

Platform Services



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ABSTRACT: *Advanced platform services enable in their rich content schema and business approach a step closer to the digitalization of the public and industrial sectors. These services are open for their further usage in a plethora of applications and run on opensourced cloud infrastructure.*

The main objective of this initiative is to increase the competitiveness of the Slovenian ICT industry by developing advanced ICT pre-integrated (platform) services, which are available via application programming interfaces to other services and applications, and they are managed and orchestrated using the cognate principles. The three areas of platform services usage (E&M Health, Solutions for Small and Medium Enterprise, Safe Society) are described and its benefits for each of these areas.

This program has been initiated by the company Iskratel, d.o.o., Kranj, and involves 15 partners, including 12 industrial and four public research institutes with their 12 research groups.

The Platform services are oriented horizontally, incorporating enabling technologies and services that allow faster and efficient development of applications and services within the initiatives Safe Society, Smart Cities and Communities PaMetSkup, Energetics and E&M Health.

The Platform Services are an excellent ICT basis for Smart Cities and Communities thanks to advanced and rich content and concepts.

The consortium of partners wants to become a global partner for integrated/comprehensive projects with flexible and innovative service providers.

Keywords: Connectivity, Orchestron Service, Network Platform

Received: 14 April 2029, Revised 21 June 2019, Accepted 3 July 2019

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1. Introduction

The program “Platform Services” (Figure 1) provides the following product directions:

- Cloud infrastructure and connectivity;
- Infocommunications and M2M services;
- Big data and analytics;
- Security, trust and privacy services;
- Generic domains services for verticals;
- Management and orchestration services (MANO).

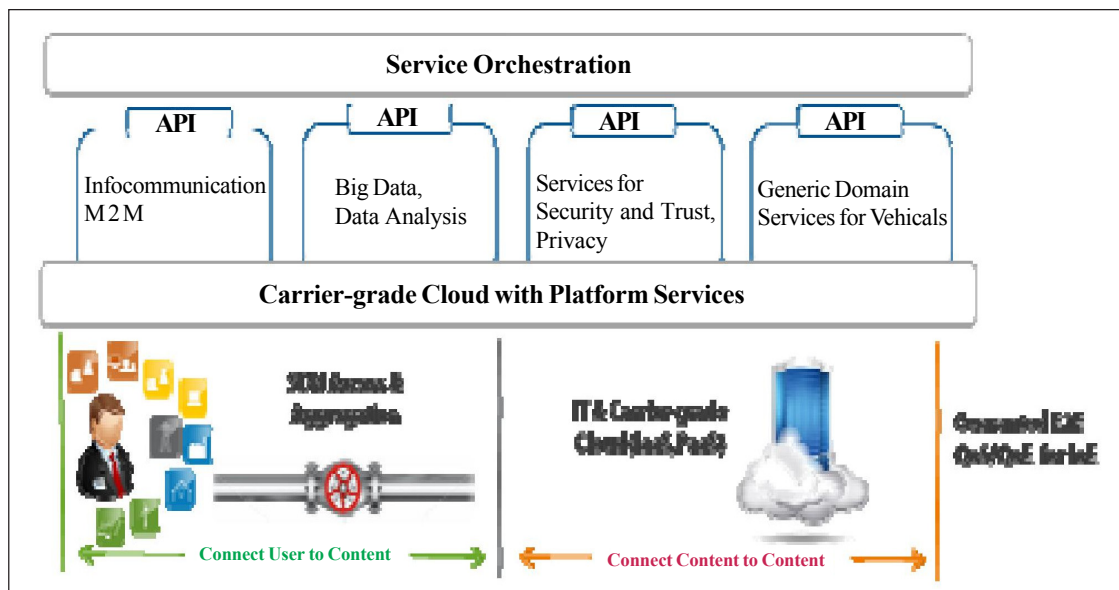


Figure 1. Platform Services

The ecosystem of partners with its innovative, open and preintegrated solutions in the area of “Platform services” will contribute significantly to digitalization and usage of advanced services by end-users, as well as to the success and innovation of individual partners and their business clients in domestic and global markets.

