

## EDITORIAL

CONTENT is gaining momentum, and its newsletter is a result of that vitality. The Newsletter is now a means for the CONTENT members to exchange information and publicise their joint research activity, either inside or outside the Network of Excellence. The current issue includes information on past and up-coming meetings, short term scientific missions, School of Audio-visual Topics in Networking (SATIN) activities, joint research work, related projects, industry liaison and patent applications. So, if you want to stay abreast with the latest R&D developments in content distribution networks, do not miss the current issue CONTENT Newsletter, also available at our website, [www.ist-content.eu](http://www.ist-content.eu).

## PAST MEETINGS



**5<sup>th</sup> CONTENT plenary meeting:** The 5<sup>th</sup> CONTENT plenary meeting took place in Krakow, Poland, on 16-17 October 2007, and was hosted by AGH. The meeting was attended by 35 people from CONTENT member institutions and from the Industry Advisory Board. Joint research activities, research integration, spreading of excellence and consortium management were the topics addressed during the intensive meeting agenda. The agenda for the first day was the following:

*9:15-9:30 Welcome to Krakow - AGH (Prof. Papir)*

*9:30-10:30 WP1. Network Coordinator- UC3M (A. Azcorra, C. Guerrero)*

Presentation of results for the review; Revision of objectives, achievements and future plans; Next milestones and deliverables; TA2 leadership discussion

*10:30-11:30 WP3. Research Integration and Training - NKUA (I. Stavarakis)*

Presentation of results for the review; Revision of objectives, achievements and future plans; SATIN Status, PhD Distribute course

*11:30-12:15 WP4. Spreading Excellence and Dissemination - UC (F. Boavida)*

Presentation of results for the review; Revision of objectives, achievements and future plans; Organization of special issue

*12:15-13:00 WP2. Joint Research - UiO (T. Plagemann)*

Presentation of results for the review; Revision of objectives, achievements and future plans; Deliverable D2.2 (final version) status (PM16-October); Identification of other cross-layer activities: benchmarking

*14:00-17:00 Research Integration TA1, TA2 and TA3 - Lead by TA leaders*

Presentation of status and futures plans on each TA; Plan for next deliverable D2.3 Research integration; Evaluation Report (PM19-January)

*17:00 Wrap-up. Network Coordinator- UC3M (A. Azcorra, C. Guerrero)*

The CONTENT plenary meeting included a half-day benchmarking workshop, on 17 October 2007. During the workshop, several technical presentations were given by CONTENT researchers, followed by discussion and identification of future steps.

**INTERMEDIA Open Forum:** The INTERMEDIA NoE organized its first Open Forum on 30th October, 2007, at Telefonica I+D, Madrid, Spain. INTERMEDIA is a research project funded by the European Commission. It is composed of 16 partners, coming from 10 countries in not only Europe but also Asia and North America. As a Network of Excellence (NoE) project, INTERMEDIA is coordinated by Prof. Nadia Magnenat-Thalmann (MIRALab, University of Geneva). The project duration is 4 years and the total budget is 5.6 million euros. In this forum, Prof Arturo Azcorra presented CONTENT and its research vision, objectives and methodology.

**9th Networked Media Concertation Meeting:** CONTENT has participated in the 9th Networked Media Concertation Meeting in 13-14 November 2007 in Brussels. In the plenary, Carmen Guerrero made a presentation of the Networked Media of the Future White Paper: Report of the Networked Media Long Term Research task force. The new FP7 Projects were also introduced. Details of the Agenda and Presentations can be found at <http://cordis.europa.eu/fp7/ict/netmedia/neweve/concertation0207.html>

**Internal Meeting with the EC on Networked Media of the Future on 29 November 2007 in Brussels:** CONTENT participated in the discussion on the challenges of the Networked Media of the Future with the key representative members of the EC INFOS Areas A, B, C, D and E and the coordinators of the three NoEs: VISNET II, INTERMEDIA and CONTENT.

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### Key words:

Content networks  
 Content services  
 Community networks  
 Overlay networks  
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## UPCOMING MEETINGS

**Workshop on the "Future Media Internet":** Organized by VISNET II, INTERMEDIA and CONTENT. 22 January 2008 in Brussels. See details at [http://cordis.europa.eu/fp7/ict/netmedia/neweve/ws20080122/ws20080122\\_en.html](http://cordis.europa.eu/fp7/ict/netmedia/neweve/ws20080122/ws20080122_en.html)

**6<sup>th</sup> CONTENT plenary meeting:** Delft University of Technology will host the CONTENT 6th plenary meeting and PhD workshop on February 20, 2008. The meeting will be preceded by an industry workshop on February 19, and followed by a Benchmarking workshop on February 21.

