Putting Mobile Services into Context

9th June 2009, Santander

The ubiquity of mobile devices and proliferation of wireless networks will allow everyone permanent access to the Internet at all times and all places. The increased computational power of these devices has the potential to empower people to generate their own applications for innovative social and cognitive activities in any situation and anywhere. This wireless connection is not limited to user devices, almost any artefact from clothing to buildings can be connected and collaborate. Furthermore new sensor technologies and wireless sensor networks provide environmental intelligence and the capability to sense, reason and actuate. This leads to the exciting vision of the interconnection of artefacts embedded in our real environment, forming a society of "intelligent things" and "smart spaces". The workshop discusses the main concepts and role that context-awareness and context aware systems will play in this vision and the significance for future networks and future Internet. This workshop aims to bring together researchers and practitioners in academia and industry to share recent results on context-awareness, as well as to foster collaboration and coordination in future EU research efforts.

This workshop is being jointly organised by C-Cast and SENSEI FP7 projects.

Programme:

8:45 Registration

9:00 Opening
R. Tönjes (University of Applied Science Osnabrück, C-CAST)
A. Gluhak (University of Surrey, SENSEI)

9:10 Session 1: Towards a Context Enhanced User Experience
Chair: R. Tönjes (University of Applied Science Osnabrück)

9:10 A. Gluhak (University of Surrey, SENSEI): "The SENSEI architecture – Enabling a Real World Internet"

9:35 M. Bauer (NEC, SENSEI): "Context and actuation based on the SENSEI system"

10:00 Boris Moltchanov (Telecom Italia Lab, C-CAST): "Context Service Enablers and Context Management Platform"

10:25 Jose Simoes (Fraunhofer Fokus, C-CAST): "Context Detection and Context-Aware Multiparty Delivery"

10: 50 Coffee Break

11:10 Session 2: Employing Context Awareness for Smart Spaces and User Generated Content
Chair: A. Gluhak (University of Surrey)

11:10 Ioanna Roussaki (National Technical University of Athens, PERSIST): "The role of context-awareness in Personal Smart Spaces n"

11:35 Sarah M. McBurney (Howard Williams Heriot-Watt University Riccarton, PERSIST): "Learning, Personalisation and Pro-activity in a PSS"

12:00 B. Martinez (Robotiker Tecnalia, m:CIUDAD): "User-created services in a context aware mobile platform"

12:25 O. Corcho (Universidad Politécnica de Madrid, GeoBuddies): "Enabling mobile user-generated content in St Jacques' Way"

12:50 Conclusion

13:00 End of Workshop

Abstracts

Martin Bauer (NEC, SENSEI): “Context and actuation based on the SENSEI system”.
Abstract:
The SENSEI system targets high-level support for retrieving context information as well as executing actuation tasks based on an infrastructure of integrated wireless sensor and actuator network islands. The goal is to provide a suitable abstraction level to enable horizontal applications that can run on top of heterogeneous wireless sensor and actuator network islands.
In this talk we will focus on what kind of support SENSEI provides for short and long-term requests based on example use cases. We explain how high-level context and actuation requests are transformed into execution plans. We introduce the information and actuation session concept that allows the separation of control and data flow, enabling a fully decentralized data flow that improves the overall scalability of the system. We show how relevant aspects of long-term requests are being monitored to trigger a dynamic and transparent adaptation of the request execution if there is a relevant change, thereby achieving continuity of information provisioning.

Oscar Corcho (Universidad Politécnica de Madrid, GeoBuddies): “Enabling mobile user-generated content in St Jacques’ Way”.
Abstract:
We will describe the current technological status and the existing research lines in the context of a pilot application that we will be testing during summer 2009 in the popular pilgrimage route called St Jacques’ Way, in Spain. This route (or set of routes) is used by hundreds of thousands of people every year, who join in the joy of walking and where self emergent communities of people arise. In our pilot, we provide users with the means to share their experiences by means of a combination of mobile, Grid and semantic technologies, which allow them to enhance their experiences. Scientific advances in the areas of ontology-based data integration, recommendation, folksonomy enrichment and data Grids will be described and future lines of research will be proposed.

