Internet of Things (IoT) Paradigm in Consumer Applications

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Abstract: Internet of Things (IoT) has been making waves and is permeating into the everyday life of people. All the *smart-** applications are built around IoT. This tutorial will provide an overview of IoT first and then discuss various dimensions of IoT. These include architecture framework, open horizontal platform, explaining all components from bottom up (i.e. from the things with focus on sensors and interconnection of the things). The open horizontal platform is being developed to solve the interoperability problem of the Internet of Things. It provides a layer of System abstractions and APIs to enable application software to interact with a diverse set of IoT resources and protocols. This tutorial will describe the Interoperability problem in the context of today's ubiquitous Machine to Machine communication, describing different communication protocols, and describes web-standards based techniques to connect the multitude of Silos together using common data models and system abstractions. Some examples of data integration across different data sources are shown in the context of user applications. Further focus on the different enabling technologies like real world objects virtualization, cognitive and autonomic technologies, real-world knowledge proofing, objects networking, harvesting technologies, etc.

Raffaele Giaffreda received his first degree (laurea) in Electronic Engineering from Politecnico di Torino in 1995 and his Master of Science in Telecom Engineering from University College of London in 2001.

After a brief work experience at the Optical Systems unit of Telecom Italia labs, in 1998 he joined British Telecom (BT UK) as a researcher shifting his interest from optical communications systems to data networks, mainly working on information retrieval systems, context-aware and mobile networks. He contributed to a number of collaborative projects within EURESCOM (P1112, P1118 and P1203), EU FP5, FP6 and FP7 programmes, with leadership roles since 2003. In 2008 he joined CREATE-NET where he is currently Head of the Smart IoT Research Area.

He is a recognized expert in the field of Internet of Things, context-aware and wireless networks with a substantial record of invited talks, publications in major journals and conferences, a patent and few book chapters. He has strong interest in the relationship between the Internet of Things, cognitive technologies and systems of smart objects, designed to assist and extend rather than replace human decisions. Due to his extensive background in the telecommunications domain, his research interests also include network virtualisation and infrastructure sharing, dynamic management of access resources, use of cognitive technologies in support of future internet applications.

He has a sound experience in creating, reviewing and leading research projects to delivery, managing R&D projects both internally in a leading European operator and within EU collaborations. Since 2011 he is also the Project Coordinator of the iCore EU FP7 Integrated Project (a 13m€, 20 Partners, 3 years collaborative project – see www.iot-icore.eu).

Technical expertise and personal interest in applied research makes him particularly enjoy strategic work, mapping long-term research ideas into near-term future proof solutions.

R. Venkatesha Prasad received his bachelors degree in Electronics and Communication Engineering and M.Tech degree in Industrial Electronics from University of Mysore, India in 1991 and 1994. He received a Ph.D. degree in 2003 from Indian Institute of Science, Bangalore India. During 1996 he was working as a consultant and project associate for ERNET Lab of ECE at Indian Institute of Science. While pursuing the Ph.D. degree, from 1999 to 2003 he was also working as a consultant for CEDT, IISc, Bangalore for VoIP application development as part of Nortel Networks sponsored project. In 2003 he was heading a team of engineers at the Esqube Communication Solutions Pvt. Ltd. Bangalore for the development of various realtime networking applications. Currently, he is a part time consultant to Esqube. From 2005 till date he is a senior researcher at Wireless and Mobile Communications group, Delft University of Technology working on the EU funded projects MAGNET/MAGNET Beyond and PNP-2008 and guiding graduate students. He is an active member of TCCN, IEEE SCC41, and reviewer of many IEEE Transactions and Elsevier Journals. He is on the TPC of many conferences including ICC, GlobeCom, ACM MM, ACM SIGCHI, etc. He is the TPC co-chair of the CogNet workshop in 2007, 2008 and 2009 and TPC chair for E2Nets at IEEE ICC-2010. He is also running the PerNets workshop from 2006 with IEEE CCNC. He is the Tutorial Co-Chair of CCNC 2009, 2011, 2012 and Demo Chair of IEEE CCNC 2010, 2012 and 2013 and publicity chair for 2014. He is the secretary of IEEE ComSoc Standards Development Board and member of Standards Program Development Board. He is an Associate editor of Transactions on Emerging Telecommunications Technologies and on reviewer panel of IEEE ComST. Currently he is an Asst. Professor in Delft University of Technology.

Michael Koster has been building infrastructure for ubiquitous computing and putting things on the Internet for 15 years. He has worked with large networked process control and M2M communication systems since the early 1980s, and for the past 25 years has designed architectures for scalable and fault-tolerant computer systems, for both large computer companies like Unisys and Sun Microsystems, and for various Silicon Valley startups. He holds over a dozen patents in shared-memory multiprocessor cache protocols and web scale data consistency mechanisms.
Michael is investigating architectures for the Internet of Things and is a co-founder of OSIOT. He is working with OSIOT to build the Open Horizontal Platform, an open source platform and API that enables interoperability between disparate data sources and devices.