

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
Valencia, Spain. May 8-11, 2017

## **PROGRAMME**



**JORDAN UNIVERSITY  
OF SCIENCE  
AND TECHNOLOGY**



**UNIVERSIDAD  
POLITECNICA  
DE VALENCIA**



**Emergingtechnet.org**

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
 Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
 Valencia, Spain. May 8-11, 2017

## PROGRAMME

	Monday 8th May 2017	Tuesday 9th May 2017	Wednesday 10th May 2017	Thursday 11th May 2017
08:00 - 17:00	On site registration		On site registration	
08:30 - 09:00				
09:00 - 9:30	Opening & Welcome	Keynote Speaker 2		Social Activity
09:30 - 10:30	Keynote speaker 1	Keynote Speaker 3	Keynote Speaker 4	
10:30 - 11:00	Coffee break	Coffee break	Coffee Break	
11:00-12:30	FMEC Session 1    SDS Session 1	FMEC session 3    SDS session 3	FMEC Session 5    SDS Session 5	
12:30 - 13:00	Lunch			
13:00 - 13:30	Lunch		Lunch	
13:30 - 14:00	TUTORIAL	SDN-NFV Session 1	Lunch	
14:00-14:30		SDN-NFV Session 1	IOTSMS Session 1    MCSMS Session 1	
14:30 - 15:30		SDN-NFV Session 1	Panel Discussion	
15:30 -16:00	Coffee Break		Coffee break	
16:00 -17:00	FMEC session 2    SDS Session 2	FMEC session 4    SDS session 4	Conference Closing Best Papers Awards and COFFEE Break & Refreshment (Social)	
17:00-18:00				
19:30 - 23:00		CONFERENCE DINNER		

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
**Collocated with**  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
**Valencia, Spain. May 8-11, 2017**

## PROGRAMME

Monday 8 <sup>th</sup> May 2017	
08:00 - 17:00	Onsite registration
09:00 - 09:30	Opening & Welcome
09:30 - 10:30	Keynote speaker 1: Dr. Jose F. Monserrat, Universidad Politecnica de Valencia Chair: Elhadj Benkhelifa
10:30 - 11:00	Coffee break
11:00 - 12:30	<p>Chair: Dongqing Liu and Mohammad Alsmirat</p> <ul style="list-style-type: none"> <li>• <b>Resource Optimization in Fog Enabled IoT Deployments</b> <i>Visali Mushunuri, Ajay Kattepur, Hemant Kumar Rath and Anantha Simha</i></li> <li>• <b>Decentralized Data Offloading for Mobile Cloud Computing Based on Game Theory</b> <i>Dongqing Liu, Lyes Khoukhi and Abdelhakim Hafid</i></li> <li>• <b>Fog Function Virtualization: a Flexible Solution for IoT Applications</b> <i>Damian Roca, Josue V. Quiroga, Mateo Valero and Mario Nemirovsky</i></li> <li>• <b>Fog Computing Through Public-Resource Computing and Storage</b> <i>Sa'ul Alonso-Monsalve, F'elix Garc'ia-Carballeira and Alejandro Calder'on</i></li> </ul>
11:00 - 12:30	<p>Chair: Shahbaz Atta and Haythem Bany Salameh</p> <ul style="list-style-type: none"> <li>• <b>STSM- A Model to Detect and Predict Large Crowd Anomalies for Optimized Path Recommendation</b> <i>Bilal Sadiq, Akhlaq Ahmad, Shahbaz Atta, Emad Felemban and Khalid Qahtani</i></li> <li>• <b>A Routing Scheme for Cognitive Radio Networks with Self-Interference Suppression Capabilities</b> by Rawan F. El Khatib and Haythem Bany Salameh</li> <li>• <b>IoT development: Discovering, enabling and validation of real life IoT scenarios</b> <i>Denis Makoshenko, Ilya Enkovich</i></li> <li>• <b>A Software Defined Architecture for Cyberphysical Systems</b> <i>Ala' Darabseh and Nikolaos M. Freris</i></li> </ul>
12:30 - 13:30	<b>LUNCH</b>
13:30 - 15:30	TUTORIAL 1: Prof. Mohammad Patwary 5G, IOT and Edge Computing: Digital Productivity