Alex Gluhak (University of Surrey, SENSEI): “The SENSEI architecture – Enabling a Real World Internet”
Abstract:
Sensor and actuator networks (SANs) represent an inexhaustible resource for real world information. Ubiquitously deployed, they can capture a diverse set of physical phenomena and real world events characterized by multiple sensing modalities and also enable localized interaction. The main challenge is to integrate SANs efficiently into the Internet as natural extensions of the infrastructure and make them universally accessible on a global scale, while leaving room for evolution and emerging applications and not degrading any of the current services. This would allow the Internet to transform small distributed pockets of sensor data to become a vast pool of global, coherent real world information and offer an equal level of real world manipulation. In this talk we present an overview of the SENSEI architecture, which provides a framework for efficient integration of heterogeneous SAN into a coherent context information and actuation infrastructure on global scale. We discuss our architectural design decisions in more detail and explain the functionality provided by the key system components, including the specified interfaces and underlying information model. Further we examine the implications of technological design choices for the distributed realisation of key components of the system.

Belen Martinez (Robotiker Tecnalia, m:CIUDAD): "User-created services in a context aware mobile platform"

Abstract:
In the move towards an open, collaborative mobile web, a need for unrestricted, customised information sharing and unleashing collective creativity emerged. Nowadays a user does not go to the web content – the content comes to the user. As users become more eager to personalise their mobile widget workspace, and as they demand more accurate, relevant information than traditional web services can provide, the user-provided service concept emerges as a further step beyond mobile widgets. It will be presented the concept of mobile user-provided services - small services that users can create and provide on the go from their mobile terminals. With special emphasis in context-aware and personalisation issues, crucial when looking for micro services in a future in mobility, where an ecosystem made up of millions of providers will offer micro services on the go and where users' context will be shifting as they move.

Sarah M. McBurney (Howard Williams Heriot-Watt University Riccarton, PERSIST): "Learning, Personalisation and Pro-activity in a PSS"
Abstract:
Personal Smart Spaces (PSS) bridge the gap between pervasive environments allowing the user to take the pervasive experience with them wherever they go. As the user moves through their environment their PSS should adapt the world around them in a beneficial way to aid the user in everyday life. To ensure such adaptation is a help, and not a hindrance, to the user mechanisms must be in place to gather, maintain and apply user specific information so system behaviour is personalised and beneficial to each individual.
So how do we gather relevant user information (e.g. preferences, user intentions, etc.) and ensure it is accurate and up to date? How do we use this information to adapt the user's environment in a beneficial way and how do we know when to perform such adaptations? This presentation describes the Learning, Personalisation and Pro-activity systems in the PSS framework illustrating how they overcome the challenges above to provide an enhanced user experience.

Boris Moltchanov (Telecom Italia Lab, C-CAST): **"**Context Service Enablers and Context Management Platform"
Abstract:
This speech presents the design of a Context Management Architecture in the C-CAST EU project. It introduces a modular and extendible management model comprising Context Broker, Context Provider and Context Consumer entities. In addition, Service Enabler components are introduced. Following the Web2.0 trend coupled with the increasing interest in web-based social communities, group management and recognition and content selection aspects are also presented. The architecture proves its ability to support a large variety of contextual information for broad kinds of context-aware services. Hence, it is suited for multi-domain context-aware communication systems and evolves by adding new context scopes during runtime.

Ioanna Roussaki (National Technical University of Athens, PERSIST): "Context Management and Personalisation"
Abstract:
Ubiquitous computing aims to assist users in their everyday tasks in a seamless and unobtrusive manner. Various research initiatives aim towards the design and realization of smart spaces in private or public places such as homes, offices, universities, schools, hospitals, hotels, museums where various automation facilities support the users. The Persist

project introduces the notion of Personal Smart Spaces (PSSs) aiming to couple the facilities offered by next generation mobile communications with the features provided by the static smart spaces. The goal of this coupling is the support of a more ubiquitous and personalised smart space that is able to follow the user wherever he/she goes. An inherent feature of PSSs is context awareness where context can be defined as the entire set of information that is relevant to a human-computer interaction. To this end, the management of context information in such an environment is a challenging task. Collecting context information from various heterogeneous sources, disseminating it across distributed nodes, processing, managing and reasoning it efficiently are not straightforward. This presentation will elaborate on the basic mechanisms that have been designed in order to address the advanced requirements of PSSs regarding the establishment of a robust distributed context management framework.

