

WORK CONTACTS	<p>Piazza della Repubblica 13 61029 Urbino (PU) Italy E-mail: chiara.contoli@uniurb.it WWW: www.uniurb.it/persona/chiera-contoli SCOPUS Author ID: 56342819200 ORCID ID: 0000-0003-2389-2593</p>
CITIZENSHIP	<p>Italy</p>
CURRENT POSITION	<p>University of Urbino “Carlo Bo”, Department of Pure and Applied Sciences (DiSPeA), Urbino, Italy Junior Assistant Professor (fixed-term, type A-PON)</p>
RESEARCH THEMES	<p>My current research is in the Internet of Things field, focused on applying deep learning and compression techniques to design, deploy, and evaluate network models that can lead to accurate and energy-efficient intelligent systems on low-power constrained devices.</p>
RESEARCH INTERESTS	<p>My research interests are in the field of the Internet of Things, human activity recognition, machine and deep learning, power management, and networked systems such as Software-Defined Networks, and network management. I also enjoy working on interdisciplinary problems.</p>
PROFESSIONAL EXPERIENCE	<p>ABizCo SACMI Group, Imola, Italy December 2019 - September 2020 Full time Software Developer</p> <p>ABizCo SACMI Group, Imola November 2018 - November 2019 Internship as Contract Software Developer</p>
EDUCATION	<p>Department of Electrical, Electronic, and Information Engineering “Guglielmo Marconi” - DEI, University of Bologna, Bologna, Italy Ph.D. in Electronics, Telecommunications, and Information Technologies Engineering May 2017</p> <ul style="list-style-type: none">• Thesis title: <i>Virtualized Network Infrastructure: Performance Analysis, Design and Implementation</i>• Advisor: Prof. Franco Callegati• Co-Advisor: Prof. Walter Cerroni• External reviewer: Prof. Flavio Esposito• External reviewer: Prof. Stuart Clayman• Area of study: Computer Networking

Abstract

In recent decades, there has been a tremendous evolution in traffic on the Internet and enterprise networks. Networks experienced two phenomena: on the one hand, the birth of many applications, each posing different requirements; on the

other hand, the explosion of personal mobile networking, with an ever-increasing demand for devices that require connectivity. These trends increased network complexity, leading to difficult management and high costs. At the same time, evolution in the Information Technology (IT) field led to the birth of cloud computing and the growth of virtualization technologies, opening new opportunities not only for companies but for individuals (be it PC or mobile users), as well as Service and Infrastructure Providers. Emerging technologies such as Software Defined Networking (SDN) and Network Functions Virtualization (NFV) seem to be promising solutions to today's network problems. Both standardized solutions and how to properly combine their usage to achieve flexible and proactive control management have yet to be discovered.

This Ph.D. thesis explores three functions in which software-defined (computer) networks can be divided: the data, the control, and the management plane. This thesis presents insights into several aspects of network virtualization, starting from cloud computing infrastructures' virtual network performance, introducing the Service Function Chaining (SFC) mechanism, and discussing its analysis, design, and implementation. In particular, the original contribution of this dissertation concerns (i) the performance evaluation of the OpenStack cloud platform (the data plane); (ii) the design and implementation of a stateful SDN controller for dynamic SFC (the control plane); (iii) design, implementation and performance analysis of a proposed Intent-based approach for dynamic SFC (the management plane).

School of Engineering and Architecture, University of Bologna, Cesena, Italy

M.S., Software Engineering

December 2013

- 108/110
- Thesis title: *Simulations of Named Data Networking for Vehicular Networks*
- Supervisor: Prof. Franco Callegati
- Co-Supervisor: Prof. Walter Cerroni
- Co-Supervisor: Prof. Giovanni Pau
- Area of study: Telecommunication Networks

Executive summary

My master's thesis focused on studying the performance of suitable protocols adopted in the contents exchange between vehicles according to the Named Data Networking (NDN) paradigm. The research activity on Vehicular Ad-hoc Networks (VANETs) was carried out at the Network Research Lab at the University of California Los Angeles (UCLA). In VANETs, vehicles are potentially both producers and consumers of content, and studying new communication models, given the intrinsic complexity of car tests, is difficult. In such a scenario, simulation plays a crucial role. Therefore, the main objective of my work consisted of i) studying the basic principle of NDN, VANETs, and the applicability of NDN to VANETs; ii) analyzing the state-of-the-art of mobility models, network simulators, and proper tools for VANET; iii) design the simulation activity: planning of several VANET scenario implemented through software modules; iv) data analysis: data collected through simulation are elaborated in order to capture the most significant aspects.

The main goal was to lead a study on the feasibility of applying NDN to VANETs, particularly vehicular networks in urban environments.

B.S., Software Engineering

December 2009

- 96/110
- Thesis title: *Sending FAX over Internet*

-
- Supervisor: Prof. Franco Callegati
 - Co-Supervisor: Prof. Walter Cerroni
 - Area of study: Telecommunication Networks

Executive summary

My bachelor thesis focused on the in-depth study of the open-source software known as HylaFAX, which allows the integration between the FAX service, the Internet network, and open-source systems for Optical Character Recognition (OCR). I extended this software with functionalities that allow customization of outbound FAX management and designed an alternative solution to manage inbound FAX. The outcome was a web application for sending/receiving FAX as e-mail that could be easily integrated with University services offered to faculty and staff.