The industry workshop aspires to establish an interactive discussion between industry and universities (present in CONTENT). The workshop will feature several presentations from industry partners as well as from CONTENT members. More information on these events can be found at <http://www.nas.ewi.tudelft.nl/content.html>



**ETSI STQ technical committee meeting:** CINI-UoN will host the next ETSI STQ technical committee meeting from 7th April to 11th April 2008. STQ (<http://portal.etsi.org/stq/Summary.asp>) is ETSI's technical committee for Speech, Transmission Planning, and Quality of Service. It was formed in 1997 combining interests from the former BTC2, TE4 and TM5 areas of ETSI. It was intended initially as a centre of expertise on speech quality issues but has broadened its scope to handle more general quality issues. STQ has over 100 members several of whom also play leading roles in ITU-T. One of the vice chairmen Jean-Yves Monfort from France Telecom is the chairman of SG12, another vice-chairman, Klemens Adler from Vodafone, is one of the two vice chairmen of SG12 and the chairman of the Working Group STQ MOBILE. The third vice-chairman is Joachim Pomy from Tenovis, he is also the vice-chairman of TISPAN WG5. STQ has three main areas of activity:

- Speech quality and end-to-end speech transmission performance
- General quality of service parameters for fixed and mobile networks
- Distributed speech recognition algorithms (the Aurora project)

## SHORT TERM SCIENTIFIC MISSIONS

**Wireless Mesh Networks Seminar, by Prof. Ian Akyildiz, Universitat Politècnica de Catalunya - CCABA Barcelona, July 18, 2007**

Professor Akyildiz from the Georgia Institute of Technology was at UPC as a visiting professor for one month between June and July. He gave a Ph.D. course and the Wireless Mesh Networks Seminar for local industry and other research entities in Catalunya.



The tutorial presented by Professor Akyildiz included a review of the evolution of the mesh networks and their basic research challenges, covering also multimedia sensor networks. He gave a specific stress on the potential and real industrial applications with many examples.

The attendance included key persons from the Catalan administration and the Universities, and many representatives of the companies located in Barcelona including people from multimedia production companies, TV, local ISP, telecommunications operators and mobile operators.

## Joint Research within Content Strengthened

Recently a number of research visits have taken place to strengthen the ties between different Content partners. The Multimedia Communications Lab, KOM, TU-Darmstadt has been hosting Andreas Mauthe, Lancaster University, for a research visit during which joint research activities within Technical Activity 2 have been discussed. The current collaboration focus on bio-inspired mechanisms for the establishment of trust relationships within peer-to-peer based content distribution networks. Initial work shows that results from the biological domain can be translated and adapted in order to be used within peer-to-peer systems successfully. They are fully compatible to the peer-to-peer spirit while providing an efficient way of maintaining a well

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balanced peer group. The initial research has resulted in a paper submission and is currently being continued. During his visit to KOM Andreas also gave a lecture on Autonomic Computing as part of the joint course between Content members. The lecture has been recorded and is available to the Content partners

The collaborative work in the area of Quality of Experience (QoE) is also currently being strengthened. During a short-term research mission of Piotr Romaniak to Lancaster University the integrated video assessment framework has been developed further. The idea behind this research is to apply QoE mechanisms in the context of content distribution networks in order to discover the source of quality loss and improve the content delivery. Good progress has been made during Piotre's visit and a joint paper is in preparation. This collaboration also involves Salvatore D'Antoni from CINI.

## SATIN

**PhD student: Michal Grega (AGH)**

**Supervisors:** Zdzislaw Papir (AGH), Nicolas Liebau (TUD)

The goal of the research being carried out is to examine the possibility of creation of a content-based search mechanism for peer-to-peer overlays. The search mechanisms in the existing data sharing peer-to-peer overlays are usually limited to simple keyword search.

The growth of the amount of the data stored in the P2P overlays is currently not accompanied by evolution of search methods dedicated for such dissemination systems. It creates a situation, where a huge data repository is potentially accessible, but cannot be used to its full potential due to the lack of effective search methods.

The proposed solution would be to implement the Query by Example (QbE) technique into the P2P overlays. QbE principle is to input to the system an example of a searched item and to receive results similar to the presented example.

