site Cooperation in Heterogenous LTE-Advanced Networks, IEEE Workshop on Optical-Wireless Integrated Technology for Systems and Networks, held in conjunction with International Conference on Communications (ICC), Budapest, Hungary, June 2013, (invited).

Further to this, SODALES has submitted for consideration a Networking session with the title "Converged Access Networking based on Active Remote Nodes" has been proposed by SODALES for the ICT2013 event (Vilnius, November 2013).

Finally, Prof. Stuart Walker (UEssex) has presented an invited, keynote paper at the IEEE SIU 2013 Conference, 24-26 April 2013, in Kyrenia, Northern Cyprus. The title of the paper was 'Ultra-high bandwidths for wireless and wired final-drop converged access networks', with authors S.D. Walker, T. Quinlan, M.C. Parker.

3.6.2 Individual achievements related to WP5

3.6.2.1 I2CAT

I2CAT has been in charge of preparing the two accepted papers and coordinating the writing and review with the rest of the partners of the consortium.

3.6.2.2 University of Essex

UESSEX has been in charge of performing the final proof reading of the papers, additionally to the individual dissemination activities at the IEEE SIU 2013 Conference that took place in Kyrenia, Northern Cyprus, from 24th to 26th April 2013.

3.6.2.3 Heinrich Hertz Institute

HHI has invited Deutsche Telekom AG for a contribution to the proposed networking session with the title "Converged Access Networking based on Active Remote Nodes" for the ICT2013 event (Vilnius, November 2013), see above. This was triggered by an entirely new network concept presented by DTAG partly during OFC and more complete during the ITG Fachtagung in Leipzig in the talk by A. Clauberg "Terastream: New Paradigm of scalable networking". In this concept, the ARN plays an important role in the access domain. For SODALES, this development is important because it has implications on the uplink to the core network.

3.7 WP6: Project management

WP6 Project management comprises 2 tasks:

Task T6.1: Establishing the project management procedures

- 2CAT is the leading partner

Task T6.2: Performing the project management duties

- I2CAT is the leading partner

WP6 provides the internal project management and the overall co-ordination of activities, financial- and technical- planning and control. It ensures that the project objectives are met and represents the contact point of the project to the Commission, the FP7 community and the external world. It provides guidance for the process of registering IPR, especially in cases where joint ownership is involved. It also addresses any issues concerning access rights, including cases where partners join or leave the project during its duration. It is assisted in its tasks by other bodies established as part of the management structure.

3.7.1 Overall WP6 achievements

At this stage, all the initial admin requirements have been fulfilled and the collaboration and file sharing repositories have been set up and fully operational.

I2CAT is maintaining the infrastructure to support these systems.

A face-to-face meeting was organized on 6th March 2013 in Barcelona, in order to finish de SODALES architecture and subsystems. This was a one-day meeting hosted at i2CAT.

3.7.2 Individual achievements related to WP6

As i2CAT is the sole participant in WP6, all activities below are referred to i2CAT:

- Coordination of all the paperwork
- Coordination of the face-to-face meeting, held in Barcelona 6th March 2013
- Maintenance of the SODALES webpage (http://www.fp7-sodales.eu)
- Maintenance of the SODALES mailing list (sodales@i2cat.net)
- Maintenance of the SODALES weekly meetings platform, using GoToMeeting
- Organization and preparation of the meeting minutes of the weekly calls, which are organized to monitor the project evolution

4 Deliverables and milestones

During this reporting period, the following Milestones and deliverables have been achieved:

- MS12 Complete definition of the SODALES architecture and services (M6): an internal document with the different architectures and the service catalogue is available. This has been the starting point for WP3 Control Plane and Network Management and also for T5.2 Standardization and T5.3 Techno-economics, both from WP5 Dissemination, Standardization and Techno-economics. Both tasks are now active.
- D1.1 SODALES architecture, service catalogue and network specifications: this deliverable is about to be delivered. Expected Delivery Data is first half of June.
- D6.3 Quarterly Report 02: this document.

5 Dissemination activities

SODALES submitted a full invited (first author is Dr. Carlos Bock) paper “Convergent Radio and Fibre Architectures for High-Speed Access”, to the ICTON 2013 conference, which will take place in Cartagena, Spain on June 23-27, 2013. Submission deadline was 20th April 2013. It has been accepted and also Dr. Bock will be chairing a session on high-speed optical access networks.

A poster paper entitled “Convergent optical-wireless network for ultra-high speed fixed and radio access” was submitted in Mar’13 and accepted for presentation at the Future Network and Mobile Summit (FuNeMs) taking place in Lisbon, July 2013. This poster has been accepted.

A Networking session with the title “Converged Access Networking based on Active Remote Nodes” has been proposed by SODALES for the ICT2013 event (Vilnius, November 2013). This proposal was submitted on 7th May 2013 and we are waiting for the final decision of the evaluation board.

Prof. Stuart Walker (UEssex) has presented an invited, keynote paper at the IEEE SIU 2013 Conference, 24-26 April 2013, in Kyrenia, Northern Cyprus. The title of the paper was ‘Ultra-high bandwidths for wireless and wired final-drop converged access networks’, with authors S.D. Walker, T. Quinlan, M.C. Parker.

Dr. Volker Jungnickel submitted a paper on Localized SC-FDMA with constant envelope to IEEE PIMRC, which will be hold in London in September 2013.