Research & Innovation 2016
Innovation is in our DNA
Come with us to the future of technologies
Innovation is in our DNA
Welcome to this new annual issue of our booklet, which presents Atos Research & Innovation (ARI) activities during 2016.

ARI’s role is to investigate emerging technologies and anticipate market demand with innovative solutions. Although one of our main challenges is to reduce the gap between R&D and the market, we are making progress approaching sales teams within the Company. Getting closer to customers and involving them in pilots and proofs of concepts enables us to transform acquired knowledge and innovations into real business opportunities.

ARI expertise and innovation focus is being recognized as a valuable source of business. A good example is the delivery of **Ideas Generation workshops** based on a methodology developed within a R&D project. Having brought successful results to the company, those workshops are now being promoted internally at global level and to Atos customers.

Thanks to ARI, Atos is a full member of the [Big Data Value Association (BDVA)](http://www.bigdatavalue.eu/); the [Alliance for Internet of Things Innovation (AIOTI)](http://www.aioti.org/) and the [5G Infrastructure Association](https://5g-ppp.eu/). Atos Spain is one of the core partners and co-leader of the Spanish node of the Knowledge and Innovation Community (KIC) for EIT Health [4], as well as member of the Supervisory Board. Our company is also member of the Madrid Node Strategic Board of the [EIT Digital](http://www.eitdigital.eu/). And more recently, Atos has become a platinum member of the FIWARE Foundation [6] with the support of ARI and due to our active participation in the whole FIWARE initiative. Our team has several positions within the foundation’s governance.

Finally, the number and diversity of projects described in this report show the intensive activity of our group. The latest EU H2020 statistics continue to **rank Atos Spain as the first Digital Services Company** [7] at European level with most participation in projects. This excellent position in the EU Research and Innovation arena increases the visibility, not only of ARI and Atos Spain, but also of Atos as a global company.

Your feedback is always welcome at es-atosresearch@atos.net, we’ll be happy to take it into consideration!

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3. [https://5g-ppp.eu/](https://5g-ppp.eu/)
4. [https://eithealth.eu/](https://eithealth.eu/)
5. [http://www.eitdigital.eu/](http://www.eitdigital.eu/)
6. [https://www.fiware.org/foundation](https://www.fiware.org/foundation)
The Research & Innovation group is the R&D hub for new technologies and a key reference for the whole Atos group. Thanks to our large expertise in research, development and innovation projects, we are able to bring new solutions and innovative elements to customers’ business.

The group focuses on projects development, combining economic exploitation of investigations’ results and the most up-to-date technological achievements with high awareness of human factors (education sciences, disability-related issues, health and well-being, cultural diversity, and multilingualism).

The main objectives of the Research & Innovation group are:

- Participate in research, development and innovation (RDI) projects that enrich Atos offer portfolio, market view or position with respect to emerging technologies
- Be a source of innovative ideas to be used by Atos sales force and technical staff
- Become an entry gate to European institutions for the different units and customers of Atos, thanks to the large background of European Commission projects (since 1987)
- Support Atos business units in other countries, as well as their customers, thanks to the network of public and private partners across Europe, which in turn, are current or potential customers of the company

Our team is distributed in various locations: Madrid, Barcelona, Bilbao, Valladolid, Santa Cruz de Tenerife in Spain, Brussels in Belgium, Istanbul and Bratislava in Slovakia.

The group is structured in a way to facilitate the relationships with the different Markets and Service Lines of the company. Thus, we are organized in ten Sectors within Atos established markets and five Technological Labs. The structure fosters the alignment of emerging technology research and development with the market / customer needs. Our ultimate goal is to be at the upfront of R&D in Information and Communications Technologies (ICT), with a deep knowledge of business and societal applications.
Capabilities

The vision of the Research & Innovation group of Atos is mainly focused on applying the latest research outcomes to real-world situations where Atos clients need solutions that go beyond what current products provide.

You will find in our group a source of innovative ideas and expertise in emerging technologies

The Research & Innovation group is the research and development hub for new technologies and a key reference for the whole Atos group. Thanks to our large expertise in research, development, and innovation projects, we are able to bring new solutions and innovative elements to customers' business.

Our focus on the combination of advanced technological developments and commercial exploitation of project outcomes leads to innovative but realistic solutions

The group focuses on projects development, combining economic exploitation of research results and the most up-to-date technological achievements with high awareness of human factors (education, usability, inclusion, cultural diversity, and multilingualism).

Our capacity of coordinating international partnerships and our extended network of technology centers, universities, and user organizations makes us a reliable business partner

Since 1987, the Research & Innovation group has been deeply involved in research, development, and innovation (RDI) projects. We have become an extremely well-known player in the European research arena, with references in various Directorates-General of the European Commission.

Furthermore, Atos, as an ICT global player, is active in long-term EU working groups and therefore has a say in the definition of future funding programs. For almost 30 years, we have acquired valuable expertise in innovation management.

Based on the day-to-day activity in research and innovation projects, our group has developed efficient working processes, templates, knowledge base, and collaborative tools. From strategy to project management, from the generation of ideas to the identification of funding opportunities and selection of the right partners, from opportunities to results, the group covers all activities and is able to provide reliable support services to our customers.

All these capacities build on the diversity and preparedness of our people. Our experts cover a wide range of disciplines, from emerging technological areas to social sciences and economics.

Teams are multidisciplinary and multicultural, and are thus able to dialogue with customers and understand their needs. Atos customers can benefit from our group's RDI related services, such as:

► advanced technology watch;
► innovation ideas channeling;
► evaluation and management;
► alignment of the organization's RDI strategy with public funding sources programs;
► proposal drafting and delivery;
► proposals negotiations;
► proper project management office;
The following diagram shows the structure of ARI management staff. A head of market coordinates all RDI activities related to Atos main markets and guarantees fluid communication with commercial staff and customers.
Public Administration
ICT is key to promote smart, sustainable & innovative government

Description
Public Administration sector builds on the results of previous research in the eGovernment and Education areas and encompasses three complementary perspectives:

► Helping the public administrations to to provide more efficient and effective public services to citizens and businesses
► Developing solutions to enhance learning such as learning at the workplace, collaborative learning, learning at school, higher education, accessible learning, authoring tools and adaptive learning.
► Developing smart cities infrastructures that offer added-value services to citizens in order to cope with societal challenges as well as to enable business services.

Goals
► Research, design and development of ICT tools that support public sector administrative processes in order to deliver seamless and faster public services.
► Adoption of emerging technologies that support new demands for services and contents in education.
► Design and deployment of new ICT tools and integration of existing technologies that allow emerging smart cities to offer sustainable and added-value services to the citizens.

Main Activities
► Management of market-driven projects.
► Promotion of project results to Atos customers in the Public and Education sector.
► Integration of research results into the public administration legacy systems.
► Definition and assessment of new and efficient services for Smart cities, focused on convergence of physical and virtual infrastructures, and citizen participation.
► Development of ICT tools that implement more efficient services with special focus on interoperability, cross-organizational flows, big and open data, cloud for public administrations, and smart cities.
► Development of ICT tools with strong education orientation focused on personalization, student experience and lifecycle management, contextualized eLearning.
► Elaboration of plans for the exploitation of research project result.
► Identification and execution of new business opportunities in the Public and Education sector in line with innovative key offerings.

Challenges
► Single European administrative space: Implement the vision of seamless cross-organizational and cross-border services through adoption of technologies such as SOA (Service Oriented Architectures), semantic technologies, etc.
► More for less: Explore solutions, constraints and applicability for clouds of public services and open source.
► Sustainable IT: Explore the role of public administration as an early adopter of technologies such as migration to IPv6, Green IT etc.
► Open government: Releasing public data and using linked data techniques to help people understand how government works and how policies are made.
► Explore how public administrations can leverage big data techniques to save money in operational efficiency. Harnessing big data in the Public sector has enormous potential.
► Connected government: Explore possibilities of internet of things in order to improve efficiency and enable transformation of e-government.
**Current Research Topics and Findings**

- Cross border authentication that allows citizens to access eGovernment services inside and outside their home country by using their national eID.
- Involvement of citizens in policy-making processes through innovative non-intrusive technologies such as social networks and virtual worlds.
- Participation of citizens in the policy development process and harmonization of policies across governmental levels (e.g. immigration policy).
- Implementation of web 2.0 governmental sites that allow interactive information sharing, interoperability and the dynamic collaboration of different kinds of users.
- User-centric design and living labs.
- Adaptive learning experience for students, collaborative learning environments, learning/training strategies, platforms to support learning processes and training.

<table>
<thead>
<tr>
<th>Title</th>
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<th>Funding</th>
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<th>Web</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEDUS</td>
<td>City Enabler for Digital Urban Services</td>
<td>EIT-DIGITAL</td>
<td>Provision of a software relying on the FIWARE open platform for crawling, collecting and rendering on a map valuable data at urban scale as well as rapidly developing urban services.</td>
<td></td>
</tr>
<tr>
<td>EMMA</td>
<td>European Multiple MOOCs Aggregator</td>
<td>CIP</td>
<td>Platform giving learners across Europe multiple language access to free, massive, open, online courses (MOOCs) from different course providers.</td>
<td>europeamoocs.eu</td>
</tr>
<tr>
<td>ESPRESSO</td>
<td>Systemic standardisation approach to empower smart cities and communities</td>
<td>H2020</td>
<td>Development of a conceptual Smart Cities Information Framework, which consists of a platform and data provision and processing services to integrate data, workflows, and processes in applications relevant for Smart Cities.</td>
<td>espresso-project.eu</td>
</tr>
<tr>
<td>MaTHiSiS</td>
<td>Managing Affective-learning Throught Intelligent atoms and Smart InteractionS</td>
<td>H2020</td>
<td>Integrated platform which provide capabilities for adaptive learning, automatic feedback, automatic assessment of learner’s progress and behavioral state, affective learning and game-based learning.</td>
<td>mathisis-project.eu</td>
</tr>
<tr>
<td>MoveUS</td>
<td>ICT cloud-based platform and mobility service available, universal and safe for all users</td>
<td>FP7</td>
<td>Changing European users’ mobility habits by offering intelligent and personalized travel information services, helping people to decide the best transport choice and providing meaningful feedback on energy efficiency savings.</td>
<td>moveus-project.eu</td>
</tr>
<tr>
<td>NEWTON</td>
<td>Networked Labs for Training in Sciences and Technologies for Information and Communication</td>
<td>H2020</td>
<td>Creation of new or inter-connect existing state-of-the art teaching labs and building a pan-European learning network platform that supports fast dissemination of learning content to a wide audience in a ubiquitous manner.</td>
<td>newtonproject.eu</td>
</tr>
<tr>
<td>Policy Compass</td>
<td>Policy Compass</td>
<td>FP7</td>
<td>Policy Compass will make better use of Europe’s open public data resources and empower policy-makers and citizens (especially the younger generation) to better assess government policies in the analysis and monitoring phases of the policy cycle.</td>
<td>policycompass.eu</td>
</tr>
<tr>
<td>RADICAL</td>
<td>Rapid Deployment and adoption of sustainable socially-aware and intelligent sensing services for emerging smart cities</td>
<td>CIP</td>
<td>Facilitating the fast creation of interoperable and socially-aware services for leveraging Internet of Things and Social Networking technologies.</td>
<td>radical-project.eu</td>
</tr>
<tr>
<td>Science2Society</td>
<td>Improving university, industry and society interfaces to boost the throughput capacity of Europe’s innovation stakeholders</td>
<td>H2020</td>
<td>Creation, piloting and sharing of good practices, guidelines and training materials that improve awareness and practical performance in university-industry-society interfacing schemes especially affected by Science 2.0 and open innovation.</td>
<td>science2society.eu</td>
</tr>
<tr>
<td>SONNETS</td>
<td>SOcialal Needs aNalysis and Emerging Technologies in the public Sector</td>
<td>H2020</td>
<td>It will deliver an innovative methodological framework for public sector organizations to accelerate its transformation through the identification, analysis and take-up of emerging technologies that hold the potential to transform public services.</td>
<td>sonnets-project.eu</td>
</tr>
<tr>
<td>STORK 2.0</td>
<td>Secure idenTity acrOss boRders lnKed 2.0</td>
<td>CIP</td>
<td>Operational open framework and infrastructure encompassing eID for secure electronic authentication of both legal and natural persons.</td>
<td>eid-stork2.eu</td>
</tr>
<tr>
<td>STRATEGIC</td>
<td>An advance service distribution network and tools for interoperable programmable, and exploitation of unified public cloud services</td>
<td>CIP</td>
<td>A cloud enabled framework on various infrastructures with a set of services related to public bodies, opening new horizons in the secure and private migration, adaptation, governance and development of public cloud services.</td>
<td>strategic-project.eu</td>
</tr>
</tbody>
</table>
Environment
Emerging geospatial technologies that support the development of distributed geo-spatial processes

Description
The Environment sector covers research and innovation for environment, and focuses its activity on the design and implementation of information architectures, oriented towards the seamless geospatial data distribution and execution of distributed geospatial processes, to improve Natural Risk Management.

The team has developed (since 1999) a large number of consultancy and research projects dealing with the use of the current geographical information standards and linked in many cases with the European Policy Initiatives in this field (e.g. INSPIRE).

Goals
Our main goal is to promote the adoption of emerging geospatial technologies that support the development of distributed geo-spatial processes. Therefore, the Environment sector is strongly linked to the Geospatial Information Research Line, where an important part of the technological activities are developed.

Main Activities
► Research and development activities dealing with environmental challenges. This is mainly done through the active participation in market-driven R&D projects with geospatial technologies.
► Integration of in-situ & EO observations from environmental sensors.
► Expertise on OGC standards (WMS, WFS, WPS, WCS, SWE...).
► Implementation of geographical independent decision support and alerting systems for the prevention of disasters.
► Elaboration of business plans for the exploitation of research project results, oriented to the environment sector.

Challenges
► Multiple Risk Management. Extend the achievements reached in the FP6 project ORCHESTRA to multiple risk and emergency domains like early warning and tsunamis in FP7 project DEWS, biodiversity, cultural heritage, agriculture and many other domains.
► Climate change adaptation measure planning and decision support.
► Observation Web. The research challenge to realize the Observation Web and the associated environmental enablers for the Future Internet leveraged by the work done in the Environmental Usage Area within the Future Internet PPP program of the European Commission.
► Earth Observation and Security. Extend the activity to Earth Observation and Security through the provision of inputs to the Copernicus and GEOSS initiatives.
► INSPIRE adoption. To be a reference partner for the Public Administration in the developments needed to adopt the INSPIRE directive.

Jose Lorenzo
Head of Sector
## Current Research Topics and Findings

- Integrated components for assisted rescue and unmanned search operations.
- Driving innovation in crisis management.
- Open Data and Big Data building on geographic information.
- Research use of Copernicus Sentinel Data for wildlife monitoring.
- Secondary raw materials inventory.

<table>
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<tbody>
<tr>
<td>BONVOYAGE</td>
<td>From Bilbao to Oslo, intermodal mobility solutions and interfaces for people and goods, supported by an innovative communication network</td>
<td>H2020, MG</td>
<td>Intermodal mobility solutions, interfaces and applications for people and goods, supported by an innovative communication network.</td>
<td>bonvoyage2020.eu</td>
</tr>
<tr>
<td>DataBio</td>
<td>Data-Driven Bioeconomy</td>
<td>H2020, BIG DATA PPP</td>
<td>Big Data PPP Large Scale Pilot focusing in production of best possible raw materials from agriculture, forestry and fishery/aquaculture.</td>
<td></td>
</tr>
<tr>
<td>DRIVER</td>
<td>Driving Innovation for European Resilience</td>
<td>FP7, SECURITY</td>
<td>Improving Crisis Management at Member State and EU level covering society resilience, strengthening first responders and training. Atos is coordinating the consortium, has led the design of the architecture and provides a system for early warning.</td>
<td>driver-project.eu</td>
</tr>
<tr>
<td>EO4wildlife</td>
<td>Platform for wildlife monitoring integrating Copernicus and ARGOS data</td>
<td>H2020, SPACE</td>
<td>EO4wildlife aims at building a service platform and Toolbox for European Sentinel Copernicus Earth Observation data use for biologists, ecologists, scientists and ornithologists.</td>
<td>eo4wildlife.eu</td>
</tr>
<tr>
<td>FOODIE</td>
<td>Farm-Oriented Open Data in Europe</td>
<td>CIP</td>
<td>Open and interoperable agricultural specialized platform hub on the cloud for the management of spatial and non-spatial data relevant for farming production.</td>
<td>foodie-project.eu</td>
</tr>
<tr>
<td>ICARUS</td>
<td>Integrated Components for Assisted Rescue and Unmanned Search operations</td>
<td>FP7, SEC</td>
<td>Development of robotic tools (unmanned Search and Rescue devices) for detecting, locating and rescuing humans.</td>
<td>fp7-icarus.eu</td>
</tr>
<tr>
<td>SMART GROUND</td>
<td>SMART data collection and inteGRation platform to enhance availability and accessibility of data and information on Secondary Raw Materials in the EU</td>
<td>H2020, WASTE</td>
<td>Fostering of resource recovery in landfills by improving the availability and accessibility of data and information on Secondary Raw Materials (SRM) in the EU.</td>
<td>smart-ground.eu</td>
</tr>
</tbody>
</table>
Information Technologies
Building the future of Internet to address major challenges of society and enterprises

Description

The Information Technologies (IT) sector addresses the IT market, including software companies, solutions integrators and software consultants.

This sector is strongly linked to the “Next Generation Cloud” Lab and “Software Engineering” and “High Performance Computing” research lines. While the lab and research lines concentrate on research projects and most of the technological developments, we provide the required support for the management of the projects and the exploitation of research results.

Goals

The sector has a twofold objective: on one hand, fostering the adoption and transfer of emerging technologies surrounding Cloud Computing, Parallel Computing, Software and Service Engineering to Atos business units. This goal allows further alignment of the research activity in these technologies with customers’ needs, providing added value solutions to be included in the company’s portfolio. On the other hand, promoting the use of produced R&D assets in the IT sector-related market.

Main Activities

► Research and development activities dealing with IT challenges. This is mainly done through the active participation in market-driven R&D projects with cloud technologies, service and software engineering, following as much as possible an open source approach.

► Collaboration with related Atos Business Units to collect requirements and provide them results and components from R&D projects.

► Promote the research results inside Atos, through Business Development, Scientific Community, Center of Excellence and Market Leaders.

► Developing support actions to create roadmaps and research agendas for future challenges in the domain of ICT, with special focus on cloud, HPC and software engineering.

