

Jacopo Massa

PLACE AND DATE OF BIRTH: SAN GIOVANNI ROTONDO (FG), 03/09/1997

RESIDENCE: VIA UGO FOSCOLO 2E, 56127 PISA (PI)

✉ jacopo.massa@di.unipi.it | 🏠 <https://pages.di.unipi.it/massa> | ☎ 0000-0002-5255-537X | 🌐 jacopo-massa

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1. Experience & Education

1.1. EDUCATION

Ph.D. in Computer Science

PISA, ITALY

UNIVERSITY OF PISA / CNR-ISTI

11/2021 – 11/2025

- **Thesis:** “*Declarative application and network management in the Cloud-Edge continuum*”
- **Advisors:** Antonio Brogi, Patrizio Dazzi, Stefano Forti • **Mark:** Excellent (with honours) • **Awarded:** 27/11/2025
- This thesis investigates declarative methodologies for managing applications and networks across the Cloud-Edge continuum, focusing on data-aware placement and intent-based networking. The work introduces models and prototypes that enable automated, context-sensitive distributed service deployment, based on data properties and infrastructure dynamics. It also proposes novel approaches for intent modelling, translation, and conflict resolution to support scalable orchestration of application and network configurations. The solutions are validated through simulation, emulation, and real-world case studies.

M.Sc. in Computer Science

PISA, ITALY

UNIVERSITY OF PISA

10/2019 – 10/2021

- **Thesis:** “*Data-aware application Placement And Routing in the Cloud-IoT continuum*”
- **Advisors:** Antonio Brogi, Stefano Forti • **Mark:** 110/110 (with honours) • **Awarded:** 08/10/2021
- This thesis proposes declarative modelling of Cloud-IoT infrastructures and multi-service applications that separately model computing and data services. Through formal logic reasoning, the methodology determines eligible service placements and data traffic routing over Cloud-IoT resources. The proposed methodology is prototyped in Prolog and assessed via simulation over a life-like use case.

B.Sc. in Computer Science

PISA, ITALY

UNIVERSITY OF PISA

09/2016 – 10/2019

- **Thesis:** “*Voice and graphical user interface for a smart building application*”
- **Advisors:** Antonio Brogi, Stefano Forti • **Mark:** 106/110 • **Awarded:** 04/10/2019
- This thesis presents the design and implementation of a hybrid voice-graphical interface for smart building environments, enabling natural language interaction with IoT devices through Amazon Alexa and a touchscreen display. The system integrates multiple microservices within the GIÒ framework, allowing users to access contextual information, manage smart room goals, and control devices via voice commands or graphical input. The solution is prototyped using Python and the Alexa Skills Kit, and its usability is evaluated through real-user testing in a university setting.

1.2. ACADEMIC POSITIONS

Research grant

PISA, ITALY

UNIVERSITY OF PISA, NOUS PROJECT

01/09/2024 – NOW

- **Taking up duties:** Prot. 0002352/2024 of 06/08/2024
- **Renewals:** Prot. 0002476/2025 of 07/08/2025 | Prot. 0132812/2026 of 19/06/2026
- Holder of the research grant “*Ambienti per la programmazione strutturata parallela e distribuita di infrastrutture di calcolo all’Edge*” associated with the NOUS EU-funded project, under the Horizon Europe programme.

Scholarship Holder

PISA, ITALY

UNIVERSITY OF PISA

01/11/2021 – 01/09/2024

- Holder of the scholarship “*Efficient solutions and approaches for AI on Edge Computing platforms*”, associated with participation in the Ph.D. programme in Computer Science, funded by CNR-ISTI “A. Faedo”.

1.3. OTHER EDUCATIONAL EXPERIENCES

From Data to Social Innovation

BARATTI, ITALY

SOBIGDATA 2025 (PH.D. SUMMER SCHOOL)

22/06/2025 – 28/06/2025

- (40h) In-depth study of interdisciplinary methods in data science, machine learning, and AI, applied to social, political, and information dynamics. The program combined expert-led lectures and collaborative group projects, addressing topics such as disinformation, data governance, and ethical data practices.

Computational Complex and Social Systems: Spreading and Accessing Information

LIPARI, ITALY

UNIVERSITY OF CATANIA (PH.D. SUMMER SCHOOL)

16/07/2023 – 22/07/2023

- (40h) In-depth study of modern data-analysis techniques, with particular attention to Big Data and data mining for the Internet of Things. Distinguished guest lecturers and recognised authorities addressed these topics, focusing on algorithms, computational models, and practical results.

Pathways to Green ICT

PISA, ITALY

UNIVERSITY OF PISA (PH.D. COURSE)

02/05/2022 – 01/06/2022

- (16h) In-depth study of Green ICT fundamentals and tools for considering sustainability in research activities. The lectures introduced the concepts of sustainability and the types of environmental impact of the lifecycle of ICT systems, methodologies to assess and decrease the environmental impact of ICT systems, as well as use cases and open research challenges.

Programming Tools and Techniques in the Pervasive Parallelism Era

PISA, ITALY

UNIVERSITY OF PISA (PH.D. COURSE)

02/05/2022 – 13/05/2022

- (16h) In-depth study of techniques and tools for efficient parallel and distributed applications, targeting both small-scale systems and larger infrastructures, possibly equipped with different accelerators. The course followed a methodological approach to provide a homogeneous overview of classical tools and techniques and new tools and techniques specifically developed for new, emerging architectures and applicative domains. Perspectives on reconfigurable coprocessors and domain-specific architectures were also covered.

