

Smart Cities at UCM GRASIA

Inter-disciplinary Research on Agent-Based Social Applications

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Juan Pavón Mestras

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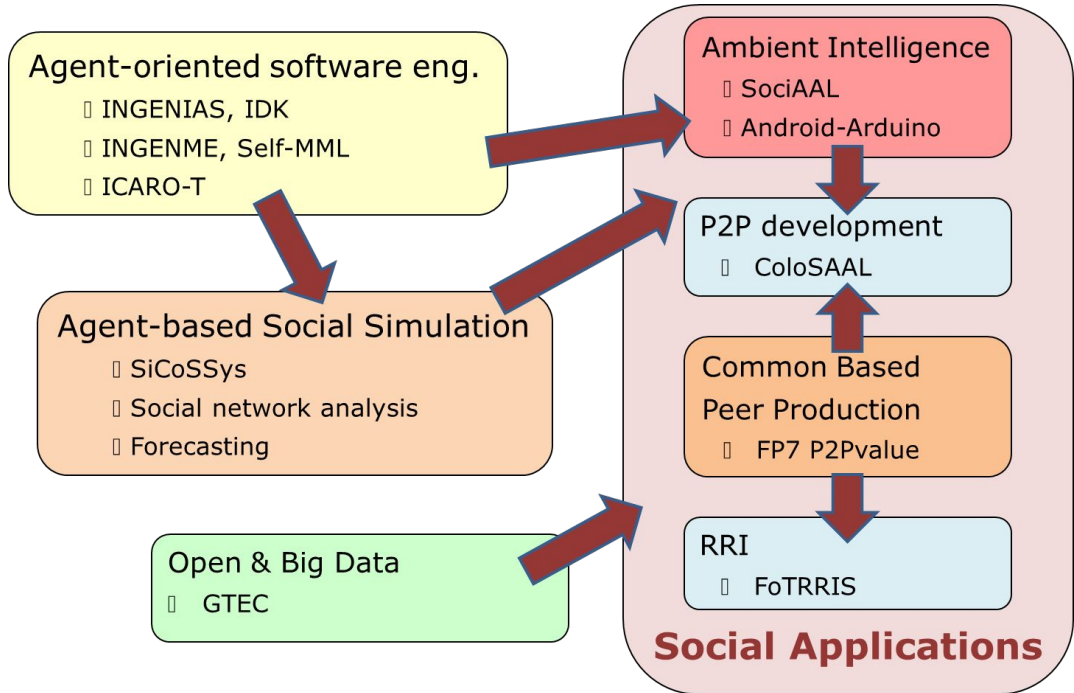


The UCM GRASIA Research Team

- Coordinators: Jorge Gómez Sanz & Juan Pavón
- 20 Researchers (15 PhD) + postgraduate students
- Multidisciplinary:
 - Computer science (AI and Sw Eng)
 - Social research
 - Communication and media sciences
 - Statistics
 - Health care