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
 Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
**Valencia, Spain. May 8-11, 2017**

## PROGRAMME

13:30 - 15:30	SDN-NFV	Chair: Mouad Idri and Yaser Jararweh
		<ul style="list-style-type: none"> <li>• <b>Mobility management based SDN-IPv6 Routing Header</b> Mouad Idri</li> <li>• <b>MPLS based Hybridization in SDN</b> Yash Sinha, Siddharth Bhatia, G S S Chalapathi and Virendra S Shekhawat</li> <li>• <b>Smart Virtual eNB (SVeNB) for 5G Mobile Communication</b> Fouad Yaseen, Nahlah Alkhalidi and Hamed Al-Raweshidy</li> <li>• <b>Network Function Virtualization as a Service for Multi-Tenant Software Defined Networks</b> Abderrahmane Ledjar, Emmanuel Sampin, Chamseddine Talhi, Mohamed Cheriet</li> <li>• <b>Software Defined Storage for Cooperative Mobile Edge Computing System</b> Jafar Badarneh, Yaser Jararweh, Mahmoud Al-Ayyoub, Mohammad Al-Smadi and Ramon Fonte</li> </ul>
15:30 - 16:00	<b>Coffee break</b>	
16:00 - 18:00	FMEC session 2	Chair: Kashif Bilal and Mohammad Patwary
		<ul style="list-style-type: none"> <li>• <b>EdgeCloudSim: An Environment for Performance Evaluation of Edge Computing Systems</b> Cagatay Sonmez, Atay Ozgovde, Cem Ersoy</li> <li>• <b>AFT: Adaptive Fibonacci-based Tuning Protocol for Service and Resource discovery in the Internet of Things</b> by Firas Albalas, Wail Mardini and Majd Al-Soud</li> <li>• <b>Edge Computing for Interactive Media and Video Streaming</b> Kashif Bilal and Aiman Erbad</li> <li>• <b>Cloud, Fog and Edge: Cooperation for the Future?</b> Kay Bierzynski, Antonio Escobar, Matthias Eberl</li> <li>• <b>Location-aware Load Prediction in Edge Data Centers</b> Chanh Nguyen Le Tan, Cristian Klein, and Erik Elmroth</li> <li>• <b>Cognitive Edge Computing based Resource Allocation Framework for Internet of Things.</b> A. Amjad, Fazle Rabby, Shaima Sadia, Mohammad Patwary &amp; Elhadj Benkhelifa</li> </ul>
16:00 - 18:00	SDS Session 2	Chair: Matthias Flittner and Kyoomars Alizadeh Noghani
		<ul style="list-style-type: none"> <li>• <b>Automating Ethernet VPN Deployment in SDN-based Data Centers</b> Kyoomars Alizadeh Noghani , Cristian Hernandez Benet , Andreas Kassler Antonio Marotta , Patrick Jestin, Vivek V. Srivastava</li> <li>• <b>TREX: Tenant-driven Network Traffic Extraction for SDN-based Cloud Environments</b> by Matthias Flittner and Robert Bauer</li> <li>• <b>OSPF routing protocol performance in Software Defined Networks</b> Albert Rego, Sandra Sendra, Jose M. Jimenez and Jaime Lloret</li> <li>• <b>SDN VANETs in 5G: An Architecture for Resilient Security Services</b></li> </ul>

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
**Collocated with**  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
**Valencia, Spain. May 8-11, 2017**

