



Networking for Communications Challenged Communities:
Architecture, Test Beds and Innovative Alliances
Contract no: 223994

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N4C Workshop “African and other 3rd Countries”



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ABSTRACT

Starting in May 2008, N4C is a 36 month research project funded by the Seventh Framework Programme (www.cordis.lu/fp7). This is a cooperation project between end-users, in Swedish Lapland and Kočevje region in Slovenian mountain, and technological partners (RTD performers and companies). Under the scope of the project we will design and experiment with an architecture infrastructure and applications in field trials and build two test beds.

This document is a brief description of the workshop: “African and other 3rd Countries”, and its outputs.

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Dissemination level	
	Level
PU = Public	X
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).	

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1. INTRODUCTION

The event that took place in Coimbra city on the 9th of December was organized by Instituto Pedro Nunes (IPN) in cooperation with the University of Coimbra. This initiative was part of a 3 day event that also included a system's integration workshop and internal meetings of the FP7 project N4C (for more details, please refer to the official agenda in Annex B). The staff involved comprised three IPN employers and seven students that are currently pursuing their Masters degree in the Coimbra University. António Cunha, André Pardal and Hugo Freitas were responsible for the event work plan and for the coordination of the students' activities. The students involved in the event are senior students of the Informatics Engineering course and their names are: João Correia, Francisco Ventura, Filipe Amaral, João Pedro Almeida, José Brandão, Teresa Frazão and José Nuno Monsanto. They participated in the dissemination activities (posters, flyers, blogs information), the workshop agenda content, dinner preparations, event recording (photos, videos), among others. These young engineers have been involved on the workshop because it is part of the IPN's strategic cooperation policy to collaborate with teaching institutions and also because we feel that these type of experiences and working environments can be quite relevant for the students' learning process and curriculum.

The N4C partners who attended the event were the following: Samo Grasic, Maria Udén, John Näslund and from LTU; Susanne Spik and Karin Kuoljok from TANNAK; Arne Wilhelm Theodorsen and Sigurd Sjursen from NORUT; Krzysztof Romanowski and Piotr Remlein from ITTI; Barbro Fransson from PLAB; Shane Brodie from Intel; Elwyn Davies from FOLLY. Other participants that could not be present contributed to the discussion through videoconference. For that purpose it was used the videoconference software Marratech. The event was broadcasted in N4C channel in Marratech to allow for the other partners to be involved in the discussion sessions that took place in the conference room at IPN. Through the remote call platform, our colleagues: Avria Doria from LTU, Marija Z. Božnar and Boštjan Grašič from MEIS, were able to participate. Considering all of these aspects, we were able to gather, during the 3 days of the event, an average assistance of forty people.

The workshop objective was to emphasize the benefits of the application of DTN technology in African and other 3rd countries. The agenda included a sequence of five presentations in the morning and a brokerage event in the afternoon of the workshop day, which were totally filmed for possible reviews. The presentations were organized according to a specific train of thought in order to address all the implications of the problem to be tackled: social perspective, infrastructures available and their limitations, how to implement DTN in Africa, business model of the technology, financial prerequisites. For more information please visit the wiki page: http://wiki.n4c.eu/wiki/index.php/Current_events .

In the first presentation was exposed the poor quality and failures of the communications network in Africa. The speaker, Mr. Paulo Costa, reported, according to his experience, a little about the native culture and its needs. This is a very important issue for a potential future DTN deployment in those regions. The presentation served the purpose of

assessment of the potential of DTN technology as means to suppress the gaps of the communications network in Africa and its co-existence with the native culture.

In the following presentation was intended to describe the ICT solutions in African communities from a Cisco's point of view. The idea was to get a good picture about the real state of the ICT solutions available to apply in remote communities (challenged communities).

The following presentation, done by Mr. Americo Redinha former president of Guiné Telecom, was dedicated to give an insight about the existing network infrastructures and how the community's social problems influence the communications network development. The ideas presented, have shown the gaps that may be complemented by the DTN Technology in Africa.

The fourth presentation that was scheduled to happen with video conference support didn't take place due to technical reasons. The idea was to clarify concepts about enterprise's view about how to deploy ICT solutions in Africa. However, the speaker, Mr. Nicholas Chevrollier, did explain the methodology to deploy with success ICT projects. The intension of the presentation was to identify critical aspects of a possible project in Africa.