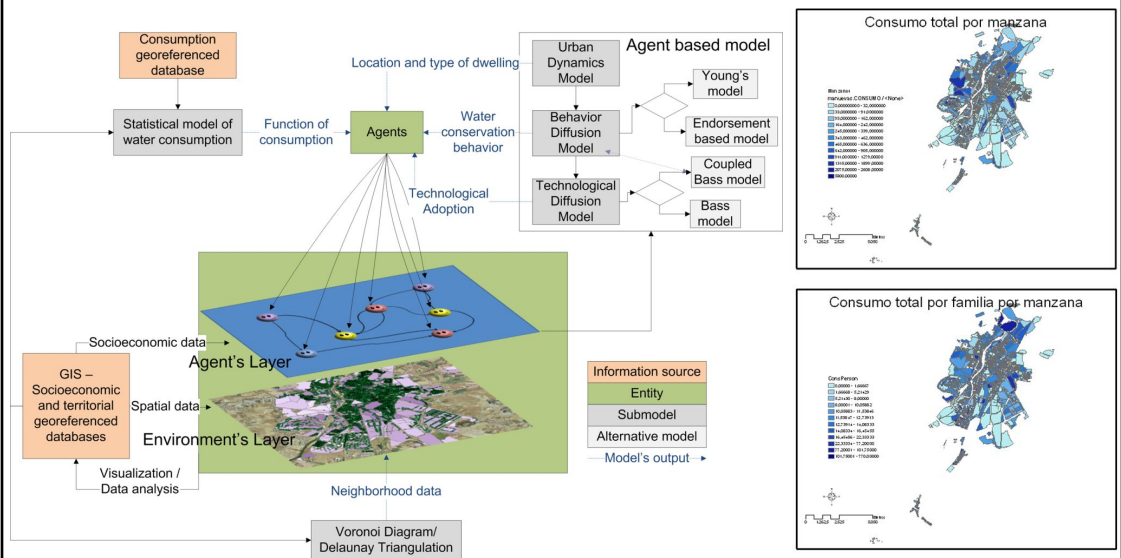


Our traditional lines of research



Agent-based modelling

Domestic water management in Valladolid

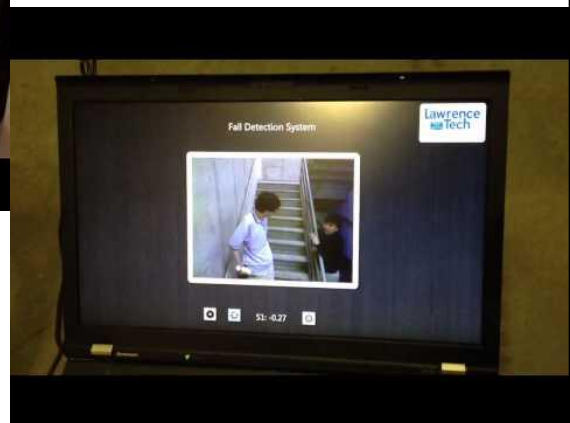
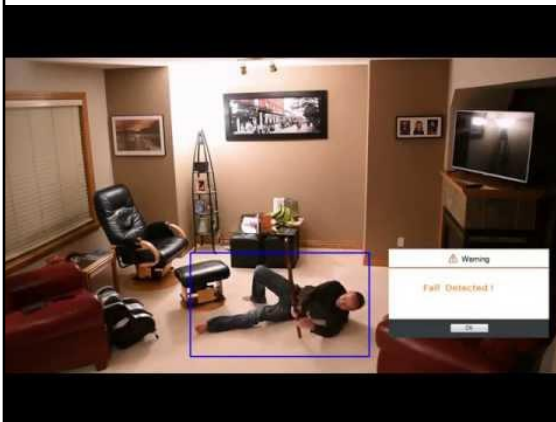


AAL development issues

- Development of AAL solutions
 - Integration of advances in hardware and software
 - Understanding of **real users' needs** and requirements
 - End-users: disabled people, personal care assistants (PCA), family
 - Healthcare specialists, social assistants, etc.
- ⇒ Limited participation in the development process
- ⇒ The final product does not correspond to their needs
- Specifics of each person's disability
 - Day-life routine
 - Usability issues



SociAAL: Testing AAL



Living labs

- A residential home research facility where the behaviour of people living in this house is observed and usage patterns are collected by researchers that are investigating methods for merging new technologies with user-centered design [https://en.wikipedia.org/wiki/Living_lab]
- Issues:
 - Expensive: equipment, personnel
 - Time to execute scenarios
 - Some scenarios cannot be experimented: fire, falls, etc.
 - Difficult to control and configure experiments
 - Repeatability issue
 - Not well integrated in the development process

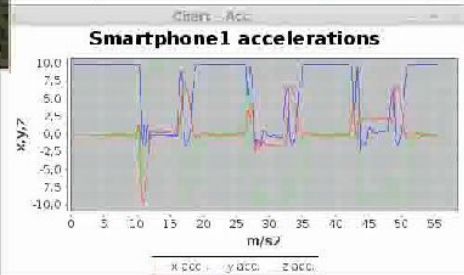
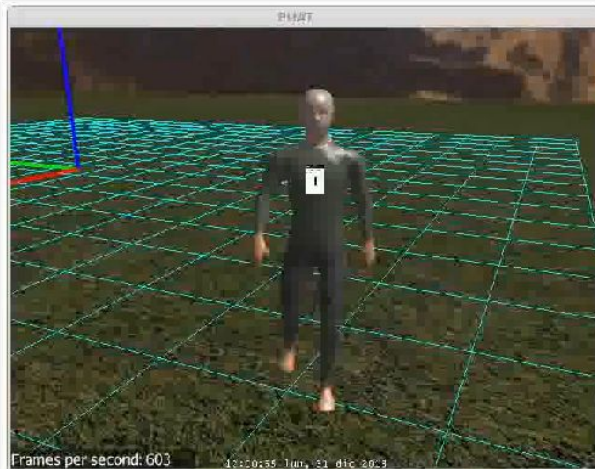