Industrial Technical Institute (ITI) Blaise Pascal, Cesena, Italy

Senior high school specializing in technical education with focus on technical expert in Computer Science

July 2005

- 96/110

CERTIFICATIONS

Abilitazione Scientifica Nazionale al ruolo di Professoressa di II fascia
Code 01/B1 - Informatics
Italian Ministry of Education, Universities and Research
Starting 2023-12-12, ending 2034-12-12

PhD SCHOOLS

Lipari School on Network and Computer Sciences, PhD Summer School, Lipari, Italy

July 2017

The school's goal was to provide all attendees a rich lecture program about Network programmability and emerging methodologies, technologies, and applications. July 09-15, 2017

IEEE CommSoc Summer School, PhD Summer School, Trento, Italy

June 2016

The school's goal was to provide all attendees with a rich lecture program about fundamentals, advanced, and hot topics in communications. June 20-23, 2016

Traffic Monitoring and Analysis (TMA), PhD School, Louvain La Neuve, Belgium

April 2016

The school's goal was to provide all attendees with a rich lecture program about network measurements, such as Internet traffic measurements, Internet-scale experimentation, Internet Modeling, and Multi-path TCP. Attendees also had the chance to follow the TMA workshop. April 07-08, 2016

GENI Regional Project, Workshop, Clemson, USA

December 2016

The workshop's goal was to provide all attendees with a rich lecture program about GENI Network adoption, cloud computing infrastructure, OpenFlow solutions on campus, and other related topics. December 02-03, 2016

**RESEARCH
CONTRACTS**

Junior Assistant Professor, University of Urbino "Carlo Bo", Department of Pure and Applied Sciences (DiSPeA), Urbino, Italy

January 2022 - Today

Fixed term research and teaching position within the scope of the PON project titled “Distributed Artificial Intelligence and Machine Learning for the Reduction of Energy Impact of Connected Devices’.

Research contract at Centro Interdipartimentale di Ricerca Industriale, - CIRI ICT, University of Bologna, Cesena, Italy
October 2020 - December 2021
Research Assistant

Research contract at ABizCo SACMI Group
November 2018 - November 2019
Research intern

Research contract at Centro Interdipartimentale di Ricerca Industriale, - CIRI ICT, University of Bologna, Cesena, Italy
January 2017 - October 2018
Postdoctoral Junior Researcher

Ph.D. at University of Bologna
January 2014 - December 2016
Ph.D. student covered by a grant from the Italian Ministry of Research.

Research contract at Second Faculty of Engineering, University of Bologna, Cesena, Italy
May 2010 to October 2010
I participated in the research project “Development of automated management systems for communication services on the Internet” . I developed a Session Initiation Protocol (SIP) client usable via a web browser and a series of software modules that allow users to visualize, on a web page, the exchange of signaling messages during services setup.

BIBLIOMETRICS

Google Scholar metrics as of May 13 2024

Overall:

- Citations: 654
- h-Index: 16
- i10-Index: 18

Since 2019:

- Citations: 437
- h-Index: 14
- i10-Index: 16

JOURNAL PUBLICATIONS NEWEST FIRST

1. L. Bigelli, C. Contoli, V. Freschi, and E. Lattanzi, “Privacy preservation in sensor-based human activity recognition through autoencoders for low-power iot devices,” *Internet of Things*, p. 101189, 2024. DOI: <https://dx.doi.org/10.1016/j.iot.2024.101189>

2. E. Lattanzi, C. Contoli, and V. Freschi, "A study on the energy sustainability of early exit networks for human activity recognition," *IEEE Transactions on Sustainable Computing*, 2023. DOI: <https://dx.doi.org/10.1109/TSUSC.2023.3303270>
3. C. Contoli and E. Lattanzi, "A study on the application of tensorflow compression techniques to human activity recognition," *IEEE Access*, 2023. DOI: <https://dx.doi.org/10.1109/ACCESS.2023.3276438>
4. E. Lattanzi, C. Contoli, and V. Freschi, "Do we need early exit networks in human activity recognition?," *Engineering Applications of Artificial Intelligence*, vol. 121, p. 106035, 2023. DOI: <https://dx.doi.org/10.1016/j.engappai.2023.106035>
5. D. Borsatti, C. Grasselli, C. Contoli, L. Micciullo, L. Spinacci, M. Settembre, W. Cerroni, and F. Callegati, "Mission critical communications support with 5g and network slicing," *IEEE Transactions on Network and Service Management*, pp. 1–1, 2022. DOI: <https://dx.doi.org/10.1109/TNSM.2022.3208657>
6. M. Gharbaoui, C. Contoli, G. Davoli, D. Borsatti, G. Cuffaro, F. Paganelli, W. Cerroni, P. Cappanera, and B. Martini, "An experimental study on latency-aware and self-adaptive service chaining orchestration in distributed nfv and sdn infrastructures," *Computer Networks*, vol. 208, p. 108880, 2022. DOI: <https://dx.doi.org/10.1016/j.comnet.2022.108880>
7. G. Davoli, W. Cerroni, S. Tomovic, C. Buratti, C. Contoli, and F. Callegati, "Intent-based service management for heterogeneous software-defined infrastructure domains," *International Journal of Network Management*, vol. 29, no. 1, p. e2051, 2019. DOI: <https://dx.doi.org/10.1002/nem.2051>
8. F. Callegati, W. Cerroni, C. Contoli, R. Cardone, M. Nocentini, and A. Manzalini, "Sdn for dynamic nfv deployment," *IEEE Communications Magazine*, vol. 54, no. 10, pp. 89–95, 2016. DOI: <https://dx.doi.org/10.1109/mcom.2016.7588275>
9. F. Callegati, W. Cerroni, and C. Contoli, "Virtual networking performance in openstack platform for network function virtualization," *Journal of Electrical and Computer Engineering*, vol. 2016, 2016. DOI: <https://dx.doi.org/10.1155/2016/5249421>
10. P. Bellavista, F. Callegati, W. Cerroni, C. Contoli, A. Corradi, L. Foschini, A. Pernaferini, and G. Santandrea, "Virtual network function embedding in real cloud environments," *Computer Networks*, vol. 93, pp. 506–517, 2015. DOI: <https://dx.doi.org/10.1016/j.comnet.2015.09.034>

