


TIGRE5-CM - Presentation

The aim of TIGRE5-CM project is to design an architecture for future generation mobile networks, based on the SDN (Software Defined Networking) paradigm, which eases the deployment, configuration and management of the network while integrating the latest technologies, both in the access network (reaching the end user terminal) and in the core network.

Network operator needs:

The project first identified the following requirements from network operator perspective:


A 3D white figure of a person standing next to a large red question mark, symbolizing a problem or a need for a solution.

Network operator needs:

- To lower operating costs.
- To improve performance.
- To increase flexibility, resiliency and network interoperability.

Solutions proposed by TIGRE5-CM:

TIGRE5-CM project aims to tackle these challenges by combining the state of the art in wireless technologies with SDN. The technical and scientific challenges to address are various and multidisciplinary, including:

A 3D white figure of a person standing next to a large green checkmark, symbolizing a solution or success.

Solutions proposed by TIGRE5-CM:

- Wireless networks.
- Switched networks and data transport networks.
- Next generation optical networks.

Keys to success

To deal with these issues, the project team is composed of four research groups that complement their knowledge of the technologies needed to complete the project. The team **strengths** are:

Human resources

- Team composed of national and international recognized researchers with support of high potential young researchers.

Experience

- Thorough knowledge of technologies and fields of study.

Excellence

- Work in a dynamic and professional environment.

Flexibility

- Ability to compete and adapt to emerging technological challenges in the global market of science.

Efficiency

- Optimizing financial and human resources.

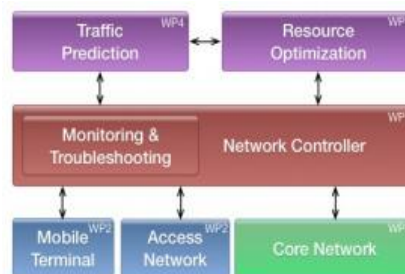
Networking

- Collaboration with several public and private researching institutions.

Objetives and work packages:

TIGRE5-CM target is the development of technologies for 5G networks and their integration into a common architecture that allows a dynamic, flexible and efficient use of resources in a mobile network. This main objective is achieved by implementing four work packages, illustrated in the following list:

- **WP1: Network Controller (coord.: ADSCOM-UC3M)**
 - Target 1: Design of 5G network controller
 - Target 2: Network monitoring and troubleshooting
- **WP2: Access technologies (coord.: WNL-UC3M)**
 - Target 3: Analysis and flexibility of user terminal
 - Target 4: Management and network access optimization
- **WP3: Core network (coord.: GIST-UAH)**
 - Target 5: Optical transport network
 - Target 6: Generic multilayer switches and platforms for advance switches implementation
 - Target 7: Evolution of AllPath and ToriiHLMAC protocols
- **WP4: Management and resource optimization (coord.: WNG-IMDEA)**
 - Target 8: Traffic demand prediction
 - Target 9: Management and network resource optimization





Specific objectives

1. The design of an SDN network controller, including its interfaces, for 5G networks.
2. The design of mechanisms for the monitoring, supervision, and troubleshooting the control networks.
3. The development of mechanisms to optimize resource efficiency, based on traffic measurement and prediction.
4. The development of advanced switching and transport technologies based on generic multilayer Ethernet switches and on “all-optical” transport networks with quality of service support.
5. The flexibility and controllability of the user terminal by the network. With the above, the project will develop an integrated architecture of high performance, with a control plane that supports and efficient, flexible, robust, configurable and programmable operation.

Expected results

Upon completion, the main results of the project would be:

1. Publications in top journals and well-know conferences;
2. Contributions to standardization activities in the relevant fora (IEEE, IETF, etc.);
3. Development of testbeds to evaluate and showcase the main contributions of the project. These testbeds will continue to be maintained after the project’s completion;
1. Collaborations with the relevant industrial partners to foster their leadership in 5G technologies.

Research groups

WNG IMDEA NETWORKS

Coordinator: Joerg Widmer



The research group Wireless Networking Group belongs to IMDEA Networks, an international research institute based in Madrid. The main objective of WNGIMDEA is advanced research in wireless networking, and its members have proven experience in this area, and more specifically in managing interference, design of MAC protocols, opportunistic transmission schemes, 3G and LTE mobile networks, WLANs, and self-organized networks. Such research is often done in collaboration with industry and other academic institutions.

The group leader, Joerg Widmer, has extensive experience in high-profile research institutes (EPFL, ICSI) and industry (NTT Docomo), is the author of several patents and has contributed very actively to technology transfer to industry. Recently, he was awarded an ERC consolidator grant as well as a Spanish Ramon y Cajal grant. He is senior member of IEEE and ACM.