## PROGRAMME

		<p>Ali Hussein, Imad H. Elhajj, Ali Chehab and Ayman Kayssi</p> <ul style="list-style-type: none"> <li>• <b>Mitigating Attacks in Software Defined Network(SDN)</b> Kallol Krishna Karmakar , Vijay Varadharajan, Udaya Tupakula</li> <li>• <b>Automated Service Delivery Platform for C-RANS</b> Deval Bhamare, Aiman Erbad, Raj Jain, Mohammed Samaka</li> </ul>
<b>Tuesday</b> <b>9<sup>th</sup> May</b>		
08:00 - 17:00	Onsite registration	
08:30 - 09:30	Keynote speaker 3 – Prof. Antonio Brogi, University of Pisa Chair: Yaser Jararweh	
09:30 - 10:30	Keynote speaker 2 – Prof. Indrakshi Ray, Colorado State University, USA Chair: Jaime Lloret Mauri	
10:30 - 11:00	Coffee break	
11:00 - 12:30	FMEC session 3	<p>Chair: Hussein Alnuweiri and Young-Woo Kwon</p> <ul style="list-style-type: none"> <li>• <b>Reliable and Efficient Mobile Edge Computing in Highly Dynamic and Volatile Environments</b> by Minh Le, Zheng Song, Young-Woo Kwon, and Eli Tilevich</li> <li>• <b>Exploring the trade-off between performance and energy consumption in cloud infrastructures</b> by D. Kanapram, G. Lamanna, M. Repetto</li> <li>• <b>Self-Configuring Deterministic Network with In-Band Configuration Channel</b> Peter Heise , Fabien Geyer and Roman Obermaisser</li> <li>• <b>Cooperative Load Balancing Scheme for Edge Computing Resources</b> Roberto Beraldi , Abderrahmen Mtibaay and Hussein Alnuweiri</li> </ul>
11:00 - 12:30	SDS Session 3	<p>Chair: Mohamad Khattar Awad and Yaser Jararweh</p> <ul style="list-style-type: none"> <li>• <b>Collapsing the Layers: 6Stor, a Scalable and IPv6-Centric Distributed Storage System</b> Guillaume Ruty, Andr�e Surcouf, Jean-Louis Rougier</li> <li>• <b>Fuzzy Decision System for Technology Choice in Hybrid Networks</b> Sarah Abdallah, Imad H. Elhajj, Ali Chehab and Ayman Kayssi</li> <li>• <b>A Benchmark Implementation for Evaluating the Performance of Power-aware Routing Algorithms in Practical Software-defined Networks</b> Yousef Rafique, Mohamad Khattar Awad and Ghadeer Neama</li> <li>• <b>QoS Management SDN-based for LTE/EPC with QoE Evaluation: IMS use case</b> Sara KHAIRI, Mostafa BELLAFKIH, Brahim RAOUYANE</li> </ul>
12:30 - 13:30	<b>Lunch</b>	

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
 Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
 Valencia, Spain. May 8-11, 2017

## PROGRAMME

13:30 - 14:30	MCSMS Session 1	Chair: Ali Safa Sadiq and Aamir Akbar
		<ul style="list-style-type: none"> <li>• <b>Towards the Optimization of Power and Bandwidth Consumption in Mobile-Cloud Hybrid Applications</b> by Aamir Akbar and Peter R. Lewis</li> <li>• <b>A Critical Overview of Latest Challenges and Solutions of Mobile Cloud Computing</b> Hesham Allam, Nasser Nassiri, Amala Rajan, Jinesh Ahmad</li> <li>• <b>An Energy-Efficient Cross-Layer Approach for Wireless Green Communications</b> Ali Safa Sadiq, Turfah Zeyad Almohammad, Rabiatal Adawiah Bt Muhamed Khadri, Abdulghani Ali Ahmed and Jaime Lloret</li> <li>• <b>Cloudlet Solution for Digital Forensic Investigation of Multiple Cases of Multiple Devices</b> by Siyakha Mthunzi, Elhadj Benkhelifa, Yaser Jararweh &amp; Mahmoud Al-Ayyoub</li> </ul>
13:30 - 14:30	IOTSMS Session 1	Chair: Attila Kertesz Mohammad Alsmirat
		<ul style="list-style-type: none"> <li>• <b>Internet of Things Data Analytics for User Authentication and Activity Recognition</b> Samera Batool, Nazar A. Saqib, Muazzam.A. Khan</li> <li>• <b>Priority-based Session Admission Control Method for Next Generation Internet</b> Andris Skrastiņš, Jans Jeļinskis</li> <li>• <b>Simulating IoT Cloud Systems:A Meteorological Case Study</b> Andras Markus and Attila Kertesz</li> </ul>
14:30 - 15:30	Panel Discussion	
15:30 - 16:00		Coffee break
16:00 - 18:00	FMEC session 4	Chair: John Yoon and Elhadj Benkhelifa
		<ul style="list-style-type: none"> <li>• <b>Towards data privacy in heterogeneous cloud environments: an extension to the SANTA policy language.</b> Nasser Abwnawar, Helge Janicke, Richard Smith and Aboubaker Lasebae</li> <li>• <b>From Smog to Fog: A Security Perspective</b> Ruben Rios, Rodrigo Roman, Jose A. Onieva and Javier Lopez</li> <li>• <b>Mitigating Anti-forensics in the Cloud via Resource-Based Privacy Preserving Activity</b> Adeyinka Odebade, Thomas Welsh, Siyakha Mthunzi and Elhadj Benkhelifa</li> <li>• <b>Resilience at the Edge in Cyber-Physical Systems</b> Abhishek Dubey, Gabor Karsai, Subhav Pradhan</li> <li>• <b>Leveraging Sensor Data Content to Assure Sensor Device Trustworthiness in Mobile Edge Computing</b> by John Yoon</li> </ul>