**CONFERENCE
PROCEEDINGS
NEWEST FIRST**

1. L. Calisti, C. Contoli, G. Di Fabrizio, N. Kania, and E. Lattanzi, "Eesiamese: Energy-efficient siamese neural network for constrained devices," in *2024 9th International Conference on Machine Learning Technologies (ICMLT)*, 2024
2. C. Contoli, L. Calisti, G. Di Fabrizio, N. Kania, A. Bogliolo, and E. Lattanzi, "A power-aware vision-based virtual sensor for real-time edge computing," in *2024 1st International Workshop on Pervasive Computing Challenges in Trustable Crowdsensing Systems (TrustSense) at IEEE PERCOM 2024*, 2024
3. S. Peretti, C. Contoli, and E. Lattanzi, "Complexity-aware features selection for wrist-worn human activity recognition," in *2024 3rd Workshop on*

4. G. Di Fabrizio, L. Calisti, C. Contoli, N. Kania, E. Lattanzi, *et al.*, “A study on the energy-efficiency of the object tracking algorithms in edge devices,” in *Proceedings of International Workshop on Intelligent Systems and Paradigms for Next Generation Computing Evolution (INSPIRE)*, pp. 1–6, ACM, 2023.
5. C. Contoli and E. Lattanzi, “Energy efficiency of deep learning compression techniques in wearable human activity recognition,” in *IFIP International Conference on Artificial Intelligence Applications and Innovations*, pp. 102–113, Springer, 2023.
DOI: https://dx.doi.org/10.1007/978-3-031-34111-3_10
6. C. Contoli, D. Rossi, G. Tontini, and D. B. F. Callegati, “Demonstration of digital twins for 5g connectivity in industry 4.0,” in *2021 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN)*, 2021.
DOI: <https://dx.doi.org/10.1109/NFV-SDN53031.2021.9665099>
7. F. Callegati, A. Campi, C. Contoli, S. Di Santi, N. Ghiselli, C. Giannelli, A. Pernaflini, and R. Zamagna, “Sdn-based differentiated traffic flow management for industrial internet of things environments,” in *2021 IEEE Symposium on Computers and Communications (ISCC)*, 2021.
DOI: <https://dx.doi.org/10.1109/ISCC53001.2021.9631388>
8. C. Contoli, F. Palumbo, F. Esposito, F. Callegati, and A. Pescape, “Flock: A live migration protocol for sdn controllers,” in *2019 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN)*, pp. 1–5, 2019.
DOI: <https://dx.doi.org/10.1109/NFV-SDN47374.2019.9040146>
9. T. Liu, F. Callegati, W. Cerroni, C. Contoli, M. Gabbriellini, and S. Giallorenzo, “Constraint programming for flexible service function chaining deployment,” vol. 2019-January, pp. 2004 – 2013, IEEE Computer Society, 2019.
10. F. Esposito, J. Wang, C. Contoli, G. Davoli, W. Cerroni, and F. Callegati, “A behavior-driven approach to intent specification for software-defined infrastructure management,” in *2018 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN)*, pp. 1–6, IEEE, 2018.
DOI: <https://dx.doi.org/10.1109/NFV-SDN.2018.8725754>
11. M. Gharbaoui, C. Contoli, G. Davoli, G. Cuffaro, B. Martini, F. Paganelli, W. Cerroni, P. Cappanera, and P. Castoldi, “Experimenting latency-aware and reliable service chaining in next generation internet testbed facility,” in *2018 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN)*, pp. 1–4, 2018. DOI: <https://dx.doi.org/10.1109/NFV-SDN.2018.8725783>
12. M. Gharbaoui, C. Contoli, G. Davoli, G. Cuffaro, B. Martini, F. Paganelli, W. Cerroni, P. Cappanera, and P. Castoldi, “Demonstration of latency-aware and self-adaptive service chaining in 5g/sdn/nfv infrastructures,” in *2018 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN)*, pp. 1–2, 2018.
DOI: <https://dx.doi.org/10.1109/NFV-SDN.2018.8725645>