Challenges

► Advanced capabilities for IaaS, PaaS and SaaS
► Service Management and Engineering: Advanced SOA and SaaS
► Fog Computing
► Software Engineering techniques for software modelling and development
► High quality user interfaces
► Business Process Management
► Eco-efficiency in data centers and software development
► Platforms for the Future Internet
► Open Source models, development and processes
► Advanced features in high performance computing
► HPC for IoT (embedded HPC) and hybrid infrastructures
Current Research Topics and Findings

The research topics mainly addressed by the associated research lines and lab are shared with the sector as well. The sector’s research activities are focused on being an active part of the future roadmaps definition in different domains (Future Internet, Green IT, Services, Cloud, Software Engineering, HPC, Big Data, IoT etc) materialized through the participation in several initiatives and platforms (PLANETIC, NESSI, FI-PPP, BDVA, European Open Science, Digitising Industry in Europe, clusters, etc). While the lab and research lines are more focused on research in the short-mid term, the sector participates in the definition of a longer term view. The sector is also the driver of the market needs towards the lab. In this way the lab’s research lines are aligned with Atos markets needs.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>ARTIST</td>
<td>Advanced software-based service provisioning and migration of legacy Software</td>
<td>FP7</td>
<td>Set of methods, tools and techniques that facilitate the transformation and modernization of legacy software assets and businesses.</td>
<td>artist-project.eu</td>
</tr>
<tr>
<td>CoeGSS</td>
<td>Centre of Excellence for Global Systems Science</td>
<td>H2020</td>
<td>Advanced decision-support in the face of global challenges. It brings together the power of HPC and some of the most promising thinking on global systems in order to improve decisions in business, politics and civil society.</td>
<td>coegss-project.eu</td>
</tr>
<tr>
<td>FIWARE</td>
<td>Future Internet Ware</td>
<td>FP7</td>
<td>Core platform that eases the creation of innovative applications by lowering the costs and complexity of serving large numbers of users globally and handling data at a large scale.</td>
<td>fiware.eu</td>
</tr>
<tr>
<td>FORTISSIMO-2</td>
<td>Factories of the Future Resources, Technology, Infrastructure and Services for Simulation and Modelling - 2</td>
<td>H2020</td>
<td>Project building on the highly successful Fortissimo project, part of the IM4S cluster bringing HPC and related services and expertise to new sectors and in particular SMEs.</td>
<td>slalom-project.eu</td>
</tr>
<tr>
<td>MCloudDaaS</td>
<td>Multi-Cloud Data Analytics as a Service</td>
<td>EIT-DIGITAL</td>
<td>The objective of the project is to extend benefits of Big Data Analytics to Multi-Cloud environments offering innovative functionalities with regards to security, scalability and fault-tolerance.</td>
<td>mclouddass.eu</td>
</tr>
<tr>
<td>MSO4SC</td>
<td>Mathematical Modelling, Simulation and Optimization for Societal Challenges with Scientific Computing</td>
<td>H2020</td>
<td>Provision of an eInfrastructure focused on the optimized execution of Math Application Development Frameworks used in social science, done with a customized orchestration for OpenMP, MPI and large parallel applications</td>
<td>cordis.europa.eu/project/rcn/205963_en.html</td>
</tr>
<tr>
<td>PLANETIC</td>
<td>Plataforma tecnológica para la adopción y difusión de las tecnologías de información, electrónicas y de comunicación</td>
<td>Spanish Ministry of Economy and Competitiveness</td>
<td>Spanish technology platform for the adoption and promotion of electronic, communication and information technologies.</td>
<td>planetic.es</td>
</tr>
<tr>
<td>SLALOM</td>
<td></td>
<td>H2020</td>
<td>Provision of two SLA reference models for cloud computing: one for cloud SLA legal contracts, and the other for technical SLA specifications.</td>
<td>slalom-project.eu</td>
</tr>
<tr>
<td>SUPERSEDE</td>
<td>Supporting evolution and adaptation of PERSONalized Software by Exploiting contextual Data and End-user feedback</td>
<td>H2020</td>
<td>Feedback-driven approach for software life cycle management, with the ultimate purpose of improving users’ quality of experience.</td>
<td>supersede.eu</td>
</tr>
</tbody>
</table>
Health

Responding to the challenges of ageing populations faced by an increase in chronic diseases and a shortage of healthcare workers

Description
The Health sector counts with more than 15 years of experience in realizing research and innovation projects related to life and care sciences, in topics like medical images treatment and analysis, information management, EHR interoperability, artificial intelligence for decision support systems creation, remote monitoring and patient assistance. In the last years, we are focusing on bioinformatics, nanotechnology, algorithms and big data development for omics data analysis.

Goals
► Research on the application of ICT to the health domain for the improvement of services for professionals and patients. Precision Medicine.
► Direct application of knowledge and research results to the development of innovative solutions and services.
► Technology transfer from research projects to Atos customers in the field.

Main Activities
► Connected Health and care.
► Big data for Omics Technologies and data analysis.
► Big data for services within the healthcare domain.
► Data-driven health transformation.

Challenges
► The inclusion of relevant standards for medical devices communication and electronic health records. This relates to the integration of widely used health dictionaries such as SNOMED and LOINC with the most accepted standards for medical devices, such as ISO/IEEE 11073 and openEHR, ISO/EN 13606, HL7 and FHIR for data interoperability.
► Omics Technologies: Analysis and integration of omics data, including the complete set of process and biochemical reactions related to biological processes (metabolomics), allow to reach a surprising understanding of the complex cellular system. The ever-increasing data generated by these technologies are having a great impact in the biomedical research framework, as well as in the clinical practice.
## Current Research Topics and Findings

- Services to exchange, integration and analysis of the huge amounts of data collected from different sources into a global information infrastructure or “infostructure” (addressing semantic and standard interoperability, cloud and grid computing, network agility).
- Algorithms to model data and simulate physiological behavior, and to extract information from this model/simulation.
- Sensors networks to gather different physiological and environmental/localisation data (Internet of Things).
- Ubiquitous and mobility-proof network to keep actors connected anytime anywhere (m’health).
- Connected Health and care.
- Information provision through Semantic Web Services.
- Patient empowerment, patient centered and connected patient.
- Data-driven health transformation.

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<tbody>
<tr>
<td>ACANTO</td>
<td>A Cyberphysical social NeTwOrk using robot friends</td>
<td>H2020</td>
<td>Using robots to increase the number of older adults who engage in a regular and sustained physical activity.</td>
<td>ict-acanto.eu</td>
</tr>
<tr>
<td>AHEAD</td>
<td>Augmented Hearing Experience and Assistance for Daily life</td>
<td>AAL</td>
<td>Integration and combination of advanced sensing devices and ICT based modules, using eyeglasses and hearing aid as a support for assisting elderly people.</td>
<td>ahead-project.eu</td>
</tr>
<tr>
<td>ALFRED</td>
<td>Interactive Assistant for Independent Living and Active Ageing</td>
<td>FP7</td>
<td>Development of a mobile personalized assistant for elderly people, enabling them to remain independent, facilitating coordination with their caregivers and promoting social inclusion.</td>
<td>alfred.eu</td>
</tr>
<tr>
<td>DAPHNE</td>
<td>Data-as-a-Service platform for Healthy Lifestyle and preventive medicine</td>
<td>FP7</td>
<td>Development of a platform to deliver personalized guidance services for lifestyle management to the citizen/patient.</td>
<td>daphne-fp7.eu</td>
</tr>
<tr>
<td>FACET</td>
<td>Frailty Care and Well Function</td>
<td>EITH</td>
<td>Development of a tool to integrate and query human phenotypic data in order to early detect frailty. The goal is to permit intervention on it and the associated diseases to prevent or delay the onset of disability.</td>
<td></td>
</tr>
<tr>
<td>HAIVISIO</td>
<td>Enhanced visibility and awareness in eHealth, Active Ageing and Independent Living projects</td>
<td>FP7</td>
<td>Fostering a common strategy for joint dissemination activities and exploitation plans for eHealth, Active Ageing and Independent Living projects.</td>
<td>haivisio.eu</td>
</tr>
<tr>
<td>HeartMan</td>
<td>Personal Decision Support System for Heart Failure Management</td>
<td>H2020</td>
<td>Development of a personal health system for congestive heart failure (CHF) that features a Decision Support System based on predictive computer models.</td>
<td>heartman-project.eu</td>
</tr>
<tr>
<td>PAPHOS</td>
<td>Platform for Advanced Prescriptive Health Operational Systems</td>
<td>EITH</td>
<td>Implementation of a secure platform that allows different actors involved in the healthcare chain to move from the reporting to prediction and prescription focusing on multimorbidity treatment combining medical data records with patient monitoring.</td>
<td></td>
</tr>
<tr>
<td>WITH-ME</td>
<td>European Platform to Promote Healthy Lifestyle and improve care through a Personal Persuasive Assistant</td>
<td>ARTEMIS</td>
<td>Provision of a health prevention platform and personalized services to improve patients’ general health conditions and prevent occurrence from a range of diseases.</td>
<td>with-me-project.eu</td>
</tr>
</tbody>
</table>
Financial Services

Economies worldwide are adapting to the challenges of digitalization; Financial Services industry is not lagging behind

Description

The world of Financial Services applications is changing due to the increased openness of IT environments, mergers and acquisitions, and above all, significant challenges brought on by customer and market dynamism. The FS sector searches for the right answer to these changes and challenges by doing research into the Future of Financial Services.

For more than ten years, R&D projects have been developed in order to ensure secure transactions, provide higher availability, confidentiality and integrity of financial services, and in recent times new trends like Big Data, IoT, and Competitive Intelligence are also paving new research in information management for financial services.

Goals

The goal of this sector is to ensure transition and explore the application of our research & innovation solutions in the financial services industry. These solutions are rooted in our activities in information security, semantic technology for the real time processing of data (e.g. news and transactions, among others), and smart city technologies.

The Research & Innovation Financial Services sector feeds requirements, business concerns and challenges of the Financial Services industry to motivate research activities in multiple areas of work, while also opening opportunities for exploitation of research outcomes in banking, insurance, and financial services.

Main Activities

► Helping Financial Services customers identifying R&D challenges and driving them into requirements for new R&D projects.
► Promotion of project results and developed assets to Atos customers in the Financial Services sector.
► Development of ICT systems and platforms that support innovation in Financial Services, both in their operation and in their business models.
► Elaboration of plans for the exploitation of research project results in the Financial Services market.

Challenges

Customers in the Financial Services market are faced with challenges of both technical and business nature that call for ICT-based solutions.

► Adapting business models to an economy more and more driven by management of information.
► Taking stock of the vast amounts of information owned by banks, to be exploited for the business and operational benefit of the organization.
► Security concerns over the use of emerging technology business models (e.g. cloud computing).
► Exploiting the potential of mobile and social-networking technologies in banking, and in insurance.
► Management of compliance in a highly regulated business environment.
Current Research Topics and Findings

- Analysis of large amounts of information to derive intelligence for enhanced competitiveness and improved operational efficiency.
- Data trends and sentiment analysis.
- Security in cloud computing, allowing the adoption of models such as SaaS, PaaS and IaaS (identity as a service) by the Financial Services industry, largely reliant on legacy technologies.
- Privacy-enhancing technologies and advanced cryptography approaches as building blocks for privacy-enhancing identity management and data management in trusted and untrusted domains.

<table>
<thead>
<tr>
<th>Title</th>
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<th>Funding</th>
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</thead>
<tbody>
<tr>
<td>CYSPA</td>
<td>European Cyber Security Protection Alliance</td>
<td>FP7</td>
<td>Addressing trustworthy ICT through a European strategy to protect cyberspace, with target audiences ranging from research communities and industry to public authorities and infrastructure operators.</td>
<td>cyspa.eu</td>
</tr>
<tr>
<td>WITDOM</td>
<td>empoWering privacy and securiTy in non-trusteD envirOnMents</td>
<td>H2020</td>
<td>Automatic and efficient privacy provisioning solutions, keeping data confidential (encrypted and privacy-protected) in the un-trusted environment, while the data owner can operate with and make use of the data in the encrypted domain.</td>
<td>witdom.eu</td>
</tr>
</tbody>
</table>
Manufacturing & Retail
Intelligent technologies for manufacturing and retail challenges

Description
The Manufacturing & Retail sector has a deep experience and capacity in multiple areas: design and integration of Collaborative Platforms (i.e., Meta-Products development covering communication tools, PLM, ERP, ALM, PMS, etc.), deployment and management of Manufacturing solutions on the cloud, data acquisition from shop floor making use of smart objects.

Those solutions are developed mainly in the scope of Internet of Things (IoT) oriented to Manufacturing Ecosystems. They consider subsequent integration of data with different systems (consumers), customized application platforms for development, Big Data applied to manufacturing and security.

The retail sector is one of the biggest users of ICT, and thus a driver for innovation. It has a major role to play in the development of a sustainable economy and also in allowing citizens to face the current economic downturn by giving them easy access to affordable and good quality consumables.

We are interested in developing new solutions for a range of activities covering manufacturing processes, the factories of the future approach, food tracking & traceability, improvement of retailer business processes and client satisfaction through better information strategies.

Goals
The main goal is to help companies, in particular SMEs, to adapt to global competitive pressures by improving the technological base of manufacturing and retail across a broad range of sectors. This sector applies new IT advances to address the challenges and opportunities deriving from:

► The complex and globalized nature of manufacturing systems.
► The reduction in manufacturing timescales and acceleration of technological innovation.
► The growing need for sustainable, resource-efficient production.
► Food traceability and food chain integrity.
► Production flow improvement - lean factories.

► New channels to provide the right information to customers while preserving their privacy and trust.
► Branding management and its impact on manufacturing process.

Main Activities
► To identify research opportunities from national and international bodies aligned to Atos’ commercial divisions needs.
► Technology transfer to improve Atos solutions.
► Exploitation activities to steer the research towards market needs and to exploit research results.
► Commercial projects to final customers, including R&D support.

► To develop Collaborative and Scalable Platform for Data visualization and analytics.
► To improve innovation activity: New ideas have to be transformed into new products and processes.
► Better knowledge of the context in the manufacturing process through any kind of sensor to support decisions thus optimizing the full process and resources consumed.
► Ensure the food chain integrity (“from farm to fork”) through tracking and traceability.
► To optimize retailer processes and its client satisfaction: Smart labels management, consumer geolocation, iBeacons and wearable technologies.
► Consumer apps: development, App store, marketplace, payment systems. Back office for applications development and for applications commercialization.

Many of the manufacturing companies are SMEs and only a few of them have the research capacity and the financial potential to implement high-risk innovative manufacturing technologies.

Jorge Rodríguez
Head of Sector
### Current Research Topics and Findings

- Sustainable, resource-efficient manufacturing.
- Production technology to exploit the potential of emerging technologies (in particular novel bio- and nano-technologies).
- Leveraging simulation and modeling techniques to address manufacturing challenges.
- Interoperability of the value chain IT systems and support to collaborative decision.
- Flexible, rapidly responsive production systems for customized manufacturing.
- Smart agrifood: Food chain integrity, making certain that food is traceable, safe to eat, high quality and genuine.
- New product information channels using mobile devices for supermarket clients.

Policy makers are aware of the potential of manufacturing innovation to contribute to tackling social, economic and environmental challenges such as healthcare, sustainability, and mobility.

<table>
<thead>
<tr>
<th>Title</th>
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<th>Funding</th>
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<th>Web</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2NET</td>
<td>Collaborative Cloud Manufacturing Networks</td>
<td>H202O-FoF</td>
<td>The creation of cloud-enabled tools for supporting the supply network optimization of manufacturing and logistic assets based on collaborative demand, production and delivery plans.</td>
<td>c2net-project.eu</td>
</tr>
<tr>
<td>COMPOSITION</td>
<td>Ecosystem for Collaborative Manufacturing Processes - Intra- and Interfactory Integration and Automation</td>
<td>H202O</td>
<td>Creation of a digital automation framework that optimizes the manufacturing processes by exploiting existing data, knowledge and tools to increase productivity and dynamically adapt to changing market requirements.</td>
<td>composition-project.eu</td>
</tr>
<tr>
<td>EASY-IMP</td>
<td>EASY</td>
<td>FP7-FoF</td>
<td>Development of methodologies, tools and platforms for the design and production of personalized meta-products &amp; services, combining wearable sensors embedded into garment with mobile and cloud computing.</td>
<td><a href="http://www.easy-imp.eu">www.easy-imp.eu</a></td>
</tr>
<tr>
<td>FORTISSIMO-2</td>
<td>Factories of the Future Resources, Technology, Infrastructure and Services for Simulation and Modelling - 2</td>
<td>H202O</td>
<td>Project building on the highly successful Fortissimo project, part of the IM4S cluster bringing HPC and related services and expertise to new sectors and in particular SMEs.</td>
<td></td>
</tr>
<tr>
<td>FRACTALS</td>
<td>Future Internet Enabled Agricultural Applications</td>
<td>FP7-FI-PPP</td>
<td>Support to the community of innovative ICT SMEs and web-entrepreneurs to develop FIWARE based applications with high market potential, addressing the needs of the agricultural sector.</td>
<td>fractals-fp7.com</td>
</tr>
<tr>
<td>OCTAVE</td>
<td>Objective Control of TAIler VEnification</td>
<td>H202O, SECURITY</td>
<td>Integration of a commercial-grade and new, hybrid automatic speaker verification (ASV) systems with the latest environmental robustness and anti-spoofing technologies to deliver a scalable, trusted biometric authentication service (TBAS).</td>
<td>octave-project.eu</td>
</tr>
<tr>
<td>RepAIR</td>
<td>Future RepAIR and Maintenance for Aerospace industry</td>
<td>FP7</td>
<td>Research on future on-site maintenance and repair of aircraft by integrated direct digital manufacturing &amp; development of a new set of technologies to maximize the benefits of 3D printing systems and bring further flexibility to produce parts at the right place and time.</td>
<td>rep-air.eu</td>
</tr>
<tr>
<td>THINKING FACTORY</td>
<td>ETORGAI</td>
<td></td>
<td>Development of a platform for the integration of Cyber-Physical Production Systems and the smart exploitation of the information and knowledge for advanced manufacturing.</td>
<td></td>
</tr>
</tbody>
</table>
Telecom

Novel network architectures and virtualized software networks

Description

The Telecom Sector focuses on:

► Developing the technology for future 5G high-speed broadband and mobile network infrastructures.
► Contribute to Networld2020 ETP and the 5G PPP initiative (member of both Steering Boards).
► Foster the adoption of integrated networks as well as novel Internet architectures and technologies.

This sector seeks the definition and adoption of assets for the telecom industry through Atos sales channels.

Our main partners include key telecom industry players (such as Telefonica, Portugal Telecom, Telecom Italia, Deutsche Telekom, Nokia, Alcatel-Lucent, Ericsson, etc.), relevant European universities (UPC, UPM, NTUA...) and cutting-edge research centers (i2CAT, Fraunhofer, iMinds, ...).

Goals

► Explore novel network architectures - such as 5G - and the applications these enable.
► Study 5G enabling technologies such as Network Function Virtualization (NFV) and Software Defined Networks (SDN).
► Analyze the impact of virtualization on the telecom landscape, both from technical and business perspectives.
► Align the research activity with the offering and activities of Atos (Next Generation Intelligent Networks, Context-aware mobility, Cloud for Network Function Virtualization, OSS/BSS, etc.), studying new business opportunities for operators.

Main Activities

From the innovation point of view, Atos is participating in initiatives that bring NFV closer to the market. As far as research is concerned, the combination of NFV and SDN for the construction of the 5G network is one of our main priorities.

The sector is currently involved in several exciting projects that cover a wide range of technological challenges such as NFV and SDN in the framework of 5G as well as Recursive Internet. In particular, we are very proud to participate in five of the first wave of European projects that are currently defining the 5G network to be.

As an IT provider and system integrator with virtualization and cloud expertise, Atos expects to fully take advantage of 5G as a big opportunity for to become even more influential in the telecom sector and link our research results with Atos' global telecom portfolio.