Solutions include the results of R & D competencies and products (TRL 2-5) and their demonstration and commercial pilots (TRL 6- 9) for the public and industrial sectors in the priority area »Healthy Living and Working Environment/Smart Cities and Communities« of the Smart Specialization Strategy in Slovenia. They also comply with the RRI thematic program objectives of the EU instruments and Digital Strategy of EU and Slovenia. The already existing prototypes or products will be upgraded with the essentially new features or built-in application programming interfaces (APIs), which transform them into easy-to-use services.

The realized business idea “Platform Services” comprises many positive multiplied impacts in: social and economic importance for the Slovenian/European society, states and businesses, development and deployment of new open digital services in the cloud that are usable in many domain areas (energetics, health, public safety, transport, smart cities and communities and others), assistance of the Slovenian ICT industry in developing complex solutions with high added value and thereby increasing export of high-tech products.

A phased approach incorporating R&D and V&V activities of pre-integrated solutions, and marketing and sales activities with the demonstration and commercial pilots will take place in the years 2016-2020.

2. Product Directions of “Platform Services”

2.1 Cloud infrastructure and connectivity

Requirement for modern Telecommunications and IT vendors is to offer more scalable, reliable and elastic products which enable faster integration of different types of applications into wide range of solutions with high added value. In order to meet these requirements, there is a need to build innovative application and service infrastructure by combining different technologies such as Virtualization, Cloud Computing, Software Defined Networking (SDN) for broad ecosystem of application providers. With this vision in mind Platform Services Infrastructure model is developed and will be upgraded with the essentially new features based on standards and open source solutions.

Broadband connectivity with guaranteed SLA (Iskratel, d.o.o., Kranj - SI3000 Lumia, NIL d.o.o. – StreetFlow, Smart Com d.o.o. - SmartSNO) connects users to content and contains products/solutions with the following features:

- Assurance of broadband access service in line with the latest technology orientations and transformations such as Software Defined Network (SDN),
- Increase Network Availability and Operation, Improve Connectivity and Access Service to public or private ICT infrastructure,
- Effective and efficient maintenance of network and network infrastructure,
- Assurance of Service Level Agreement (SLA).

Cloud infrastructure covers the solution for data centers as shown in Figure 2 and the cloud platform as shown in Figure 3. Datacenter infrastructure provided by FMC d.o.o. and RC IKT d.o.o. is geo-redundant with Carrier-grade characteristics, where two datacenters are interconnected with dedicated, redundant, Gbit interconnections. The architecture of each datacenter is built around scalable, highly secure and high-availability configuration. Each datacenter provides essential IT resources, such as Server Farms, where all CPU resources are virtualized, SAN storage with storage and database resources, and backup devices. Connections to internet, and the routing between datacenter resources and the internet are provided by means of Bbit connections via at least two independent ISPs and with the use of Border Gateway protocol (BGP).

For Platform Services, Iskratel has developed its own scalable infrastructure which brings framework for application installation in Data centers. This »Cloud Service Platform« (CSP) enables many deployment options from application virtualization scenario to cloud scenarios. All building blocks together offer a user to achieve availability and reliability of its services in many different ways with diverse solutions. Combining building blocks and their features in a proper way CSP can be used as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Data as a Service (DaaS). In order to provide cost efficiency, scalability, flexibility and high reliability in a standardized way, the architecture of the Platform Services is built on the NFV concept.

Network Function Virtualization, in short NFV, is a network architecture concept which, by using the technologies of IT virtualization, virtualizes entire classes of network node functions into building blocks that may be connected, or chained, to