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13. D. Borsatti, G. Davoli, W. Cerroni, C. Contoli, and F. Callegati, "Performance of service function chaining on the openstack cloud platform," in *2018 14th International Conference on Network and Service Management (CNSM)*, pp. 432–437, 2018.
 14. A. Melis, D. Berardi, C. Contoli, F. Callegati, F. Esposito, and M. Prandini, "A policy checker approach for secure industrial sdn," in *2018 2nd Cyber Security in Networking Conference (CSNet)*, pp. 1–7, IEEE, 2018.
DOI: <https://dx.doi.org/10.1109/CSNET.2018.8602927>
 15. F. Foresta, W. Cerroni, L. Foschini, G. Davoli, C. Contoli, A. Corradi, and F. Callegati, "Improving openstack networking: Advantages and performance of native sdn integration," in *Communications (ICC), 2018 IEEE International Conference on*, pp. 1–7, IEEE, 2018.
DOI: <https://dx.doi.org/10.1109/ICC.2018.8422753>
 16. G. Davoli, W. Cerroni, C. Contoli, F. Foresta, and F. Callegati, "Implementation of service function chaining control plane through openflow," in *Network Function Virtualization and Software Defined Networks (NFV-SDN), 2017 IEEE Conference on*, pp. 1–4, IEEE, 2017.
DOI: <https://dx.doi.org/10.1109/NFV-SDN.2017.8169852>
 17. D. Aguiari, C. Contoli, G. Delnevo, and L. Monti, "Smart mobility and sensing: Case studies based on a bike information gathering architecture," in *International Conference on Smart Objects and Technologies for Social Good*, pp. 112–121, Springer, Cham, 2017.
DOI: https://dx.doi.org/10.1007/978-3-319-76111-4_12
 18. W. Cerroni, C. Buratti, S. Cerboni, G. Davoli, C. Contoli, F. Foresta, F. Callegati, and R. Verdone, "Intent-based management and orchestration of heterogeneous openflow/iot sdn domains," in *Network Softwarization (NetSoft), 2017 IEEE Conference on*, pp. 1–9, IEEE, 2017.
DOI: <https://dx.doi.org/10.1109/NETSOFT.2017.8004109>
 19. F. Callegati, W. Cerroni, C. Contoli, and F. Foresta, "Performance of intent-based virtualized network infrastructure management," in *Communications (ICC), 2017 IEEE International Conference on*, pp. 1–6, IEEE, 2017.
DOI: <https://dx.doi.org/10.1109/ICC.2017.7997431>
 20. F. Callegati, W. Cerroni, C. Contoli, and G. Santandrea, "Sdn controller design for dynamic chaining of virtual network functions," in *Software Defined Networks (EWSN), 2015 Fourth European Workshop on*, pp. 25–30, IEEE, 2015.
DOI: <https://dx.doi.org/10.1109/EWSN.2015.56>
 21. F. Callegati, W. Cerroni, C. Contoli, and G. Santandrea, "Implementing dynamic chaining of virtual network functions in openstack platform," in *Transparent Optical Networks (ICTON), 2015 17th International Conference on*, pp. 1–4, IEEE, 2015.
DOI: <https://dx.doi.org/10.1109/ICTON.2015.7193561>
 22. F. Callegati, W. Cerroni, C. Contoli, and G. Santandrea, "Dynamic chaining of virtual network functions in cloud-based edge networks," in *Network Softwarization (NetSoft), 2015 1st IEEE Conference on*, pp. 1–5, IEEE, 2015.
DOI: <https://dx.doi.org/10.1109/NETSOFT.2015.7116127>
 23. F. Callegati, W. Cerroni, C. Contoli, and G. Santandrea, "Performance of multi-tenant virtual networks in openstack-based cloud infrastructures," in *Globecom Workshops (GC Wkshps), 2014*, pp. 81–85, IEEE, 2014.
DOI: <https://dx.doi.org/10.1109/GLOCOMW.2014.7063390>

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24. F. Callegati, W. Cerroni, C. Contoli, and G. Santandrea, "Performance of network virtualization in cloud computing infrastructures: The openstack case," in *Cloud Networking (CloudNet), 2014 IEEE 3rd International Conference on*, pp. 132–137, IEEE, 2014.
DOI: <https://dx.doi.org/10.1109/CloudNet.2014.6968981>
 25. C. Contoli, W. Cerroni, F. Callegati, and G. Pau, "Performance of named data networking in urban vehicular communications," in *Transparent Optical Networks (ICTON), 2014 16th International Conference on*, pp. 1–4, IEEE, 2014.
DOI: 10.1109/ICTON.2014.6876304

PARTICIPATION IN RESEARCH PROJECTS

Artificial Intelligence and Distributed Machine Learning for the Energetic Impact Reduction on Connected Devices, University of Urbino "Carlo Bo", Department of Pure and Applied Sciences, - DiSPeA, Urbino, Italy
OPERATIVE PROGRAM (PON) "RESEARCH AND INNOVATION" 2014-2020 - D.M. 1062

Junior Assistant Professor January 2022 to today
Member of the research group led by Professor Emanuele Lattanzi. My focus is on adopting machine and deep learning techniques to study and optimize the energy efficiency of IoT devices.

Secure Industry 4.0, University of Bologna, Centro Interdipartimentale di Ricerca Industriale, - CIRI ICT, Cesena, Italy
POR-FESR 2014-2020

Research assistant October 2020 to September 2021
Member of the research group led by Professor Franco Callegati. My focus was on adopting technologies such as cloud computing, software-defined networks, and network function virtualization in the context of an industrial reality to realize a digital twin network for test and simulation purposes.

Material, devices and innovative processes for industry 4.0, University of Bologna, Centro Interdipartimentale di Ricerca Industriale, - CIRI ICT, Cesena, Italy
POR-FESR 2014-2020

Research intern November 2018 to November 2019
I worked as a research intern and software developer at ABizCo SACMI group; my focus was on several activities, ranging from industrial cyber security to software development for industrial purposes.