The first goal of the presented research is to verify the possibility of introduction of QbE system in the existing P2P file sharing overlay for image search. The research focuses on the research challenges and identified major open problems. The second goal of the research is to create a set of benchmarks. These dedicated benchmarks will allow tuning the system for best performance. They will also allow comparing other search systems for P2P networks. This task is performed in cooperation with Universidad Carlos III de Madrid, Delft University of Technology and National and Kapodistrian University of Athens. Michal Grega is the chair of the Search Benchmarking group within the Benchmarking activity. In the further research two simulation tasks will be performed. One, to analyze the application layer of the proposed solution will be performed with use of a dedicated, database-based software. The second set of simulation will be done with use of the PeerfactSIM.KOM. These simulations are planned to be assisted by the developers of the simulator from Technische Universität Darmstadt.

Apart from taking part in the CONTENT project Michal Grega is involved in several other national and European research activities. Those activities include analysis of biomedical video recordings, watermarking of surveillance video recordings (planned) and indexing of video art.

**PhD student: Marcelo Yannuzzi (UPC)**

**Supervisors:** Xavi Masip-Bruin (UPC), Edmundo Monteiro (UC)

The subject of the research work being carried out is to study the performance and reliability of end-to-end communications on the Internet, with special focus on the design of QoS-based route control strategies for multi-homed networks.

Current work analyses the advantages of changing the existing intelligent route control model for Content Providers, from standalone and selfish to a more advanced cooperative and social route control model.

It is possible to show that this approach significantly improves the existing route control model. Indeed, when several route controllers compete for network resources, the conventional ones are outperformed by those proposed in the framework of this PhD thesis work, and this becomes especially noticeable as the network utilization increases.

Extensive simulations show that in competitive content delivery environments, it is possible to reduce the performance penalties associated with the current intelligent route control strategies by more than 40% on average, and still obtain better end-to-end traffic performance for delay-sensitive applications. It can also be shown that the cooperative extension offers significant potential benefits in terms of inbound traffic control for multi-homed networks. A key advantage is that the extensions proposed in this PhD work can be installed and used today by performing software upgrades to any of the existing route control solutions.

**PhD student: Isaias Martinez-Yelmo (UC3M)**

**Supervisors:** Carmen Guerrero (UC3M) and Andreas Mauthe (ULANC)

Research Topic: Analysis of performance for the interconnection of overlay network technologies

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DHT overlay networks have been extensively studied by the research community in recent years. Their basic properties are to maintain a structure between all the peers in the overlay in order to route queries to the destination. Some of these DHT overlays are Content Addressable Network (CAN), Kademlia, Chord or Pastry. Usually, these networks require  $O(\log N)$  peer hops to reach the desired destination and  $O(\log N)$  routing entries to maintain the desired structure.

Nevertheless, improved alternatives can be found to the canonical flat overlay networks. A well-known approach is a hierarchical architecture. However, these approaches not only can be used for improve traditional overlays, these type of hierarchical overlay networks can be also used to create a mechanism to interconnect different overlays. A general approach will be the example presented in the following figure. Nevertheless, before deal with this general approach is necessary to address first smaller objectives.

Due to the work realised on the last months in relation with this topics, a paper titled *Routing Performance in a Hierarchical DHT-based Overlay Network* will be published on the 16<sup>th</sup> Euromicro International Conference on Parallel, Distributed and network-based Processing on February 13-15, 2008.

In this paper, the routing performance (number of hops) of a hierarchical architecture is studied and a general model to calculate this routing performance is proposed. The abstract of this work can be read here:

The scalability properties of DHT based overlay networks is considered satisfactory. However, in large scale systems this might still cause a problem since they have a logarithmic complexity depending. Further, they only provide a one dimensional structure and do not make use on inherent clustering properties of some applications (e.g. P2PVoIP or locality aware overlays). Thus, structures based on a hierarchical approach can have performance as well as structural advantages. In this paper, a generic hierarchical architecture based on super-peers is presented where a peer ID is composed by a Prefix ID and a Suffix ID. Prefix ID is only routed at the super-peer level and the Suffix ID at the peer level. We specifically analyse the Routing Performance of this approach within the context of two specific overlays, viz. CAN and Kademlia.

For additional information, the full text of the paper can be found at

<http://www.it.uc3m.es/imyelmo/papers/Martinez-Yelmo-RPHierarchicalDHTOverlays.pdf>

The on-going plans for this research activity are to implement a hierarchical Kademlia in TUD PeerFactSim.