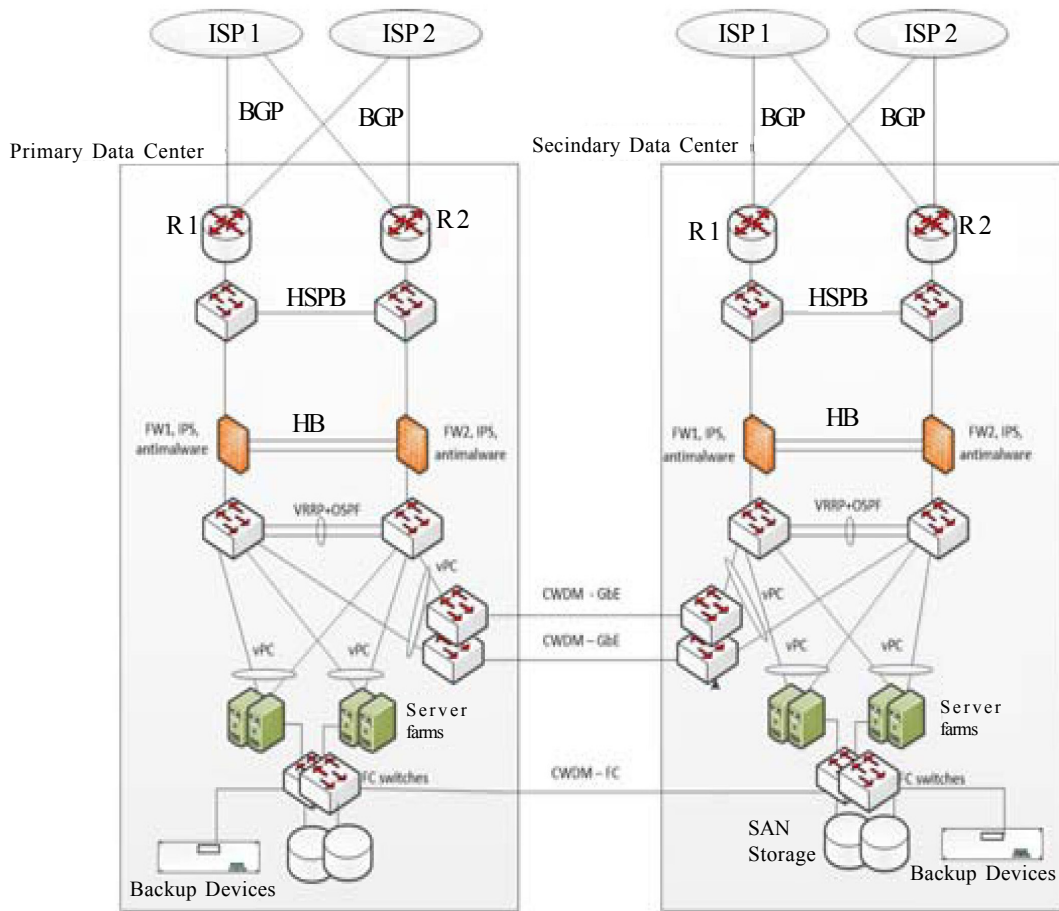


Figure 2. Data Center

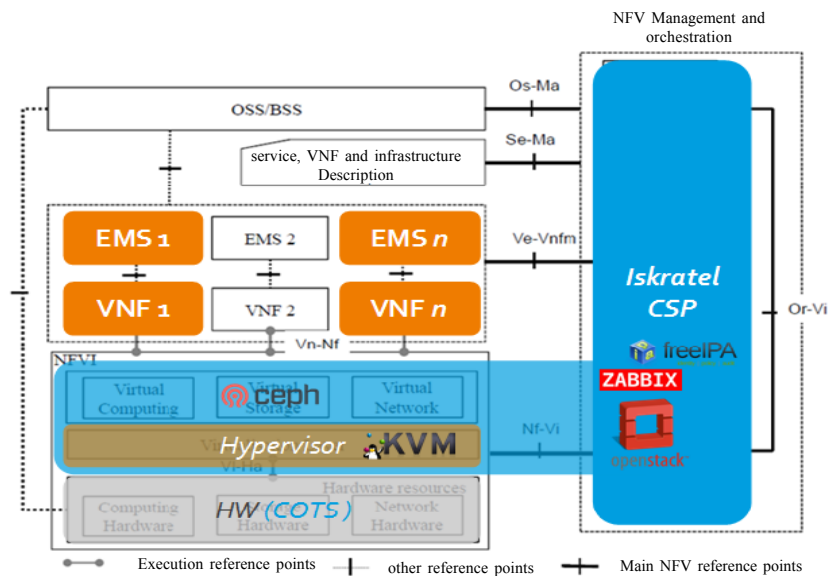


Figure 3. CSP in NFV Architecture

create communication services. It provides many benefits along the IT Services value chain, ranging from the cost benefits of using a generic purpose hardware and software, to the scalability, high reliability and flexibility to deploy variety of rather different IT services on the platform.