Virtual living lab

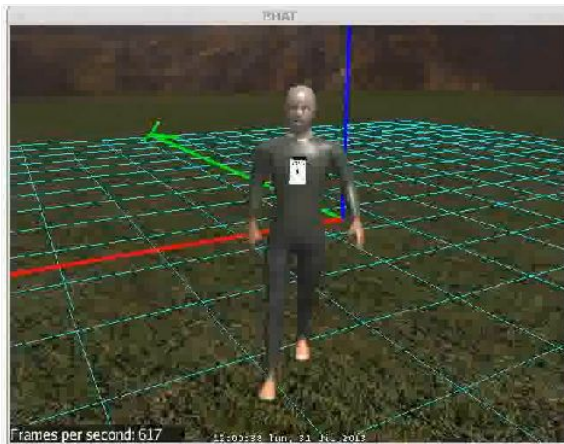
- New concept
 - Pablo Campillo-Sanchez, Jorge J. Gómez-Sanz: *Agent Based Simulation for Creating Ambient Assisted Living Solutions*. PAAMS 2014: 319-322
- Simulation of a living lab issues
 - Keep **user's privacy**
 - Need to have **repeatable, cheaper**, but **credible** experiments
 - Run **simulations for weeks in real time**
 - Study and capture the **requirements** associated to actors
 - E.g. situations faced by Parkinson patients
 - How to capture **Activities of Daily Living**
 - How to model **interaction between actors and the devices**
 - Actors
 - Can produce events: voice, movements, manipulation of objects (e.g. an android smart phone)
 - Can perceive the environment: images (screen), sound, vibrations, other events (e.g. door opening)