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
 Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
**Valencia, Spain. May 8-11, 2017**

## PROGRAMME

16:00 - 18:00	SDS Session 4	Chair: Malek Al-Zewairi and Haythem Bany Salameh
		<ul style="list-style-type: none"> <li>• <b>An Experimental Software Defined Security Controller for Software Defined Network</b> Malek Al-Zewairi , Dima Suleiman , and Sufyan Almajali</li> <li>• <b>Using Attribute-Based Access Control for Remote Healthcare Monitoring</b> Indrakshi Ray , Bithin Alangot, Shilpa Nair, Krishnashree Achuthan</li> <li>• <b>Software Defined IoT Security Framework</b> Ola Salman, Imad Elhajj, Ali Chehab and Ayman Kayssi</li> <li>• <b>Security analysis as Software-defined Security for SDN environment</b> Nadya EL MOUSSAID, Ahmed TOUMANARI, Maryam EL AZHARI</li> <li>• <b>Security-aware Channel Assignment in IoT-based Cognitive Radio Networks for Time-Critical Applications</b> Haythem Bany Salameh, Sufyan Almajali, Moussa Ayyash and Hany Elgala</li> </ul>
19:30 - 23:00	<b>GALA DINNER</b>	
<b>Wednesday 10<sup>th</sup> May</b>		
08:00 - 15:30	Onsite registration	
09:30 - 10:30	Keynote talk 4- Prof. Jaime Lloret Mauri, Polytechnic University of Valencia, Spain Chair: Elhadj Benkhelifa, Staffordshire University, UK	
10:30 - 11:00	Coffee break	
11:00 - 13:00	FMEC Session 5	Chair: Mathias Santos de Brito and Sufyan Almajali
		<ul style="list-style-type: none"> <li>• <b>A Service Orchestration Architecture for Fog-enabled Infrastructures</b> Mathias Santos de Brito, Saiful Hoque, Thomas Magedanz, Ronald Steinke, Alexander Willner, Daniel Nehls, Oliver Keils, Florian Schreiner</li> <li>• <b>Towards Gateway to Cloud Offloading in IoT Publish/Subscribe Systems</b> Daniel Happ and Adam Wolisz</li> <li>• <b>Defining and Testing Virtual Federated Networks Across Multiple Cloud Sites</b> Ivan Andrade, Carlos de Alfonso and Ignacio Blanquer</li> <li>• <b>A data protection model for fog computing</b> Thanh Dat Dang and Doan Hoang</li> <li>• <b>Cloud Based Intelligent Extensible Shared Context Services</b> Sufyan Almajali, Dhiah el Diehn I. Abou-Tair</li> <li>• <b>Authentication Proxy as a Service</b> Jacques Bou Abdo</li> </ul>

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
**Collocated with**  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
**Valencia, Spain. May 8-11, 2017**