2.2 Infocommunications and M2M services

Infocommunications and M2M services fall into three major product categories, which help transform communications into such services that can be built easily in applications:

- Infocommunication servers providing H2H (Human to human), M2M (Machine to machine) in H2M (Human to machine) video, data and voice communications contain:

Communication servers providing H2H and partially *H2M communication* that play a role of multimedia servers in the NGN or IMS architecture inside covered operators networks or as (IP)PBX enterprise or community networks (Iskratel, d.o.o., Kranj - vIMS);

The system for the electronic exchange and storage of *messages*, providing the exchange and storage of various kinds of standardized documents and the implementation of various business processes among partners on the basis of standard EDI (ZZI d.o.o. – bizBox, eHramba, SETCCE d.o.o. - eNvoices);

Event-driven platform for M2M communication, (Iskratel, d.o.o., Kranj – SI5000 M2M platform);

- Application servers and applications in cloud with the following key representatives:

Unified communications for advanced and converged *multimedia communication and collaboration* (Iskratel, d.o.o., Kranj - UC/FMC, Invida d.o.o. – MITV).

Applications in cloud for storing and document sharing (XLAB d.o.o. – Koofer, RC IKT d.o.o - iktXplorer).

Customer relationship and salesforce management *applications* in cloud (CRM) and *advance tools for marketing* (Pronet, d.o.o. – ProCRM, RC IKT d.o.o. – iktXmarketer, iktXDlist).

Applications for 112/eCall and First responders *Operational Centres* (Iskratel, d.o.o., Kranj – 112/eCall).

Applications for Operational communications and *Information* used by personnel or via automatized infocommunication processes in the industrial sectors (Iskratel, d.o.o., Kranj – Dispatching and Information systems).

Applications for two-way communication among *speakers in different languages* (Alpineon d.o.o. – VoiceTRAN).

Call center applications for direct multimedia contact with clients and for optimizing services at home (SmartCom d.o.o. – BeeSMART, CoreSignal, Iskratel, d.o.o., Kranj – Contact center).

Application for business remote desktop (XLAB d.o.o. – ISL Online). Application using location services with the 3D GIS *visualisation* (XLAB d.o.o. – 3D GIS GEA, Smart Locator).

Application for optimisation and automation of work in *the field* (i-ROSE d.o.o. – MSP).

Application for maintaining the knowledge sharing and elearning (Invida d.o.o. – MIT, UL/FE LTFE – e-CHO).

Applications for the rapid production of interactive and *sharing video content* (Invida d.o.o. – MITV).

Applications that enable communication with *applications in natural language* (Pronet d.o.o. – SIRIS);

- Devices and applications for end users:

Customer Premises Equipment (CPE) used as universal user terminal device, which supports a variety of access technologies towards operator (ADSL2+, VDSL, FTTH P2P / GPON, ETTH, 3G, 4G) and towards user (ETTH, Wifi, Zigbee, ...). and represents a point of entry for H2H, H2M and M2M (Iskratel, d.o.o., Kranj – Innbox).

Virtual CPE built on standard x86 platform and virtualisation layer that could host applications for network connectivity and security (firewall, IPS, switchig, routing,...) and application server for other applications like Unified Communication (RC IKT d.o.o. – iktXBox).

Application for multimedia communications running on Android, IOS and Windows in the field of H2H in M2M communications (Iskratele d.o.o. – i/A/W10, UL/FE LTE – Komunikator).

2.3 Big Data and Analytics (IJS-E3, FRI)

The analytics and usage of Big Data is rapidly growing into an essential aspect of any successful endeavour, be it academic or industrial. As the amount of readily available and accessible data increases, the manipulation of that data into meaningful information offers a large competitive advantage to its users by providing a tangible added value and threatens to make those actors who are not able to capitalize upon it uncompetitive.