**PhD student: Rubén Cuevas Rumín (UC3M)**

**Supervisors:** Carmen Guerrero (UC3M) and Pablo Rodriguez (Telefonica R&D Barcelona)

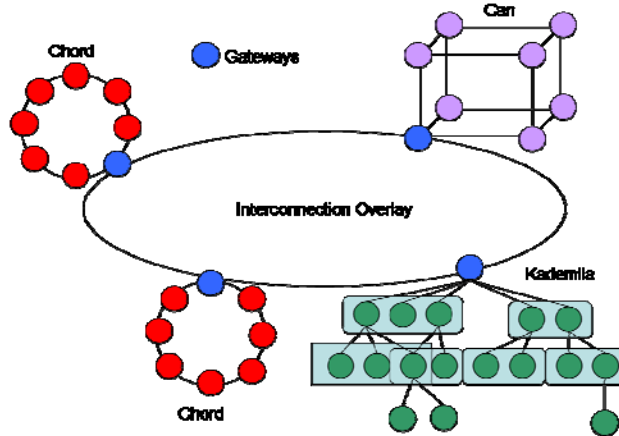


On the first stage of his PhD Rubén Cuevas has been involved in two different research lines. Firstly he studied the usage of Overlay Networks in the field of Mobility Management. As result an architecture called Peer to Peer Home Agent Network (P2PHAN) has been proposed.

The contribution of this research line has been three papers in International Workshops and Conferences:

- R. Cuevas, C. Guerrero, A. Cuevas, M. Calderón, C.J. Bernardos, "P2P Based Architecture for Global Home Agent Dynamic Discovery in IP Mobility", 65th Semi Annual IEEE Vehicular Technology Conference (65th IEEE VTC). Dublin (Ireland). 22-25 April 2007.
- R. Cuevas, A. Cuevas, C Guerrero, M. Uruña, J. Gutierrez, "A Secure Approach for Global Home Agent Dynamic Discovery based on Peer-to-Peer", Fifth International Workshop on Databases, Information Systems and Peer-to-Peer Computing (DBISP2P 2007). Vienna (Austria). 24 September 2007. Proceedings will be published in the series Springer Lecture Notes in Computer Science (LNCS).
- A. Cuevas, R. Cuevas, M. Uruña, C Guerrero, "A Novel Overlay Network for a Secure Global Home Agent Dynamic Discovery", 1st International Workshop on Peer to Peer Networks (PPN'07). Vilamoura, Algarve (Portugal), Nov 25-30, 2007. Proceedings will be published in the series Springer Lecture Notes in Computer Science (LNCS).

The first paper presents the proposed solution whereas the other two focus on the P2PHAN security. The result is a complete secure architecture. Furthermore, the P2PHAN could be migrate in order to implement the Service Discovery functionality in other scenarios.



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On the other hand Rubén Cuevas has been working on the definition of a novel architecture for content distribution based on p2p techniques. This is named BITTELLA and basically it is a fully distributed unstructured p2p system (as Gnutella) where we exploit the common interests among the users in order to reduce the traffic needed in the search procedure and forms Common Interest Groups. For this purpose BITTELLA uses semantic searches and a novel mechanism called Bittella Ranking Algorithm. Furthermore, BITTELLA defines a novel tracker-less Bittorrent protocol on top of an unstructured p2p network. Due to the use of Bittorrent-like techniques (i.e. Tit-for-Tat) the download time is reduced compared with other unstructured p2p systems.

However, BITTELLA is still an on-going work. We have to further analyse its performance by means of simulation. We are planning to use the PeerFactSim simulator from TUD.

The contribution of this research line has been two papers in International Workshops:

- R. Cuevas, C. Guerrero, C. Navarro, I. Martinez-Yelmo, "Bittella: A new protocol for unstructured p2p networks based on the small world per content structure", MedHocNet 2007, Corfu (Greece). June 2007.
- R. Cuevas, C. Guerrero, I. Martinez-Yelmo, A. Cuevas, C. Navarro, "Bittella: A Novel Content Distribution Overlay based on Bittorrent and Social Groups", 1st International Workshop on Peer to Peer Networks (PPN'07). Vilamoura, Algarve (Portugal), Nov 25-30, 2007. Proceedings will be published in the series Springer Lecture Notes in Computer Science (LNCS).

Currently, Rubén Cuevas is working on the definition of scheduling strategies for the sharing of multiple files in p2p systems.

## RESEARCH NOTES

### The First Open-Source Implementation of CAPWAP

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The management of network infrastructures may be a nightmare especially when a huge number of devices is used in providing connectivity to wide communities of people. This problem is also present when considering WiFi hotspots. Managing channel allocation, virtual access points' authentication policies as well as configurations' updates upon an AP failure or new APs installation, represent typical tasks greatly benefiting from automatic and centralized management solutions. However, devices' heterogeneity is a major problem when dealing with such infrastructures. Indeed, different vendors use different solutions and, usually, different management interfaces. This, obviously, complicates and limits the definition of any automatic and centralized management strategy for such networks.