## PROGRAMME

11:00- 13:00	SDS Session 5	Chair: Oliver Michel and Yaser Jararweh
		<ul style="list-style-type: none"> <li>• <b>SD-CPS: Taming the Challenges of Cyber-Physical Systems with a Software-Defined Approach</b> by Pradeeban Kathiravelu and Lu'is Veiga</li> <li>• <b>Adaptive SDN-based architecture using QoE metrics in live video streaming on Cloud Mobile Media</b> by Miguel Garcia-Pineda, Santiago Felici-Castell and Jaume Segura-Garcia</li> <li>• <b>SDN in Wide-Area Networks: A Survey</b> Oliver Michel, Eric Keller</li> <li>• <b>Evaluation of SDS Controller (CorpHD) for Various Storage Demands</b> Shreya Bokare, Sanjay Pawar and Shikha Nema</li> <li>• <b>BigCrypt for Big Data Encryption</b> Abdullah Al Mamun , Khaled Salah , Somaya Al-maadeed , and Tarek R. Sheltami</li> </ul>
13:00 - 14:00	<b>LUNCH</b>	
14:00 - 15:00	<b>Demo: Prototyping Platform for IOT Applications Using TCP/IPV6 Over WSN</b> By Prof. Abdelhakim Hafid, University of Montreal, Canada	
15:00 - 16:00	<b>Demo: Prototyping Platform for IOT Applications Using TCP/IPV6 Over WSN</b> By Prof. Abdelhakim Hafid, University of Montreal, Canada	
14:00 - 16:00	IOTSMS Session 2	Chair: Haythem Bany Salameh and Mohammad Alsmirat
		<ul style="list-style-type: none"> <li>• <b>Proposed Model to Implement High-Level Information Security in Internet of Things</b> Sergio Duque Castilho, Eduardo P. Godoy and Tayane W. L. Castilho</li> <li>• <b>Next Generation Marine Data Networks in an IOT Environment</b> Rabab Al-Zaidi, John Woods, Mohammed Al-Khalidi, Khattab Alheeti &amp; Klaus McDonald</li> <li>• <b>Collision-Free Anycast Transmission Scheduling in UWSNs</b> Ahmad Ababneh Mahmoud Al-Ayyoub, Yaser Jararweh and Mohammad Alsmirat</li> <li>• <b>Multi-Level Security for the 5G/IoT Ubiquitous Network</b> Ola Salman, Ayman Kayssi Ali Chehab, and Imad Elhajj</li> <li>• <b>On consumable energy allocation frame-work with SWIPT for remotely located wireless node within internet of things</b> by AlaaAllah Ahmed ElSabaa , Mohammad Patwary, Elhadj Benkhelifa, Amira Zaki and Said E. El-Khamy</li> </ul>
16:00- 17:00	Coffee, Tea and Refreshments	
	Conference Closing Remarks Best Papers Announcements and Awards Certificates of Attendance	
<b>Thursday 11<sup>th</sup> May</b>		
FREE DAY FOR SOCIAL ACTIVITIES		

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
Valencia, Spain. May 8-11, 2017

## PROGRAMME

### Keynote Speech 1

**The path to which the 5G takes us, from the atom to the direct communication  
between devices and machines**



**Prof. Jose F. Monserrat**  
**Universitat Politècnica de València (UPV), Spain**

**Abstract:** This keynote speech analyses the current positioning of vendors and operators concerning the mobile market and its evolution towards the 5G. The seminar will deal with the analysis of the Mobile World Congress 2017, focusing then in the 5G process and the last advances in 3GPP specifications. Special attention will be paid to the D2D and mmW communication topic and the last advances in the research conducted in Prof. Monserrat group.

