Contract No. 250505

inCASA

Integrated Network for Completely Assisted Senior citizen's Autonomy

"Using SOA for a Combined Telecare and Telehealth Platform for Monitoring of Elderly People"

G. Lamprinakos, S. Asanin[Δ], P. Rosengren[Δ], D. I. Kaklamani, Iakovos S. Venieris

ICT Policy Support Programme
Call 3 objective 1.3 ICT for ageing well / independent living

Project start date: 1st April 2010
Duration: 30 months
Coordinating partner: SANTER REPLY Spa
Published by the inCASA Consortium
Project co-funded by the European Commission within the CIP ICT-PSP Programme

Date: 06-10-2011
Dissemination Level: Public
Work package: WP8 - Dissemination
Task: T8.3 - Contribution to international scientific conferences and Scientific Journal Publication
Document owner: CNET[Δ]/NTUA

Remote Telehealth and Telecare monitoring

- Has attracted the interest of many research projects during last years
- There is a need to address the issue of ageing population
  - EU estimates 70% increase of people aged 65 and above by year 2050
- Towards the improvement of elderly people's quality of life
- Towards the reduction of ever growing healthcare costs

Perspectives

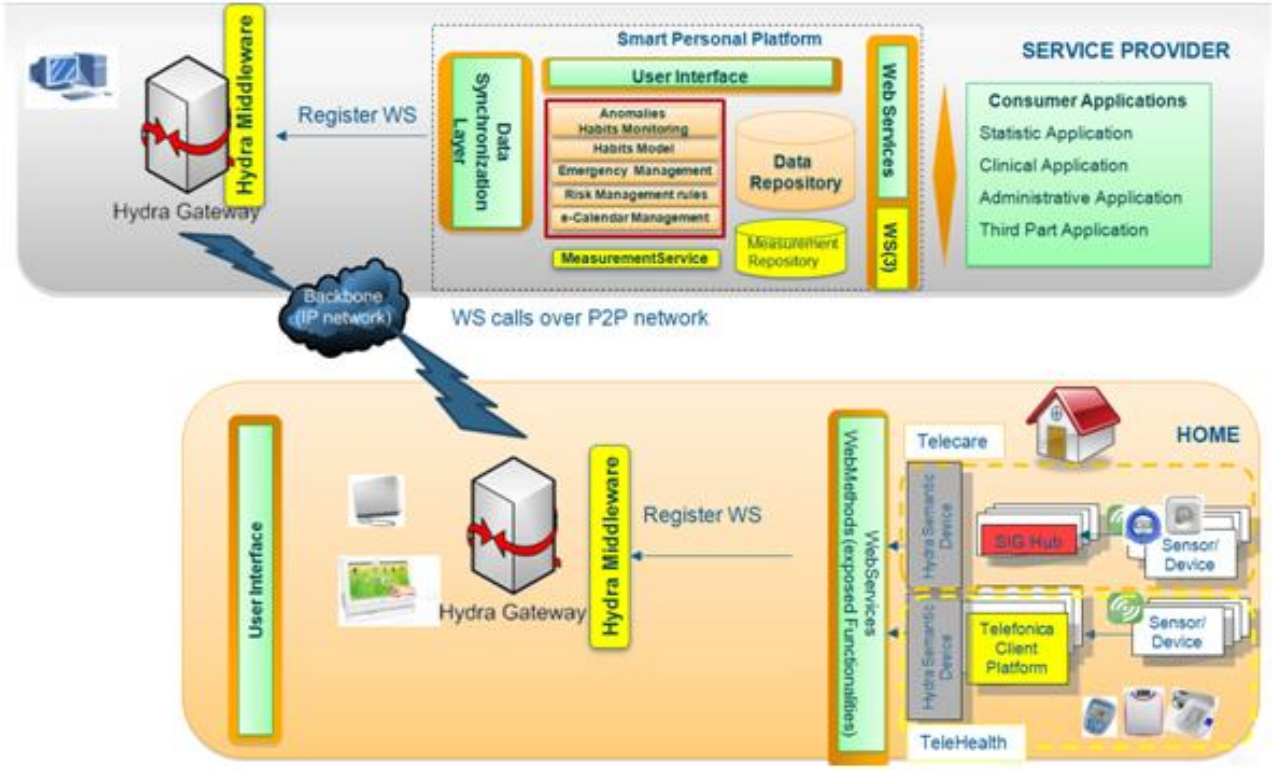
- Offer health services remotely on top of health devices and biometric sensors
- Help elderly to live in an independent way in their own homes
- Significant decrease in their hospitalizations