Recently, the CAPWAP (Control and Provisioning of Wireless Access Points) Working Group of IETF has proposed the CAPWAP protocol ([1], [2]). The CAPWAP protocol defines a common interface for exchanging data and management information between the Wireless Termination Points (WTPs), i.e. the Access Points, and the Access Controller (AC), i.e. the entity managing all those devices. The CAPWAP WG focused on three fundamental points: (i) automatic configuration, (ii) security and (iii) interoperability. Indeed,

- The standard defines a discovery and an automatic configuration protocol. Basing on this protocol an AC is able to automatically register WTPs, being informed on the functionalities they export. Moreover, the AC may check WTPs status and implement rules for the automatic network management based on WTPs availability and their exposed functionalities.
- The standard makes mandatory the using of DTLS for the encryption of any control and management data exchanged between the WTPs and the AC. The encryption is, hence, used primary for communication and configuration integrity. However, encryption may also be used for privacy when using the CAPWAP data encapsulation functionality.
- The primary goal of the CAPWAP protocol is the interoperability among WTPs and AC. The CAPWAP protocol standardizes the messages that can be exchanged between such elements, allowing an AC to manage consistently WTPs from different vendors.

Here at the University Campus Bio-Medico of Rome, partner of the CINI Consortium, we developed the first open source implementation of the CAPWAP protocol [3]. The open source project implements most of the functionalities defined in the standard: from the discovery protocol to the encryption of management and control messages. Although some of the functionalities are still missing, the modular architecture of the project allows for an easy and immediate implementation of such functionalities as well as it allows for a rapid update of the protocol implementation based on changes in the standard [4]. As far as we know there are not other projects on CAPWAP as advanced as our project. This, with the increasing attention on CAPWAP (the number of papers and conferences has increased exponentially over the last few years), suggests a potentially growing interest in our open-source implementation.

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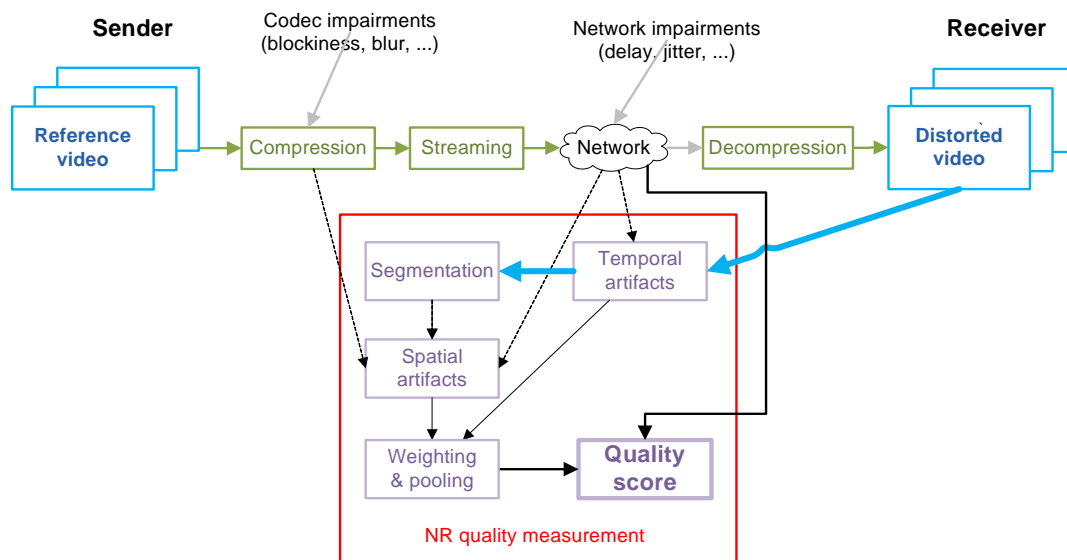
## Quality of Experience Assessment Framework

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Quality of Service (QoS) refers to the capability of a network to provide better service to selected network traffic over various technologies. QoS is a measure of performance at the packet level from the network perspective.

Quality of Experience (QoE) describes the performance of a device, system, service, or application (or any combination thereof) from the users point of view. QoE is a measure of end-to-end performance at the service level from the user perspective.