Challenges

► Next generation communication networks (5G) and innovative networking paradigms (Network Function Virtualization, Recursive Internet).
► Combination of cloud computing and networking: Cloud RAN and Mobile Edge Computing (MEC).
► Global telecom solutions (i.e. Big Data for network management) in complex and heterogeneous environments for ubiquitous and reliable service delivery.

Josep Martra
Head of sector
# Current Research Topics and Findings

- Network Function virtualisation (NFV)
- Mobile Edge Computing (MEC)
- Large-scale federation of Future Internet facilities and services for experimental purposes.
- Recursive Internet paradigms.

<table>
<thead>
<tr>
<th>Title</th>
<th>Project Title</th>
<th>Funding</th>
<th>Description</th>
<th>Web</th>
</tr>
</thead>
<tbody>
<tr>
<td>5G NORMA</td>
<td>5G Novel Radio Multiservice adaptive network Architecture</td>
<td>H2020</td>
<td>Development of a novel mobile network architecture providing adaptability in a resource efficient way able to handle fluctuations in traffic demand resulting from heterogeneous and dynamically changing services and to changing local context.</td>
<td>5gnorma.5g-ppp.eu</td>
</tr>
<tr>
<td>5G-CROSSHAUL</td>
<td>The 5G Integrated Fronthaul/Backhaul</td>
<td>H2020</td>
<td>5G integrated backhaul and fronthaul transport network enabling a flexible and software-defined reconfiguration of all networking elements in a multi-tenant and service-oriented unified management environment.</td>
<td>xhaul.eu</td>
</tr>
<tr>
<td>5GEx</td>
<td>5G Exchange</td>
<td>H2020</td>
<td>The aim is to enable collaboration between operators regarding 5G infrastructure services.</td>
<td></td>
</tr>
<tr>
<td>FED4FIRE</td>
<td>Federation for FIRE</td>
<td>FP7</td>
<td>Open and easily accessible facilities to the FIRE experimentation communities, which focus on fixed and wireless infrastructures, services and applications, and combinations thereof.</td>
<td>wwwfed4fire.eu</td>
</tr>
<tr>
<td>PRISTINE</td>
<td>Programmability in Recursive Internet Network Architecture for European supremacy of virtualised networks</td>
<td>FP7</td>
<td>Demonstration of programmable functions in a recursive internet environment for several use cases (security, QoS, congestion control).</td>
<td>ict-pristine.eu</td>
</tr>
<tr>
<td>SESAME</td>
<td>Small Cells Coordination for Multi-tenancy and Edge Services</td>
<td>H2020</td>
<td>Small cells for 5G equipped with computing capabilities are exploited for network management and service delivery enhancement.</td>
<td>wwwsesame.h2020-5g-ppp.eu</td>
</tr>
<tr>
<td>SONATA</td>
<td>Service Programming and Orchestration for Virtualized Software Networks</td>
<td>H2020</td>
<td>SDK and a modular orchestrator of network services for bringing NFV closer to the market in the framework of 5G.</td>
<td>sonata-nfv.eu</td>
</tr>
<tr>
<td>T-NOVA</td>
<td>Network Functions as-a-Service over Virtualised Infrastructures</td>
<td>FP7</td>
<td>Design and implementation of an integrated architecture for the automated management of Virtualized Network Functions over Network/IT infrastructures.</td>
<td>wwwt-nova.eu</td>
</tr>
</tbody>
</table>
Today it’s a totally different energy world: welcome to the century of digitalized energy systems

**Description**

The way we are generating, distributing, and using energy (electricity, water, oil & gas) in Europe has changed dramatically in the new century due to new opportunities to generate renewable energy and the declining of fossil energy sources and to the introduction of smart energy grids and European deregulation. New players have appeared and the roles of incumbent players are changing fast. An ICT-driven market place is already a reality for all energy players and stakeholders that should by guided towards a process of digital transformation. ICT energy systems and applications are at the very core of these changes, being the key enablers for smart energy innovation.

**Goals**

The main goal is to deliver research & innovation initiatives across the entire energy value chain.

It focuses on the major challenges faced by its main players & stakeholders, spanning across every segment of the energy market (electric, water, oil & gas), thus driving the digital transformation of the the European energy industry.

**Main Activities**

Activities are related to the application in the energy domain of advanced ICT smart energy systems and technologies:

- Electric distribution network: advanced smart grid automation, control and management of distribution networks in order to meet the anticipated increased use of distributed energy generation.

- Microgrids and Nanogrids: the introduction of distributed generation supports the establishment of regional/microgrids or local/nanogrids, aggregating and largely autonomously controlling their own supply and demand side resources.

- Electric Vehicles: the large scale introduction of electrical and hybrid vehicles requires interaction between the energy infrastructure, the transport infrastructure, the vehicle information systems and the communication network infrastructure, in order to collect, process and deliver the needed information.

- Efficient Water Management in urban and rural areas through smart ICT application and services for water utilities and consumers.

**Challenges**

The European energy & utilities market industry is facing major challenges towards the Energy and Climate targets for 2020 and beyond to reduce greenhouse gas emissions, increase the share of renewable energies and improve energy efficiency.

- Deregulation, the green agenda, and ICT technology changes have rewritten the utilities rulebook. Smart metering and the smart grid are at center stage of research, innovation and as well commercial deployments and the exploitation of the data set generated by them.

- The increasing proportion of electricity from renewable sources means that the ICT energy systems supporting the grid will have to be distributed and to adapt to a highly volatile supply (e.g. from wind and solar generators). From the consumption perspective, real-time adaption of fares to the cost of energy consumed will create and drive future consumption patterns. At the same time, private and commercial consumers are being encouraged to efficiently use their resources (electricity and water) and to participate in the generation, distribution and storage of electricity.
Current Research Topics and Findings

The main findings of the Energy sector are in the context of the projects listed below, trying to bring together relevant aspects of future ICT smart energy systems:

- Sustainable integration of electric vehicles (EV) developing an intelligent charging system for the real-time exchange of charge related data between Fleets of EVs (FEVs) and the grid allowing the management of high-current fast-charging for large numbers of FEVs; real-time grid balancing according to spatial and temporal needs and capacities (e-DASH).
- Deployment of a distributed ICT infrastructure, combining in-vehicle and cloud based approach collecting and processing data generated by the e-vehicle, and distributing commands for optimizing energy consumption of the different climate systems (Heating, Ventilation and Air Conditioning) for reaching a global energy savings of 50% (JOSPEL).
- Interoperability network that connects the capacities of the neighborhood and wide regional Renewable Energy Sources + Electrical Energy Storages (EES) ecosystems into a collaboration framework that mitigates the requirement of the overall EES capacities thanks to the shared capacities among the participating actors (SHAR-Q).

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<tr>
<th>Title</th>
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<tbody>
<tr>
<td>CPS4 Small</td>
<td>Cyber-Physical Systems for Small Communities, empowering small communities to self-manage their utility services</td>
<td>EITDIGITAL</td>
<td>Cyber Physical Systems for Small Communities has developed an Information and Communication Control Centre that enables small communities to self-manage their utility services by metering resources and monitoring parameters</td>
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<tr>
<td>Communities</td>
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<tr>
<td>JOSPEL</td>
<td>Low energy passenger comfort systems based on the Joule and Peltier effects</td>
<td>H2020</td>
<td>Deployment of distributed ICT infrastructure in electric vehicles for enabling the application of innovative eco-driving strategies combined with efficient climate systems</td>
<td>jospel-project.eu</td>
</tr>
<tr>
<td>SAGA</td>
<td>Security &amp; Privacy as-a-service toolbox</td>
<td>EIT Innoenergy</td>
<td>Set of software tools &amp; services continuously improving the security and privacy issues in the smart meter device market</td>
<td>kic-innoenergy.com</td>
</tr>
<tr>
<td>SHAR-Q</td>
<td>Storage capacity sharing over virtual neighbourhoods of energy ecosystems</td>
<td>H2020</td>
<td>The principal objective of the SHAR-Q is to optimize the storage capacities deployed in the grid with the help of a peer-to-peer interoperability network that connects neighbourhooding RES+Storage ecosystems into a collaboration framework</td>
<td>sharqproject.eu</td>
</tr>
<tr>
<td>Wisebatt</td>
<td>Wise up your battery</td>
<td>EITDIGITAL</td>
<td>Wisebatt has developed Awareness, an application embedded in battery-powered devices to estimate their remaining lifetime accurately. It addresses OEM, hardware and software designers, and supports services providers</td>
<td></td>
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</tbody>
</table>
Homeland Security & Defence
Promoting innovative solutions and emerging technologies for the protection of citizens, goods and infrastructures

Description
The sector of Homeland Security & Defense (HSD) coordinates the research and the commercial exploitation of assets produced by the group targeted to industry and public institutions in the defense and security arena, and especially to the homeland security field, Ministry of Interior, the National and Regional Police Forces and also all types of organizations that address or deal with crisis management, citizen safety, critical infrastructures, crime fighting, law enforcement and border intelligence.

Goals
The main goal is to encourage the adoption of emerging technologies in the Homeland Security & Defense sector, as well as identify business opportunities for Atos when these involve issues such as crisis management, emergency services, protection of citizens, goods and infrastructures, border surveillance and management or ICT support for law enforcement.

Main Activities
► Promotion of project results and developed assets to Atos customers in Homeland Security & Defense.
► Identification and pursuing new business opportunities in HSD in line with Atos innovative key digital services.
► Management of market-driven R&D projects, elaboration of plans for the exploitation of research project results oriented to security and civil protection.

Challenges
► Link strategy and technology: the HSD sector is guided by political and strategic planning, such as the Common Security and Defense Policy (CSDP), which is now integrated into the EU Common Foreign and Security Policy (CFSP), or the Stockholm agenda. Here the challenges are to identify links between these guidelines and actions and emerging/future technologies, to explore “dual use” technologies (defense tech applicable in civil security and the other way round) and to deliver more for less (poll resources, cloud-based solutions, data and info sharing, etc.).
► Interoperability and collaboration: HSD organizations are immersed in the development of NATO, EDA or other EU cooperation frameworks that span a variety of topics from counter-terrorism and crisis management to operational data exchange or cybersecurity. Objectives are to avoid duplication, pool resources and foster EU excellence.
► Exploiting “data deluge”: increasing availability of useful information allows the acquisition of knowledge and development of new generation of intelligence applications needed to enhance situational awareness and agility in decision making.
Current Research Topics and Findings

► Innovation in Crisis Management, Resilience and Emergency services.
► Protection and Surveillance of Critical Infrastructures and Systems.
► Technologies and Processes for Border Control Management.
► Decision Support Systems applied to security.
► Chemical, Biological, Radiological and Nuclear related IT solutions.
► Complex event processing, different mining technologies (data, link, opinion, audio...), data and context fusion, visual analytics.
► Design, modeling and simulation of forward-looking scenarios.
► Automatic image processing and recognition in high demanding scenarios.

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<tbody>
<tr>
<td>BODEGA</td>
<td>BORDERGUARD - Proactive Enhancement of Human Performance in Border Control</td>
<td>H2020</td>
<td>BODEGA gets into the Human Factors in border lines to enhance the performance of border guards and the travelers’ experience. Atos, as expert in decision making, designs a decision support system to evaluate certain solutions in particular contexts.</td>
<td>bodega-project.eu</td>
</tr>
<tr>
<td>CIRAS</td>
<td>Critical Infrastructure Risk Assessment Support</td>
<td>CIPS, DG Home</td>
<td>CIRAS provides a Decision Support System for the protection of Critical Infrastructures. Atos has coordinated the consortium and led the technical design and development, having produced modules for the comparison of security measures alternatives.</td>
<td>cirasproject.eu</td>
</tr>
<tr>
<td>CIVILEX</td>
<td>Supporting European Civilian External Actions</td>
<td>H2020</td>
<td>CIVILEX aims to model the information systems in use within the EU Civilian missions and provide possible solutions for a future interoperable Situational Awareness, Information Exchange and Operational Control Platform. Atos coordinates the action.</td>
<td>civilex.eu</td>
</tr>
<tr>
<td>DRIVER</td>
<td>Driving Innovation in Crisis Management for European Resilience</td>
<td>FP7, SECURITY</td>
<td>Improving Crisis Management at Member State and EU level covering society resilience, strengthening first responders and training. Atos is coordinating the consortium, has led the design of the architecture and provides a system for early warning.</td>
<td>driver-project.eu</td>
</tr>
<tr>
<td>ResiStand</td>
<td>ResiStand: Increasing disaster resilience by establishing a sustainable process to support standardisation of technologies and services</td>
<td>H2020</td>
<td>ResiStand is drafting a roadmap for the empowerment of Crisis Management and European disaster resilience through standardisation. Atos, as industry leader, ensures that expectations of suppliers are adequately portrayed in the Resistand Process</td>
<td>resistand.eu</td>
</tr>
<tr>
<td>TOXi-TRIAGE</td>
<td>Integrated and adaptive responses to toxic emergencies for rapid triage engineering the roadmap from casualty to patient to survivor</td>
<td>H2020</td>
<td>TOXi-Triage merges technologies from clinical medicine with practices of search and rescue into an integrated concept of operation for triage in a catastrophic CBRN incident. Atos develops an integrated information and communication centre.</td>
<td>toxitriage.eu</td>
</tr>
<tr>
<td>ZONESEC</td>
<td>Towards a EU Framework for the Security of Widezones</td>
<td>FP7</td>
<td>ZONESEC addresses Widezones surveillance defining a European framework taking into consideration costs, complexity, vulnerability, societal acceptance and ethics. Atos leads the joint technical effort, the Core development and Dissemination.</td>
<td>zonesec.eu</td>
</tr>
</tbody>
</table>
Transport

Innovation is essential if supply-chain stakeholders are to remain competitive

Description

Logistics is the backbone of economic activity and growth. It represents 10-15% of global GDP, and has made enormous impacts in terms of globalization and free trade as both an enabler and as an outcome. Moreover, supply chains are highly productive of data and yet these data involve different information systems, different user requirements, different business models and different deployment trajectories.

The Transport & Trade Logistics sector covers a range of activities to deliver advanced IT services, fast and robust solutions for the implementation, integrating interoperability, security, resilience and real-time optimization that enables the cost-effective, green and secure transit of goods through the Global Supply Chain and the urban logistics environment. Supply chain innovation is essential if manufacturing organizations are to remain competitive.

Goals

Our research goals focus on achieving competitive advantage required by supply-chain stakeholders in times of rapid changes to have a clear understanding of the direction of change, challenges and its implications for business or supply chain mechanisms.

► Advanced technology research, development, testing and evaluation to evolve and improve the mechanisms, business and security in the transport of goods in air, land and sea environments.

► To collaborate and work on relevant research projects.

► To disseminate and transfer relevant research findings in the logistics domain.

Main Activities

► Enable the interoperability and integration of systems, delivering cost reductions, greater efficiency and enhanced security.

► Development of enablers to unlock the real-time information exchange across suppliers, manufacturers, logistics providers and retailers without necessitating costly interfaces.

► Usage of open standards and lightweight communication mechanisms to expose a collaborative environment in the logistics sector.

► Encourage the exploitation of these best practice results through a targeted dissemination campaign aimed at decision makers in the logistics industry.

Challenges

► Supply chain visibility and transparency - Accurate data.

► Enable the interoperability and integration of systems, delivering cost reductions, greater efficiency and enhanced security.

► Development of connectivity infrastructure for collaborative and efficient data sharing among all stakeholders in the logistics sector.

► Supply Chain Resilience - Develop the essential tools and processes necessary to create a capability of “design for resilience”.

► Security and facilitation.

German Herrero
Head of Sector
## Current Research Topics and Findings

- Real-time Cloud Messaging AEON
- GObal Operation Distribution System GOAL
- Urban logistics
- Green logistics

<table>
<thead>
<tr>
<th>Title</th>
<th>Project Title</th>
<th>Funding</th>
<th>Description</th>
<th>Web</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTOMAT</td>
<td>Automotive Big Data Marketplace for Innovative Cross-sectorial Vehicle Data Services</td>
<td>H2020</td>
<td>Development of a novel and open ecosystem in the form of a cross-border Vehicle Big Data Marketplace that leverages currently unused information gathered from connected vehicles.</td>
<td>automat-project.eu</td>
</tr>
<tr>
<td>CO-GISTICS</td>
<td>Deploying Cooperative Logistics</td>
<td>FP7</td>
<td>Deployment of cooperative solutions for efficient and sustainable logistics across Europe, integration of existing freight and transport systems with innovative solutions such as cooperative services and intelligent cargo</td>
<td>logistics.eu</td>
</tr>
<tr>
<td>CORE</td>
<td>Consistently Optimised RESilient ecosystem in the Supply Chain</td>
<td>FP7</td>
<td>Ecosystem integrating interoperability, security, resilience and real-time optimisation to produce cost-effective, fast and robust solutions that will guarantee the efficient and secure transit of goods through the worldwide Global Supply Chain system.</td>
<td>coreproject.eu</td>
</tr>
<tr>
<td>DRIVER</td>
<td>Driving Innovation in Crisis Management for European Resilience</td>
<td>FP7, SECURITY</td>
<td>Improving Crisis Management at Member State and EU level covering society resilience, strengthening first responders and training. Atos is coordinating the consortium, has led the design of the architecture and provides a system for early warning.</td>
<td>driver-project.eu</td>
</tr>
<tr>
<td>FREVUE</td>
<td>Freight Electric Vehicles in Urban Europe</td>
<td>FP7</td>
<td>Demonstration to industry, consumers and policy makers of how electric freight vehicles can provide a smart, clean and efficient solution to transport-related challenges currently affecting European cities.</td>
<td>frevue.eu</td>
</tr>
<tr>
<td>HOPE</td>
<td>Holistic Personal public Eco-mobility</td>
<td>FP7</td>
<td>Open platform capable of combining Interoperable Fare Management and Traveler Information Systems. Smart Trip-Planning features will provide for reliable and comprehensive user experience, always proposing to travelers the best available options.</td>
<td>hope-eu-project.eu</td>
</tr>
</tbody>
</table>
New media and digital content management are quickly becoming strategic growth areas for Atos

Description
The Media sector encompasses two complementary perspectives:

► On one hand there is the media industry (broadcast, content production, press, etc.)
► and on the other, media and gaming technologies such as digital content management, 3D audio and video analysis, Big Data social media analysis, augmented and mixed reality etc.

In terms of clients, there tend to be either very large media conglomerates and/or broadcasters or small, agile technology companies.

Goals
The main goal is to improve the positioning of Atos in Media, New Media and Digital Content Management. These areas are quickly becoming a strategic growth area for Atos and this will drive the research topics of this sector with a strong market orientation.

The design and development of ICT tools that support:

► Multi-platform efficient Media content management, search, retrieval and content distribution.
► Content recommendation and personalized advertising through content characterization, content annotation, datafusion and profiling.
► Rich multimedia user experience.
► Social network analytics.
► Non-leisure gaming and gamification technologies.

Main Activities
Besides participating in R&D projects, the Media sector supported Atos Major Events for the 2016 Summer Olympic Games in Rio de Janeiro, Brasil. It also contributed to the Olympic Broadcasting Services webcasting solution for the Winter Olympics 2014 in Sochi and for the second Youth Olympic Games in Nanjing.

We also follow the activities of the New European Media (NEM) initiative.