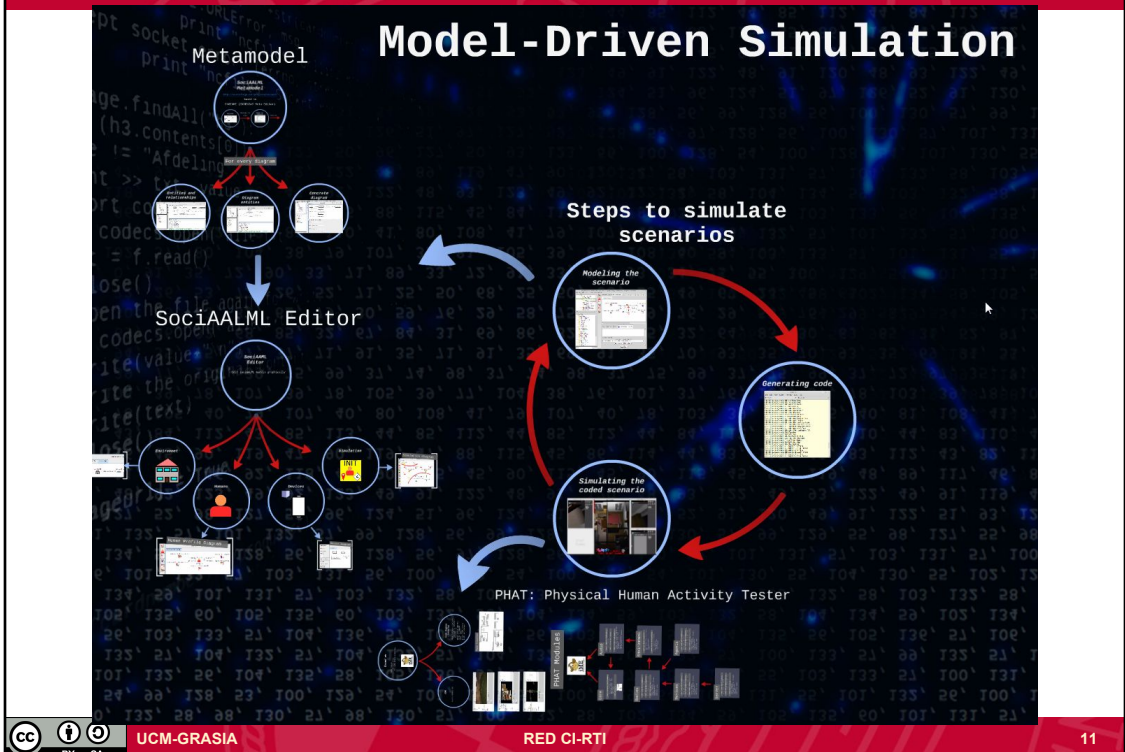


SociAAL: Virtual Living Lab



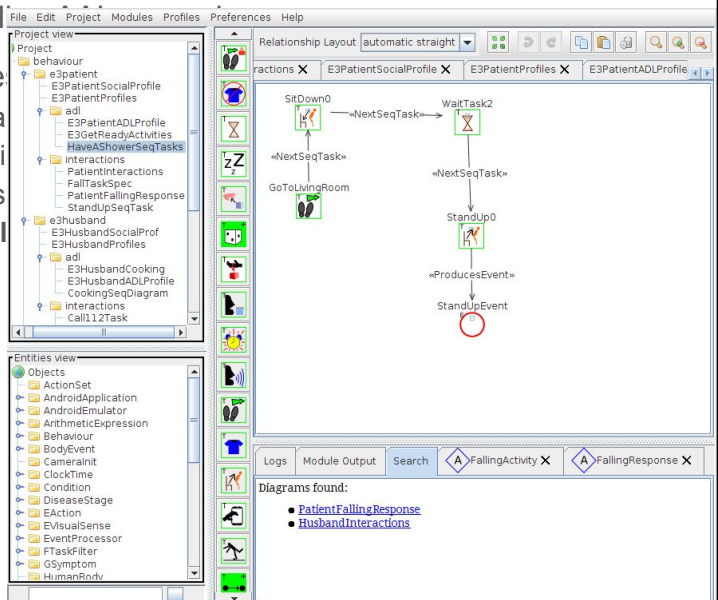
SociAAL: Virtual Living Lab





SociAAL-ML

- A language for modelling
- Each scenario requires
 - **Actors** in the scenario
 - **Activities** of the daily life
 - How these activities are performed
 - Description of the environment