The last speaker, Ms. Barbro Fransson, presented business models for DTN in an African context and financial prerequisites. The expected output was to have tangible business plans and models for the DTN technology that is being developed under the scope of this project.

In the afternoon, Mr. Nuno Silva, an IP manager, coordinated the activities of the workshop participants. A brokerage event took place and using the elevator pitch methodology, the participants were asked to develop short value propositions for DTN implementation in Africa. This exercise served the purpose of developing a better understanding about the DTN implementation models for Africa, focused on specific users' needs and investor value.

2. PRESENTATIONS

The event's official agenda:

08:45-09:00	Coffee and Tea, Participants welcoming
09:00-09:35	Communication Problems in Africa, a NGO perspective <i>Mr. Paulo Costa, Leigos para o Desenvolvimento</i>
09:35-10:10	Overview of ICT solutions in African communities <i>Mr. Daniel Paes, CISCO</i>
10:10-10:45	Communication problems in Africa, an operator perspective <i>Mr. Américo Redinha, ex-President of Guiné Telecom and ex-Director of Unitel ANGOLA</i>
10:45-11:00	Coffee break

- 11:00-11:35 **How to deploy ICT (Networking) Solutions in Africa?**
Mr. Nicholas Chevrollier, TNO Netherlands
- 11:35-12:10 **Business Model for DNT (in an African context)**
Ms. Barbro Fransson, Power Lake AB, Sweden
- 12:10-12:45 **Debate Sessions**
Moderator: Professor Jorge Dias, Coimbra University

2.1 "LIVE AND WORK AT SOUTH"

Mr. Paulo Costa talked about his personal experience in dealing with the African native communities and their needs. The speaker was a voluntary of the NGO "Leigos para o Desenvolvimento", which is an organization focused in Human valorization in Africa and East Timor. The Mr. Paulo Costa reported his three years of experience and emphasized the communication problems in a province of Angola named Uije. This province has 60000km² of area and is situated at 350km of Luanda (Angola's capital). He reported how was hard the communications, the GSM was very intermittent and mail postal with big latency (several months and in some cases not existent).

The cultural perspective was identified as being a very important factor to take into account when implementing projects in Angola. Aspects like the big rate of analphabetism and the war, that's been lasting for forty years, were mentioned. Furthermore, in Africa people have a very slow life rhythm. People don't run, they are rather keen on passing themselves when doing things. Another key element for these communities is the concept of family, which is very different when compared to the Europeans which have built a very individualist society.

Another point that has been stressed was the evidence of the necessity of communication for important areas like business activities, security, healthcare, policy, etc. It is required reliability and efficiency networks for communication with a low cost of acquisition, in opposition to the actual network.

Summarizing, the communication is a necessity for this people, but it should be taken into account the natives' cultural background and beliefs. The technology can be deployed in more traditional societies too and the most competitive factors are the cost, durability, reliability and the communication infrastructure must be prepared to withstand harsh environment conditions and handling.



2.2 "OVERVIEW OF ICT SOLUTIONS IN AFRICAN COMMUNITIES, CISCO'S PERSPECTIVE"

In this presentation, Mr. Daniel Paes, described the ICT solutions in African communities and its importance to the people development as a community an as individuals.

For nearly 40 years ICT in Africa has only gradually evolved: PSTN, PBX, SDH, copper, TDM have been the predominant technologies. However the ICT in Africa has received new impulses due to the arrival of the Internet and IP Technology, Globalization of Economies, new national legislation and privatization and Mobile, Wireless Technology. Today many African countries have an ICT charter, a booming mobile operator environment, and increasingly a wire-line operator switching to IP NGN networks.

The speaker focused on the trends and drivers and pointed out the importance of having good communication infrastructures in all levels of the community. Around the globe, communities and countries are using technology to become connected, improve services to citizens, and foster a pro-business climate. Because of it, businesses and individuals are benefiting from the age of the Internet—an era in which information is readily available, systems and services are online and people have the potential to be more connected and productive than ever before.

The trends and drivers are: Fiscal pressures and difficulties in balancing budgets, higher citizen expectations, IT consolidation, intra- and inter-agency collaboration. In an African context a web of IT services can ultimately shape the challenged communities and increase their competitiveness. Network communications can be built around the citizens to promote cooperation and collaboration among individuals and institutions thus giving them access to: Education, culture, transportation, public safety, Healthcare, government administrators and policies which ultimately will provide for empowerment and a better future.