Challenges
The biggest challenge is to convert the extensive knowledge accumulated by this sector during last years in different R&D projects related to media technologies into assets that are useful to the rest of Atos Group.

The focus is on the following challenges:

► Content annotation and enriched metadata for multimedia.
► Multimedia search, distribution and retrieval.
► 3D and virtual worlds.
► Streaming (P2P, 3D, SVC, MDC, etc.).
► Social media analytics related to media content.
Current Research Topics and Findings

- Metadata, especially for sports
  - In video Mpeg, 7 MPEG 21, etc.
  - In Sport (SportML, EventML, Major Events)
- Realtime recommender systems
- Personalized Content
- Multimedia search and retrieval
- P2P streaming
- Social media analytics
- Second Screen
- New user interfaces for access to multimedia (multitouch, Kinect, tablet)
- Digital archiving

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</thead>
<tbody>
<tr>
<td>CoNCEPT</td>
<td>COllaborative CiEative design PlaTform</td>
<td>FP7</td>
<td>Collaborative design platform for the early stages of the design process</td>
<td>concept-fp7.eu</td>
</tr>
<tr>
<td>Flame</td>
<td>Facility for Large-scale Adaptive Media Experimentation</td>
<td>H2020</td>
<td>Development and operation of an experimental infrastructure for media content delivery that combines VSNs and ICN to optimize efficiency and user experience considering the expected demand patterns of the Future Media Internet applications &amp; services.</td>
<td>flame-project.eu</td>
</tr>
<tr>
<td>ProsocialLearn</td>
<td>Gamification of Prosocial Learning for Increased Youth Inclusion and Academic Achievement</td>
<td>H2020</td>
<td>Delivery of a series of disruptive innovations for the production and distribution of prosocial games that engage children and technology transfer from the games industry to the educational sector.</td>
<td>prosociallearn.eu</td>
</tr>
<tr>
<td>SMART</td>
<td>Multimedia Search and Retrieval over Integrated Social and Sensor Networks</td>
<td>FP7</td>
<td>Research and implementation of a scalable open source next generation multimedia search engine that will be able to search information stemming from the physical world.</td>
<td>smartfp7.eu</td>
</tr>
<tr>
<td>Trillion</td>
<td>Trusted Citizen - LEA Collaboration Over Social Networks</td>
<td>H2020</td>
<td>Open, flexible, secure and resilient socio-technical platform to foster effective collaboration of citizens and law enforcement officers.</td>
<td>trillion-project.eng.it</td>
</tr>
</tbody>
</table>
Data Intelligence

Helping to manage your data by researching on Big Data, AI, Semantics and Linked Data

Description

The Data Intelligence Lab researches on novel technologies in the fields of Big Data, Artificial Intelligence, Semantics and Linked Data. These complementary fields are amongst the technologies with more influence in the current business trends.

From companies to governments, from organizations to individuals, from the web to social networks, from traditional media to sensors, data is growing everywhere. Data is the new gold. Our lab is monitoring and researching on Big Data solutions to cope with this data deluge, trying to help all possible stakeholders to better acquire, store, organize, annotate, curate, analyze and finally use the data. We see Big Data as a philosophy, as a new paradigm that allows performing data analytics where nobody has gone before.

We deal with technologies related to the entire data value chain (data acquisition, pre-processing, analysis and usage). Of particular interest for us are the architectures, frameworks and techniques that are the foundations of any data-intensive related application. Big data analytics, with especial focus on text analytics using Language Technologies, is one of the key pillars of the work carried out within the lab.

On the other hand, the world is now in the quest of opening data to the public. Especially, but not only, the Public Sector is clearly embracing the open data initiative. Within the Data Intelligence Lab we research and apply the Linked Data paradigm to help organizations that need to share data on the web and at the same time offering a programmatic interface allowing not only humans, but also machines (programs) to get automatic access and understanding of the data. The use of semantics and Linked Data is a key enabler of the use of public data in the future.

Main Activities

We believe there is no solution that fits-it-all, but general good architectural principles and best practices combined with an excellent knowledge of available tools and new research trends, make the difference between success and mediocrity.

► Artificial Intelligence: From Machine Learning to Deep Learning to the multiple applications of the technology to real-world applications and challenges.
► Linked Data: Application of the Linked Data paradigm for data publication and linking.
► Semantics: Application of ontologies and language technologies for annotation, searching and extracting meaning from texts.

Goals

The main objective is researching on technologies and their applicability related to data and meta-data management:

► Big Data: Under the Big Data umbrella, the Data Intelligence Lab is particularly interested in pushing the state of the art in surfaceing business intelligence from web resources and social networks, as well as investigating new solutions for big data storage, big data architectures, data visualization, data analytics and data science.

► We are working in projects and solutions for big data architectures, with special emphasis in bringing together innovative technologies in sounding architectures fit for specific purposes.
► We are setting up and testing novel infrastructures for data acquisition and annotation, analyzing sentiments and bringing together semantics and big data.
► We have developed a Social Network monitoring tool called Capturean that is the cornerstone of our knowledge transfer to commercialize research and innovation results.
► We develop machine learning algorithms and tested deep learning techniques in the scope of data analytics projects.
► We are trying to add our 2 cents to the Linked Open Data initiative by bringing Linked Data technologies in the scope of big data solutions, and our own developments to our projects, therefore promoting the uptake of open data.
► We have an extensive track record in projects and solutions dealing with semantic technologies, such as ontology engineering, semantic applications for enterprises, natural language processing in English and Spanish, among others.

Tomas Pariente
Head of Lab
## Challenges

### Big Data
- Architectural approaches to deal with massive amounts of historical and streaming data in a coherent manner.
- Data acquisition from social networks, with special emphasis in gathering intelligence from Twitter.
- Use of Cloud Computing for storage and massive processing parallelization.
- NoSQL storage.
- Sentiment analysis.
- Machine Learning and Data Mining over large datasets.

### Artificial Intelligence
- Deep Learning.
- Neural networks.

### Semantics
- Triplestores usage and customization, and their applicability in Linked Data and Big Data solutions.
- Terminology servers and its application to semantic interoperability.
- Reusing and engineering ontologies for multiple purposes and domain.
- Natural Language Processing techniques in Spanish and English.

### Current Research Topics and Findings
- Automatic deployment of Big Data architectures, components and services.
- Cross-domain data integration.
- Stream processing and stream analytics.
- Interpretation and analysis of unstructured textual resources using Natural Language Processing, Machine Learning and Data Mining techniques.
- Usage of Linked Data open tools for data publishing and linking.

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<tbody>
<tr>
<td>ACANTO</td>
<td>A CyberphysicAI social NeTWork using robot friends</td>
<td>H2020</td>
<td>Using robots to increase the number of older adults who engage in a regular and sustained physical activity.</td>
<td><a href="ict-acanto.eu">ict-acanto.eu</a></td>
</tr>
<tr>
<td>CoeGSS</td>
<td>Centre of Excellence for Global Systems Science</td>
<td>H2020</td>
<td>Advanced decision-support in the face of global challenges. It brings together the power of HPC and some of the most promising thinking on global systems in order to improve decisions in business, politics and civil society.</td>
<td><a href="coegss-project.eu">coegss-project.eu</a></td>
</tr>
<tr>
<td>LeanBigData</td>
<td>Ultra-Scalable and Ultra-Efficient Integrated and Visual Big Data Analytics</td>
<td>FP7</td>
<td>LeanBigData targets at building an ultra-scalable and ultra-efficient integrated big data platform addressing important open issues in big data analytics</td>
<td><a href="leanbigdata.eu">leanbigdata.eu</a></td>
</tr>
<tr>
<td>MLi</td>
<td>Towards a MultiLingual Data Services infrastructure</td>
<td>FP7</td>
<td>Providing the foundations and roadmap of a scalable platform for the joint development/enhancement and hosting of (multi-language datasets, processing tools and basic services.</td>
<td><a href="mli-project.eu">mli-project.eu</a></td>
</tr>
<tr>
<td>PHEME</td>
<td>Computing Veracity Across Media, Languages, and Social Networks</td>
<td>FP7</td>
<td>Combination of big data analytics with advanced linguistic and visual methods. The results will be suitable for direct application in medical information systems and digital journalism.</td>
<td><a href="pheme.eu">pheme.eu</a></td>
</tr>
<tr>
<td>QROWD</td>
<td>Because Big Data Integration is Humanly Possible</td>
<td>H2020</td>
<td>Methods to perform cross-sectoral streaming Big Data integration including geographic, transport, meteorological, cross domain and news data, while capitalizing on human feedback channels.</td>
<td></td>
</tr>
<tr>
<td>TOREADOR</td>
<td>TrustwOrthy model-awaRE Analytics Data platfORm</td>
<td>H2020</td>
<td>TOREADOR aims at overcoming some major hurdles that until now have prevented many European companies from reaping the full benefits of Big Data Analytics.</td>
<td><a href="toreador-project.eu">toreador-project.eu</a></td>
</tr>
<tr>
<td>VELaSSCo</td>
<td>Visualization for Extremely Large-Scale Scientific Computing</td>
<td>FP7</td>
<td>Development of a new concept of integrated end-user visual analysis methods with advanced management and post-processing algorithms for engineering modelling applications, scalable for real-time petabyte level simulations.</td>
<td><a href="velassco.eu">velassco.eu</a></td>
</tr>
</tbody>
</table>
Next Generation Cloud
Contributing to Atos innovation strategy with regards to Cloud computing

Description
Cloud adoption is increasing across all types of organisations. IDC predicts “cloud IT infrastructure spending will reach $531B billion by 2019” while identifying that “Over 70% of heavy cloud users are thinking in terms of a ‘hybrid’ cloud strategy”. 451 Research’s Market Monitor forecasts that “the market for cloud computing, including PaaS, IaaS and infrastructure software as a service will achieve $44.2B by 2020”. Gartner anticipates that “By 2020, over 50% of all new applications developed on PaaS will be IoT-centric”.

Two trends are emerging in this context, on which the NG Cloud Lab’s vision focus its attention.

First, a disruptive approach emerged due to the specific needs of IoT applications enabled by combining network with typical cloud principles in order to create decentralized and disperse cloud platforms, coined under the term “Edge Computing”.

Secondly, a more evolutionary trend focusing on multi-cloud hybrid models. New technological developments together with advances in standardization efforts and, in general, a more cloud computing cloud market, create the necessary ground for making these a reality in the coming years.

Investigation on these is this lab’s main mission, building upon more than ten years of experience performing insightful research in cloud technologies, distributed systems and service engineering.

Goals
The main goal of this lab is to contribute to Atos research and innovation strategy with regards to Cloud and Edge computing developments, models and architectures.

The Lab’s main research areas are Cloud Service Integration, the so-called Multi-Cloud, and Edge Computing. It addition to this, our work includes research in the intersection among these – nowadays tagged as Dew Computing by some authors- and research topics cross-cutting these lines as application field of the Computing Continuum vision. You can find detailed information about the Lab’s Computing Continuum vision, and the specific research topics identified for future work in these research areas here.

Main Activities

**Advanced capabilities for IaaS, PaaS and SaaS**
- Accounting and monitoring
- Autonomic resource management
- SLA management
- Multi-cloud environments IaaS, PaaS and SaaS
- Experimental Facilities in Cloud
- Eco-efficiency in Clouds and Data Centres

**Service Management and Engineering: Advanced Service Architectures and SaaS**
- Cloud Service Composition, aggregation and orchestration
- Service, Application and Data Marketplaces
- Trust & Reputation Service Management
- License Management

**Edge computing**
- Heterogeneous / Things virtualisation management
- Ad-hoc Cloud management

**Challenges**
- Cloud Hybrid models: Interoperation, Portability, Federation and Brokerage
- SLAs, Trust and License Management for Cloud environments
- Integration of edge and mobile devices into decentralized Cloud architectures for IoT services
- Energy efficiency in heterogeneous computing environments, Cloud computing and Data centers

Ana Maria Juan Ferrer
Head of Lab
Big Data Storage and scalability in Big Data processing
Cloud-based Experimental facilities
Autonomic and self-healing capabilities for Cloud management
Cloud Service composition, aggregation and orchestration
Cloud Marketplaces, Vertical markets, Added-value services and Applications
Cloud Standardization and Compliance
Scalability based on predictive models and including heterogeneous resources
Heterogeneous and autonomic resource management

Current Research Topics and Findings

Cloud Service Integration / Multi-Cloud
- Improved mechanisms for QoS and SLA Management
- Scalability
- Multi-tenancy / Isolation
- Cloud Migration
- Application deployment Automation
- Improved Cloud Monitoring
- Interoperability and Multi-Cloud Provisioning
- Cloud Networking
- Economy, Cost, Trust and Reputation models
- Cloud marketplaces
- Eco-efficiency

Edge (Fog) Computing
- Edge (Fog) Management and heterogeneity
- Across Edge execution orchestration
- Interoperability and standardization
- Off-loading optimization
- Edge computing communication topology automation
- Support for heterogeneous and geographically distributed systems

DeW Computing: Where the Edge meets the Cloud
- Edge / Fog Service Management
- Admission Control
- Data abstractions and movement in Cloud and Edge computing
- Edge Workload management

Development areas for Computing Continuum, Mavericks Cloud Research
- Swarm management among IoT, Edge and Cloud Computing
- Cyber-physical Cloud/Edge computing
- Cloud Robotics

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<tbody>
<tr>
<td>AGILE</td>
<td>Adaptive Gateways for Diverse Multiple Environments</td>
<td>H2020</td>
<td>Modular hardware and software gateway for IoT with support for protocol interoperability, device and data management, IoT apps execution, and external Cloud communication.</td>
<td>agile-iot.eu</td>
</tr>
<tr>
<td>ASCETIC</td>
<td>Adapting Service lifeCycle towards EfficientT Clouds</td>
<td>FP7</td>
<td>Provision of novel methods and tools to support software developers aiming to optimize energy efficiency and minimize the carbon footprint resulting from designing, developing, deploying, and running software in Clouds.</td>
<td>ascetic.eu</td>
</tr>
<tr>
<td>BASMATI</td>
<td>Cloud Brokerage Across Borders For Mobile Users And Applications</td>
<td>H2020</td>
<td>Development of an integrated Brokerage Platform targeting federated clouds in order to support dynamic needs of mobile applications and users.</td>
<td></td>
</tr>
<tr>
<td>CloudSocket</td>
<td>Business and IT-Cloud Alignment using a Smart Socket</td>
<td>H2020</td>
<td>Introduction of the BPaaS concept that fulfills business process needs thanks to smart alignment techniques, packages BPaaS as “extended Cloudlets” autonomously deployable and including adaptive rules to appropriately react in a multi-cloud environment.</td>
<td>cloudsocket.eu</td>
</tr>
<tr>
<td>INDIGO-DataCloud</td>
<td>INtegrating Distributed data Infrastructures for Global ExplOitation</td>
<td>H2020</td>
<td>Development of an innovative cloud platform for the scientific community based on open source software and providing access without restrictions to a diversity of e-Infrastructures (public or commercial, GRID/Cloud/HPC).</td>
<td>indigo-datacloud.eu</td>
</tr>
<tr>
<td>RAPID</td>
<td>Heterogeneous Secure Multilevel Remote Acceleration Service for Low-Power Integrated systems and Devices</td>
<td>H2020</td>
<td>Development of an efficient heterogeneous cloud computing infrastructure, which can be used to seamlessly offload CPU-based and GPU-based tasks of applications running on low-power as well as more powerful devices over a heterogeneous network.</td>
<td>rapid-project.eu</td>
</tr>
<tr>
<td>SeaClouds</td>
<td>Seamless adaptive multi-cloud management of service-based applications</td>
<td>FP7</td>
<td>Solutions to enable seamless adaptive multi-cloud management of complex applications, by supporting distribution, monitoring and migration of application modules over multiple heterogeneous (PaaS) clouds.</td>
<td>seaclouds-project.eu</td>
</tr>
<tr>
<td>symbIoTe</td>
<td>Symbiosis of smart objects across IoT environments</td>
<td>H2020</td>
<td>Fostering a simplified IoT application and service development process over interworking IoT platforms.</td>
<td>symbiote-h2020.eu</td>
</tr>
<tr>
<td>TANGO</td>
<td>Transparent heterogeneous hardware Architecture deployment for eNergy Gain in Operation</td>
<td>H2020</td>
<td>Control of underlying heterogeneous hardware architectures, configurations and software systems while providing tools to optimize various dimensions of software design and operations.</td>
<td>tango-project.eu</td>
</tr>
</tbody>
</table>
Cybersecurity

Addressing security, trust and privacy from a technological perspective, to ensure the security of citizens and organizations

Description

Trustworthy, secure and reliable ICT systems are crucial for a wide take up of converging digital services and a global requirement for the reliable and undisturbed functioning of our information society.

In this scenario, the Cybersecurity (CS) lab is an interdisciplinary group that conducts research in the trust, security and privacy domains for the improvement of information technology security, as well as the increase of trust and dependability in systems and services.

Goals

Our ambition is to coherently address security, trust and privacy from a technological perspective, in an effort to ensure innovation in the field of secure software development, secure service composition, and secure service delivery. The goal is to find solutions for ensuring the security of citizens and organizations from threats such as terrorism, natural disasters and crime, while respecting fundamental rights, such as privacy.

Our research areas include, among others: cyber security, compliance & policy management, secure software engineering, security in virtualized environments, automated reconfiguration of security and high performance Security Information and Event Management (SIEM) systems.

Main Activities

► Innovative security mechanisms (e.g. dynamic or adaptive features).
► Compliance & Policy Management.
► Security event and information management infrastructure (e.g. evidence-based policy enforcement, including security/privacy event monitoring, collection and assessment).
► Security methodologies and frameworks (e.g. risk assessment and secure software development).
► CyberSecurity: fight against malware and botnets, improved resilience against cyber threats.

Challenges

► Security in shared service applications and infrastructures such as Cloud.
► Security & Privacy in Social Networks.
► Security of ICT in large distributed IT systems (sensor networks, interconnected critical infrastructures).
► Information exchange, interoperability and data fusion for situational awareness.
► Context-aware security and context-aware privacy protection.
► Digital forensics (e.g. forensics in Cloud).

Rodrigo Díaz
Head of Lab
Current Research Topics and Findings

► Trust (establishment of trust relations, management of trust).
► High Performance Security Information and Event Management (SIEM).
► High Performance Compliance Management, including: Evidence Collection, Compliance Assessments and Accountability.
► Privacy by Design, Context-aware privacy enhancement and privacy preservation.
► Security for Virtualized environments.
► Secure Software Engineering.
► Automated Reconfiguration of Security.
► Risk and cost-driven security decision making.
► Prevention of crime and efficient collaboration of police forces.
► Data protection technologies and applications.
► Botnets detection and mitigation.