SociAAL: Virtual Living Lab

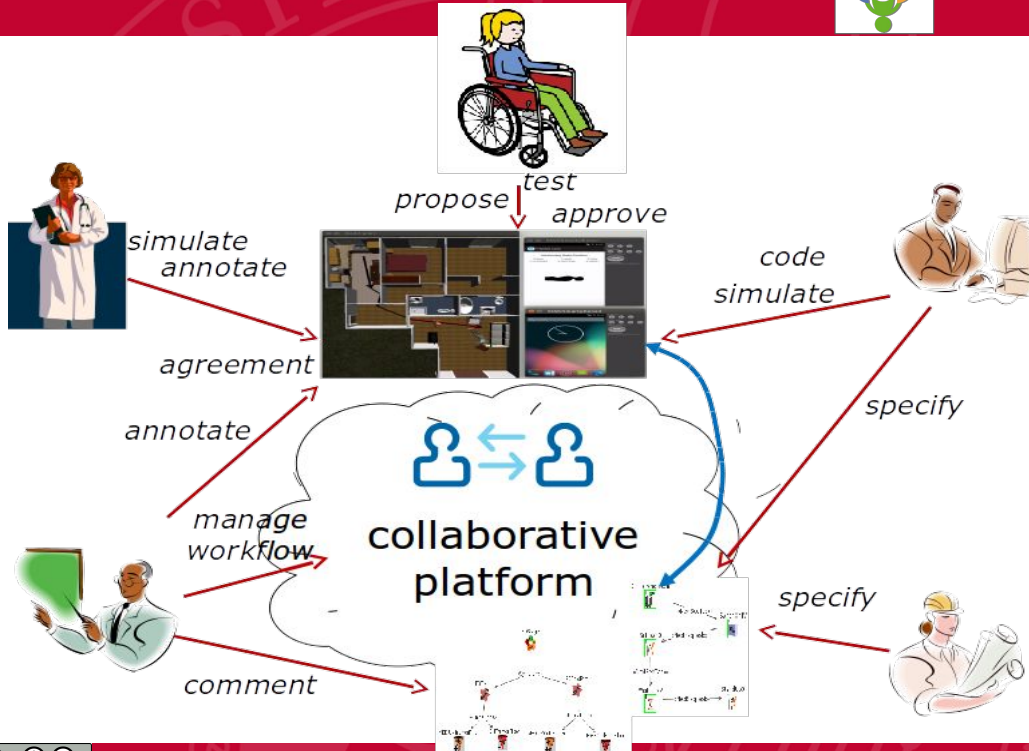
The screenshot displays the SociAAL software interface. On the left, the 'Project view' shows a hierarchical tree of project elements including 'behaviour', 'SocialSpecDiagram', 'ADL SpecDiagram', 'ActivityDiagram', 'SequentialTaskDiag', 'DeviceDiagram', and 'House'. Below this is the 'Entities view' listing various objects like 'Behavior', 'WatchTV', 'Dishwashing', 'EEvent', 'EPrivateEvent', 'EIntrusionEvent', 'EBehaviourEvent', 'StartBehaviourEvent', 'StopBehaviourEvent', 'FallEvent', 'NearTaskEvent', 'CloseDoorEvent', 'SymptomChangeEvent', 'GTask', 'BCompTask', 'BRandomTask', 'BQueueTask', 'BSimpleTask', 'BGoToTask', 'BGoToLivingRoom', 'BSenseDurationTask', 'BStatePermitted', 'BPickUpTask', and 'BUseTask'. The main window shows a 'SocialSpecDiagram' with a 'Relationship Layout' and a 'Messages' log. A 3D virtual environment of a house is shown on the right, with labeled rooms like 'Bedroom1', 'Wardrobe1', 'Bathroom1', 'WC1', 'Kitchen1', 'LivingRoom1', 'Hallway1', 'Bedroom2', 'Wardrobe2', 'Bathroom2', 'WC2', 'Kitchen2', 'LivingRoom2', 'Hallway2', 'Bedroom3', 'Wardrobe3', 'Bathroom3', 'WC3', 'Kitchen3', 'LivingRoom3', and 'Hallway3'. Below the 3D view is a task flow diagram with nodes: 'GoToLivingRoom' (with a person icon), 'SwitchOnTV' (with a TV icon), 'SitDown0' (with a person sitting icon), 'Wait30Seconds' (with a clock icon), and 'StandUp0' (with a person standing icon). Arrows indicate the sequence: 'GoToLivingRoom' leads to 'SwitchOnTV', 'SwitchOnTV' leads to 'SitDown0', 'SitDown0' leads to 'Wait30Seconds', and 'Wait30Seconds' leads to 'StandUp0'. Each transition is labeled with '<NextSeqTask>'.



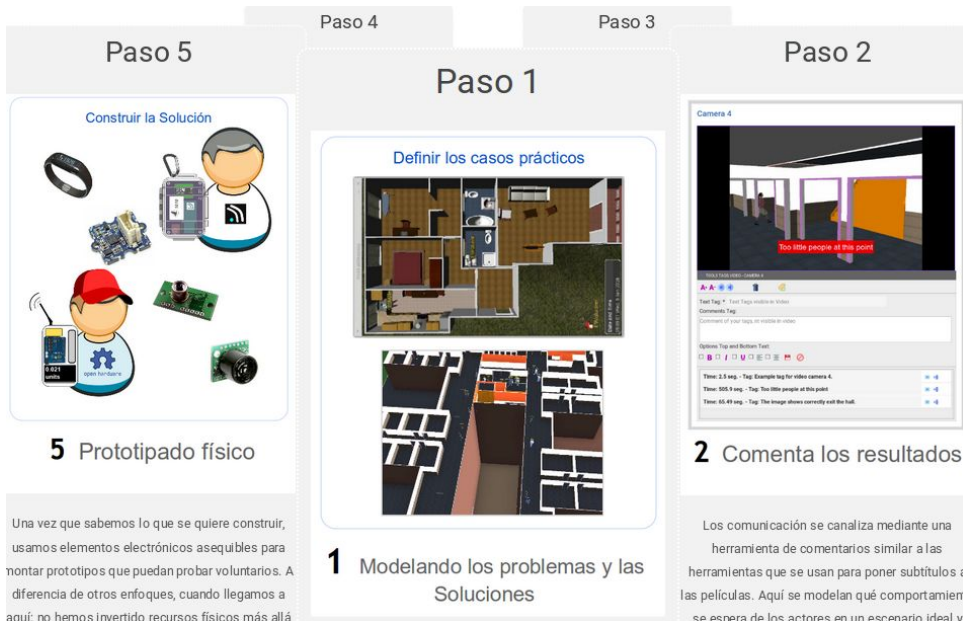
MOSI-AGIL: Modelling crowds of pedestrians