According to the EU Commission Communication “Towards a thriving data-driven economy”¹, we are witnessing a new industrial revolution driven by digital data, computation, and automation. Human activities, industrial processes, and research all lead to data collection and processing on an unprecedented scale, signalling a paradigm shift towards a data-driven socioeconomic model². The resulting datasets are so large and complex that such “Big Data” is becoming difficult to process with the current data management tools and methods. If successfully processed and managed, Big Data has the potential to spur new products, services, and practices as well as new scientific methodologies. As pointed out by the Commission Communication, this “global trend holds enormous potential in various fields” and that “data-driven innovation brings vast new job opportunities”.

Both the Slovenian economic and academic environments must be equipped with services that will enable them to remain competitive and at the top of the state-of-the-art as the approach to decision making and problem solving is altered due to the growing presence of Big Data and, ever more prominently the increasing importance of open data³. Slovenian experts in ICT fields such as artificial intelligence, machine learning and data analytics are well equipped to offer versatile and evolving platform solutions that will enable Slovenian economic and academic ecosystems to remain competitive and at the forefront of technological development in the area of Big Data analytics and its usage on a global scale.

The partners within the proposed consortium have a deep understanding of both the underlying principles as well as the technologies required to implement solutions that stretch across the entire data value chain, are versatile and flexible enough to be integrated across various sectors and are sustainable in the rapidly evolving technological environment.

Various solutions developed by the partners already exist and are ready to be integrated into a collective state-of-the-art platform (Josef Stefan Institute – Qminer, Faculty of computer and information science). These include state-of-the art analytics platforms for processing multimodal data including sensor data, textual data, video data, and structured data. The existing tools allow for the input of various types of data and support various data standards, enable data fusion across various types of data, enable the usage of various data and stream processing methods in a predictive environment that allows and offers:

Semi-automatic decision making regarding the optimal model to be used in a given scenario;

- Data enrichment from internal and external sources;
- A rich collection of pre-defined calculated features across various modalities;
- Pre-defined data structures for merging multimodal data;
- Automatic building of chosen models with different time scales;
- GUI for interactive visualization of complex data.

¹ Towards a thriving data-driven economy, COM(2014) 442, <http://ec.europa.eu/digital-agenda/en/towards-thriving-datadriven-economy>.

² “European Big Data Value Strategic Research & Innovation Agenda”, European Big Data Value Partnership, July 2014

³ <http://ec.europa.eu/digital-agenda/en/open-data-0>

Solutions also exist in the area of complex event processing, root cause analysis, case based reasoning, behaviour profiles, various types of clustering of multimodal data and reasoning, just to name a few.

The overall goal within this initiative is to bring these tools to true “Big Data” scales and to ensure they are ready to meet evolving industrial needs. Specifically, two primary goals within this initiative have been defined by the consortium as the development of:

- SI3000 DS/INS (Iskratel, d.o.o., Kranj) - a modular system that allows adaptation to various business models and is optimally set for the integration of components of existing 112 systems and consequently for expansion into future systems.
- IoT platform (UL/FE LTFE, FRI) - representing an intermediate layer for extraction, contextualization and visualization of information from various sources in the area of the Internet of Things and thus enabling the development of applications with added value across various domains.

2.4 Security, Trust and Privacy Services

Security and privacy are one of basic requirements of the envisioned Smart Cities and Communities’ ecosystem. They are straightforwardly provisioned at the level of information and communication technologies. Security provisioning in the envisioned ecosystem is very challenging. Technologies and administrative boundaries are heavily interwoven, mobility is a norm, number of devices can be immense and computing and communication resources are shared simultaneously among multiple users. Pervasiveness of the technology, substantial data collection and analytic and intermixture of technological and sociological aspects of human existence are tough challenges of privacy provisioning.

Proposed platform services address security and privacy challenges and requirements directly. They are optimally positioned in the ecosystem technological stack for provisioning the required services. Their positioning and scope enable a holistic approach to security and privacy provisioning on all information communication layers of the system; the services are exported to end user applications through a set of APIs.

The platform security services are provided either in hardware or software (FMC d.o.o. - RTsecureB 1.0, RTsecureA 1.0, SETCCE d.o.o. – Cloud Sign, S-CAAS, IJS-E5 – Safe and private cloud storage). Cryptographic mechanisms are used to secure communication between users and devices regardless of whether physical or wireless mode of communication or communication protocol is used. Trust is managed among user and among administrative domains involved. Vertical services, like identity, attributes, credentials, policy management and policy enforcement are available through platform APIs. Security services and APIs enable integration of other complex and more demanding services for the end users, such as biometric authentication (BioID – Alpineon d.o.o.).