SACHER (Smart Architecture for Cultural Heritage in Emilia Romagna), University of Bologna, Centro Interdipartimentale di Ricerca Industriale, - CIRI ICT, Cesena, Italy
POR-FESR 2014-2020

Ph.D. Student January 2016 to January 2018
Member of the research group led by Professor Franco Callegati. The Emilia-Romagna region funded the project in the context of "Grants for strategical industrial research tailored to primary environments of the Strategy of Intelligent Specialization". I focused on the design and development of technological components expected by the project.

EuroCPS - European Network of competencies and platforms for Enabling SME from any sector building Innovative CPS products to sustain demand for European manufacturing, Dipartimento di Ingegneria dell'Energia

Elettrica dell'Informazione "Guglielmo Marconi" - DEI, University of Bologna, Italy

H2020, Project N. 644090

Ph.D. Student

January 2015 to December 2016

Member of the research group led by Professor Franco Callegati. The participation allowed me to take part in the research meetings.

CC4BA - Certification Centre for Business Acceleration of SDN and NFV, San Francisco, CA, USA

Ph.D. student

November 2015 to January 2016

As part of the CC4BA research project, I spent three months at the RocketSpace Corporate Innovation Agency, EIT Digital headquarters. I had the chance to get in touch with Professor Scott Shenker from UC Berkeley and with local industrial realty such as Facebook and Deutsch Telekom in order to discuss research topics. I also had the chance to get in touch and start a collaboration with the Open Networking Lab (ONLAB), now part of the Open Networking Foundation. The collaboration allowed me to participate in Software Defined Network research topics and contribute to the Open Network Operating System (ONOS) project.

CC4BA - Certification Centre for Business Acceleration of SDN and NFV, EIT Digital, Innovation Activity N. 16406

Ph.D. student

January 2015 to December 2015

I participated in the research activities with the team composed of Professor Franco Callegati, Professor Walter Cerroni, and Antonio Manzalini from Telecom Italia. I focused on the design and development of technological components expected by the project.

SDN at the Edges, EIT Digital, Innovation Activity N. 15270

Scholar

January 2013 to December 2013

I participated in the research activities with the team composed of Professor Franco Callegati, Professor Walter Cerroni, and Antonio Manzalini from Telecom Italia. I focused on the design and development of technological components expected by the project.

Smart Networks at the Edge, EIT Digital, Innovation Activity N. 14443

Scholar

January 2013 to December 2013

I participated in the research activities with the team composed of Professor Franco Callegati, Professor Walter Cerroni, and Antonio Manzalini from Telecom Italia. The focus was on early virtual network infrastructure platforms.

University of California Los Angeles, Los Angeles, CA, USA

Visiting scholar

January 2013 to June 2013

After obtaining a grant from the University of Bologna for research periods abroad, I conducted an educational experience at the University of California Los Angeles. I collaborated with a research group, coordinated by Professor Giovanni Pau, in developing software that allows the simulation of Vehicular Networks capable of emulating real vehicular mobility on geographic maps.

Development of automated management systems for communication services on Internet, University of Bologna, Cesena, Italy

Scholar

May 2010 to October 2010

Member of the NetLab research group led by Professor Franco Callegati. After my Bachelor's Degree, I had my first research activity carried out in collaboration with Professor Walter Cerroni and Eng. Aldo Campi.

I developed a Session Initiation Protocol (SIP) client usable via a web browser and a series of software modules that allow users to visualize, on a web page, the exchange of signaling messages during services setup.

Building the Future Optical Network In Europe, Dipartimento di Ingegneria dell'Energia Elettrica dell'Informazione "Guglielmo Marconi" - DEI, University of Bologna, Italy

Scholar

January 2010 to June 2010

Project id: VII FP, prog. N. 216863

Member of the research group led by Professor Franco Callegati. The participation allowed me to participate in the research activity in collaboration with Professor Walter Cerroni and Professor Carla Raffaelli.

EDITORIAL ACTIVITY

Networks (ISSN:1097-0037): Review editor

2021 - today

SERVICES IN INTERNATIONAL CONFERENCES

IEEE NFV-SDN

2019 - today

- Program Committee member 2019
- Program Committee chair (Demo co-chair) 2020
- Program Committee chair (Publication co-chair, Session chair) 2021
- Program Committee chair (Demo co-chair) 2022
- Program Committee chair (Keynote speaker co-chair) 2023

IEEE Conference on Network Softwarization

2019 - today

- Session chair 2019
- Technical Program Committee chair 2024

REVIEWING FOR INTERNATIONAL JOURNALS

Journal of Network and Systems Management

Springer Nature (ISSN:1064-7570)

2023

MDPI Sensors (ISSN:1424-8220)

2023

MDPI Electronics (ISSN: 2079-9292)

2023

IEEE JSAC (ISSN: 7338716)

2023

MDPI Network (ISSN:2673-8732)

2022

Networks (ISSN:1097-0037)

2021

Network and Computer

Applications Journal (ISSN: 1084-8045, 1095-8592)

2017

REVIEWING FOR INTERNATIONAL CONFERENCES

IEEE NFV-SDN

2016-today

EuCNC & 6G Summit

2022-today

IEEE Network Softwarization

2017, 2022-today

IEEE GLOBECOM NGNI

2017-2018, 2021-today

IEEE INFOCOM Workshops - CCSNA

2018

IEEE International Symposium

on Computers and Communications

2017-2018

IEEE GLOBECOM Workshops - CCSNA

2015-2016

IEEE International Conference on Communications

2015, 2022

IEEE High Performance Switching and Routing

2015

**TALKS IN
INTERNATIONAL
CONFERENCES**

A Power-aware Vision-based Virtual Sensor for Real-Time Edge Computing
1st International Workshop on Pervasive Computing Challenges in Trustable Crowd-sensing Systems (TrustSense) at IEEE PERCOM 2024