The objective of this work is to create a QoE assessment framework allowing building a system for accurate video quality assessment. The system will blindly estimate quality scores (without comparison with reference video). The methodology comprises of studying, classifying and evaluating current researches on audio-visual content quality assessment in terms of performance and feasibility. The next step of the methodology of the system design is to propose a framework system architecture) for integrated video quality assessment. Within the framework, several key functions as well as correlations between them will be defined. In particular, a framework component will be developed to assess the impact of network impairments on the video quality. In order to improve the efficiency of the research, the topic has been divided into two related study approaches: picture-based (artifacts) analysis and network-based analysis.



The topic of QoE is represented as a task force group in the CONTENT benchmarking activity. The group works on topics such as network impairment, transport protocol, video codec as well as user perception. The group has defined two "Systems under Test" in order to clarify and improve joint work on benchmarking.

## PeerfactSim.KOM - Realistic and Efficient Modeling of Network Transmission Times

Multimedia Communications Lab  
Technische Universität Darmstadt

When using simulations as an evaluation methodology, the benchmarking of peer-to-peer (p2p) content distribution networks leads to two opposing requirements. First, in order to understand, evaluate and validate novel research approaches, it is necessary to simulate large scale networks with thousand or even million of

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259

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### Project partners:

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UPMC	FR
FCT-UC	PT
NKUA	GR
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participants. On the other hand, in order to predict the realistic behavior, of say, newly developed p2p overlay protocols, it is necessary for the simulation model to be as realistic as possible.

For this reason, the Multimedia Communications Lab (KOM) at Technische Universität Darmstadt recently developed a highly efficient underlay model capable of providing realistic round trip times, country based packet loss and jitter predictions. To accomplish this, several gigabytes of internet measurement data derived from the CAIDA [1] and PingER [2] projects are integrated into the core simulation framework of PeerfactSim [3].

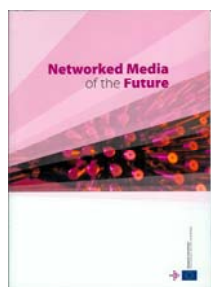
Additionally, using Geolocation, PeerfactSim can identify and very precisely predict (with maximal error of about 100 meters) the real-world geographic location of the simulated participants.

Thus, PeerfactSim allows simulations with internet network conditions that are as close to reality as possible while still being highly scalable and therefore, represents a powerful evaluation tool that strengthens the joint research within the Content [4] project partners.

## References

- [1] <http://www.caida.org>
- [2] <http://www-iepm.slac.stanford.edu/pinger/>
- [3] <http://www.peerfactsim.com>
- [4] <http://www.ist-content.eu/>

## PAPERS



### White Paper on Networked Media of the Future

This white paper was written in the scope of the activity of Networked Media Task Force (NM-TF), a task force that comprises the three Networks of Excellence in the area of Networked Media funded under the EC Framework Programme 6 (VISNET-II , INTERMEDIA and CONTENT ), October 2007. Available at: [ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/netmedia/networked-media-of-the-future\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/netmedia/networked-media-of-the-future_en.pdf)

### White Paper on User Centric Media - Future and Challenges in European Research

This paper was produced by the cluster of EU projects on User Centric Media of the Information Society and Media Directorate General of the European Commission. The report encompasses the contributions from 11 European Research projects funded under the 6th EU Research and Development Framework Programme. November 2007. Available at: [ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/netmedia/user-centric-media\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/netmedia/user-centric-media_en.pdf)



## PROJECTS

### The WiMAX technology in the WEIRD project: Quality of Service and Mobility

In the last few years wireless Metropolitan Area Networks increased their momentum, due to the need to reach more and more user communities - in case isolated - by overcoming the cost barriers of wired technologies. As a broadband wireless access technology, WiMAX is able to provide ubiquitous internet access allowing end users to be connected to the internet independently of their location. The WEIRD (*WiMAX Extension to Isolated Research Data networks*) FP6 European Integrated Project, aims at designing, developing and validating advanced management and control plane functionalities able to support novel application scenarios, such as environmental monitoring, tele-medicine and fire prevention; coping with future needs of research user communities and to build test-beds allowing the European research backbone networks like GEANT, GEANT2 and relevant National Research and Educational Networks to be reachable from remote areas.

The University of Coimbra participates in the project through the research laboratories ADAI/DEM and LCT/CISUC/DEI. The former is responsible for the fire prevention and motoring applications and the latter is the leader of the implementation work package of the project, being mainly involved in the Quality of Service (QoS) and Mobility aspects of the WiMAX technology.