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<tbody>
<tr>
<td>ACDC</td>
<td>ACDC - the Advanced Cyber Defence Centre</td>
<td></td>
<td>Bringing together organizations from 14 European countries, including public administrations, private sector and academia, in order to achieve a sustainable victory over a powerful cyber threat commonly known as botnet.</td>
<td>botfree.eu</td>
</tr>
<tr>
<td>CIPSEC</td>
<td>Enhancing Critical Infrastructure Protection</td>
<td>H2O20</td>
<td>Creation of an unified security framework that orchestrates state-of-the-art heterogeneous security products to offer high levels of protection in Information Technology and Operational Technology departments of Critical Infrastructures.</td>
<td>cipsec.eu/</td>
</tr>
<tr>
<td>COMPOSITION</td>
<td>Ecosystem for Collaborative Manufacturing Processes</td>
<td>H2O20</td>
<td>Creation of a digital automation framework that optimizes the manufacturing processes by exploiting existing data, knowledge and tools to increase productivity and dynamically adapt to changing market requirements.</td>
<td>composition-project.eu/</td>
</tr>
<tr>
<td>RERUM</td>
<td>REliable, Resilient and secure IoT for Smart city</td>
<td></td>
<td>Architectural framework for dependable, reliable, and secure networks of heterogeneous smart objects supporting innovative Smart City applications.</td>
<td>ict-rerum.eu</td>
</tr>
<tr>
<td>TREDISEC</td>
<td>Trust-aware, REliable and Distributed Information</td>
<td>H2O20</td>
<td>Unified framework where resulting primitives are integrated, while following the end-to-end security principle as closely as allowed by functional and non-functional requirements.</td>
<td>tredisec.eu</td>
</tr>
<tr>
<td>VisiOn</td>
<td>Visual Privacy Management in User Centric Open</td>
<td>H2O20</td>
<td>Implementation of a privacy platform software components leveraging on existing software, tools and methodologies, which partners have developed in previous projects.</td>
<td>visioneuproject.eu</td>
</tr>
</tbody>
</table>
**Internet of Everything**

Fostering holistic federation of IoT platforms as ICT infrastructure for Smart Environments

**Description**

In recent years the potential Internet of Things technologies have acquired high attention and gained further recognition as key enabler for citizen centric business generation in different application areas, such as Smart Cities, Smart Energy and Environmental Management and Protection, Smart Industry and Factories of the Future, Smart Home and Assisted Living, Public Safety, Agriculture and Tourism. The Internet of Everything concept goes one step forward involving People, Process, Data and Things under the same scope.

We currently understand the Internet of Everything as a paradigm considering the pervasive presence, in any context of the human activity, of sensing and actuating physical devices and ICT objects that are addressable, interconnected, and able to communicate and cooperate which each other.

Atos has a clear IoT end to end strategy aligned with the Group strategy, from IoT services to IoT platform. IoE will enable and empower our clients on their digital transformation journey and develop competitive advantage. The new IoE paradigm is not only about gathering data from objects, is about using these data in better decisions and integrated in the business processes.

We strongly support the usage of standard and open web technologies to construct the Internet of Everything. The openness in technologies ensures that implemented standards are used without barriers, enabling freedom for researching, deployment and creation of new business models in a digital world.

**Goals**

- Provide a full operative IoE platform capable of connecting People, Process, Data and Things in a standard, scalable and decoupled way. The resulting ecosystem enables a multi domain business and applications through a set of services for real time communications, data storing, monitoring, statistics, etc.
- Foster Open Standard Web technologies to create services, platforms and applications focusing on the growing needs of interoperability. IoT open standards interoperability is necessary for market adoption and horizontal solutions.
- To support interoperability and Open Standards, the European FIWARE Platform is used to implement IoT scenarios taking advantage of the IoT Generic Enablers and NGSI Data Standard.

**Main Activities**

At technical level we focus on developing a complete IoE platform where the embedded devices are complemented with the new landing of tiny computers and any kind of sensors. Smart gateways virtualize sensors (devices, actuators, etc.) powering them with connectivity capabilities and adaptable behavior. They act and react intelligently thanks to the analysis of surrounding data and communicate to the world through different services and integration frameworks.

At the business modeling research level, our aim is to abstract technological heterogeneity of vast amounts of diverse real work addressable objects, to enable their use for enhancing IoT services and applications, and the involvement of cross-domain actors in multi-sided business platforms.

Last year we have started a new research line about managing the huge heterogeneous ecosystems in IoT scenarios.

We participate in technological research activities looking both for deriving user situation-aware application requirements in real time and for producing virtualized IT object models and integration frameworks equipped with advanced features. Virtual IT objects become robust and reusable in a broader IoE service context and easily integrable with other platforms and services.

At the business modeling research level, our aim is to abstract technological heterogeneity of vast amounts of diverse real work addressable objects, to enable their use for enhancing IoT services and applications, and the involvement of cross-domain actors in multi-sided business platforms.

José Gato
Head of Lab
Some of the pending achievements towards a mature implementation of the IoE paradigm are:

► Faster software developments and solutions using a complete ecosystem guided by common open standard technologies and architecture.

► The business of Open Standard APIs: implementing and exposing services and tools through APIs as a product. Restful interfaces support this approach making use of HTTPS protocol as standard for M2M, M2I, V2X, etc.

► Semantic interoperability of sensor information exchange models in heterogeneous environments.

► Adoption of governance mechanisms fostering innovation, trust, and fair data ownership management, while respecting security, privacy and complexity of new IoE environments.

► Bringing “agile developments” and “continuous integration” methodologies to provide deployment of large-scale environments.

► Development of sustainable business embracing the full potential of the Internet of Everything.

► Participate in R&D programs to propose innovative security environments.

As a key actor in the European IoE research landscape, our lab provides technological contributions to the solution of the mentioned issues aiming at ensuring wider adoption and implementation of the IoE paradigm.

<table>
<thead>
<tr>
<th>Title</th>
<th>Project Title</th>
<th>Funding</th>
<th>Description</th>
<th>Web</th>
</tr>
</thead>
<tbody>
<tr>
<td>COSMOS</td>
<td>Cultivate Resilient Smart Objects for Sustainable City Applications</td>
<td>FP7</td>
<td>Development of an IoT framework where things are able to learn based on others experiences while socially-enriched coordination considers the role and participation scheme of things, in and across networks.</td>
<td>iot-cosmos.eu</td>
</tr>
<tr>
<td>CREATE-IoT</td>
<td>CREATE-IoT</td>
<td>H2020</td>
<td>The project’s aim is to stimulate collaboration between Internet of Things (IoT) initiatives, foster the take up of IoT in Europe and support the development and growth of IoT ecosystems based on open technologies and platforms.</td>
<td></td>
</tr>
<tr>
<td>iKaaS</td>
<td>Intelligent Knowledge-as-a-Service</td>
<td>H2020</td>
<td>Intelligent, privacy preserving and secure Smart City Platform based on a Big Data resource and an analytics engine.</td>
<td>iKaaS.com</td>
</tr>
<tr>
<td>P-SOCRATES</td>
<td>Parallel Software Framework for Time-Critical Many-core Systems</td>
<td>FP7</td>
<td>Development of an entirely new design framework, from the conceptual design of the system functionality to its physical implementation, to facilitate the deployment of standardized parallel architectures in all kinds of systems.</td>
<td>p-socrates.eu</td>
</tr>
<tr>
<td>RERUM</td>
<td>RELiable, Resilient and secUre IoT for sMart city applications</td>
<td>FP7</td>
<td>Architectural framework for dependable, reliable, and secure networks of heterogeneous smart objects supporting innovative Smart City applications.</td>
<td>ict-rerum.eu</td>
</tr>
<tr>
<td>VICINITY</td>
<td>Open virtual neighbourhood network to connect IoT infrastructures and smart objects</td>
<td>H2020</td>
<td>Development and demonstration of a bottom-up ecosystem of decentralised interoperability of IoT infrastructures called virtual neighborhood, where users can share the access to their smart objects without losing the control over them.</td>
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</tr>
</tbody>
</table>
Identity & Privacy
Securing corporate & personal identity in cyberspace

Description

Secure identity and privacy technologies are basic for citizens in the Digital Society & Economy: it is about protecting who and what we are in the context of fundamental human rights and freedoms including the right to personal data protection in all aspects of life involving ICT and online services.

Assurance of identity data security and better privacy protection both create key competitive advantage for Atos and for our public and private partners, having in focus both customer concerns in this regard and existing threats which create social alarm and hamper trust in eServices of global digital markets and ICT systems in general.

Goals

Secure identity schemes for Identity and Access Management and the protection of identity-related and other personal and sensitive information (in compliance with regulatory frameworks that guarantee citizen fundamental rights) are basic enablers of trust and security for end-users, and for the eco-system of stakeholders around ICT services.

The Identity and Privacy lab focuses on innovative technological trends in these areas to serve the needs of the Research and Innovation sectors and markets offering trustworthy solutions and assets and fostering competitive advantages in an increasingly complex and distributed environment (Cloud, Big Data, Future Internet, Mobile & Bring Your Own, Internet of Things, etc.) where eID and privacy can achieve for Atos customers compliance with regulatory requirements, more efficiency, competitive advantage and enhanced trust towards their end-users, reduced fraud and enhanced cooperation with stakeholders in the eServices value chains.

Main Activities


► Digital/Electronic Identity Technologies: Electronic certificates, on-line electronic IDs, smartcards, travel documents, cross-border, cross-domain interoperable strong authentication for notified & web-based eIDs and compliance with relevant Regulations (e.g. eIDAS Regulation, ICAO 9303, ).

► Cryptography and Electronic Trust Services: homomorphic encryption for trusted data processing in untrusted environments, secure computation, proxy re-encryption, searchable encryption, malleable signatures, electronic signatures/seals, electronic registered delivery, timestamps, digital preservation.


► Data Protection by Design and Privacy Engineering Methodologies: Privacy and Security by Design methodologies, patterns and controls, Privacy Enhancing Technologies (including anonymisation, pseudonymisation, differential privacy, user-defined data protection and sharing policies), User-centric multi-service privacy managers awareness and empowerment tools, Privacy Metrics, Identity Fraud and Theft Prevention.

► Biometrics: Multi-biometrics, mobile biometrics, crypto-biometrics, automated and mobile border control, usability, standards.

Challenges

► Interoperable eID solutions will be key enablers of secure and seamless access to eServices (e.g. STORK/STORK 2.0 and eIDAS).

► eID, eIDM, trust services, advanced cryptography and privacy/security-by-design as fundamental enablers of Trust in Future Internet & Cloud.

► Complex Identity Federation & Data Exchange Scenarios (involving personally identifiable information).

► Strong (multi-factor) authentication.

► Identity & Privacy Assurance.

► Auditing and Compliance.
## Current Research Topics and Findings

- **Privacy-enhancing technologies and advanced cryptography approaches as building blocks for privacy-enhancing identity management and data management in trusted and untrusted domains.**
- **Identity Management-as-a-Service (IDMaaS) & Networked Identity: authentication/identification services composable with other services in the Cloud (identity as a commodity).**
- **Methodological approaches: Privacy-by-Design (PbD) including Privacy Impact Assessment, cost & value of privacy compliance, full identity data lifecycle management...**
- **Biometrics: Crypto-biometrics, Cancellable biometrics, Mobile biometrics.**

<table>
<thead>
<tr>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>ABC4EU</td>
<td>Automated Border Control Gates for Europe</td>
<td>H2020</td>
<td>ABC4EU makes border control more flexible by enhancing the workflow and harmonizing the functionalities of Automated Border Control (ABC) gates and other Border Control Processes, aligned with Smart Borders Package of the EU.</td>
<td>abc4eu.eu</td>
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<tr>
<td>ARIES</td>
<td>reliAble euRopean Identity EcoSystem</td>
<td>H2020</td>
<td>Comprehensive framework and holistic approach of technologies, processes and security features for reliable e-identity ecosystem to improve identity, trust and security, with better support to law enforcement in addressing new cybersecurity threats.</td>
<td>aries-project.eu</td>
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<tr>
<td>CREDENTIA</td>
<td>Secure Cloud Identity Wallet</td>
<td>H2020</td>
<td>Innovative cloud based services for storing, managing, and sharing digital identity information and other personal data. Security of services relies on combination of strong hardware-based multi-factor authentication with end-to-end encryption.</td>
<td>credential.eu</td>
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<tr>
<td>DAPHNE</td>
<td>Data-as-a-Service platform for Healthy Lifestyle and preventive medicine</td>
<td>FP7</td>
<td>Development of a platform to deliver personalized guidance services for lifestyle management to the citizen/patient.</td>
<td>daphne-fp7.eu</td>
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<tr>
<td>FIDES</td>
<td>Federated Identity Management System</td>
<td>EIT-DIGITAL</td>
<td>Platform with secure cross-platform identity management system (mobile/desktop), consolidation into a production environment in three national contexts with a sustainable business model.</td>
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<tr>
<td>FOODIE</td>
<td>Farm-Oriented Open Data in Europe</td>
<td>CIP</td>
<td>Open and interoperable agricultural specialized platform hub on the cloud for the management of spatial and non-spatial data relevant for farming production.</td>
<td>foodie-project.eu</td>
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<tr>
<td>LIGHTest</td>
<td>Lightweight Infrastructure for Global Heterogeneous Trust management in support of an open Ecosystem of Stakeholders and Trust schemes</td>
<td>H2020</td>
<td>Global, cross-domain trust infrastructure that renders it transparent and easy for verifiers to evaluate electronic transactions and make domain-specific trust decisions, querying different trust authorities worldwide and combining trust aspects.</td>
<td>lightest.eu</td>
</tr>
<tr>
<td>MoveUS</td>
<td>ICT cloud-based platform and mobility service: available, universal and safe for all users</td>
<td>FP7</td>
<td>Changing European users' mobility habits by offering intelligent and personalized travel information services, helping people to decide the best transport choice and providing meaningful feedback on energy efficiency savings.</td>
<td>moveus-project.eu</td>
</tr>
<tr>
<td>PIME</td>
<td>Personal Information Management Ecosystems</td>
<td>EIT-DIGITAL</td>
<td>Modular, scalable patient-centric privacy tool offering patients a dashboard that shows which caregivers have accessed their data and when. Security features include strong multi-platform authentication, authorization and audit.</td>
<td></td>
</tr>
<tr>
<td>PRIpare</td>
<td>Preparing Industry to Privacy-by-design by supporting its Application in Research</td>
<td>FP7</td>
<td>Facilitate application of a privacy &amp; security-by-design methodology that contributes to the advent of unhindered usage of Internet, support its practice by the ICT research community, foster risk management culture.</td>
<td>pripare.eu</td>
</tr>
<tr>
<td>PRISMACLOUD</td>
<td>Privacy and Security Maintaining Services in the Cloud</td>
<td>H2020</td>
<td>The main idea and ambition of PRISMACLOUD is to enable end-to-end security for cloud users and provide tools to protect their privacy with the best technical means possible by cryptography.</td>
<td>prismacloud.eu</td>
</tr>
<tr>
<td>STRATEGIC</td>
<td>An advance service distribution network and tools for interoperable programmable, and exploitation of unified public cloud services</td>
<td></td>
<td>A cloud enabled framework on various infrastructures with a set of services related to public bodies, opening new horizons in the secure and private migration, adaptation, governance and development of public cloud services.</td>
<td><a href="http://www.strategic-project.eu">www.strategic-project.eu</a></td>
</tr>
<tr>
<td>WITDOM</td>
<td>empoWering privacy and securiTy in non-trusteD envirOnMents</td>
<td>H2020</td>
<td>Automatic and efficient privacy provisioning solutions, keeping data confidential (encrypted and privacy-protected) in the un-trusted environment, while the data owner can operate with and make use of the data in the encrypted domain.</td>
<td>witdom.eu</td>
</tr>
</tbody>
</table>
Research Lines
**Geospatial Applications**

**Living in a spatially-enabled world**

**Description**

Relation to current technological trends:

**Cloud computing, Big Data and HPC**

Moving existing geospatial solutions in different domains to the cloud and Big Data paradigm in order to accommodate to customers needs of scalability and performance:

- Open data for precision farming agriculture.
- Storage and (near) real-time analysis of large amounts of vector-based data (e.g. satellite imagery, VGI) and satellite imagery using well-known big data tools (e.g. Hadoop, MongoDB) complemented with GIS-optimized solutions such as PostGIS and Rasdaman.
- Early warning systems on the cloud for increased performance and interconnection in Crisis Management.
- HPC for real-time execution of complex calculation and scientific models (e.g. tsunami simulations).

**Internet of Things (IoT) and Smart Cities**

- Location awareness IS a core component of the Internet of Things.
- Sensor management/data access through OGC SWE standards (Working group in OGC to align SWE with IoT approach).

**Crowdsourcing**

- Commonly known also as Volunteered Geographic Information (VGI), which relies on web-based applications and/or mobile devices for collecting user-generated data.
- Community-based mapping (e.g. OpenStreetMap, crisis/disaster mapping).
- Crowdsourced sensing: Typically used in the Environment domain (e.g., environmental observation through (human) sensors but also starting to grow its acceptance in disaster/hazardous events.

**Critical Mass / Market**

- Expertise in GIS technologies and standards, which have been applied in different projects/domains (e.g. OGC, INSPIRE, GEOSS, ORCHESTRA).
- Expertise in the Environmental and Crisis Management domains.
- Strong partners network in the GIS community.
- DEWS Early Warning System as main result (used in three projects: FOODIE, DRIVER, ARTIST).
- Experience in integration of sensor data.
- Shifting to big data/cloud paradigm (experience being gained in FOODIE and DRIVER projects).

**Relation between the Research Line and Atos Portfolio**

- Solutions/Projects are clearly aligned with Atos business areas and can provide support for bidding opportunities
  - Environment and Agriculture (e.g. Spanish Ministry of Environment and Agriculture) with FOODIE, ENVIROFI and EO2HEAVEN projects.
  - Homeland and Security with ORCHESTRA, DEWS, ICARUS and DRIVER projects.
  - SmartCities, Transport, Tourism, Health
  - Helix Nebula/Canopy
- Collaboration with other ATOS divisions in tenders
  - GEMMA Emergency Management Solution
  - Smart Cities (Madrid City Council)
High Performance Computing
Why do we need ever-higher performing computers?

Description
Many industrial scenarios require very advanced computation capabilities due to the big amount of data to be analyzed and to the really complex calculations to be performed. HPC is the technology which enables handling with such complexity, providing the technical solutions, which will bring industry to a new era where simulations, advanced modeling and improved visualization will enable the engineering and manufacturing of new products, so they will be more cost-efficient, safe and more advanced.

Non-functional properties in HPC/HTC:
- SLAs and related monitoring
- Nodes trust and dependability/availability-related metrics
- Energy management and cost
- Dynamic applications profiling and allocation

Optimization of resources allocation in HPC:
- Hybrid solutions Cloud + Physical hardware
- Exploit existing infrastructures as much as possible (complementary applications)
- Non-functional properties-aware allocation

Exploit advanced virtualization in the HPC environment with accelerators (in different application domains):
- Traditional resources (CPUs, Storage and Network) through Containers
- GPUs
- FPGAs
- Others (MPPAs, DSPs...)

Low power computing for embedded systems:
- Management of embedded HPC devices
- Real-time data analytics with a parallelized Complex Event Processing engine

Programming models for exploiting HPC capabilities and co-design

Critical Mass / Market
Atos has already experience in many topics related to HPC and the domains where it can be applied:
- Previous Grid related projects (BeinGrid, Elegi, Akogrimo, Grasp, etc...)
- Cloud research - virtualization and HPC as a service...
- Research in the Big Data topic (VELASSCO)
- Research in Energy-related topics (ASCETiC)

Thanks to this experience, several members of the team have knowledge about parallelization and the usage of accelerators.

