



UNIVERSITÀ DI PISA
DIPARTIMENTO DI INGEGNERIA DELL'INFORMAZIONE
Dottorato di Ricerca in Ingegneria dell'Informazione

Doctoral Course

“Edge Computing technologies and standards toward 5G”

Teacher: Dario Sabella

INTEL Deutschland GmbH - Germany

Short Abstract:

The course will cover the main aspects of Edge Computing, from the description of the technology to the standards and industry associations working in the field. A particular emphasis will be given to the ETSI MEC standard (Multi-access Edge Computing), by mentioning as well other SDOs and the relationship with 3GPP for the definition of 5G systems. Short examples of “MEC in action” from Industry Groups, associations and involved companies will complete the course.

Course Contents in brief:

- Edge Computing, Fog computing, Cloud computing
- ETSI MEC Framework and Reference Architecture
- General principles for Mobile Edge Service APIs
- MEC APIs (Radio Network Information API, Location API, BW API, ...)
- MEC Mobility aspects
- Performance Assessment, Metrics, Best Practices and Guidelines
- Mobile Edge Management
- Edge Computing and 5G
- MEC in action: examples and trials

Total # of hours: 20

References:

[MEC001] ETSI GS MEC 001 V1.1.1 (2016-03) Mobile Edge Computing (MEC) Terminology - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/001/01.01.01_60/gs_MEC001v010101p.pdf

[MEC002] ETSI GS MEC 002 V1.1.1 (2016-03) Mobile Edge Computing (MEC); Technical Requirements - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/002/01.01.01_60/gs_MEC002v010101p.pdf

- [MEC003] ETSI GS MEC 003 V1.1.1 (2016-03) Mobile Edge Computing (MEC); Framework and Reference Architecture - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/003/01.01.01_60/gs_MEC003v010101p.pdf
- [IEG004] ETSI GS MEC-IEG 004 V1.1.1 (2015-11) Mobile-Edge Computing (MEC); Service Scenarios - http://www.etsi.org/deliver/etsi_gs/MEC-IEG/001_099/004/01.01.01_60/gs_MEC-IEG004v010101p.pdf
- [IEG005] ETSI GS MEC-IEG 005 V1.1.1 (2015-08) Mobile-Edge Computing (MEC); Proof of Concept Framework - http://www.etsi.org/deliver/etsi_gs/MEC-IEG/001_099/005/01.01.01_60/gs_MEC-IEG005v010101p.pdf
- [IEG006] ETSI GS MEC-IEG 006 V1.1.1 (2017-01) Mobile Edge Computing; Market Acceleration; MEC Metrics Best Practice and Guidelines - http://www.etsi.org/deliver/etsi_gs/MEC-IEG/001_099/006/01.01.01_60/gs_MEC-IEG006v010101p.pdf
- [MEC009] ETSI MEC 009 “General principles for Mobile Edge Service APIs” - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/009/01.01.01_60/gs_MEC009v010101p.pdf
- [MEC010-1] ETSI MEC 010-2 “Mobile Edge Management; Part 2: Application lifecycle, rules and requirements management” - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/01002/01.01.01_60/gs_MEC01002v010101p.pdf
- [MEC010-2] ETSI MEC 010-2 “Mobile Edge Management; Part 2: Application lifecycle, rules and requirements management” - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/01002/01.01.01_60/gs_MEC01002v010101p.pdf
- [MEC011] ETSI MEC 011 “Mobile Edge Platform Application Enablement” - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/011/01.01.01_60/gs_MEC011v010101p.pdf
- [MEC012] ETSI MEC 012 “Radio Network Information API” - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/012/01.01.01_60/gs_MEC012v010101p.pdf
- [MEC013] ETSI MEC 013 “Location API” - http://www.etsi.org/deliver/etsi_gs/MEC/001_099/013/01.01.01_60/gs_MEC013v010101p.pdf
- [MEC015] ETSI MEC 015 “Bandwidth management API” – http://www.etsi.org/deliver/etsi_gs/MEC/001_099/015/01.01.01_60/gs_MEC015v010101p.pdf
- [MEC016] ETSI MEC 016 “UE application interface” – http://www.etsi.org/deliver/etsi_gs/MEC/001_099/016/01.01.01_60/gs_MEC016v010101p.pdf
- [MEC018] ETSI MEC 018 “End to End Mobility Aspects” - http://www.etsi.org/deliver/etsi_gr/MEC/001_099/018/01.01.01_60/gr_MEC018v010101p.pdf
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CV of the Teacher

Dario Sabella received his Dr. Eng. Degree in Electronics Engineering from Politecnico di Torino, Italy, in 2002. After graduation, he joined the research center of TIM (Telecom Italia group), being involved in several R&D projects targeting future generation communications. In 2004 he received an additional post-degree specialization Master in Telecommunications. Then he worked in the Wireless Access Innovation division, as responsible in various TIM research activities for the study of OFDMA technologies (WiMAX, 3GPP LTE and LTE-A); he worked also in FP7 and H2020 European projects (EARTH, ARTIST4G, iJOIN, Flex5Gware). From February 2017 he's working with Intel as Senior Research and Standards engineer. He has been co-author of several publications and patents in the field of wireless communications, radio resource management, packet scheduling and energy efficiency. He has organized several international workshops and conferences on green communications and heterogeneous networks.



Room and Schedule

Room: *Aula Riunioni del Dipartimento di Ingegneria dell'Informazione, Via G. Caruso 16, Pisa – Ground Floor*

Schedule:

Day 1 - Monday March 11th, 2019

- 14.00 – 15.45 Overview on Cloud computing, Edge Computing, Fog computing
- 15.45 – 16.00 *break*
- 16.00 – 17.00 MEC Framework and Reference Architecture
- 17.00 – 17.30 Presentation of the PhD Exercise work

Day 2 - Tuesday March 12th, 2019

- 9.15 – 9.30 Wrap-up of day1
- 9.30 – 10.00 MEC Framework and Reference Architecture (cntd)
- 10.00 – 10.30 General principles for Mobile Edge Service APIs
- 10.30 – 10.45 *break*
- 10.45 – 12.00 Mobile Edge Platform Application Enablement
- 12.00 – 13.00 Mobile Edge Management
- 13.00 – 14.00 *Lunch break*
- 14.00 – 16.00 Mobile Edge Management
- 16.00 – 16.15 *break*
- 16.15 – 17.30 MEC PoCs (case study: RAVEN PoC)

Day 3 - Wednesday March 13th, 2019

- 9.15 – 9.30 Wrap-up of day2
- 9.30 – 10.30 MEC in 5G, MEC in NFV
- 10.30 – 10.45 *break*
- 10.45 – 12.00 MEC in 5G, MEC in NFV (cntd)
- 12.00 – 13.00 MEC support for V2X use cases
- 13.00 – 14.00 *Lunch break*
- 14.00 – 16.00 MEC APIs (RNI, Location, BW mgmt, V2X, ...)
- 16.00 – 16.15 *break*
- 16.15 – 17.30 MEC Hackathons, OpenAPI

Day 4 - Thursday March 14th, 2019

9.15 – 9.30 Wrap-up of day3

9.30 – 10.30 Metrics Best Practices and Guidelines, MEC Testing Framework

10.30 – 10.45 break

10.45 – 12.30 Exercise Class

12.30 – 13.00 Q&A