**Biography:** Dr.-Ing. Jose F. Monserrat received his MSc. degree with High Honors and Ph.D. degree in Telecommunications engineering from the Universitat Politècnica de València (UPV) in 2003 and 2007, respectively. He was the recipient of the First Regional Prize of Engineering Studies in 2003 for his outstanding student record receiving also the Best Thesis Prize from the UPV in 2008. In 2009 he was awarded with the best young researcher prize of Valencia. In 2016 he received the merit medal from the Spanish royal academy of engineering, in the young researcher category. He is currently an associate professor in the Communications Department of the UPV. His current research focuses on the design of future 5G wireless systems and their performance assessment. He has been involved in several European Projects, being especially significant his participation in NEWCOM, PROSIMOS, WINNER+ and METIS/METIS-II where he led the simulation activities. He also participated in 2010 in one external evaluation group within ITU-R on the performance assessment of the candidates for the future family of standards IMT-Advanced. He co-edited two special issues in IEEE Communications Magazine on IMT-Advanced and 5G technologies and is co-editor of the Wiley book "Mobile and wireless communications for IMT-Advanced and beyond" and the Cambridge book "5G Mobile and Wireless Communications Technology". Jose Monserrat is senior member of the IEEE, manages around 0.5 M€ yearly budget, holds 6 patents and has published more than 50 journal papers. Currently the group headed by Prof. Jose F. Monserrat consists of 5 Postdoctoral fellows, 8 PhD students and 2 Master students.

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
Valencia, Spain. May 8-11, 2017

## PROGRAMME

**Keynote Speech 2**  
**Attribute-Based Access Control Status and Directions**



**Prof. Indrakshi Ray**  
**Colorado State University, USA**

**Abstract:** This keynote speech analyses the current positioning of vendors and operators concerning the mobile market and its evolution towards the 5G. The seminar will deal with the analysis of the Mobile World Congress 2017, focusing then in the 5G process and the last advances in 3GPP specifications. Special attention will be paid to the D2D and mmW communication topic and the last advances in the research conducted in Prof. Monserrat group.

**Biography:** Indrakshi Ray is a Professor in the Computer Science Department at Colorado State University. She has been a visiting faculty at Air Force Research Laboratory, Naval Research Laboratory, and at INRIA, Rocquencourt, France. She obtained her Ph.D. in Information Technology from George Mason University. Dr. Ray's research interests include security and privacy, database systems, and formal methods for software assurance. She is on the editorial board of IEEE Transactions on Dependable and Secure Computing and Computer Standards and Interfaces. She has been a guest editor of ACM Transactions of Information Systems Security and Journal of Digital Library. She was the Program Chair of ACM SACMAT 2006, Program Co-Chair for ICISS 2013, CSS 2013, IFIP DBSec 2003, and General Chair of SACMAT 2008.

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
Valencia, Spain. May 8-11, 2017

## PROGRAMME

**Keynote Speech 3**  
**QoS-aware deployment of Fog applications**



**Prof. Antonio Brogi**  
**University of Pisa, Italy**

**Abstract:** Deploying composite applications over Fog infrastructures is challenging due to the heterogeneity and scale of such infrastructures. Application components must be provided with the software and hardware capabilities they need, while communications should meet the desired QoS (e.g., latency and bandwidth). On the other hand, different Fog and Cloud nodes provide different software and hardware capabilities, and actual communication links support different QoS over time. In this talk we will discuss some of the problems of determining how to “best” deploy composite applications over Fog infrastructures, and the benefits of automated tools capable of supporting human-driven application management at the edge.

**Biography:** Antonio Brogi is full professor at the Department of Computer Science, University of Pisa, Italy, since 2004. His research interests include service-oriented, cloud and fog computing, coordination and adaptation of software elements, formal methods, and design of programming languages. He has published the results of his research in over 150 papers in international journals and conferences. He is member of the editorial board of the journal “Computer Languages, Systems and Structures”, of the steering committee of the ClbSE, ESOC, and FOCLASA conference series, and he has participated in the program committee of a number of international conferences and workshops in his areas of research. He has been participating in various international and national research projects, both as project leader and as principal investigator for his University. He recently coordinated the UNIPI-PRA-2016-64 project “Through the fog” and participated as principal investigator for UNIPI in the EU-FP7-ICT-610531 project “SeaClouds -Seamless adaptive multi-cloud management of service-based applications”.