The following projects are active in the RL:
- Fortissimo2: HPC simulation for SMEs in the manufacturing sector, by means of many experiments;
- CoeGSS: Exploitation of HPC capabilities for Global System Science applications;
- MSO4SC: Provision of Maths as-a-Service, thanks to an e-Infrastructure able to manage Math Application Development Frameworks.

Relation between the Research Line and Atos Portfolio
The acquisition of Bull has opened new opportunities related to HPC technologies. Atos Managed Services (MS) Line has expanded its offer in order to achieve full solutions:
- Deployment of Data Centres
- Maintenance & Improvements
- Monitoring of the Infrastructure

Consulting and Systems Integration has a line related to consultancy for configuring infrastructure needs, which may benefit from the knowledge generated by the HPC research line.

Finally, Bullion Servers is a Bull Product (http://www.bull.com/bullion-servers) which could benefit from the research performed:
- For Big Data and Cloud Computing mainly
- Massive In-memory processing
- Scalable
Software Engineering

Improve your productivity, release better quality software

Description

► Model Driven Software Engineering (Design-Time)
MDA/MDE forward engineering techniques and methods applied to the specification, program-comprehension, re-engineering (design-pattern driven) of software systems and code synthesis

► Software modeling and simulation (Run-time)
Research on techniques and methods that enable the specification and modeling of concerns on complex software systems and their simulation at model level, exploring the solution space

► Aspect Oriented Software Engineering/Modeling
AOP/AOM techniques applied to the management of cross-cutting concerns, interweaving in complex software systems

► DSL based software modeling and development: code generation and optimization. DSL applicability to HPC, embedded systems and IoT
Development of model-based domain specific language supporting the modeling, optimization and code synthesis of software for different software domains

► Vector Programming/Parallel programming
Co-design development of techniques and tools that simplifies the adoption of vector/Parallel programming in software development, exploiting the full potential of new CPU/GPU for desktop/laptop applications

► Advanced User Interface design and development
Development of techniques and methods simplifying the design and development of advanced user interfaces in a computing continuum, regardless the platform

► Run-time dynamic adaptation
Research on techniques and methods enabling autonomous, context-aware applications, supporting self* features, such as self-adaptation, self-healing, self-reconfiguration, etc.

► OSS Community development
Development of techniques, methods and tools enabling a collaborative software development lifecycle

► Choreography Service composition
Research on choreography techniques enabling a de-centralized coordination of software agents in mutual collaborations

► Search-based software engineering
Research on software optimization techniques aiming at improving software engineering evolution and maintenance. Automatic exploration of solution space and mapping to the problem space

► Software architectures and methodologies
Research on new software architectures and methodologies, including programming paradigms (functional programming, etc.)

► Enterprise Application Integration, middleware
Development techniques and tools enabling the interoperability of software systems, applied to EAI

► Advanced Software Engineering automation techniques
Research on the automation of software engineering techniques and methods, covering the entire software engineering live-cycle, particularly supporting software maintenance

Critical Mass / Market

► Several years of expertise in software engineering technologies and standards which have been applied in different projects/domains, including:
  • FP6: SECSE, MOMOCS
  • FP7: NEXOF-RA, SOA4ALL, Qualipso, Cloud4SOA, MARKOS, ARTIST, ALERT
  • H2020: SUPERSEDE

► Participation in Software Engineering initiatives: NEXOF Software Engineering, Software Engineering Cluster

► Main Assets:
  • yourBPM: framework for dynamic service composition
  • ARTIST: model-based framework supporting the re-architecture of legacy systems

Jesús Gorroñogoitia
User Experience
How to engage users and improve their motivation to learn, cooperate, create...

Description
This research line has a bi-dimensional focus on general learning research concerns (vertical axis) and training and motivational support for domain specific applications (horizontal axis). It aims at developing innovative solutions to address:

► Latest and general educational challenges with the provision of technology support systems for formal, informal, no formal learning approaches.
► Educational/training, pervasive and inclusive issues of the different applications or solutions created by the other ARI labs and sectors, in terms of:
  • Personalisation.
  • Optimized operations and services to foster motivation and creativity through continuous awareness of learners and their location and status.
  • Effective communication and interaction between human-wearable devices, continuous biological monitoring, etc.

Learning Analytics as application of Big Data + Business Intelligence approach in educational settings with the purposes of understanding and optimizing learning and the environments where the learning occurs. It provides support the personalization, progress monitoring and generation of recommendations for improvements in the learning contents and process designs as well as the individual performance.

Game based applications, such as Gamification, Virtual world, Simulations as mechanisms to foster the engagement, productivity as well as the development of high level skills like critical thinking, problem solving, creativity or soft skills. Such type of applications facilitates higher levels of participants’ (learners) involvement in the planned activities through exploration, experimentation, competition or co-operation.

Technologies to support inclusion and accessibility in learning/interactive processes: Applications based on Wearable technologies and Human Machine Interfaces which facilitate the acquisition of information about learners with special needs (or not) to allow the personalization of their learning activities and their integration in the educational process.

Context-aware technologies which leverage information about the end user to improve the quality of his interaction anticipating immediate needs and proactively offering enriched, situation-aware and usable content, functions and experiences. Technologies to gather information about the user and context of his interaction.

Social Networks and SNA. Social networking tools to foster the collaboration anytime, anywhere as means to support knowledge sharing and understanding, placing individuals at the center of the network. Social Network Analysis especially to address the study of user attributes, behavior and location-based interactions.

Critical Mass / Market
Several years of experience of research related to:

► Learning and Instructional Design, Computer-supported Collaborative work, Game-based learning, Usability, Formal models for knowledge representation and application of emerging technologies in different research and development projects tackling Technology Enhanced Learning challenges (Projects EMMA, HOTEL, GALA, IntelLEO, STELLAR).
► Solutions to enhance and ensure the Usability and Accessibility of learning applications (Projects EU4ALL, AgentDYSL).
► Training solutions and support for applications in different knowledge domains: Crisis Management (DRIVER), Health care (VERITAS).
► Human machine interfaces and context aware applications (Astute, Holides).

Relation between the Research Line and Atos Portfolio
Our involvement in different research and development projects related to User and learning experience and their outcomes are aligned with different Atos areas of interest. This alignment allows us to provide of support and references for technology and knowledge transfer to existing Atos clients and new business opportunities, such as:

► Collaborations in the preparation of new project proposals for Public Sector and Education market.
► Contributions to the definitions of Training and Gamification approaches to be applied in:
  • Banking and Consulting
  • Health care
Key Projects
Challenges

European SMEs do not currently have access to advanced management systems and to collaborative tools due to their restricted resources. SMEs manufacturing value chains are distributed and dependent on complex information and material flows requiring new approaches to reduce the complexity of manufacturing management systems. They need ubiquitous tools supporting collaboration among value chain partners and providing advanced algorithms to achieve holistic global and local optimization of manufacturing assets and to respond faster and more efficiently to unforeseen changes.

C2NET aims to collect the most promising results from R&D EU Framework Program projects and build a novel Cloud Architecture to provide SMEs affordable tools (in term of cost and usability) to help them to overcome the current economic crisis and to enhance their competitiveness in the global economy.

Value Proposition

The goal of C2NET Project is the creation of cloud-enabled tools for supporting the SMEs supply network optimization of manufacturing and logistic assets based on collaborative demand, production and delivery plans. C2NET Project will provide a scalable real-time architecture, platform and software to allow the supply network partners:

► to master complexity and data security of the supply network,
► to store and share product, process and logistic data,
► to optimize the manufacturing assets by the collaborative computation of production plans,
► to optimize the logistics assets through efficient delivery plans and
► to render the complete set of supply chain management information on the any digital mobile device (PC, tablets, smartphones) of decision makers enabling them to monitor, visualize, control, share and collaborate.

Outcomes

The expected outcomes of the C2NET project are:

► **Data Collection Framework.** To provide new ways to securely store relevant information from supply network partners in public cloud, community cloud or private cloud, ensuring data security and provide the ability of data sharing and data analytics.

► **Network Optimizer.** To provide new tools for supporting the supply network optimization of manufacturing and logistic assets.

► **Cloud Platform.** To provide new tools to support decision-makers in collaborative processes with intuitive UIs that display in real-time the right data at the right time, built in advanced apps for mobile devices for selective management functionalities across the supply network.

► **Collaboration Tools.** To provide a new cloud space for allowing the access to all the participants in the value chain to support their decisions and processes enhancement.

Business Impact

The business ambition of C2NET project is:

► To develop a new approach for facilitating collaborative demand, production and delivery plans along the supply network.

► To provide new tools for supporting the supply network optimization of manufacturing and logistic assets.

► To securely store relevant information from supply network partners in public cloud, community cloud or private cloud, ensuring data security and provide the ability of data sharing and data analytics.

► To support decision-makers with intuitive UIs that display in real-time the right data at the right time, built in advanced apps for mobile devices for selective management functionalities across the supply network.
Challenges

In recent years, the majority of the world’s Critical Infrastructures CIs evolved to become more flexible, cost efficient and able to offer better services and conditions for business opportunities. Towards this evolution, CIs and companies offering CI services had to adopt many of the recent advances of the Information and Communication Technologies (ICT) field. This adaptation however, was rather hasty and without thorough evaluation of its impact on security. The result was to leave CIs vulnerable to the new set of threats and attacks that impose high levels of risk to the public safety, economy and welfare of the population.

In so far, the main approach to protect CIs is to handle them as comprehensive entities and offer them a complete solution for their overall infrastructures and systems (IT&OT departments). However, complete CI protection solutions exist in the form of individual products from individual companies. These products integrate only tools and solutions designed by the same company, thus offering limited technical solutions.

Value Proposition

The main aim of CIPSEC is to create a unified security framework that orchestrates state-of-the-art heterogeneous security products to offer high levels of protection in IT (information technology) and OT (operational technology) departments of CIs. As part of this framework CIPSEC will offer a complete security ecosystem of additional services that can support the proposed technical solutions to work reliably and at professional quality. These services include vulnerability tests and recommendations, key personnel training courses, public-private partnerships (PPPs), forensics analysis, standardization and protection against cascading effects.

All solutions and services will be validated in three pilots performed in three different CI environments (transportation, health, environment). CIPSEC will also develop a marketing strategy for optimal positioning of its solutions in the CI security market.

Business Impact

- CIPSEC will provide a unified security framework for Critical Infrastructures by allowing easy integration of heterogeneous systems to its framework with reduced adjustment, notably anomaly detection, anti-malware, cybersecurity detection and prevention, distributed denial of service, and hardware security platforms. CIPSEC will collect and process input from multiple sources and will provide monitoring for the complete Critical Infrastructure.

- CIPSEC will offer a complete set of additional services to reliably support the proposed technical solutions at a professional demanding level, among which industrial control system vulnerability tests, studies for cascade effect attacks, contingency plans, and innovative forensics analysis are included. Training courses and certification will be also provided.

- Through the identification of a requirements baseline for security and resilience within pilots, CIPSEC will be endorsed under true conditions and real infrastructures.

- CIPSEC will supply an overall solution, suitable for transportation, health and environment sectors both at module level (for each industry and security facet) and at system level (the complete framework).

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<thead>
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<th>Web</th>
<th><a href="http://www.cipsec.eu">www.cipsec.eu</a></th>
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<td>Budget</td>
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<tr>
<td>Funding</td>
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<td>Date</td>
<td>May 2016 to Apr 2019</td>
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<tr>
<td>Coordinator</td>
<td>Atos</td>
</tr>
<tr>
<td>Contact</td>
<td>Rodrigo Diaz</td>
</tr>
<tr>
<td>e-mail</td>
<td><a href="mailto:rodrigo.diaz@atos.net">rodrigo.diaz@atos.net</a></td>
</tr>
</tbody>
</table>
**EO4wildlife**

**Challenges**

EO4wildlife main objective is to bring large communities of multidisciplinary research scientists such as biologists, ecologists and ornithologists around the world to collaborate closely together while using European Sentinel Copernicus Earth Observation more extensively and efficiently.

EO4wildlife research specialises in the big data intelligent management, processing, fusion and advanced analytics with a Knowledge Base for wildlife migratory behaviour trends.

The research will lead to the development of web-enabled open services using OGC standards for sensor observation and measurements and data processing of heterogeneous geospatial observation data and uncertainties.

**Value Proposition**

Space technologies have the potential to transform scientific project back on Earth. As a member of the European Commissions’ EO4wildlife project, Atos is designing and developing a platform that will enable scientists around the world to analyse wildlife movements using the Sentinel satellites’ observation data of the European Union’s Copernicus program to support projects to study the habitat of various migrating animals. These earth observation satellites are generating unprecedented volumes of data. To maximize the value of these terabytes of information, the scientific and research community needs to be able to integrate this data into their studies.

**Outcomes**

An open service platform with an interoperable toolbox will be designed and implemented. The platform will offer high level big data services that can be accessed by scientists to perform their respective research on species behaviour linked to environmental conditions and change of those conditions under certain threats.

Also, the platform front end will be intuitive to use and access by scientists. It will reduce barriers to accessing dedicated big data services for processing geospatial environmental simulations using Sentinel Earth Observation data which are intelligently fused with in-situ observations data from other sources.

<table>
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<tr>
<th>Web</th>
<th><a href="http://www.eo4wildlife.eu">www.eo4wildlife.eu</a></th>
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<td>Program</td>
<td>H2020: SPACE</td>
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<td>Coordinator</td>
<td>Atos</td>
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<td>Contacts</td>
<td>José Lorenzo</td>
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<td>e-mail</td>
<td><a href="mailto:jose.lorenzo@atos.net">jose.lorenzo@atos.net</a></td>
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FITMAN

Challenges
The mission of the FITMAN (Future Internet Technologies for MANufacturing industries) project is to provide the FI PPP Core Platform with 10 industry-led use case trials in the domains of Smart, Digital and Virtual Factories of the Future (FoF).

Value Proposition
FITMAN Trials - 4 conducted by Large Enterprises, 6 by SMEs - will test and assess the suitability, openness and flexibility of FIWARE Generic Enablers, while contributing to the STEEP (social-technological-environmental-political) sustainability of EU Manufacturing Industries.

The use case trials belong to several manufacturing sectors such as automotive, aeronautics, white goods, furniture, textile/clothing, LED lighting, plastic, construction, and manufacturing assets management.

Outcomes
The FITMAN Smart Factory platform is the composition of a set of FIWARE Generic Enablers (GEs) and Specific Enablers (SEs) which is materialized in a functional platform for the Smart Factory domain and deals with the optimization of the production processes (in terms of production costs reduction, efficient energy usage, improvement in production reliability, production machines usage, etc.) via the monitoring and management of the production process and of its components. In this sense, it aims to collect information from the shop floor to support the real time decision making exploiting data collected and to improve predictive maintenance by monitoring the machinery.

The Digital Factory Reference Platform is composed by a set of Generic Enablers and Specific Enablers arranged through suitable open interfaces (Open APIs) in order to facilitate the development of advanced functionalities to the user. The reference platform is intended to facilitate the fast and cost effective development of innovative services and applications that connect people with the information required to perform their tasks. The reference platform is specially intended to provide support in the development of advanced & 3D data visualization services and applications.

The Virtual Factory Platform is composed of a set of 6 Generic Enablers and 7 Specific Enablers collaborating together in order to offer advanced functionalities to the user.

Business Impact
The platform can be seen as a Business Collaboration Platform where actors of the Virtual Enterprise can collaborate among them in order to achieve business goals. Major functionalities provided regarding tangible and intangible assets management and collaborative business process execution.

The Fitmanovationlab AKA FIWARE for Industry is initially powered by the FITMAN EU project, and it is the European community and two-sided digital platform where ICT Industry can locate resources and expertise to develop FIWARE-enabled digital platforms and where Manufacturing Industry can find FIWARE-enabled reference implementations of Industry 4.0 business processes for their competitive advantage. The synergies between LAB-HUB-ACADEMY and SHOWCASE pillars make FIWARE for Industry the digital innovation environment for Industry 4.0 Factories of the Future.

It is accessible through the following links:
www.fitmanovationlab.eu
www.fiware4industry.eu
www.fiware4industry.com

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<tr>
<td>Contact Name</td>
<td>José Lorenzo</td>
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<td>e-mail</td>
<td><a href="mailto:jose.lorenzo@atos.net">jose.lorenzo@atos.net</a></td>
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Challenges

HeartMan is a personal health system to help congestive heart failure patients manage their disease. Its decision support system provides personalized advice. It features advanced devices and monitoring methods to understand the patients’ physical and psychological state, and standard-based data management for wide interoperability.

1%-2% of people in the developed world suffer from congestive heart failure (CHF), which costs the society around 100 billion USD per year. While the improvements in treatment have lately decreased the number of hospitalizations and deaths due to CHF, they remain high. Around half the patients with CHF are expected to die within five years, and CHF is the most frequent cause of hospitalization in people aged over 65. There is currently no cure available, which makes better management of CHF of paramount importance. Both to improve the patients’ quality of life and to reduce the economic costs to the society.

In the European project CHIRON, heart failing patients in two countries were telereported to gather a unique dataset consisting of 17 parameters characterizing HF patients’ short-term health and environment. Due to the reluctance of severely sick patients (among whom deaths and hospitalizations are likely) to participate in the study, patient-reported outcomes were used instead – specifically how the patients perceive their health. This is very much in line with the recent trends in medicine that stress the importance of patient participation and their quality of life. The Chiron data was used to build models that can predict how a patient will perceive his/her health based on parameters such as daily exercise, humidity, heart rate etc. Many of these parameters can be controlled, so the CHIRON predictive model is suitable as a basis for a Decision Support System that can provide day-to-day advice to patients.

Value Proposition

In the HeartMan project we will develop a personal health system for congestive heart failure (CHF) that will feature a DSS based on predictive computer models. The user – a CHF patient – will be monitored with the sensors in his/her smartphone, health devices that may be wearable (e.g., an ECG monitor), used occasionally (e.g., a scales) or placed in the apartment (e.g., a temperature and humidity sensor). The devices will be connected to a mobile phone through a framework capable of intelligently managing a wide range of devices and ensuring the right devices are sampled with the right frequency at the right time. The framework will also interpret the sensor data to extract parameters describing the patient’s physical and psychological state. These parameters together with the user’s feedback entered through a mobile application will be fed into a DSS. The DSS will first use predictive computer models for CHF, and other decision models to suggest the appropriate intervention for the patient in his/her current state. Next, the patient’s psychological profile and state will be used to select the most appropriate presentation of the intervention, as well as select psychological interventions aiming to increase the receptiveness to medical advice and help cope with the disease. The interventions will then be presented to the user through the mobile application. The data generated by the system will be stored in the cloud, taking into account privacy and security concerns. It will be available to the treating physician through a web interface, and he/she will also be able to modify the advice provided by the DSS if necessary. Anonymized data will also be available to medical researchers, who will be able to gain new insights into the CHF and its management.