2.3 "A HARD WAY TOWARDS DEVELOPMENT"

In this presentation, Mr. Américo Redinha talked about his experience, as former President of Guiné Telecom, in dealing with barriers to the development. Issues like: low human development, high cost of energy, poor transfers between African countries, socio-political instability in some countries, low inter-provider, corruption, cooperation and collaboration among citizens, service providers and government institutions. The speaker presented the human development index of the ten most developed countries and ten least developed countries of the world and it became quite clear that ten of the least developed countries are African. To exemplify the difficulties, the speaker presented some practical examples:

1. The cost of energy (consumption) of a standard mobile operator which in most cases is obtained solely by using power generated on site with diesel generators. The cost of providing for 2x17KVA and 15000btu for A/C unit is 25000 US dollars per year for a diesel generator. But in a few cases there are solar generators in substitution of diesel generators.
2. The price for SAT-3 bandwidth in the African countries it serves is quite high, over 50 times greater than bandwidth price in the US. The reason for this fact should be attributed to the operators which have monopoly control of access.
3. There is a poor performance on transfers between African countries, with 900 – 2000ms of latency for inter-country traffic. The connectivity is heavy dependent of Inter-Continental Satellite. There isn't sufficient internal optical fibre and cross-border connectivity.

4. The corruption is a big problem in Africa and it's presented in all social layers. This corruption represents a big cost for African countries in order of 150 billions dollars per year.

Despite the problems, African officials are working hard to change things. Nowadays in Africa is being deploying the last part of a submarine fiber optics infrastructure which will close a submarine optical fibre ring around Africa. This communication infrastructure will improve the capacity of optical fibre connectivity within Africa and the rest of the world. It will enable new services and products not possible before due to bandwidth restrictions. It will reduce unit costs (capital and operational) for global connectivity, leading to increased profits. It will reduce out payments to foreign telecommunications (satellite) facility providers. It will provide direct routes through own infrastructure obviate the need for transits through Third Parties - reduced out payments. Then, it contributes towards the socio-economic development of the region and expansion in inter-Africa trade, facilitated by better communication in the region. Furthermore, the speaker presents others current initiatives to develop the network in Africa.

In most places there isn't wired access network or is much damaged, so the solution is to deploy wireless access network, because this solution provides for bandwidth on demand, faster time to market and less CAPEX. According to this context, Africa presents it self as excellent scenery to deploy the DTN technology and thus take further the concept of Asynchronous communications applied to challenged communities.



2.4 "HOW TO DEPLOY ICT (NETWORKING) SOLUTIONS IN AFRICA?"

Although this presentation could not be done due to technical issues the speaker, Mr. Nicholas Chevrollier from TNO –Netherlands, facilitate the access to a document where the main ideas where exposed:

The aim of the presentation was to address the most important aspects about ICT solutions deployment in Africa. Before that, the speaker presented the enterprise TNO, where the speaker currently is employed, presenting the five core areas of TNO, its innovation in development and the LinkNet enterprise.

Subsequently, the focus was given to possible deployment of ICT solution in Africa through of five project challenges. These challenges are: a) identify the sectors that can benefit with ICT solutions (namely: healthcare, education, civil society and governance); b) identify in which one(s), satcom could be an added value; c) Explain the holistic description of these sectors; d) identify if there is a reference model for successful capacity building projects using satcom; e) identify how to validate the reference model.

To explain the local cultural differences the speaker presented a table with the match between African relational culture and Western rational culture, for a sequence of expressions. To understand the context of deployment ICT solutions the speaker presented pictures of their infrastructure conditions.

Relatively to risks assessment about deployment of ICT solutions it was referred three types of risks and for each type presented the main factors to take in consideration. The first risk type is the strategic and main factor is the readiness of human resources, competence, motivation, commitment and availability. The second risk type is the structural and the main factor is the corruption. The last risks type is the technical and the main factor is the lack of power source/energy.