Service-Oriented Perspective

- Remote Telehealth / Telecare monitoring environment consists of various devices, sensors, communication links and protocols
- New services should be easily deployed to meet ever evolving needs of end users
  - SOA application in order to ease new services development and deployment in a healthcare-based Internet of Things (IoT) environment

The inCASA solution

- Mainly divided in two categories:
  1. End User's entity where both clinical and environmental data are collected
  2. Service provider's infrastructure entity where data is collected, analyzed, stored and made available to Consumer Applications



The inCASA components

- Data collection at first level
  - Activity Hub collecting environmental data
  - Telehealth gateway collecting data from vital-sign monitoring devices
- Smart Personal Platform: able to store, retrieve and analyze the available personal data
- Consumer Applications: a set of high level views available to the personnel of the inCASA pilots and responsible for the rendering of data and alerts for professional GUIs
- Hydra middleware: A Service-oriented software component for IoT applications

Smart Personal Platform (SPP)

- SPP retrieves, stores and analyzes the end user's data received from the inCASA gateway
- Collects the monitoring data and creates a habits model for the elderly
- Includes reasoning mechanisms responsible for comparing collected data against stored user habits model, to detect deviations
- A key functionality offered by SPP towards project's goals is the *generation of alarms in case of divergence*

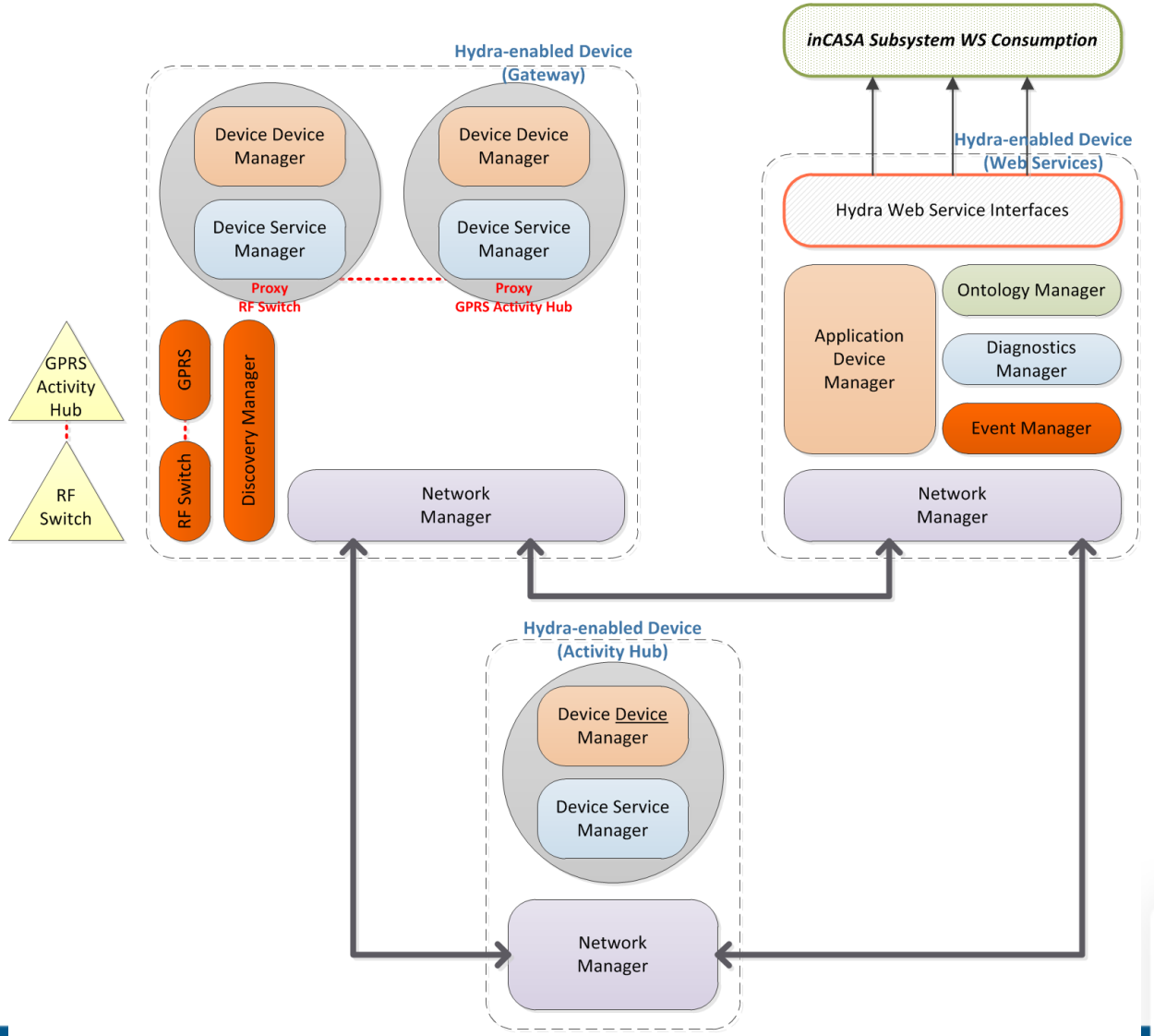
Consumer Applications (CA)