Energy efficiency of deep learning compression techniques in wearable human activity recognition
IFIP International Conference on Artificial Intelligence Applications and Innovations (AIAI 2023)

Sdn-based differentiated traffic flow management for the industrial internet of things environments
IEEE Symposium on Computers and Communications (ISCC 2021)

Flock: a live migration protocol for SDN controller
IEEE Conference on Network Function Virtualization and Software Defined Networks 2019 (NFV-SDN 2019)

Federated Platooning: Insider Threats and Mitigations
Hawaii International Conference on System Sciences 2019 (HICSS 2019)

A Behavior-driven approach to Intent specification for Software Defined Infrastructure Management
IEEE Conference on Network Function Virtualization and Software Defined Networks 2018 (NFV-SDN 2018)

Intent-based network programmability ? Hands-on session, tutorial
IEEE Consumer Communications & Networking Conference 2018 (CC&NC 2018)

Intent-based network programmability ? Hands-on session, tutorial
IEEE Conference on Network Function Virtualization and Software Defined Networks 2017 (NFV-SDN 2017)

Intent-based management and orchestration of heterogeneous OpenFlow/IoT SDN domains
3rd IEEE Conference on Network Softwarization 2017 (NetSoft 2017)

Performance of Intent-based virtualized network infrastructure management
International Conference on Communications 2017 (ICC 2017)

SDN controller design for dynamic chaining of virtual network functions
4th European Workshop on Software Defined Networks 2015 (EWSDN 2015)

Dynamic Chaining of virtual network functions in cloud-based edge networks
1st IEEE Conference on Network Softwarization 2015 (NetSoft 2015)

Performance of Named Data Networking in urban vehicular communication
16th International Conference on Transparent Optical Network 2014 (ICTON 2014)

OTHER TALKS

The mathematics in our daily lives
Seminar for Math and Reality, University of Urbino, Urbino, IT, 2023

Software-Defined Infrastructure Management: an Intent-based Approach
Seminar, Saint Louis University, Saint Louis (MO), USA, 2019

Performance of Intent-based Virtualized Infrastructure management
14th Italian Networking Workshop 2017 (INW 2017)

Virtualized Network Infrastructure: Performance Analysis, Design and Implementation
Ph.D. defense, 2017

SDN in practice: OpenFlow protocol and Mininet emulator
Seminar for “Telecommunications Networks A” course, 2017
Virtualized Network Infrastructure: Control and Management
Seminar, Workshop Finmeccanica, 2016

Virtualized network infrastructures and service management: from performance analysis to implementation
Seminar, Saint Louis University, Saint Louis (MO), USA, 2016

Performance of Network Virtualization in Cloud-computing Infrastructure: The OpenStack case
12th Italian Networking Workshop 2015 (INW 2015)

Future Network Architectures: Network Function Virtualization and Software Defined Networking
2nd year Ph.D. seminar, 2015

Implementing Dynamic Chaining of Virtual Network Functions in Cloud-Based Edge Networks
Seminar for VEM Sistemi, 2015

Dynamic Chaining of Virtual Network Functions in Cloud-Based Edge Networks
Seminar for “Telecommunications Networks Laboratory LM” course, 2015

OpenFlow protocol and Mininet emulator
Seminar for “Telecommunications Networks Laboratory LM” course, 2015

Implementing Dynamic Chaining of Virtual Network Functions in Cloud-Based Edge Networks
Seminar for “Telecommunications Networks Laboratory LM” course, 2014

AWARDS

*Best Fast-Track Paper Award **IEEE NFV-SDN 2019**, Dallas, USA*
*Best Experiment Award **3rd FED4FIRE 2018**, Paris, France*
*Best Demo Award **IEEE NFV-SDN 2018**, Verona, Italy*
*Best Paper Award **IEEE ICC 2018**, Kansas City, USA*

INTERNATIONAL EXPERIENCE

***Saint Louis University**, Saint Louis, MO, USA*
Visiting Researcher **August 2016 to December 2016**

- I participated in research activities on network architecture, network management, and programmable networks
- SLU supervisor: Dr. Flavio Esposito
- UniBo supervisors: Prof. Franco Callegati, Prof. Walter Cerroni

RocketSpace Corporation, EIT Digital Headquarters, San Francisco, CA, USA

Visiting Researcher

November 2015 to January 2016

- I participated in research activities on Software Defined Networks and Network Function Virtualization
- EIT Digital supervisor: Marko Turpeinen
- UniBo supervisors: Prof. Franco Callegati

University of California Los Angeles, Los Angeles, CA, USA

Visiting Scholar

October 2012 to June 2013

- I participated in research activities on vehicular ad hoc network and named data networking
- UCLA supervisor: Dr. Giovanni Pau
- UniBo supervisors: Prof. Franco Callegati

TEACHING EXPERIENCE

University of Urbino “Carlo Bo”, Urbino, Italy

PHD COURSES:

- A.A. 2023/2024 **Machine Learning and High-Performance Computing**, PhD Program in Research Methods in Science and Technology (ReMeST), 16 hours (8CFU). *Application of machine learning techniques to large-scale data sets using high-performance computing infrastructure. Strong hands-on experience working with popular machine learning libraries and frameworks, such as TensorFlow, PyTorch, and scikit-learn commonly used in high-performance computing.*

RESPONSIBILITY OF BACHELOR COURSES:

- A.A. 2023/2024 **Fundamentals of Informatics**, Bachelor Degree in Sustainable Industrial Engineering, 6 CFU. *The course provides basic knowledge of the principles of computer science and structured programming. It also provides basic elements for programming in Python for intelligent and energy-efficient devices.*
- A.A. 2023/2024 **Web technologies for Land Management Systems**, Bachelor Degree in Informatics - Science and Technology, 6 CFU. *Theoretical foundations and practical knowledge about Web technologies that can be used to provide digital services (HTML, CSS, JavaScript, Web services, REST APIs, etc.).*
- A.A. 2022/2023 **Digital Land Management Systems**, Bachelor Degree in Applied Informatics, 6 CFU. *Theoretical foundations and practical knowledge about digital platforms, among which the Internet and the Web, economical and social mechanisms they are based on the modern technologies that can be used to provide digital services (Web services, REST APIs, etc.).*
- A.A. 2021/2022 **Digital Land Management Systems**, Bachelor Degree in Applied Informatics, 6 CFU. *Theoretical foundations and practical knowledge about digital platforms, among which the Internet and the Web, economical and social mechanisms they are based on the modern technologies that can be used to provide digital services (Web services, REST APIs, etc.).*

Alma Mater Studiorum University of Bologna, Bologna, Italy

RESPONSIBILITY OF LEARNING MODULES:

- A.A. 2023/2024 **Laboratory of Network Programmability and Automation**, Master Degree in Computer Science and Engineering, 3 CFU.

Teaching activity in English. *Theory and practice of modern network programming. Basics of network softwarization, virtual network programming and automation in the cloud computing environment.*

- A.A. 2022/2023 **Laboratory of Network Programmability and Automation**, Master Degree in Computer Science and Engineering, 3 CFU. Teaching activity in English. *Theory and practice of modern network programming. Basics of network softwarization, virtual network programming and automation in the cloud computing environment.*
- A.A. 2021/2022 **Programming**, Degree in Computer Systems Technologies, 3 CFU. *Practical programming in C, from basics of program writing to design and development of solutions to problems.*
- A.A. 2021/2022 **Computer Networks and Network Programming**, Degree in Computer Systems Technologies, 3 CFU. *Theory and practice of computer networks basics; basics network programming.*
- A.A. 2021/2022 **Laboratory of Network Programmability and Automation**, Master Degree in Computer Science and Engineering, 3 CFU. Teaching activity in English. *Theory and practice of modern network programming. Basics of network softwarization, virtual network programming and automation in the cloud computing environment.*
- A.A. 2021/2022 **Programmable Networking**, Degree in Computer Systems Technologies, 3 CFU. Teaching activity in English. *Theory and practice of modern network programming. Basics of virtual network programming and automation in the cloud computing environment.*
- A.A. 2018/2019 **Network Programmability**, Bachelor Degree in Computer Science and Engineering, 3 CFU. *Basics network programming. Design and implementation of distributed network applications.*
- A.A. 2017/2018 **Network Programmability**, Bachelor Degree in Computer Science and Engineering, 3 CFU. *Basics network programming. Design and implementation of distributed network applications.*
- A.A. 2016/2017 **Network Programmability**, Bachelor Degree in Computer Science and Engineering, 3 CFU. *Basics network programming. Design and implementation of distributed network applications.*
- A.A. 2014/2015 **Network Engineering M**, Master Degree in Telecommunications Engineering, 3 CFU. Teaching activity in English. *Routing protocols in the Internet.*

TUTORING:

- A.A. 2020/2021 **Network Programmability**, Master Degree in Computer Science and Engineering. Teaching activity in English.
- A.A. 2015/2016 **Telecommunications Networks A**, Bachelor Degree in Computer Science and Engineering.
- A.A. 2015/2016 **Telecommunications Networks and Devices Programming Laboratory**, Bachelor Degree in Computer Science and Engineering.
- A.A. 2014/2015 **Telecommunications Networks Laboratory M**, Master Degree in Computer Science and Engineering.
- A.A. 2014/2015 **Telecommunications Networks Laboratory A**, Bachelor Degree in Computer Science and Engineering.

SUPERVISION OF GRADUATE STUDENTS:

- Gianluca Davoli: “Intent-based approach to virtualized infrastructure management in SDN/NFV deployments”, 2017

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- Nikolas Subrani: “Alternative per la configurazione dell’infrastruttura di rete in piattaforme OpenStack”, 2016
 - Arnau Salas: “OpenDayLight as a software controller for Software Defined Networking”, 2015
 - Francesco Cristiano: “Emulazione distribuita di reti di telecomunicazioni su piattaforma Mininet”, 2015

SUPERVISION OF BACHELOR STUDENTS:

- Susanna Peretti: “The impact of features selection on identifying a pattern in hand-washing recognition”, 2023
- Alessandro Molari: “Model Checking of Software Defined Networks using Header Space Analysis”, 2017
- Elia Leoni: “Piano di controllo SDN per la composizione dinamica di funzioni dire rete virtuali”, 2016
- Francesco Foresta: “Composizione dinamica di funzioni di rete virtuali in ambienti cloud”, 2015
- Luigi Ponti: “Virtualizzazione di funzioni di rete su piattaforme per cloud computing”, 2015
- Giulio Crestani: “Problematiche di sicurezza nelle software defined networks”, 2014

EXTRA-INSTITUTIONAL TEACHING:

- 2015 - 2021: **IFTS - TechNet**, Cesena, Italy
From theory to practice, I teach basics and advanced aspects of Telecommunications Networks.
- 2018: **Bologna Business School**, Bologna, Italy
Master course in *Internet of Things*
My focus was on providing basics of Intent-based programmability, from theory to practical implementation.
- 2018: **ITS Professional School**, Cesena, Italy
My focus was on teaching basics of socket programming in Java and C# languages.