Jose Simoes (Fraunhofer Fokus, C-CAST): "Context Detection and Context-Aware Multiparty Delivery"

Abstract:
Telecommunication and Internet services are constantly subject to changes, seeking the customer's full satisfaction. Enriching these services with innovative approaches such as context-aware, mobile, adaptable and interactive mechanisms, enables users to experience a variety of personalized services seamlessly across different platforms and technologies. Focusing on the user perceived Quality of Experience and efficient network support of real-time group communications, we present an architectural framework that allows dynamic adaptation of the multiparty delivery, group communications optimization and maximization of group member's overall satisfaction. This is done by optimizing the delivery in all layers of the multiparty networking stack (i.e. session, transport, and network layers) based not only on the user networking contexts but also on its environmental contexts.

CVs

Dr. Martin Bauer is a research scientist at the NEC Laboratories Europe in Heidelberg. He received his MSc in Computer and Information Science from the University of Oregon, USA, in 1998, and both his Dipl.-Inf. and his doctorate degree from the University of Stuttgart, Germany, in 2000 and 2007 respectively. The title of his dissertation is "Observing Physical World Events through Distributed World Models". From 2000 to 2005 he was a researcher at the University of Stuttgart, where he worked on the national Collaborative Research Center 627 "Nexus - Spatial World Models for Mobile Context-aware Applications" funded by the German Research Foundation (DFG). In 2005 he joined the NEC Laboratories Europe (NLE), where he has been working on the European projects MobiLife, SPICE, MAGNET Beyond, and SENSEI. He has (co-)authored more than 30 technical papers and has also been active as peer reviewer and program committee member for several journals, conferences and workshops.
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Oscar Corcho, PhD, is a lecturer at Departamento de Inteligencia Artificial, Facultad de Informática, Universidad Politécnica de Madrid (UPM). He belongs to the Ontology Engineering Group at UPM. Previously, he worked as a Marie Curie research fellow at the University of Manchester, and was a research manager at iSOCO. He holds a degree in Computer Science, an MSc in Software Engineering and a PhD in Computational Science and Artificial Intelligence from UPM. He was awarded the Third National Award by the Spanish Ministry of Education in 2001. His research activities are focused on Semantic Grid, Semantic Web and Ontological Engineering. He has participated in a number of EU projects in these areas: SemsorGrid4Env, ADMIRE, OntoGrid, Esperonto, DIP, HOPS, SWWS, Knowledge Web, OntoWeb and MKBEEM, and has also participated in the HALO project, funded by Vulcan Inc. He has published two books, "Ontological Engineering" and "A layered declarative approach to ontology translation with knowledge preservation", and more than 50 papers in journals, conferences and workshops. He usually participates in the organisation or in the programme committees of relevant international conferences and workshops.
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Dr. Alex Gluhak is a post-doctoral research fellow at the Centre for Communication Systems Research (CCSR) at the University of Surrey, UK, where he is currently coordinating sensor network related research activities. He completed a Dipl.-Ing.(FH) degree from the University of Applied Sciences in Offenburg, Germany in 2002 and a PhD degree at the University of Surrey in 2006. After his PhD graduation he has held research positions with CSSR and later the Ericsson Ireland Research Centre. He was involved in the UK Virtual Centre of Excellence on Mobile and Personal Communications and contributed actively to several large European research projects, such as e-SENSE and SENSEI. His research interests are mobile multicast delivery, next generation network architectures, service-oriented sensor networks and scalable context information infrastructures for next generation networks. He has authored various papers in refereed international conferences and journals. He was a visiting researcher at the University of California Irvine, US, in 2002 and at the National Institute of Information and Communication Technologies, Japan in 2005.
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Belén Martínez, has graduated in telecommunication engineering from the industrial and telecommunication engineer school (ETSI) of Bilbao, Spain.
She works as a researcher at the Robotiker Tecnalia Research center located at Zamudio (Spain). Her career at Robotiker started in 2000 and she has worked for several projects on digital security, web services and industrial software development. Her research areas are focused on service domain and the next-generation Internet, including semantic technologies, mobile platforms and the Internet of Things. She has participated in many