Project name: CONTENT  
 Contract No: IST-FP6-0384239  
 Project type: NoE

Start date: 1 July 2006  
 Duration: 36 months

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 EUR 2 648 000  
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 Home platforms



The WEIRD project aims to exploit and enhance the WiMAX technology in order to cope with future needs of research communities. To build such a broadband access network infrastructure, and to improve the QoS and quality of experience for end-users, WEIRD project must cope with the following challenges:

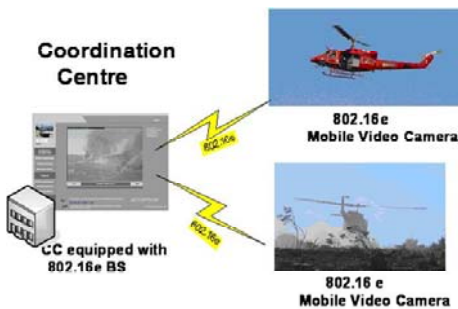
Enhancements to the WiMAX technology:

- Enhancements of handover and access control mechanics at convergence layer
- Interoperability with mobility management
- Radio-over-fiber techniques for massive and cost-effective WiMAX deployment.

Enhancements to the IP control plane:

- Advanced Authorization, Authentication and Accounting
- QoS support for real time and mission critical applications
- Resource management

The University of Coimbra is responsible for the fire prevention scenario, bringing together the expertise of the ADAI/DEM team in the areas of fire prevention and LCT/CISUC/DEI in the areas of network QoS, management and mobility.



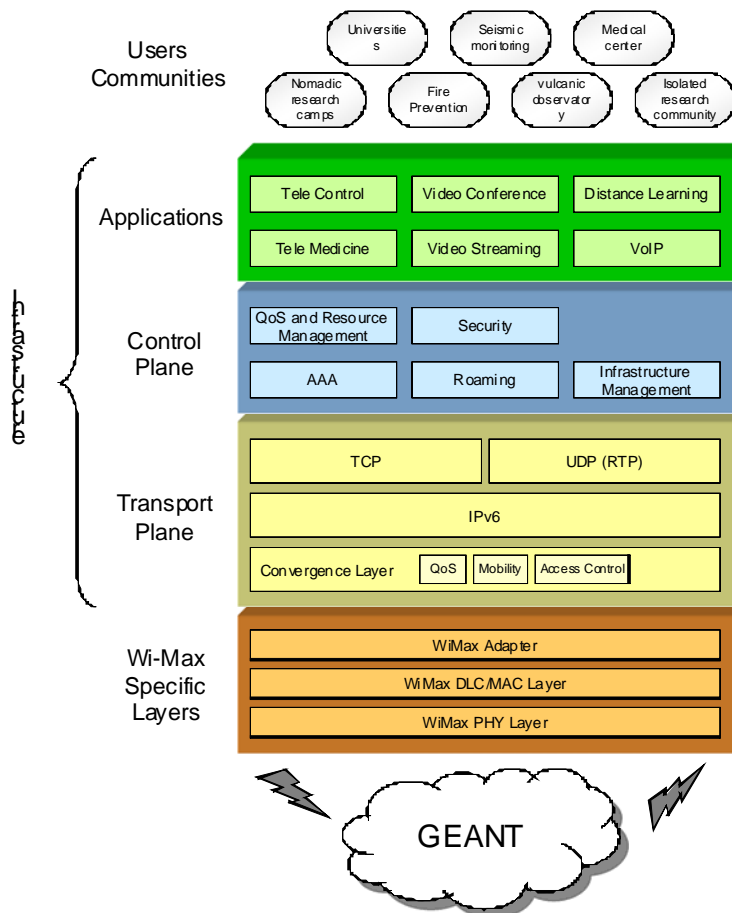
Several pilot projects have shown how the use of technologies such as sensors and video cameras can help fire detection. The main obstacles to the implementation of such systems are the costs and image quality related to GSM/GPRS communications and the difficulty to implement radio links to transmit video in mountainous regions.

In the WEIRD project there are three applications for fire prevention that take advantages of the WiMAX technology. The first application is related to the transmission of images and text data taken from the Forest Fire Simulation System located and operated in the District Civil Protection

Coordination Centre in Serra da Lousã to a mobile unit in the field. The second application is related to fixed and mobile video surveillance as illustrated in the following picture.

The third application intends to distribute a network of sensors in the Urban-Wildland interface with hard accessibility. The environmental data collected by the sensors includes temperature, wind direction and humidity, as a complement to the images provided by the fixed video-cameras, helping fire prevention and fire control. The environmental parameters collected will be transmitted to a sink node with less memory and energy restrictions which will connect to the IP network infrastructure through the WiMAX technology.