- CAs consume Web Services exposed by the SPP for personal / environmental data retrieval
- The back-end of the inCASA platform where the operators have access
- Responsible for the integration of Telecare and Telehealth data into a unified view per patient
- Exposed web services to be called by the SPP upon alarm generation, whose functionality includes on-screen alert and relevant updates to carers

Hydra Middleware

- The central building block for the Socio-Medical platform in inCASA solution
- Hydra is the core component of the inCASA SOA approach
  - Interconnection of different isolated home networks through P2P technologies
  - Device discovery and selection of the most appropriate software components through a proxy that controls communication and data exchange with devices
  - Offers the services of the device in a standard and easy-to-consume way
  - Uses web services and UPnP (Universal Plug and Play) technologies
  - Eases in this way applications development on top of the middleware and “hides” low-level details (e.g. network communication protocol) from software developers
- Acts as an intelligent software layer placed between the operating system and applications which contains a large number of software components (i.e. managers) that handle various processing tasks

Middleware as a Key Component towards SOA



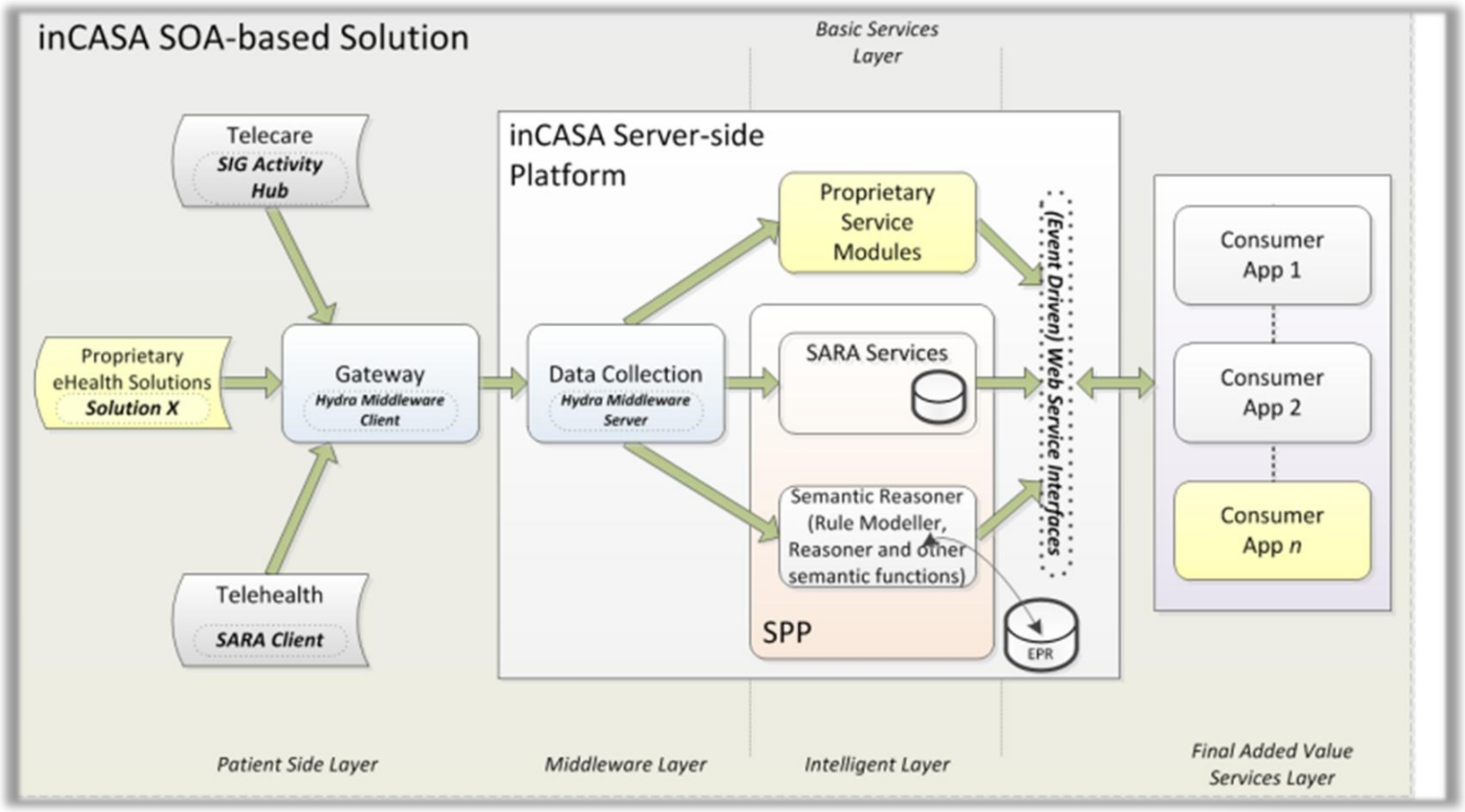
inCASA SOA Solution 1/3

- inCASA's various types of medical devices and sensors are managed by extended device ontology
- The semantic representations of devices and their service descriptions are used to generate WS interfaces
- Allow inCASA programmers to access and use devices using standard web technology
- Uses SOAP tunneling to make WS calls between physical devices in two different networks enabling remote control and access of any device

inCASA SOA Solution 2/3

- Using the SOA and MDA approaches in Hydra, inCASA has gained features to create any possible ubiquitous services and systems interconnecting devices, people, terminals, etc
  - Interoperability at a semantic level by extending semantic WS to device level
  - Publishing through standard WS technology of embedded interfaces and services to the inCASA network
  - Uniform support of different standards where for instance any Continua/ IEEE11073 device can connect to the gateway as well as other types of non-Continua devices

inCASA SOA Solution 3/3



Conclusions

- The inCASA approach offers interoperability at service level
- Meets the requirements for connecting and using a wide range of different devices even though following different types of standards
- SOA eases new application development on top of the core middleware
- Focus on the Telecare / Telehealth integration and on reasoning mechanisms for alarm generation

Thank you for your attention