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
Valencia, Spain. May 8-11, 2017

## PROGRAMME

**Keynote Speech 4**  
**Smart Multimedia Services Distribution Using Software Defined Adaptive Cognitive Networks**



**Prof. Jaime Lloret**  
**Universitat Politècnica de València (UPV), Spain**

**Abstract :** Current networks have many limitations due to their rigidity, which is given by static configurations mainly based on commands or static scripts. The resource provisioning is less automatic and the efficiency decreases. Moreover, virtualization and cloud are changing radically the traffic patterns of the data center. This is mainly due to the communication between servers, because the applications are split in many virtual machines that must communicate. Software Defined Networks (SDNs) are able to divide the control plane from the data plane, which allow higher programmable, automatic and flexible networks. In SDNs, we do not need to program node by node, but by a centralized manner through software that can be implemented independently of the manufacturer or the model (if they are supporting the same communication protocol). SDNs provide a more open network and allow accessing better to certain intelligent functions, which can contribute higher intelligence to the network operating. These features make SDNs ideal to have a system that is able to adapt with the aim of having higher performance. Cognitive networks use the information gathered from the network, such as observing traffic patterns for different network devices or the used protocols, the behavior of the users and servers, and the additional information that can be taken from the wireless networks (user movement, location, etc.), in order to implement a series of procedures. In order to achieve this goal, artificial intelligence and automatic learning will be used over the available information. This will allow improving a specific objective and achieve higher system performance. This speech will show the steps performed in a cooperative project where we designed and developed a network architecture and the communication protocol, that use the cognitive information taken from the data frames, the users and servers behavior, and the traffic patterns (traffic changes, quality of service parameters, state of the frames, etc.) with the aim of improving the multimedia delivery performance. The designed network is able to self adapt in each case. Network devices gather network parameters and patterns that are used by a smart network algorithm to evolve behaviors based on the empirical data. The cognitive adaptive software defined network can be implemented in a wide range of multimedia applications.

**Biography:** Prof. Jaime Lloret (jlloret@dcom.upv.es) received his M.Sc. in Physics in 1997, his M.Sc. in electronic Engineering in 2003 and his Ph.D. in telecommunication engineering (Dr. Ing.) in 2006. He is a Cisco Certified Network Professional Instructor. He worked as a network designer and administrator in several enterprises. He is currently Associate Professor in the Polytechnic University of Valencia. He is the Chair of the Integrated Management Coastal Research Institute (IGIC) and he is the head of the "Active and collaborative techniques and use of technologic resources in the

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
**Collocated with**  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
**Valencia, Spain. May 8-11, 2017**

## **PROGRAMME**

education (EITACURTE)" Innovation Group. He is the director of the University Diploma "Redes y Comunicaciones de Ordenadores" and of the University Master "Digital Post Production". He has been Internet Technical Committee chair (IEEE Communications Society and Internet society) for the term 2013-2015. He has authored 22 book chapters and has more than 380 research papers published in national and international conferences, international journals (more than 140 with ISI Thomson JCR). He has been the co-editor of 40 conference proceedings and guest editor of several international books and journals. He is editor-in-chief of the "Ad Hoc and Sensor Wireless Networks" (with ISI Thomson Impact Factor), the international journal "Networks Protocols and Algorithms", and the International Journal of Multimedia Communications, IARIA Journals Board Chair (8 Journals) and he is (or has been) associate editor of 46 international journals (16 of them with ISI Thomson Impact Factor). He has been involved in more than 400 Program committees of international conferences, and more than 150 organization and steering committees. He leads many national and international projects. He is currently the chair of the Working Group of the Standard IEEE 1907.1. He has been general chair (or co-chair) of 38 International workshops and conferences. He is IEEE Senior and IARIA Fellow.

**IEEE Technically Sponsored**  
**2<sup>nd</sup> International Conference on Fog & Mobile Edge Computing (FMEC 2017)**  
Collocated with  
**4<sup>th</sup> International Conference on Software Defined Systems (SDS 2017)**  
Valencia, Spain. May 8-11, 2017

## PROGRAMME



**JORDAN UNIVERSITY  
OF SCIENCE  
AND TECHNOLOGY**



**UNIVERSIDAD  
POLITECNICA  
DE VALENCIA**



**Emergingtechnet.org**