The platform privacy services are provided by flexible and fine grain access control mechanisms to data or content exchanged, either among end users or business applications. Access control and cryptographic mechanisms are used to implement secure end user cloud storage and computation on encrypted data. Access control monitoring and enforcement of privacy policies as a service for end users and enterprises provide transparency of privacy provisioning and its compliance with current and future Slovenian and European regulation.

Security and privacy provisioning in the cloud inherit a number of cloud pertinent advantages like efficiency, elasticity and reliability. Quality improvement of overall basic security services, such as security management is possible both for enterprises and end users. Monitoring security events and incidents detection in the ecosystem can be significantly better and broader than in the case of a single-platform user. Collaboration with other platform services, such as monitoring of SND networking and content distribution, collection of sensors data and big data analytic can bring new security solutions and services to the platform users.

Platform approach to security and privacy ensures better compliance with current Slovenian and European legislation and regulation, as well as more flexibility in adapting to their foreseen changes. The services are directly usable for end users and enterprises. Multiple domains in Smart Cities and Communities can be supported, interweaved with public services, such as government, traffic management, environment management, health, education, etc.

Key security challenges of communication services (VoIP, video, messaging, collaboration) preventing Theft of Service, Invasion of Privacy and Denial of Service Attacks are addressed by using special Virtual Network Functions (VNF), which are offered in platform approach as VNF-as-a-Service model. One of them is the virtual Session Border Controller (Iskratel, d.o.o., Kranj - vSBC) used as a service, which is implemented in Border Gateway.

Typically, BGW is deployed as a border element at the edge of service provider's network, at the edge of an enterprise network, or as the border element between different service provider networks. It provides secure interconnection for communication services and also enables Load Balancing of traffic and allows monitoring and supervision of QoS.

2.5 Management and Orchestration Services (MANO)

Orchestration in Management of Infocommunication services is one of the crucial features of information infrastructure, which will base on NFV architecture.

On this basis, the new infrastructure will be the common infrastructure for applications and for infocommunication services in the future. All modern platforms rely on paradigms of virtualization, reliability, scalability and elasticity, security, multitenancy, device and location independence, agility, Service-oriented Architecture, increased utilization, higher performance, higher productivity etc. Therefore they will be deployed on Cloud-based platforms. For providing services according to new business models, such as XaaS, importance of the following functionalities and systems will be increased:

- Orchestration and Management for entities of platform and applications, systems for management and monitoring of Cloud infrastructure;
- Monitoring and management of failures in applications and infrastructure;
- Monitoring and management of Service Level Agreement, service quality and the quality of experience.

Within application infrastructure for Infocommunication services and application, applications and subsystems for Orchestration and Management of infrastructure and services shall be included, such as:

- Management system for applications and elements with open interfaces for integration purposes (Iskratel, d.o.o., Kranj – SI3000 Management Node System and the partners' management applications);
- Fault management system with the defined principles for developing fault access modules for applications and services (Iskratel, d.o.o., Kranj – SI3000 Fault Monitoring System, Fault Access Modules – provided by partners);
- Different management and orchestration components for applications for various vertical sectors (Iskratel, d.o.o., Kranj – SI3000 Cloud Services Platform, NIL d.o.o. – Orkestrator, RC IKT d.o.o. – IktX applications) and
- Systems for monitoring and management for Quality of Services and Quality of Experience of broadband connectivity and network features (UL/FE LTFE – Solution for QoE); and subsystems for Orchestration of applications such as:
- Cloud service platform components for IaaS/PaaS/SaaS/DaaS;
- Process orchestration system and
- Special applications and modules for encryption of data and communication.