The screenshot displays the MOSI-AGIL software interface. The top part shows a 3D virtual environment of a crowd of pedestrians in a virtual space, with a camera view labeled 'Cam 7'. Below the 3D view are two line graphs titled 'People Flow'. The left graph shows 'People Flow' over 'Time (seconds)' from 0 to 1,300. The right graph shows 'People Flow' over 'Time (seconds)' from 0 to 1,200. Both graphs show a blue line representing the number of people in the crowd over time, with a red line indicating a specific path or metric. The y-axis for both graphs ranges from 0 to 20.





<http://grasia.fdi.ucm.es/hackwithpeople>



Una vez que sabemos lo que se quiere construir, usamos elementos electrónicos asequibles para montar prototipos que puedan probar voluntarios. A diferencia de otros enfoques, cuando llegamos a aquí: no hemos invertido recursos físicos más allá

La comunicación se canaliza mediante una herramienta de comentarios similar a las herramientas que se usan para poner subtítulos a las películas. Aquí se modelan qué comportamiento se espera de los actores en un escenario ideal y

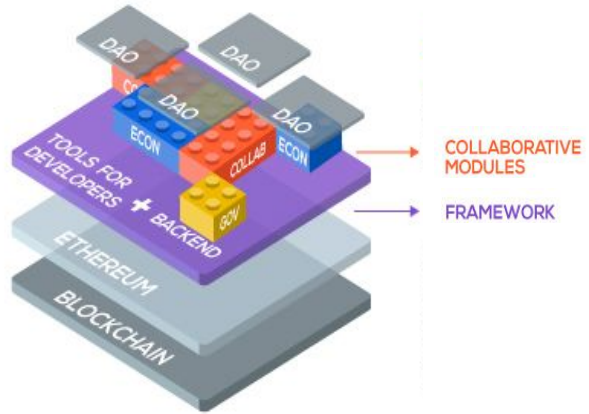


Otras líneas de trabajo

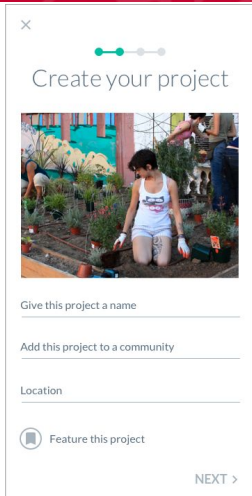
- Middleware para aplicaciones P2P



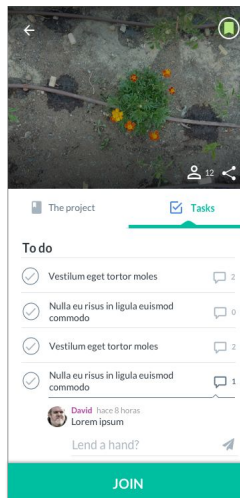
- ERC Starting Grant: P2P MODELS (Decentralized Blockchain-based Organizations for Bootstrapping the Collaborative Economy)