Other members: Angelos Chatzipapas, Arash Asadi, Aymen Fakhreddine, Vincenzo Mancuso, Christian Vitale, Domenico Giustiniano, Foivos Michelinakis, Nicola Bui, Qing Wang, Thomas Nitsche, Marco Ajmone, Roberto Calvo, Hany Assasa and Javier Hervás Alonso.



Ref: S2013/ICE-2919

Title: Tecnologías Integradas de gestión y operación de Red 5G

Duration: 4 years (1/10/2014-30/09/2018)



UNION EUROPEA
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ADSCOM UC3M

Coordinator: David Larrabeiti López



The research group ADSCOM (Advanced Switching and Communication Technologies), led by Professor David Larrabeiti López, is integrated within the Department of Telematics Engineering at Carlos III University of Madrid. The team is experienced in EU projects and promotes the mobility of our researchers.

The group has published over 150 articles in international journals and important conferences, and has participated in over 20 european, national and regional projects and private industry.

Other members: Manuel Urueña Pascual, Jose Alberto Hernández Gutierrez and Ángel Cuevas Rumín.



WNL-UC3M

Coordinator: Pablo Serrano Yáñez-Mingot



The research group of the Department of Telematics WLN-UC3M, from Carlos III University in Madrid, actively participates in both higher education and research in advanced topics of services and applications over wireless networks. His teaching and research ranging from technology based on 802.11 (WiFi) to mobile networks, 3G, LTE and next generation networks.

The group leader, Albert Banchs, has extensive research and industrial transfer experience, having worked at Telefónica I + D and laboratories NEC Heidelberg, and made visits to ICSI, EPFL and the University of Zurich. He is co-author of three patents granted and three other requested. Albert Banch has been ISTCARMEN project coordinator, and participates regularly in the scientific committee of several conferences and journals.

Other members: Albert Banchs Roca, Antonio de la Oliva, Carlos Jesús Bernardos Cano, Jaime García Reinoso, Alberto García Martínez, Juan Brenes and Anna Maria Mandalari.



GIST-UAH

Coordinator: Juan Ramón Velasco Pérez



The GIST UAH group consists of three research units: Netserv, IKACS and NESIS. The group is led by Dr. and university professor Juan Ramon Velasco, with extensive research experience and numerous publications. The group is correctly participating in several national and international research projects.

Juan Ramon Velasco has received several awards and serves on the board of the Telematics Association and the board of the Spanish Association of Telecommunications Engineers in the Region of Castilla-La Mancha.

Other members: Bernardo Alarcos Alcázar, David Orden Martín, Enrique de la Hoz de la Hoz, Elisa Rojas Sánchez, Guillermo Agustín Ibáñez Fernández, Ivan Marsá Maestre, Isaías Martínez Yelmo, Juan Antonio Carral Pelayo, José Manuel Arco Rodríguez, José Manuel Giménez Guzmán, Miguel Ángel López Carmona, Antonio García Herraiz, Susel Fernández Malián and Joaquín Álvarez Horcajo.





Partners

Telefónica

Telefónica I+D, the research and development company of the Telefónica Group, was founded in 1988 and its mission is to contribute to the Group's competitiveness and modernity through technological innovation. With this aim, the company applies new ideas, concepts and practices in addition to developing products and advanced services.

It currently collaborates with technological leaders and many organizations from 40 countries; among which figure more than 150 universities around the world. It also participates in the most important international forums on technological knowledge of the ICT sector, thus creating one of the largest European innovation ecosystems.

Ericsson

Ericsson Spain, SA, is the largest provider of systems for mobile networks. Top ten mobile operators in the world are customers of Ericsson Spain, SA, and about 40% of all calls go through systems designed by the company. It is also one of the leading manufacturers of systems IMS (IP Multimedia Systems) based on 3GPP standards and currently used in production networks. Ericsson Spain SA has around 1,500 employees, the research and development center, located in Madrid, was founded in 1986 and currently has over five hundred engineers.

Teldat

Teldat Group is a leading technology company in Europe in the manufacture and marketing of advanced platforms Internetworking for corporate environments. For more than twenty years of experience as a telecommunications provider Teldat, over 250,000 units have been installed in 800 networks of some of the most demanding operators and multinational companies. Teldat is present in over 35 countries. Teldat is focusing on developing access services professional range for data, voice and image transmission, IP telephony and security applications based on IP networks.