**OTHER
ACTIVITIES**

Orientation Commission, *University of Urbino Carlo Bo* 2022 - today
Member of the Orientation Commission of the First Cycle Degree/Bachelor in Applied Computer Science of the University of Urbino Carlo Bo.

Judging Commission, *University of Urbino Carlo Bo* 2023

- Member of the judging commission of the procedure selection to award 1 research grants. The grant aims to conduct research on the projects titled “Explainable Artificial Intelligence in contesto urbano”. - Decreto n. 499/2023, 24/10/2023.
- Member of the judging commission of the procedure selection to award 1 research grant. The grant aims to conduct research on a project titled “Digital platforms for supporting the creation of social value in urban contexts”. - Decreto n. 447, 22/09/2023.
- Member of the judging commission of the procedure selection to award 2 research grants. The grant aims to conduct research on two projects titled “IoT solutions and edge computing for real-time semantic enrichment of urban digital twins” and “IoT and machine learning solutions for proof of attendance and activity recognition in rewarding and gasification contexts”. - Decreto n.184, 03/05/2023 and n.185, 03/05/2023.

- Member of the judging commission of the procedure selection to award 1 autonomous collaboration agreement. The aim of the agreement is to provide support for the organization, teaching, and practical exercise activities during the Summer School titled “Coding and computational thinking in the library”. - Decreto n.172/2022, 04/07/2022.
- Member of the judging commission of the procedure selection to award 1 autonomous collaboration agreement. The aim of the agreement is to renovate and expand the website of the Dynamic Models in Economy and Finance research group. - Decreto n. 12/2023, 20/01/2023.

SERVICES

Contribution to the open-source software project Open Networking Operating System (ONOS), the leading open source SDN controller for building next-generation SDN/NFV solutions, developed by the Open Networking Foundation.

Developer of SinglePointToMultiPointIntentCodec, 2016

- SinglePointToMultiPointIntentCodec is both an encoder and decoder plugin for ONOS. It implements the Single point-to-Multi point connectivity intent by encoding/decoding JSON messages.
- IntentsWebResource is a REST endpoint which exposes an API that allow users and third party applications to send Single point-to-Multi point intent requests over REST. Such requests result in several actions to be applied to the ONOS intent framework.

SKILLS

Computer Programming:

- Java, Python, C, C++, Perl, C#, JavaScript, PHP, SQL
- Design with Unified Modeling Language (UML) and Google Protocol Buffer
- Object Oriented design
- Distributed systems
- Concurrent programming
- PLC programming

Software Engineering and Productive teamwork:

- Distributed Version Control Systems (Git)
- Build systems (Maven)

Information/Internet Technology:

- Markup languages (HTML, XML, CSS)
- Database manipulation with SQL
- Networking, protocols and tools (IP, TCP, UDP, RIP, OSPF, BGP, MPLS, Wireshark)
- Future networking technologies: Software Defined Networking, Network Function Virtualization, Mininet, OpenFlow, OpenVSwitch SDN control platform (POX, Ryu, ONOS)
- Cloud platforms: OpenStack

Productivity Applications:

- LaTeX, BibTeX

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- IDE (Eclipse, IntelliJIdea)

Operating Systems:

- Linux, with specific skills for Ubuntu and Mint
- Microsoft Windows

LANGUAGE SKILLS

- Italian - Native
- English - Fluent
- German - Beginner

REFERENCES AVAILABLE TO CONTACT

Prof. Emanuele Lattanzi (e-mail: emanuele.lattanzi@uniurb.it; phone: +39 0722 304411)

- Associate Professor, DiSPeA, University of Urbino
- Piazza della Repubblica 13, 61029 Urbino (PU), Italy
- *Prof. Lattanzi is my supervisor in the PON Research Project*

Prof. Flavio Esposito (e-mail: flavio.esposito@slu.edu; phone: +1 (314) 977-2434)

- Associate Professor, Computer Science Department, Saint Louis University
- 220 North Grand Blvd, St. Louis, MO 63103-2007
- *Dr. Esposito was advisor during my research period in Saint Louis*

Prof. Franco Callegati (e-mail: franco.callegati@unibo.it; phone: +39 (0547) 339218)

- Full Professor, DISI, University of Bologna
- Via Dell'Università 50, 47521 Cesena (FC), Italy
- *Dr. Callegati was my supervisor for Master Thesis and PhD*

Prof. Walter Cerroni (e-mail: walter.cerroni@unibo.it; phone: +39 (0547) 339209)

- Associate Professor, DEI, University of Bologna
- Via Dell'Università 50, 47521 Cesena (FC), Italy
- *Dr. Cerroni was my co-supervisor for Master Thesis and PhD*

¹Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base all'art. 13 del D. Lgs. 196/2003 e all'art. 13 GDPR 679/16.