The presented main factors for success were the sustainability and ownership. The speaker subdivided sustainability in three kinds. The first was social sustainability and is about to make sure that the end-users will be able and want to use the outcome product as produced by the project. The second was financial sustainability and is relation to ensure that the financial targets of the project are fulfilled. The third was environmental sustainability and is relative to make sure the generation of the final outcome of the project keeps the environment as pristine as naturally possible. The ownership is an important factor for success and it is reached by:

- Involving end-users from the very beginning;
- Create spaces for participation where stakeholders can express their demands;
- Make relationships equal, valuing all inputs and contributions, not just finance;
- Take time in formulation – to build relationships;
- Every case is different and context specific;
- Focus on social processes not technology;
- Sometimes innovation comes out of failure.

An important point of financial sustainability is the creation of social enterprises/business with social objectives, to be owned by the poor or disadvantaged and investors may not take profits out of the enterprise.

2.5 "BUSINESS MODELS FOR DTN IN AFRICAN CONTEXT"

The aim of this presentation was to explain business models to apply in an African context the DTN technology. Initially, Ms. Barbro Fransson, explained the N4C project relevance for African and other 3rd countries' communities. Then, the N4C project aims to extend Internet access to people, businesses and authorities operating in remote locations, in regions that haven't got access to internet (World Wide Web) through optical fibres, copper cables, radio waves or satellite.

The speaker presented the UN African Information Society Initiative (AISII), which it is an action framework that has been the basis for information and communication activities in Africa since 1996. Ms. Barbro Fransson, introduced the example of other remote communities, she presented the connection problems of rural Sweden, namely low rate of access to broadband (DSL, fibre 3G) and low take up (correlation between average income and educational level and take up rate), thus reinforcing the idea that Sweden shares with Africa the same problem: how to get viable business models for internet access in rural areas with other countries with large rural areas.

The N4C expected outcomes are: DTN network (incl. web caching), two test beds and three applications of services (namely: animal tracking, hikers PDA and meteorological and environmental data capture).

In an ideal world the business plan follow the next sequence: research, market validation, market initiation and full deployment. However, the business modeling in N4C deals with issues such as Economic of scale (natural monopolies) and investors have to deal with "normal" BP issues: what product or service the service provider sells, the market for the service and the price and what profit margins. High fixed costs to build broadband networks causes long run average costs to decline as output expands (i.e. economies of scale).



3. BROKERAGE EVENT: "ELEVATOR PITCH"

The agenda of brokerage event was: in make groups, using the “Elevator Pitch” methodology, the participants were asked to develop short value propositions for DTN implementation in Africa.

The job of each group was divided in six points: a) split into smaller groups; b) select/identify an idea; c) transform it into a value proposition; d) sum it up as an elevator pitch; e) pitch to the group; f) Clarify, Discuss, Research, Reform.

The desired output of this exercise was to have collectively developed a better understanding of DTN implementation models for Africa, focused on specific user’s needs and investor value. This exercise was divided in four tasks to request the following questions: what is it? who needs it? why is it needed? what’s the one key benefit for the user? where is the value for the investor or stakeholder?, in one minute and before the clock start each group identify their audience.

1. Task one had the duration of ten minutes and the aims was to discussing the process, the task and the general interests to generate an idea.
2. Task two, twenty minutes, was focused in discussion and writing. The idea was selected, with the principle “Liking more than reasoning”. Subsequently, the speaker was selected. Finally, the speech was writing and probably rewriting.
3. The third task was the deliverable of elevator pitch in one minute by each group’s speaker.
4. The last task was the open discussion about the Pitches of the different working groups.

The outputs of this exercise were four Pitches (four groups). The audience of first Pitch was the European Commission and consist in create ten pilot projects for ten site in Africa to evaluate and test the potentiality of DTN in Africa. The people who needs DTN was teachers and health workers and the keys benefits were less cost, more robust and add reliability to internet communications.

The audience of second Pitch was the telecommunication companies in Botswana. The idea was complement the traditional connections in this country with DTN and its applications.

The third Pitch had as audience the owners of diamond mines in South Africa. The idea was that providing the internet access possibility for the mine workers to communicate with their families and for general socialization would improve the general status and thus the productivity of the work force.

The last Pitch had as audience the meteorological agencies of Africa. The idea was send meteorological prevision to farmers to provide efficient crops exploration.