The scenarios considered in the WEIRD project are supported by the architecture shown below. The adopted applications are those that use the Internet Engineering Task Force protocols and the IP Multimedia Subsystem model for service provisioning of the 3rd Generation Partnership Project. The control plane includes characteristics such as security, QoS and roaming. At the transport plane, a convergence layer for WiMAX enriches IP with mobility, QoS and Access Control functionalities. Finally, improvements in the WiMAX Data Link and Physical layers boost the performance of the system.



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The project partners are: Datamat, Consorzio di Ricerca nell'automatica e nelle telecomunicazioni, Alcatel, Wind Telecomunicazioni, Consorzio Pisa Ricerche, Italtel, Socrate Medical, Osservatorio Vesuviano, Associazione OASI Maria SS - Italy; Portugal Telecom Inovacao, University of Coimbra - LCT/CISUC/DEI, ADAI/DEM - Portugal; VTT - Finland; DAS Photonics - Spain; Orange, University Politehnica of Bucarest - Romania; Icelandic Meteorological Office (IS) and National Research Networks.

## INDUSTRY LIAISON

Leading European industrial companies and R&D centres, including service providers and/or broadcasters can be part of the CONTENT Industry Advisory Board, which follows the activities of the consortium, access their public results, provide input and general advice (including on technology transfer matters) and establish bilateral agreements and exploration of PhD students internship opportunities. Industry Advisory Board members can also exploit opportunities to carry out joint research with CONTENT members through joint participation in national or international projects, whenever possible: Integrated Projects, STREPS and Joint industry-funded research projects. Regarding SMEs, CONTENT interacts with them at national level, by organising Local Industry Workshops and/or Technology Days for local industry in several countries.

### CONTENT Industry Workshop on Evaluation of Quality of Experience in Video IP and P2P Streaming



The workshop took place at AGH University of Science and Technology, Department of Telecommunications Building (D-5), Krakow, Poland, on October 15, 2007. The list of industry participants includes Polska Telefonia Cyfrowa (ERA GSM, <http://www.era.pl/>), TANDBERG ASA (<http://www.tandberg.com/>), P4 (<http://www.playmobile.pl/>),

Mobiwide (<http://mobiwide.com>), Philips Research (<http://www.research.philips.com/>), INTERIA.PL SA (<http://www.interia.pl>), Wind Mobile (<http://www.windmobile.pl>) and Onet (<http://www.onet.pl>). The workshop preceded the CONTENT plenary meeting on 16-17 October 2007. All CONTENT members participated in this important event.

### 1<sup>st</sup> Portuguese Local Industry Workshop

The 1<sup>st</sup> Portuguese Local Industry Workshop took place in Tagus Park, Oeiras (Lisbon), on November 28<sup>th</sup>, 2007. The main objective of the workshop was the exchange of ideas between researchers in content distribution networks at national level. Several questions arose in this respect: what are the main research and development challenges in order to provide content to user communities? What are the solutions for content distribution used in current networks? How does the industry envisage the evolution of content networks? What types of content have interest to the users? How will the all-IP world affect content creation, sharing and distribution? Are the main issues technological or societal? Around 50 people from academia and industry participated in the workshop, according to the following program:

- 15:00 - Opening - Rui Rocha (IST), Jorge Sá Silva (UC)
- 15:10 - The CONTENT NoE: Objectives and research challenges - Jorge Sá Silva (UC)
- 15:30 - Ericsson IPX - Efficient Content Aggregation and Distribution, Madalena Jusek (Ericsson)
- 16:00 - The importance of content distribution networks for social communities - Jorge Vila Boa (EDIMPRESA)
- 16:30 - Coffee break
- 16:45 - Microsoft Solutions for Content Distribution - Vítor Santos (Microsoft)
- 17:15 - Mobile Solutions for Communities - Paulo Gaudêncio (Movensis)
- 17:45 - Closing

The 1<sup>st</sup> Portuguese CONTENT Local Industry Workshop was held in conjunction with and the support of RTCM (Mobile Communications Thematic Network, <http://rtcm.inescporto.pt>), Instituto Superior Técnico and the Laboratory of Communications and Telematics of the University of Coimbra.

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## PATENTS

UC3M filed a new patent application: Arturo Azcorra Saloña, Alberto García Martínez, Guillermo Ibáñez Fernández. "Self Configuring Routing and 802.1D Bridging Bridge with automatic hierarchical local MAC addresses". Patent Applicatin N° P2007023558, 30 August 2007.

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