Outcomes

The ambition of the HeartMan system is to better support CHF patients in the management of their disease than existing systems. Its advantages over commercial products and research projects will be mostly due to the application of predictive models and psychological interventions based on cognitive dissonance and mindfulness. In summary, the HeartMan project will develop a mHealth solution for CHF, which is a market with existing customers and solutions, but these solutions are not nearly as advanced as the one we are proposing. More advanced solutions are accepted by customers in other mHealth markets, so we are confident they will be accepted and welcomed by CHF patients as well. Given the impact of cardiovascular disease, many European projects have been dedicated to its study, however, they for the most do not provide adequate personalised and psychologically appropriate support to the patients, which is where the most important innovation of the HeartMan system will be:

Business Impact

The HeartMan system will achieve improved self-management of congestive heart failure (CHF) by using a decision support system (DSS) based on predictive models intended for the patients. The HeartMan DSS will be designed as a patient-oriented personalized system, promoting self-care management in an individualised fashion. The users will be educated and assisted in the monitoring procedures required by the system, and provided with personalised advice together with explanations appropriate for their understanding. As a result, they will be closely involved in their disease management. From the available evidence, these features are expected to increase the level of patient participation.

The HeartMan system will be a major step forward in the technology for self-management of CHF. It will provide considerably more value to the patients than the current devices that only monitor the patients’ physiological signals and at best provide basic interpretations.

The HeartMan system will provide decision support through cognitive behavioural therapy using an approach based on cognitive dissonance and mindfulness exercises. From the available evidence, these features are expected to enhance the level of patient empowerment and self-control.
MaTHiSiS will assist the educational process for learners and their tutors and caregivers by creating a novel and continuously adaptable “robot/machine/computer”-human interaction ecosystem to enhance vocational training, workplace learning and mainstream education for individuals with or without learning disabilities.

**Value Proposition**

One of the core objectives of MaTHiSiS project is to enter the learning environments and make use of computing devices in learning in a more interactive way, which will provide a product-system to be used in formal, non-formal and informal education. An ecosystem for assisting learners/tutors/caregivers for both regular learners and learners with special needs will be introduced and validated in 5 use cases: Autism Spectrum, Profound and Multiple Learning Disabilities Case, Mainstream Education Case, Industrial Training Case and Career Guidance Distance Learning Case.

MaTHiSiS product-system consists of an integrated platform, along with a set of reusable learning components (educational material, digital educational artefacts etc.) that will guide the deployment of the users’ learning activities. Its educational scheme will be based on custom-made and adaptable learning goals and educational material.

MaTHiSiS will provide a “product-system” consisting of an integrated multi-agent interactive platform, along with a set of reusable learning components (educational material, digital educational artefacts, etc.) that will guide the deployment of the users’ learning activities. Its educational scheme will be based on custom-made and adaptable learning goals and educational material.

**Outcomes**

MaTHiSiS will provide a “product-system” consisting of an integrated multi-agent interactive platform, along with a set of reusable learning components (educational material, digital educational artefacts, etc.) that will guide the deployment of the users’ learning activities. Its educational scheme will be based on custom-made and adaptable learning goals and educational material.

MaTHiSiS will support learning across a variety of learning contexts and, with the use of a variety of devices (robots, interactive boards and mobile devices), with personalized and adaptable, time and location independent learning paths, being transferred between the agents, always taking into consideration best knowledge and practices learnt from the previous device.

By the end of the project, MaTHiSiS will introduce a marketable innovation, aimed at the re-usability of educational and training content and fostering the interactivity between technology and learners/tutors/caregivers.

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**Business Impact**

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**Research & Innovation 2016**

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**Web**

www.mathisis-project.eu

**Program**

H2020

**Budget**

7621,085 €

**Funding**

6,531,895 €

**Date**

Nov 2016

**Coordinator**

Atos Spain

**Contact**

Ana Piñuela

e-mail ana.pinuela@atos.net
Challenges

Social media poses three major computational challenges, dubbed by Gartner the 3Vs of big data: volume, velocity, and variety. Content analytics methods have faced additional difficulties, arising from the short, noisy, and strongly contextualized nature of social media. In order to address the 3Vs of social media, new language technologies have emerged, e.g. using locality sensitive hashing to detect breaking news stories from media streams (volume), predicting stock market movements from microblog sentiment (velocity), and recommending blogs and news articles based on user content (variety).

PHEME will focus on a fourth crucial, but hitherto largely unstudied, challenge: veracity. It will model, identify, and verify phemes (internet memes with added truthfulness or deception), as they spread across media, languages, and social networks.

Value Proposition

PHEME will achieve this by developing novel cross-disciplinary social semantic methods, combining document semantics, a priori large-scale world knowledge (e.g. Linked Open Data) and a posteriori knowledge and context from social networks, cross-media links and spatio-temporal metadata. Key novel contributions are dealing with multiple truths, reasoning about rumor and the temporal validity of facts, and building longitudinal models of users, influence, and trust.

Outcomes

In particular, PHEME will deliver a veracity framework able to track rumors over time, providing a set of state-of-the-art components and algorithms for social media veracity checking. Results will be validated in two high-profile case studies: healthcare and digital journalism.

Business Impact

The techniques developed in PHEME will be generic with many business applications, e.g. brand and reputation management, customer relationship management, semantic search and knowledge management. In addition to its high commercial relevance, PHEME will also benefit society and citizens by enabling government organizations to keep track of and react to rumors spreading online.

Of especial interest is the potential impact for detection and veracity checking of news of journalists. This has already attracted attention to journalists around the globe, and the proof is that the project is now known by the media informally as the “Twitter lie detector”.

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<tr>
<td>Contacts</td>
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Challenges

The evolution of energy grids leads to new opportunities based on the integration of Renewable Energy Sources (RES) and Electrical Energy Storages (EES). The sharing of storage capacities, deployed at distributed locations, will bring significant savings on the required storage capacities and in turn will significantly reduce the unit-cost of energy output of the RES+EES ecosystems that are participating on the sharing process.

Value Proposition

► Collaboration framework among Energy last mile actors.
► Open interoperability gateway with the corresponding open API that connects the smart energy resources.
► Added value services supporting efficient sharing of energy production/consumption.
► Electric vehicle integration as energy storage source in the smart grid.
► Real life scenarios that evaluate and showcase SHAR-Q technologies supporting sustainable energy ecosystems.

Outcomes

► Open interoperability gateway: open API that connects the smart energy resources, operated by different actors, into the SHAR-Q collaboration framework.
► Services for renewable meteorology and climatology: operational forecast of RES output and planning of EES capacities to cover the expected gaps of RES production.
► RES and EES collaboration framework: local storages will be exploited and correlated with the RES production in order to increase the RES hosting capacity of the grid considering the current network capacity.
► Adaptive charging of e-vehicles and V2G services: exploitation of demand elasticity of vehicles connected to the grid for serving charging demand during off-peak hours or during periods with excess of RES generation.
► Security, privacy and trust: Integration of cybersecurity features to assure robustness and privacy of the SHAR-Q services.

Business Impact

SHAR-Q focuses on the creation of open ecosystems that boost the participation of multiple and different stakeholders in the energy last mile scenario. The openness of the approach aims at increasing replicability of the solution while simplifying not only its deployment but also the management of the services. Furthermore, SHAR-Q carefully follows the standardization bodies so as to provide connectors and data formats that are widely adopted.

The SHAR-Q concept is fully decentralized where each user has under control his/her involvement in the collaborative processes. Thus the platform presents a system built-in democracy. A further advantage of the decentralized nature of the SHAR-Q platform is that there are no central databases containing sensitive data on the users. All user data is stored in the user’s local infrastructure and so the users’ privacy is preserved by design.

SHAR-Q platform and services may require special energy tariff systems that can be implemented only with contribution from appropriate energy market players. Moreover there is a wider commercial ecosystem that consists of product manufacturers, smart grid operators, service providers and system integrators around the distributed renewable energy production that benefit from the technology that will be developed in the projects.

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<td>Atos Spain</td>
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<tr>
<td>Contact</td>
<td>Andrea Rossi</td>
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<tr>
<td>e-mail</td>
<td><a href="mailto:andrea.rossi@atos.net">andrea.rossi@atos.net</a></td>
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Challenges

Software Defined Networking (SDN) and Network Functions Virtualization (NFV) are emerging as major transformational technologies towards “software networks”, a new paradigm that is evolving the telecom sector with new network capabilities and business opportunities.

SONATA addresses the significant challenges associated with both the development and deployment of the complex services envisioned for 5G networks and empowered by these technologies. The project is developing a NFV framework that provides a programming model and development toolchain for virtualized services, fully integrated with a DevOps-enabled service platform and an orchestration system.

Value Proposition

SONATA primary value proposition is to enable and ensure delivery on the promised NFV core business case. The new challenges introduced by the NFV transition require a MANO solution, as well as enablers of service agility on the development side.

Furthermore, SONATA has two unique key advantages that differentiate it from the competition. These two key advantages are the core values of SONATA value proposition:

► Flexibility and Openness.
► Holistic Inter-Organizational Approach with SDK (Software Development Kit) and DevOps.

On the one hand, SONATA’s open and flexible architecture can help to alleviate NFV adopters’ initial pain points revolving around multi-vendor complexity. On the other hand, SONATA’s agile service development and DevOps methodology can help to empower CSPs and supporting third-party developers with the workflow and tools needed for the agile service development and deployment envisioned for 5G networks.

Outcomes

SONATA initial results include:

► SONATA’s Network Service SDK: Facilitates network service development for third-party developers
► SONATA’s Service platform: Thanks to the modular design of its MANO framework, the platform offers high customization opportunities for both, Communication Service Providers and Service Developers.
► SONATA NFV DevOps Workflow: The SONATA system is designed for agile development and operation of network services. It enables a DevOps workflow between the SDK tools and the service platform, which allows developers and operators to closely collaborate.

Business Impact

► Reduce time-to-market of networked services. The contribution of SONATA towards reducing time to market for services based on NFV adoption and extension is two-fold. On the one hand, offering a well-structured Service Development Kit (SDK) that will allow service developers to easily develop and deploy networked services on top of telecom operators’ resources, while, on the other hand, promoting DevOps model to seamlessly integrate service development and management operations of virtual network functions.

► Optimize resources and reduce costs of service deployment and operation. SONATA is developing uniform multi-vendor service orchestration functions that fully exploit available resources to efficiently fulfill service requirements. This also extends to non-trivial services, for example, services that maintain state inside their individual functions or that map specific users to specific functions. This is supported both at deployment time for initial configuration of a single service as well as during operation time when the mapping of multiple competing services to resources is re-configured.

► Accelerate industry adoption of software networks. Driven by the excellence and complementarity of its consortium, perfectly balanced in terms of company types, technical expertise and roles in the value chain, SONATA achieves this not only by technical results, e.g. the integration of SONATA SDK with service orchestrator, but also via the definition of a roadmap highlighting business opportunities arising from the adoption of extended NFV technologies proposed by SONATA.

SONATA results are publicly available in a GitHub repository under a permissive, open source license (Apache v2.0) for full rights of modification and distribution. The ideal reference point for all the project outcomes which include the public deliverables, the source code and all related technical documents, etc., is the project website.
Challenges

One of the most important problems for Cloud adoption is uncertainty around cloud contracts and SLAs (Jurisdiction, liability, service definition, small print, etc.), which leads to risk and lack of adoption.

SLALOM aims to tackle different challenges and expects to address some of the top problems for potential adopters of Cloud services (Adopters - public administrations, large companies, and SMEs; Cloud Service Providers; Legal Firms and Profession - either providing services or expert groups influencing the practice on Cloud SLAs; Legal firms and Profession influencers; Policy Makers; Standardization bodies; Scientific Community and Researchers).

We identify the following top problems:

- Lack of knowledge about what are fair and reasonable contractual terms and conditions related to service levels.
- Lack of knowledge about how service levels need to be specified technically to provide meaningful protection for adopters.
- Lack of resources - financial and personnel - to be able to research the issues.
- Lack of clout to get some cloud service providers to offer fair and balanced provisions.

One of our most important goals is pursue “consensus” among adopters and providers, and create a practical reference for doing business in the cloud. It is important to hear what is important for all stakeholders in the business in the cloud. It is important to hear and create a practical reference for doing “consensus” among adopters and providers, and Close the Gap between Cloud SLAs and real market marketplace. SLALOM takes a collaborative approach by contacting real market stakeholders, and Close the Gap between Cloud Adopters and Providers:

- Cloud Service Providers can base their own SLA contractual clauses and technical specifications on the SLALOM recommendations.
- Cloud Adopters will identify use of SLALOM to mean trustworthy and fair service level contractual terms and technical specifications.

Value Proposition

SLALOM is a ready to use Cloud SLAs. SLALOM will take theory to practice, providing a trusted verifiable starting point for providers and business users to negotiate SLAs for doing business in the Cloud in a simple, fair and transparent way.

ISO will tell you WHAT SLALOM will help you with HOW. SLALOM provides additional assurance for the uptake of cloud services with its SLA model legal clauses and technical specifications, using a trustworthy base which is practical, fair, and understandable, while saving time and resources.

► Understandable: Cloud SLAs are not simple, but SLALOM is. We establish the baseline to allow you focus only on what matters so you can make the safe jump into the cloud! SLALOM provides guidance for the use of its model terms and specifications saving time and money.

► Practical: Make your life simpler. Forget about SLA uncertainty. SLALOM provides practical templates for SLA contractual clauses and technical specifications. Slalom gives you a trusted verifiable starting point for service providers and adopters to negotiate with its guidance materials and its flexible framework built on top of ISO, which can be adapted to suit a variety of requirements and verticals.

► Safe & Fair: Compete on value. Take it or leave it is not an option. SLALOM’s model terms and specifications are designed to be fair and balanced, not giving hidden advantage to either providers or adopters. Consensus between all stakeholders and promotion of safe and fair models’ is needed. We are aligned with organizations that are driving the uptake of recommendations both by cloud providers and consumers such as EC, standards organizations, and industry associations.

Outcomes

SLALOM offers a ready to use Cloud SLA baseline with template documents considering ISO standards that addresses technical and legal aspects. SLALOM outcomes will be:

► SLA Legal Terms
► SLA Technical Specifications

Business Impact

SLALOM will impact on both the cloud industry and market - both providers and adopters and the research community advancing cloud computing and SLA capabilities.

► SLALOM will reduce or eliminate the most important barriers of cloud adoption (legal barriers, including liability, responsibility, data protection confidentiality, applicable law and intellectual property) by establishing the commonly accepted and comprehensive contract model specifying clear conditions for these aspects.

► Standardizing contract terms and conditions in Europe will encourage competition on price and value differentiation, which will leverage the creation of leaner, more differentiated companies are more competitive in the global marketplace.

SLALOM provides additional assurance for the uptake of cloud services with its templates for SLA legal model terms (legal clauses for Master Service Agreement and Service Level Agreement) and technical specifications exploiting ISO standards that will set a trustworthy base, which is practical, fair, and understandable, while saving time and resources.
Challenges

The advent of outsourced and distributed processing environments like cloud prompts fundamental transformations in whole ICT ecosystems, while bringing new opportunities to stakeholders in the availability and rational use of physical resources with large-scale savings in IT investments. Conversely, it also poses new security challenges especially for ensuring robust protection of privacy and integrity of personal information, which are a fundamental part of the societal acceptance of new ICT schemes, services and solutions.

In this context, the WITDOM project focuses on developing innovative solutions for truly efficient and practical privacy enhancing techniques and efficient signal and data processing in the encrypted domain for the increasingly demanded outsourced environments. Actually, the main target WITDOM pursues is to produce a framework for end-to-end protection of data in untrusted and fast evolving ICT-based environments, with a particular focus in data-outsourcing scenarios, where new threats, vulnerabilities and risks due to new uses require end-to-end security solutions that will withstand progress for the lifetime of applications they support.

Value Proposition

WITDOM aims at producing a novel framework for a quantitative evaluation of end-to-end security and privacy, aiming at guaranteeing efficient and verifiable provision of privacy in the context of ICT services owned by third-party providers of distributed processing and storage, thereby maximizing independence from stated security and privacy commitments by respective providers, and minimizing the current need of blind trust from the clients, solely based on written consents.

This framework will be instantiated and validated in two realistic application scenarios:

► A health scenario based on genetic data sharing for large research data analyses and individual outsourced clinical analyses;
► A financial services scenario based on the management of both customers’ data and finance data of contracts as well as providing outsourced secure financial services over private and public Cloud instances.

Outcomes

WITDOM will deliver the following products according to three different levels:

► General Level: the WITDOM framework, aligned with concurrent projects and advancing the SoTA. The WITDOM E2E framework acknowledges the following aspects:
  • Driven by Privacy by Design (PbD) principles, holistic, E2E privacy / security time-resistant, efficient solutions & guarantees.
  • Methods to quantify information leaked in traces left by crypto primitives to achieve sufficient & adequate privacy levels.
  • New trustworthiness-enhanced business models for exploitation, supporting Data Protection (DP) law, leading to reduce the need for trust in third parties.
► Practical Level: the WITDOM platform based on a global SOA architecture.
► Implementation Level: the toolkit and prototypes for the project scenarios (eHealth, FS), aiming at achieving a technology readiness level (TRL) 4-5.

Business Impact

WITDOM's innovations deals with the instantiation of the developed framework, platform and tools in two carefully chosen use-case scenarios, whose impact and sensitivity of the involved data make privacy a must; and where privacy and confidentiality constraints are a true barrier for profiting from the benefits of outsourced architectures and Cloud-based deployments.

The first use-case scenario is a health scenario based on outsourcing genetic data processes and workflows for large research analyses and individual clinical analyses; genetic data is extremely sensitive, and genomic privacy has become a hot topic for research and innovation, to which WITDOM contributes by focusing on solutions for outsourced processing of genetic data in two specific use cases dealing with secure sequence alignment and secure annotation, also providing endusers with secure outsourced backup functionalities with integrity and consistency guarantees.

The second scenario deals with outsourced financial analyses based on the management of both customers’ data and finance data, to enable risk calculations, fraud detection and forecasting operations deployed as outsourced secure financial services over private and public Cloud instances.

Moreover, research and Innovation in this field cannot ignore the fundamental impact of the data protection regulations and directives on the evolution of Cloud-related environments and in the processing of personal and sensitive data. Therefore, a key aspect of WITDOM innovations is built upon a legal assessment and validation of the recently reformed (May 2016) European Data Protection Regulation, linking legal and ethical requirements with technological means to guarantee their enforcement.
Challenges

Analyzing the market, we have found the importance of exploiting parallelism is of increasing significance, as parallelization has become a dominant method of delivering higher performance and improved energy efficiency.

In this context, some of the biggest challenges to future application performance are:

• Future application performance lie with not only efficient node-level execution but power consumption as well.
• Developers need to fully understand, and use an approach that abstracts, the nuances of different hardware configurations and software systems (both rapidly evolving),
• Developers need ways to address additional difficulties in performance, security mixed-criticality and power consumption resulting from the heterogeneous system.
• An important step in software design for low power is that software must correctly fit to the capabilities of the underlying (and heterogeneous) hardware.

Value Proposition

Simplify & Optimize Heterogeneity: Simplifying the way programmers approach the development of next generation applications.

TANGO tools help control and abstract underlying heterogeneous hardware architectures, configurations and software systems including heterogeneous clusters, chips and programmable logic devices while providing tools to optimize various dimensions of software design and operations (energy efficiency, performance, data movement and location, cost, time-criticality, security, dependability on target architectures).