research projects supported by the European Commission, like m:CIUDAD (ICT-FP7), TRENDS (IST-FP6), MUSE (IST-FP6), m-TOGUIDE (IST-FP5) and EMATEK (EQUAL).
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Sarah M. McBurney
Born in Ballymena, Northern Ireland, Sarah achieved 3 A-levels at Cambridge House Grammar School for Girls in 2000 before moving to Edinburgh to study Computer Science at Heriot-Watt University. She achieved an MEng in Software Engineering with distinction in 2005 and has since worked for the University as a Research Associate (RA). She is involved in various European projects in pervasive computing such as the recently completed Daidalos project and the current Persist project. Her work is centred on personalisation in pervasive environments, with particular focus on machine learning techniques to learn adaptation rule models from monitored behaviour. Sarah is currently working towards a PhD which she hopes to complete in the coming year. Sarah is also a member of the Intelligent Systems Lab (ISL) within Heriot-Watt University.
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Boris Moltchanov received a Ing. Degree in information technologies and computer since from Volgograd State Technical University (Russian Federation) and Politecnico di Torino (Italy) in August 1997 – Summa Cum Laude; and bachelor degree in management, marketing and world economy from Volgograd State Technical University (Russian Federation) in January 1998 – Summa Cum Laude. In 1998 he was invited as researcher in Politecnico di Torino (Italy) where he worked for more than one year. In 2000 he joined TILab (formerly CSELT) as expert of Mobile Terminal and Value Added Service platforms. He worked in development of Telecom Italia international group strategic roadmaps for value added services, comprising services in NGN, then spent two years in exploration of the WSN technology and currently involved in the exploration of innovative telecommunication services, mainly Context Aware Services. He's author of some international patents, papers and participant of conferences and workshops as well as of some standardization entities.
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Ioanna Roussaki received her Diploma in Electrical and Computer Engineering from the National Technical University of Athens in 1997. In 2003, she received her PhD in the area of telecommunications and computer networks and became a senior research associate in the Computer Networks Laboratory of the School of Electrical and Computer Engineering (SECE). In 2008, she has been appointed as lecturer in SECE on ambient intelligence systems. Since 1998, she has participated in several EU research projects on ubiquitous and pervasive computing, context-awareness, web services, semantics and ontologies, e-negotiations, mobile and personal communications, virtual home environment, mobile agent systems, algorithms and complexity theory, such as VESPER, SMART-EC, CONTEXT in FP5, as well as IP DAIDALOS, IP DAIDALOS-II and IP Amigo in FP6, and Persist in FP7. She has over 50 publications on these research fields and she teaches computing courses in SECE. She is a member of IEEE and the Technical Chamber of Greece.
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Jose Simoes has graduated with distinction in Telecommunications and Computer Engineering in 2006 at Instituto Superior das Ciencias do Trabalho e da Empresa (ISCTE), Portugal. He also studied at Universidade Federal de Santa Catarina in Brazil. In the past he has worked for Netcall (1st VoIP Provider in Portugal) as Network Engineer and Business Consultant. Currently he is a Ph.D student at Technical University of Berlin and a research fellow at Fraunhofer Institute FOKUS in the competence center for next generation network infrastructures - NGNI. His current interests are User Quality of Experience (QoE) applied to next generation services (personalization, contextualization,

adaptation, mobility and interactivity) and advertising, focusing on architectures for next generation heterogeneous networks.
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