4. DISSEMINATION IMPACT

This workshop had a big impact on the community due to the media coverage of the event. In the 11th of December 2008 if anyone inserted in the Google search engine the words “N4C Coimbra” it would have had 276 hits. News about this workshop were published in the main Portuguese newspapers and the initiative has also been reported on national TV (http://wiki.n4c.eu/wiki/index.php/Current_events), where António Cunha explained the main directives of the project N4C and its expected outcome and impact in challenged regions (Swedish Lapland, African communities). Newspapers headlines examples: “Bringing the Internet to ‘end of the world’. The project will have a major impact on African communities in areas of vital importance such as education, health and business. It will no doubt be a key driver of development. Using a technology known as Delay and Disruption Tolerant Networking (DTN), an innovative approach to the architecture of computing system.” By Expresso Newspaper.

ANNEXES

ANNEX A: PHOTO REPORT



Students helping in participants' registration.



Interaction between students and others participants.



Students in workshop reception.



Participants' registration.



Participants' registration.



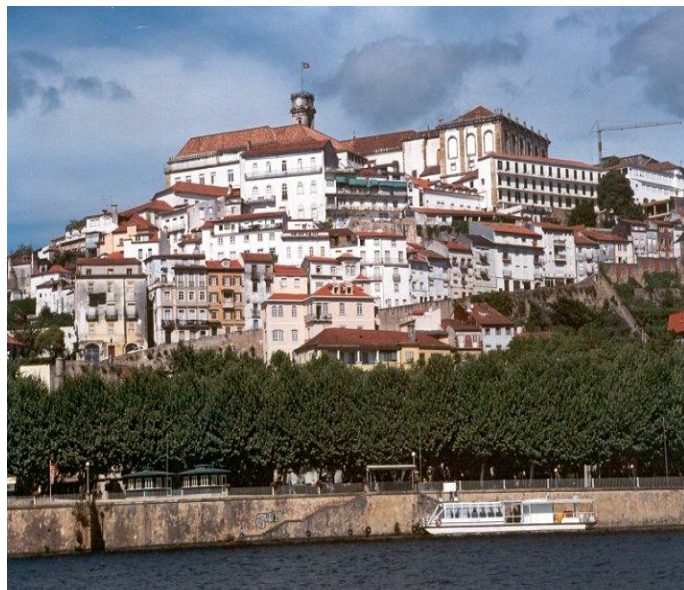
The audience.



The audience.



IPN staff.

ANNEX B

Invitation to: African and other 3rd Countries & Integration workshops

Hosted by the Pedro Nunes
Institute (IPN) & Coimbra
University (FCTUC)

From 9 to 11 of December of 2008, in
Coimbra City, Portugal

ABOUT N4C

N4C (“Networking for Communications Challenged Communities: Architecture, Test Beds and Innovative Alliances”) is a three year research project financed by the European Commission, Seventh Framework Programme, coordinated by the LTU. N4C objectives are to develop and test a broadband network with use of Delay and Disruption Tolerant Networking (DTN) access technology and to evolve a test bed for applications in communication-challenged areas in Swedish Lapland and in Slovenian mountain. In the network and the test bed, tests will be carried out on user-driven applications, animal tracking including reindeer and cattle, hiker PDA applications and on the collection of meteorological data.

PRACTICAL INFORMATION

9th to 11th of December 2008: Pedro Nunes Institute (IPN)

Fees: The workshop is open to invited guests and other interested parties. Participants will be assigned to participation on the “first come, first served” basis.

Travel and Accommodation: Participants are expected to make their own travel and accommodation arrangements.

Language of the workshop: The event will be held in English only.

Booking details and further information about this initiative please contact:

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The Seventh Framework Programme for research and technological development (FP7)
is the European Union’s chief
instrument for funding research over the period 2007-2013.



Agenda N4C

Tuesday 9th of December of 2008, Coimbra city

African and other 3rd countries (Public conference, closed session)