Outcomes

The results will be packaged and released in TANGO Toolbox as Open Source. The toolbox will include:

- A toolbox based implementation of the reference architecture
- Reference software development models and methodologies for best practice
- A collection of reusable IDE plugins, programming models and runtimes
- An adaptive quality model for holistic system performance
- Automatic code generation including software and hardware energy modeling

Business Impact

TANGO will impact on both the IT industry and the market. It will also impact on the research community advancing future application development processes to a new stage in which the development process for parallel architectures will be simplified, abstracted from underlying architectures and hardware, and will enable tools to consider optimized control and self-adaptation.

Besides the release of the technologies under an Open Source approach, TANGO considers the foundation of a research alliance –TANGO Heterogeneous Hardware Alliance (HHW Alliance), in which it will seek complementary efforts of other research projects, initiatives and IT community organizations to nurture a strong research collaboration, integration and effective promotion of the results and continue evolving the work done during the project to become a relevant influencer in the developing HHW market.

More concretely, we identify potential in the following contexts:

- Abstracting hardware heterogeneity to help create & operate next-gen apps
- Embracing new hardware in the Data Center extending HPC workloads
- Code taking control of Performance vs Energy Awareness
Commercial Offers
In recent years, the Web has become not only a place to consume and search for content, but an active environment where people and organizations create content and exchange data and knowledge. User-generated content, especially coming from social networks (SN), blogs, or forums, is of a highly dynamic nature. The amount of content available even for specific topics is mind-boggling. There is a clear need of tracking, filtering, and analyzing this content in an automatic way in order to make sense of it and enable different usages of the data.

Capturean implements advanced data collection and information integration technologies to gather and harmonize data from multiple sources into a single coherent representation. The acquired data is then analyzed, providing insights and metrics coming from social media. These metrics provide a view of what is going on the web that can serve as an input for multiple applications and business scenarios, such as brand management, product placement, media tracking, financial sentiment over time, reputation on the web, political debates, etc.

Business Challenge
In the age of Internet, business decisions are increasingly dependent on the just-in-time delivery of relevant information and knowledge. While in the past this information used to be structured, in today’s world there is increasing dependence on unstructured sources of information, such as the Internet, and subjective inputs, such as sentiments, assessments, opinions, rumors, beliefs, etc.

Internet texts such as weblog articles and forums provide, for example, a massive amount of potentially useful information. An analyst or decision maker would have to collect, filter, assess, and interpret all these texts with respect to a current object of interest. However, accomplishing this task cannot be done manually due to time constraints in decision making and the enormous amount of documents.

Customers and R&D projects are asking for versatile tools that allow the acquisition of intelligence from Social Networks and apply it to the decision making process.

Capturean offers a solution open, innovative, and adaptable to the needs of customers and organizations to gather and extract facts and intelligence from Social Networks.

Solution
Capturean provides automated methods for knowledge and intelligence processing and management, from data acquisition all the way to the final application services that include decision support, visualization, etc.

This application layer can be developed in a fast and cost-effective way thanks to previous implementations of Capture and the reuse of previously developed services for a broad range of sectors and applications, such as reputational risk in finance, rumor detection, security in smart cities, etc.

Capture is based on state-of-the-art big data technologies. The solutions use Open Source frameworks and tools ranging from Apache Hadoop and Storm for distributed processing, to Apache HBase and Solr for storage and information retrieval. Capture extracts data from SN and RSS feeds using open APIs and tools delivering a set of metrics for specific scenarios.

Capture resembles the water cycle:

► by drinking from Data Sources (Twitter, RSS...), each delimited by queries to a Social Network;
► feeding Data Channels, or data flows related to several sources, usually about related topics;
► stored in thematic Data Pools, or functional topic-based repositories of annotated data;
► accessible via Solr queries;
► and processable in the cloud as-a-service using big data technologies.

Benefits
Capturean is an Atos offering in Social Network analytics, providing several APIs and integration points in order to ease the process of delivering data and insights to people or external applications.

Capturean provides an innovative dashboard with advanced reporting tools leaving the insights at the fingerprints of the users.
Do you know how Atos can help you setting smart services based on FIWARE?

Are you looking for opportunities to combine the Internet of Things with information and Big Data services on the Cloud? The FIWARE ecosystem can offer end-to-end solutions, as it provides enabling technologies and an open source standard platform that facilitates the development of smart applications.

Atos, a leading digital services company and one of the founders of the initiative, has acquired deep knowledge of the FIWARE technologies and ecosystem. Atos is therefore a reliable provider of commercial services around FIWARE.

Setting a FIWARE instance

A full FIWARE instance is the first thing our customers ask for when it comes to develop and deploy FIWARE based applications. An instance consists of a replication of FIWARE components and sufficient capacity quote to deploy FIWARE technologies. Based on our experience in operating one of the nodes of the FIWARE Lab – the experimental and federated cloud environment where to test and try FIWARE technologies – and thanks to Atos large expertise in managing dedicated infrastructures for multiple customers providing a professional service on infrastructure operation, we have designed a service that is adaptable to customers’ needs.

There are two options:

1. Resources consumed ad hoc, on an hourly/daily basis
2. A yearly arrangement, with reduced prices for ad hoc resources

Option 2 allows making significant savings compared to option 1 but is bound to one year commitment.

End-to-end integration service allowing the connection of the sensors/devices layer to our customers’ existing systems and applications.

According to analysts in 2015, Atos is positioned as one of the main players in IoT. Atos has experience in numerous vertical applications of IoT technologies and this is backed with a significant amount of commercial references. Understanding the business of our customer is crucial to provide the best IoT solution to a specific problem and context.

Atos has started to introduce FIWARE as underlying technology for Smart Cities. Actually, Atos is deploying FIWARE in two different pilots, one with the city of Málaga (Spain), where a mobility app improves city transport for citizens and the other one in Eindhoven (Netherlands) about smart lighting for traffic management. In both cases, Atos is integrating FIWARE with existing systems, sensors and specific city services.

IoT solutions based on FIWARE.

Beyond the use of FIWARE in Smart Cities, and taking advantage of Atos expertise in IoT technologies, Atos offers also vertical applications based on FIWARE for different domains, such as Industry 4.0 or Agrifood (see Atos IoT solution for trash management). FIWARE is a suitable technology to pilot IoT solutions in manufacturing, construction, logistics, or utilities large companies. The proven integration of FIWARE with existing commercial tools leverages the value of FIWARE for many other sectors, bringing interoperability and modularity at a competitive price.

Coaching and training services.

Although the specifications of FIWARE APIs are public and royalty-free, and an open source reference implementation of each of the FIWARE components is publicly available, it is sometimes challenging to start developing FIWARE applications. To help our customers overcome the initial learning curve, Atos offers ad-hoc coaching and training services. Atos extended experience in developing FIWARE applications is extremely valuable when delivering practical training about the platform. It is particularly suited to present the overall initiative to IT companies interested in developing their own FIWARE applications or to Atos partners developing joint solutions.

The key to a successful implementation of a FIWARE solution:

Atos is Platinum member of the FIWARE Foundation. The FIWARE Foundation is the legal independent body providing shared resources to help to achieve the FIWARE Mission by Empowering, Promoting, Augmenting, Protecting, and Validating FIWARE technologies and the Community around them, including users, developers and the entire ecosystem.
We are here to help you!

Based on its day-to-day activity, the Atos Research & Innovation team (ARI) has developed efficient working processes, methodologies, knowledge and collaborative tools that can be expanded for the benefit of customers.

From strategy to project management, from the generation of ideas to the identification of funding opportunities and selection of the right partners, from opportunities to results, our extensive experience enables us to provide reliable Research, Development and Innovation (RDI) support and consulting services.

The challenge is to improve the competitiveness of companies and / or public bodies through the integration of research, development and innovation activities in their operations. Research and innovation public programs support organisations in carrying out innovative projects.

However, not all organisations have the expertise or the abilities to manage this support properly. Furthermore, to remain competitive, businesses need to internationalize their knowledge or technology, entering projects that cannot be performed individually, but in cooperation with partners all over Europe and beyond.

We offer support services that cover the whole cycle, from identification of funding sources and programs, to proposal preparation, including the establishment of partnerships.

Support services also include contract negotiation, as well as the following administrative / financial management and technical coordination of funded projects.

Additional services are related to the innovation process and consider emerging technologies watch, ideas generation, innovation management, etc.

All those activities are supported by state-of-the-art methodologies and IT tools in order to offer efficient and skillful support.

The benefits for our customers are increased possibilities to start and undertake research and innovation activities. It also allows them to network and cooperate with key players in RDI (e.g. research institutes, universities, companies, etc.), which is an added value in view of the creation of partnerships, alliances and internationalization. Benefits can be summarized as follows:

► Be at the cutting edge of innovation.
► Access to and participation in R&D programs.
► Work in collaboration with organizations all over Europe.
► Gain competitiveness.
Publications, Events & Awards
## Publications
### Research & Innovation 2016

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<tr>
<th>Publication</th>
<th>ARI Author/s</th>
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<tr>
<td>TANGO: Transparent heterogeneous hardware Architecture deployment for eNergy Gain in Operation</td>
<td>David Garcia Perez, Ana Juan Ferrer, et al</td>
<td><a href="https://arxiv.org/abs/1603.01407">https://arxiv.org/abs/1603.01407</a></td>
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<td>BASMATI-A Brokerage Architecture on Federated Clouds for Mobile Applications</td>
<td>Ana Juan Ferrer et al</td>
<td><a href="">ftp://147.46.237.98/DP-132.pdf</a></td>
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<tr>
<td>Multi-cloud Platform-as-a-service Model, Functionalities and Approaches</td>
<td>Ana Juan Ferrer, David Garcia Pérez, Román Sosa González</td>
<td><a href="http://www.sciencedirect.com/science/article/pii/S187705091632097X">http://www.sciencedirect.com/science/article/pii/S187705091632097X</a></td>
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<tr>
<td>WISER helps organizations implement effective cyber risk management</td>
<td>A. Alvárez, E. González</td>
<td>European CIIP Newsletter. March 2016</td>
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<tr>
<td>A Privacy Engineering Framework for the Internet of Things</td>
<td>N.Notario</td>
<td>Paper presented at CPDP 2016: 9th International Conference on Computers, Privacy and Data Protection</td>
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<td>A cloud radiological web portal based on real-time enforcement of legal requirements and specific patient-hospital data sharing agreements</td>
<td>J.F.Ruiz</td>
<td>European Congress of Radiology, Vienna (Austria), March 1-5, 2017</td>
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<tr>
<td>Publication</td>
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“This specification defines PAT, “Privacy-Enhanced Authorization Tokens” or “Pseudonym-based Authorization Tokens”, a protocol and a token construction procedure for client authorization in a constrained environment.” |
Many solutions and IoT frameworks have only a minimum set of security, which is a basic access control. The EU FP7 project RERUM has a main focus on designing an IoT architecture based on the concepts of Security and Privacy by design. |
Position paper at Cloudscape Brazil 2016 |
ERCIM News magazine Nº 104 |
ERCIM Newsletter. July 2016 |
ERCIM News Magazine Nº106 |
Computers&Security (Journal), DOI: 10.1016/j.cose.2016.09.001 |
Conference proceedings for 24th International Requirements Engineering Conference, Beijing, China |
| A Lifecycle for Data Sharing Agreements: How it Works Out | J.F.Ruiz | Paper accepted Annual Privacy Forum 2016 |
| Privacy Preserving Cloud Services | N.Notario, A.Crespo | Paper accepted at CSA-EMEA Congress 2016, Madrid, Spain |
| Data-as-a-service platform for delivering healthy lifestyle and preventive medicine: Concept and structure of the DAPHNE Project | A. Palomares | [http://dx.doi.org/10.2196/resprot.6589](http://dx.doi.org/10.2196/resprot.6589)  
Paper published in Journal of Medical Internet Research Publications, Global eHealth Innovation |
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<td>Overview about DAPHNE Project at ICH The 6th International Conference on Current and Future Trends of Information and Communication Technologies in Healthcare Guilford, London UK</td>
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<td>Unlocking the potential of Additive Manufacturing</td>
<td>R. Díaz</td>
<td>![<a href="https://ascent.atos.net/download/unlocking-potential">https://ascent.atos.net/download/unlocking-potential</a> additive-manufacturing](<a href="https://ascent.atos.net/download/unlocking-potential">https://ascent.atos.net/download/unlocking-potential</a> additive-manufacturing/)</td>
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<td>MoveUs, fomentando hábitos de movilidad sostenible por medio de tecnología</td>
<td>Susana Palomares et al.</td>
<td><img src="https://www.esmartcity.es/comunicaciones/il-congreso-ciudades-inteligentes-moveus" alt="https://www.esmartcity.es/comunicaciones/il-congreso-ciudades-inteligentes-moveus" /></td>
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<td>Il Congreso de Ciudades Inteligentes (Madrid, 13-14 Abril 2016).</td>
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<td>For the INSPIRE Conference 2016 GIM International was invited to compile a special edition of the magazine focusing on the thematic plenary sessions of the conference. The INSPIRE edition contains interviews with 15 keynote speakers.</td>
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<td>European CIIP Newsletter, July 16 - October 16, Volume 10, Number 2</td>
<td>Jaime Martín Pérez</td>
<td>Article about CIRAS project (PAGES 7-10) included in the European CIIP Newsletter, July 16 - October 16, Volume 10, Number 2</td>
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<td>Augmented Hearing for elderly people From requirements to implementation</td>
<td>Ivo Ramos et al.</td>
<td>![<a href="https://www.researchgate.net/publication/279867091">https://www.researchgate.net/publication/279867091</a> Augmented_Hearing_for_elderly_people_From_requirements_to_implementation](<a href="https://www.researchgate.net/publication/279867091">https://www.researchgate.net/publication/279867091</a> Augmented_Hearing_for_elderly_people_From_requirements_to_implementation)</td>
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<td>ICT for Ageing Well</td>
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Prizes and Awards

2016

Thinking Cities AWARD for the MoveUs project!

Madrid wins the ‘Thinking Cities’ Award thanks to the MoveUs project, in which ARI is highly involved. This is a great recognition for our team, which is in charge of the project coordination and management, the living labs for the pilots organization, the exploitation activities, and the security aspects of the solution. The award winner was chosen among all abstracts that were submitted by Polis members for the 2016 Polis Conference. The Thinking Cities Award is associated to ‘Thinking Cities’ magazine, which showcases urban transport innovation in practice from European cities and beyond, and is published by Polis and H3B media twice a year. Read More >>>

Mejores Ideas - Diario Médico 2016

Diario Médico the leading Spanish medical journal awarded ARI-Health Pocket mHealth as one of the 2016 Best Ideas in the Management category.
Platforms

Introduction

Even though most Public Bodies carry out public and private consultations to elaborate their research program, in the last years there has been an industry-led movement aiming at better coordinating and defining research areas and instruments, both at European and National levels. The main benefit of these initiatives is that industrial partners, including SMEs (in many cases also academia and research centers), discuss which are the main priorities for the sector in terms of R&D and provide this input to the related funding organisations. This ensures a greater impact of the program. The main characteristics of these initiatives are that they are well organized, with mechanisms for open participation and represent a critical mass of stakeholders with a unique voice. Therefore, they are considered the natural interface to interact with a specific industry or sector.

Nowadays the spectrum of initiatives is quite vast in terms of both thematic areas and instruments. From an instrument point of view we can distinguish ETP (European Technology Platforms), JTI (Joint Technology Initiatives), Lead Market Initiatives and PPP (Public Private Partnerships).

From the viewpoint of research areas, we depict hereafter a brief classification of current ETP, JTI, PPP and other initiatives. It is by no means a complete list, but a selection of some relevant initiatives for Atos, where the Research & Innovation group plays a major role.

Nuria De-Lama
ICT Program Manager
European Technology Platforms (ETPs)

Atos is a founding member of the European Technology Platform NESSI (Networked European Software and Services Initiative) and sits on the steering board of NetWorld2020.

Public Private Partnerships (PPPs)

Our company is a major partner in Future Internet-related initiatives being member of the FI PPP Steering Board and Industrial Advisory Board. Since 2014, Atos is a founding member of the Big Data Value Association (BDVA), assuming the roles of Vice-presidency and Deputy Secretary-general. We are also member of the 5G PPP Steering Board.

EIT Knowledge and Innovation Communities (KICs)

Atos is a core member of the KIC EIT Health and an official member of the KIC EIT Digital associated node Madrid.
National Technology Platforms (NTPs)

At national level, Atos is currently holding the Presidency and Secretary of PLANETIC for ICT, as well as the Vice-presidency of es.Internet for Future Internet technologies, and is member of several others, such as PESI, Logistop, eVIA for Health and Independent Living.

PTFE
www.ptferroviaria.es

PLANETIC
www.planetic.es

PESI
www.pesi-seguridadindustrial.org

NanoMed
www.nanomedspain.net

LOGISTOP
www.logistop.org

ES.Internet
esinternet.imasdtic.es

eVIA
evia.imasdtic.es

Standardization Organizations

OASIS
www.oasis-open.org

ETSI
www.etsi.org

Special Interest Groups

FIWARE Foundation
www.fiware.org/foundation

ERTICO
ertico.com

EOS
www.eos-eu.com

CELTIC
celticplus.eu

Smart Cities Platform
eu-smartcities.eu
About Atos

Atos SE (Societas Europaea) is a leader in digital transformation with circa 100,000 employees in 72 countries and pro forma annual revenue of circa €12 billion. Serving a global client base, the Group is the European leader in Big Data, Cybersecurity, Digital Workplace and provides Cloud services, Infrastructure & Data Management, Business & Platform solutions, as well as transactional services through Worldline, the European leader in the payment industry. With its cutting edge technologies, digital expertise and industry knowledge, the Group supports the digital transformation of its clients across different business sectors: Defense, Financial Services, Health, Manufacturing, Media, Utilities, Public sector, Retail, Telecommunications, and Transportation.

The Group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and is listed on the Euronext Paris market. Atos operates under the brands Atos, Atos Consulting, Atos Worldgrid, Bull, Canopy, Unify and Worldline.

Find out more about us
atos.net
atos.net/career
More thoughts and inspiration at ascent.atos.net

Let’s start a discussion together

Research & Innovation

Barcelona
Pere IV, 291-307
08020 Barcelona
Spain
+34 93 486 18 18

Bilbao
Camino Capuchinos de Basurto, 6 - 3ºB
48013 Bilbao
Spain
+34 94 439 92 88

Bratislava
Einsteinova 11
851 01 Bratislava
Slovakia
+421 2 68526801

Istanbul
ITU ARI Teknokent 2
Buyukdere Cad. A Blok Floor3
Maslak 34398 Istanbul
Turkey
+90 212 286 46 66

Madrid
C/ Albarracin, 25
28037 Madrid
Spain
+34 91 440 88 00

Santander
C/ Real Consulado s/n.
Poligono Industrial de Candina
39011 Santander, Cantabria
Spain
+34 94 235 59 31

Sevilla
Avenida Kansas City, 9
Edif. Realia, Mód. 3-6
41007 Sevilla
Spain
+34 955 512 108

Tenerife
C/ Fuentes Santa Cruz, 3
Edif. Cuadrado - Oficinas 2º
Santa Cruz de Tenerife
Canary Islands
Spain
+34 91 440 88 00

Valladolid
C/ Andrés Laguna 9-11
Edificio Zarzuela, Planta 1
Parque Tecnológico de Castilla León
47151 Boecillo, Valladolid
Spain
+34 983 10 29 97