3. Areas of Usage of “Platform Services”

3.1 Platform Services for E&M Health

3.1.1 E&M Health Solutions

There are multiple electronic and mobile health related solutions that can take advantage of the platform services. Examples of such solutions are in the text below.

mHealth PCARD platform focuses on monitoring patients and the elderly and connecting them with caregivers and medical professionals in a secure and privacy transparent manner. The mHealth PCARD provides wearable sensor devices used in clinical environment for monitoring ECG, vital signs, as well as monitoring everyday activity of patients and elderly in home care or similar environment. The PCARD platform is used in scenarios for discovering arrhythmias, measuring the impact of drugs on arrhythmia, documenting ischemia, following up on the adherence to the drug therapies, checking the results of ablation procedure, evaluating syncope and light-headedness⁴ and other.

Home Care service is provided by the social care providers.

The service involves Care Signal monitoring and response application delivered for the elderly independently dwelling at home. The user's home is equipped with various sensors for the purpose of monitoring the environment and user activity, such as panic/SOS button, presence/motion detector, door/window contact detector, door barrier, smoke/heat detector, water leak detector, and temperature detector. The Care Signal backend system collects sensitive sensor data, processes them, providing reliable notifications and routes alerts to relevant stakeholders via an appropriate communication channel.

Remote Rehabilitation is intended for persons after stroke and is based on a patented standing frame, currently also equipped with integrated sensors (accelerometer, gyroscope – 2D tilt sensor) and actuators (horizontal translational standing platform), which are connected to the remote rehabilitation application. The system is used by the therapist to remotely set rehabilitation tasks, follow therapy execution and progress, guide the patient in the therapy, and prepare reports for assessment of the therapy by the physician. The system is used by the patient to execute regular therapies according to the prescribed tasks and guidance from the therapist. The information from different medical devices or/and developed sensor units is aggregated into balance ability measurement and presented to the physician.

Remote Diagnostics is intended for doctors and medical professionals to help them remotely diagnose patients, who are living independently. The service allows medical data to be visualized in a manner that is easily understandable by medical professionals. The service relies on input data collected from various sensors, i.e multisensory devices that are ready to assess functional vital parameters (heart rate, blood pressure, body temperature) personal health sensors. The service allows for the integration of diagnosis pattern recognition algorithms for different medical conditions that help doctors with the diagnosis of the patients and the elderly.

3.1.2 How do E&M Health Solutions Benefit from the Platform Services

All the E&M health services and scenarios have strict requirements in the fields of Privacy and Security, since they rely on collecting and processing a considerable amount of sensitive medical and activity-related data. The common use cases for security and privacy platform services are the following:

- The transfer of sensitive data gathered by the sensing devices can be secured using strong encryption using Rtsecure A platform service.
- For storing sensitive data in the cloud, the scenarios rely on the “Secure and Privacy-aware cloud storage” platform service, in which sensitive data are encrypted and stored on secure servers residing within the EU, to which the EU data regulations apply. The data relating to each end-user are separated and sandboxed to prevent them from being seen by any unauthorized parties. Accesses to the sensitive data are controlled using S-CAAS (see below). All the accesses to the sensitive data are logged using audit trails that contain information on who was accessing the data at what time, for what purpose and through which application.
- For accessing e-health applications and sensitive data, the S-CAAS platform service is used. Through it, the end-users / representatives of stakeholders can be authenticated for the required security level. S-CAAS assumes 4 levels of trusted authentication: the strongest being two-factor authentication using an EU-wide e-ID mechanism that is eIDAS compatible. An extra security level can be added to the existing one by integrating the BioID platform service (biometric authentication).
- Another functionality provided by the S-CAAS platform service to secure storage and medical applications is outsourced simple authorization. Thus, the appropriate stakeholders (physicians, relatives, medical professionals, caregivers) will only have access to the exact set of data that is needed for each medical or management application in need-to-know basis.
- In cases where it is needed to obtain explicit consent from the end user to be able to lawfully monitor and process the sensitive medical data or to get explicit consent from the end-user on certain medical practices, the solution is legally compliant signing of electronic documents. This is provided by the CloudSign platform service that enables legally (eIDAS) compliant signatures using electronic signatures and timestamps; it also provides long-term archiving of electronic contracts and documents.
- Management of medical sensors, devices and wearables that medical staff performs in terms of installation of devices in smart homes, their connection to the backend services or pairing of wearable devices with end-users can be handled and integrated by the IoT platform services.