08:45-09:00	Coffee and Tea
	Participants welcoming
09:00-09:35	Communication Problems in Africa, a NGO perspective <i>Mr. Paulo Costa, Leigos para o Desenvolvimento</i>
09:35-10:10	Overview of ICT solutions in African communities <i>Mr. Daniel Paes, CISCO</i>
10:10-10:45	Communication problems in Africa, an operator perspective <i>Mr. Américo Redinha, ex-President of Guiné Telecom and ex-Director of Unitel ANGOLA</i>
10:45-11:00	Coffee brake
11:00-11:35	How to deploy ICT (Networking) Solutions in Africa? <i>Mr. Nicholas Chevrollier, TNO Netherlands</i>
11:35-12:10	Business Model for DNT (in an African context) <i>Ms. Barbro Fransson, Power Lake AB, Sweden</i>
12:10-12:45	Debate Sessions <i>Moderator: Professor Jorge Dias, Coimbra University</i>
13:00-14:30	Lunch Buffé
14:30-16:30	Brokerage Event (N4C partners closed session) In groups using the “elevator pitch” methodology the participants will be asked to develop short value propositions for DTN implementation in Africa. The workshop will include external participants invited by IPN.
16:30-16:45	Coffee Brake
16:45-18:00	Brokerage Event (continue)
18:15-19:30	City Tour
19:30-21:30	Dinner

21:45	Evening get together
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Wednesday 10th of December of 2008, Coimbra city

Integration Workshop (Public conference, N4C Project closed session)

08:45-09:00	Coffee and Tea	
09:00-09:45	Systems' integration Methodologies	<i>Professor Paulo Marques, FCTUC</i>
09:45-10:30	Systems' Integration in Technology based companies	<i>Mr. Ricardo Patrício, Active Space Technologies</i>
10:30-10:45	Coffee brake	
10:45-11:30	Systems' integration and tests in critical systems	<i>Critical Software</i>
	Systems' integration in multinational corporations	<i>Michael T. Cummins, Intel</i>
11:30-12:15		
12:15-12:45	Debate Sessions	<i>Moderator: Professor Marília Curado, Coimbra University</i>
13:00-14:30	Lunch Buffé	
	N4C Technical Internal meeting - Member Presentations I (closed session)	
	Guidelines for partner's presentations:	
	- What am I doing? (Please use diagrams to illustrate your contribution to the project, e.g. use case diagram)	
	- Where do I locate my work in the "big picture"? (location your work on the global diagram of the system)	
	- Which are the modules that interact with my research modules?	
	- What are the main interfaces between my modules and the global system?	
	Sequence of partners presentations:	
14:30-14:55	- FOLLY	
14:55-15:20	- TCD (Marratech)	
15:20-15:45	- Intel	
15:45-16:10	- ALBENTIA	
16:10-16:35	- LTU	

16:35-17:05

Coffee Brake

N4C Technical Internal meeting - Member Presentations II (closed session)

Sequence of partners presentations:

17:05-17:30

- NORUT

17:30-17:55

- MEIS (Marratech)

17:55-18:20

- UPM

18:20-18:45

- ITTI

18:45-19:30

- IPN

19:45-21:30

Dinner

Thursday 11th of December of 2008, Coimbra city

N4C Internal Meeting (Closed session - Project work)

08:45-09:00

Coffee and Tea

N4C Technical Internal meeting: Subsystem Integration Model and Test (Global view).

The group will be divided in two or three teams taking into account the specific area of expertise of each partner.

Expected outputs: N4C global platform use case; Identification of the interfaces between modules; identification of the modules and parts not foreseen in the initial specification (“Do we have all the modules to build the common platform?”) ; Main Tests identification;

Work document: M7.1_N4C-WP7.-0.2

- Team Work
- Presentation to the group

09:00-10:30

10:30-10:50

10:50-11:10

Coffee brake

N4C Technical Internal meeting: Subsystem Integration Model and Test (Winter Tests):

Expected outputs: Winter tests use case; Identification of the modules that will be used in winter tests; tests identification; success criteria identification

Work document: M7.1_N4C-WP7.-0.2

- Team Work
- Presentation to the group

11:10-12:30

12:30-12:45

12:45-14:00

Lunch Buffé

14:00-15:00

N4C Technical Internal meeting – Ad Hoc Meeting

N4C Technical Internal meeting – Presentation of Redmine Platform

- 15:00-15:15 - Exposition of Redmine Characteristics
- 15:15-15:30 - Discussion and decision about platform adoption

15:30-16:00 N4C Technical Internal meeting – Conclusions and next steps

16:30-17:00 Coffee Brake

17:00-18:30 IPN Presentation
Visit to IPN Labs and Business Incubator

Note: all sessions will have Marratech and Skype available except the Nicolas Chevrollier intervention, because we will use the same equipment to establish the video conference between TNO and IPN.