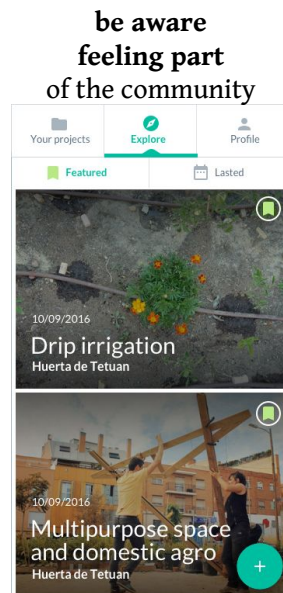
P2Pvalue: Tools for CBPP



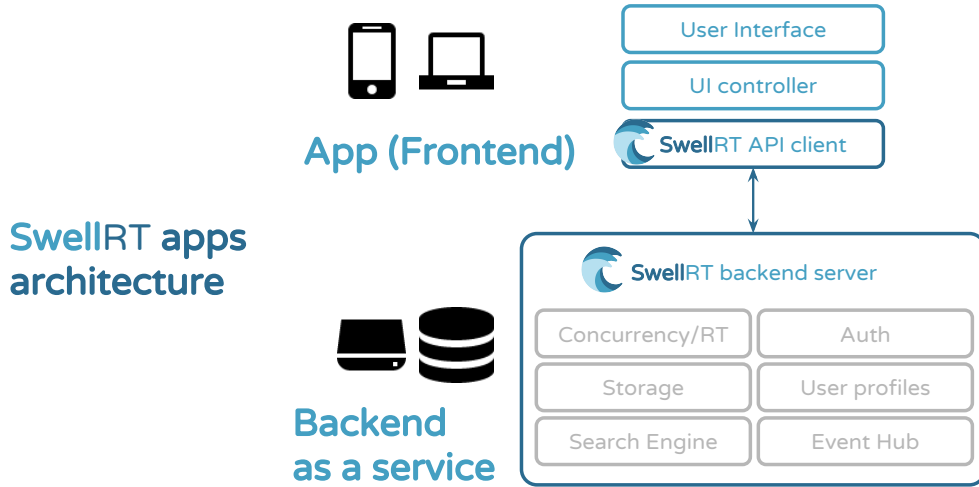
**share responsibilities
explain how to do things**