- There is potential value in integration with big-Data and analytics platform services, but only for the nonsensitive data, such as data relating to work practices of medical professionals and the optimization of their working processes.

3.2 Platform Services for Small and Medium Enterprises

3.2.1 Solutions for Small and Medium Enterprises

In the knowledge society, firms need to develop competitive advantages based on an adequate and intensive use of information and communication technologies (ICTs), which is an essential element of success in today's market. This fact is especially relevant for small and medium sized enterprises (SMEs), whose survival depends, among other factors, on the use they make of ICTs to develop their business model. Modern ICT services make optimal usage of their internal resources and - at the same time - interconnects them to their customers, partners and government services and institutions. Many times SME companies have limited ICT budget compering to large Enterprises. In addition, many small businesses could not afford to employ IT specialist(s). In order to fill this gap Service providers of different size and background address SME market segment with service packages such as "Virtual Office", "Mobile cloud", "New IP-Centrex", "Office in the Cloud" and others.

3.2.2 How do SME Solutions Benefit from the Platform Services

Platform Services initiative brings platforms, tools and concrete application packages in order to enable quick and efficient work of Service providers.

The Complete Solution Building Blocks are as following:

- **Communication services including Voice:** Unified Communications, Broadband connectivity including Industrial Internet, Mobility by using Fixed-Mobile Convergence, Business connectivity, Communication devices for staff used also for personal needs
- **Applications:** Office in the cloud (E-mail, Web hosting), Mobile workplace, Electronic document storage, Electronic document sharing among business partners and with government;
- **System services:** Cloud platform, Billing and Accounting, Directories of system entities, employees, organisations, partners, Remote control, Single sign on, Single window, Central Provisiong, All-in-One CPE/UI, OoS/SLA control, Local Support, Local Data, Regulatory compliance.

3.3 Platform Services for Safe Society

3.3.1 Safe Society Solutions

The program "Safe society" provides applications, services and networks solutions that cover the operational and tactical levels (Figure 4):

- Next generation Contact center 112;
- Next generation information and notification systems;
- Control center solutions;
- Critical communications;
- On-site emergency support systems;
- Public safety services and applications.

The core application in this pre-integrated solution is the application Next generation Contact center 112, which supports mass contacts and 112 call handling by providing H2H and M2H interactions. The other applications within this program enable to generate additional information on the basis of gathering, collecting and processing such information from the different city areas. The collected information will be post-processed and transferred to citizens or visitors in cities and/or to key personnel and first responders.

The solution bases on the establishment of a control center, where the necessary infrastructure for the implementation of safe city



Figure 4. The Safe Society network, services and applications

services exists. An open architecture enables the integration of other information systems and the systems, which could process actions. The open architecture allows adaptation to the specific needs of individual regions and is future-safe for upgrading the system and adding the essentially new features in a simple way.

The key advantage of the solution is its flexibility in defining and implementing processes for public notification and/or alerting in case of emergency situations. The benefits of the solutions are the increased level of security for citizens during emergency situations and the increased quality of life for them because of relevant and important public information. Public notification shall be provided via the communication subsystem by using media, data and voice services.

A GIS- and Videogrid-driven environment in the control room gives the staff complete information about all events. In the action support subsystem it is possible to determine in advance which measures to take. The technology allows an easy integration of various action support systems. The actions are executed via the public information subsystems and/or via established links with the centers for emergency situations (e.g. 112). The operators are able to simultaneously communicate with various emergency departments and inform the citizens via public information and notification systems by defining various scenarios, which are automatically performed in such cases.

While supporting also the test scenarios this solution can be also used for training and improving the measures.

3.3.2 How do Safe Society solutions benefit from the platform services

Platform services provide a flexible communication platform for all types of communications, from H2H and H2M to M2M. The generic components and services are added that enable to create efficiently the safe city and society solutions. Using this principle the platform services will be used as a framework for the integrated services of the safe city solution.

By using the platform services it is possible to support cost- and technology-effectively complex business models of the safe city solutions. The establishment, upgrading and management of such solutions will also be optimal thanks to the platform services.

Acknowledgments

The authors would like to thank partners of the program Platform Services and their colleagues at work for valuable comments and thorough reading of this article.

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