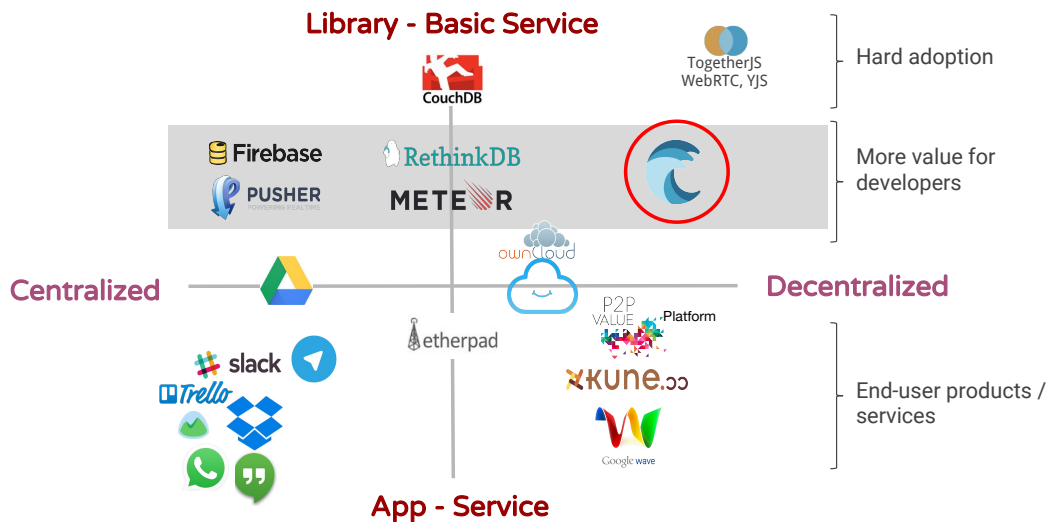
collaborate



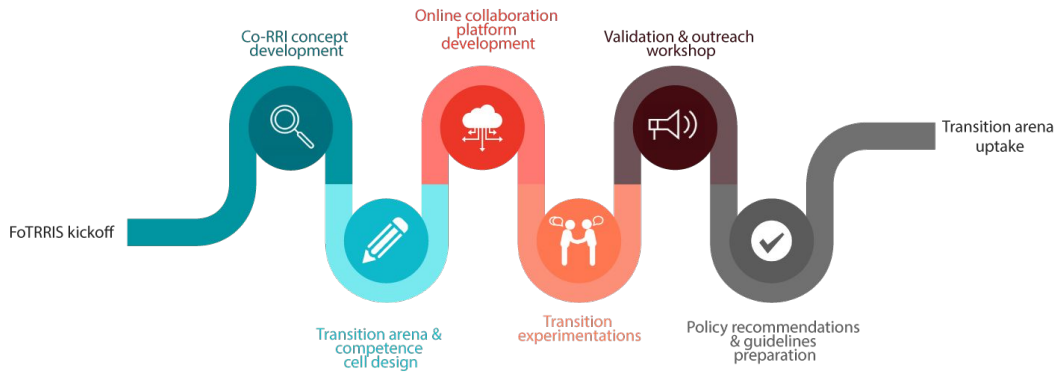
- Fast App development with SwellRT



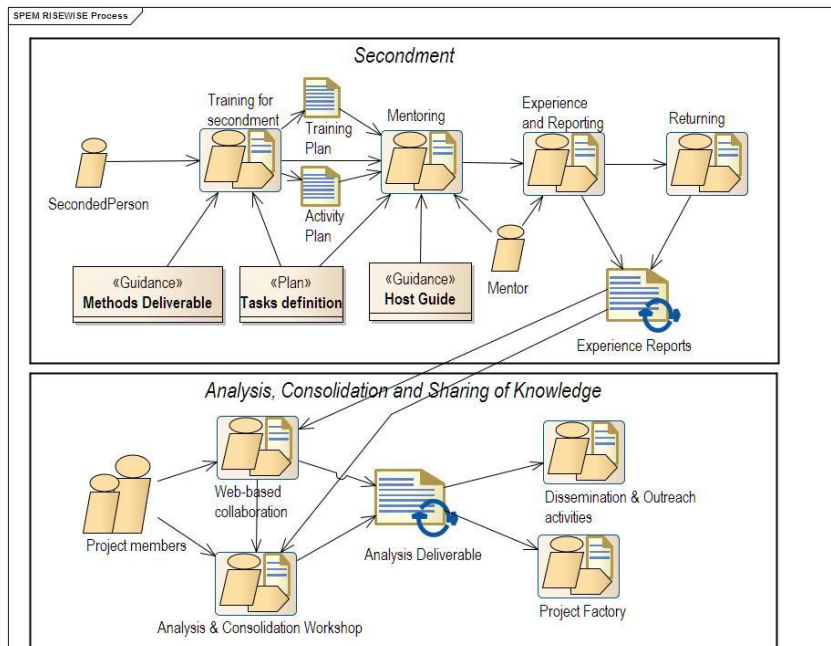
- RT Technologies Quadrant



Fostering a Transition towards RRI systems



Rise Women with disabilities In Social Engagement



Máster en Internet de las Cosas

<http://grasia.fdi.ucm.es/miot/>



INICIO DESCRIPCIÓN PLAN DE ESTUDIOS MATRÍCULA Y PRECIOS HORARIOS Y SEDE ACTIVIDADES CONTACTO

BIENVENIDO AL MÁSTER UNIVERSITARIO EN INTERNET DE LAS COSAS Y SISTEMAS INTELIGENTES



Un título oficial reconocido en el Espacio Europeo de Educación Superior (en proceso de acreditación).

Se trata de un título de máster universitario que capacitará para hacer un doctorado o bien sólo adquirir competencias profesionales. El título estará avalado por las autoridades educativas españolas y será reconocido por otras universidades igual que otros másteres oficiales.



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Conclusiones

- Main page of UCM GRASIA

- <http://grasia.fdi.ucm.es>



- Herramientas para comunidades P2P: Teem

- Web app: <https://teem.works/>

-  <http://tiny.cc/teemapp>



- Middleware para aplicaciones descentralizadas:

- <http://swellrt.org/>



- Hack with People

- <http://grasia.fdi.ucm.es/hackwithpeople/>



- MASSIS

- <http://www.massisframework.com/>



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