Mobile CrowdSensing and the Edge: An outlook to distributed architectures and privacy aspects

PISA, ITALY

UNIVERSITY OF PISA (PH.D. COURSE)

14/12/2021 – 21/12/2021

- (20h) In-depth study of the Mobile CrowdSensing (MCS) paradigm, with particular attention to Edge-based architectures and security mechanisms. It included real-world experiments, data-analytics methodologies for MCS platform optimisation, and security and privacy mechanisms in MCS architectures.

2. Research activities

2.1. BRIEF DESCRIPTION

The candidate's research lies in the **autonomous management** of applications, resources, and networks across the Cloud-Edge continuum, with particular attention to distributed infrastructures characterised by heterogeneity, dynamics, and stringent application requirements. It investigates methodologies that translate data-related, quality-of-service, and resource-availability requirements into verifiable placement, orchestration, and routing decisions by integrating **declarative programming**, optimisation, continuous reasoning, simulation, and emulation. The work is organised into three areas, detailed in the following sections: **declarative and data-aware Cloud-Edge management**, which combines constraints, optimisation, and neuro-symbolic techniques for placement; **Intent-Based Networking and traffic engineering**, addressing network configuration and control from high-level requirements; and **Urgent Edge Computing**, concerning distributed workload adaptation under dynamic and critical operating conditions. Taken together, these contributions outline Cloud-Edge systems that are increasingly adaptive, resilient, and requirement-driven.

Declarative and data-aware management of the Cloud-Edge continuum

- I investigate data-aware placement of multi-service applications over dynamic infrastructures, considering data properties and computing and network constraints. DA-Placer [C13, C16] computes service placements and SDN routes with Prolog; EdgeWise [C14] and EdgeWiseCR [J3] combine declarative reasoning and MILP, reusing valid solutions to reduce recomputation and migrations. ECLYPSE [J4] enables their reproducible evaluation through simulation, emulation, and hybrid experiments. The integration of Large Language Models and symbolic reasoning translates placement requests into Prolog facts, rules, and queries [C2], supporting specification construction and the production of inspectable solutions.
- **Related publications:** [C2, J3, J4, T1, C9, C13, C14, C16].

Intent-Based Networking and traffic engineering

- I develop declarative methodologies that translate provisioning intents into executable VNF-chain configurations. DIPS [C15] processes individual intents, while MultiDIPS [C12] handles concurrent requests and conflict-resolution strategies [C10, C11]. Traffic engineering with dgLBF [J1, C4] computes paths and per-hop latency budgets meeting end-to-end latency, reliability, and protection requirements, integrating network decisions with placement decisions.
- **Related publications:** [J1, C4, T1, C9, C10, C11, C12, C15].

Urgent Edge Computing

- I contributed to the white paper defining the motivations and requirements of Urgent Edge Computing [C8], for critical applications over decentralised Edge infrastructures. I study collaborative allocation and offloading strategies based on marginal cost [J2, C7] and decentralised Q-learning [C6], adapting workloads to changing demand without a global orchestrator. This yields reactive and distributed orchestration mechanisms suited to urgent operational conditions.
- **Related publications:** [J2, C6, C7, C8].

2.2. PUBLICATIONS

BIBLIOMETRIC INDICATORS (UPDATED ON 31/08/2026)

GOOGLE SCHOLAR	Documents: 22	Citations: 109	h-index: 6	i10-index: 5
RESEARCHGATE	Documents: 22	Citations: 93	h-index: 6	
SCOPUS	Documents: 17	Citations: 68	h-index: 5	
WEB OF SCIENCE	Documents: 16	Citations: 49	h-index: 4	

JOURNAL PAPERS

- [J1] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, A. Brogi, A. Clemm, and T. Eckert, "Declarative traffic engineering for low-latency and reliable networking", *Future Generation Computer Systems*, vol. 182, p. 108 494, Sep. 2026, issn: 0167-739X.
DOI: 10.1016/j.future.2026.108494.
- [J2] E. Carlini, P. Dazzi, L. Ferrucci, **J. Massa**, and M. Mordacchini, "Dynamic Workload Balancing in Decentralized Edge Systems: A Marginal Cost Approach", *Future Generation Computer Systems*, vol. 176, p. 108 167, Mar. 2026, issn: 0167-739X.
DOI: 10.1016/j.future.2025.108167.
- [J3] **J. Massa**, S. Forti, P. Dazzi, and A. Brogi, "Combining Declarative and Linear Programming for Application Management in the Cloud-Edge Continuum", *Future Generation Computer Systems*, vol. 176, p. 108 224, Mar. 2026, issn: 0167-739X.
DOI: 10.1016/j.future.2025.108224.

- [J4] **J. Massa**, V. De Caro, S. Forti, P. Dazzi, D. Bacciu, and A. Brogi, “ECLYPSE: A Python Framework for Simulation and Emulation of the Cloud-Edge Continuum”, *Journal of Software: Evolution and Process*, vol. 38, no. 1, e70081, Jan. 2026.
DOI: 10.1002/smr.70081.

CONFERENCE PAPERS

- [C1] **J. Massa**, S. Forti, S. Bruschi, J. Soldani, and A. Brogi, “SCI-aware application placement in the cloud-edge continuum”, in *Proceedings of the 12th European Conference on Service-Oriented and Cloud Computing (ESOCC)*, In press, Sep. 2026.
- [C2] **J. Massa**, G. Bisicchia, P. Dazzi, and A. Brogi, “A Neurosymbolic Prolog Skill for LLM-Driven Service Placement”, in *2026 IEEE 19th International Conference on Cloud Computing (CLOUD)*, Aug. 2026, pp. 29–31.
DOI: 10.1109/CLOUD72782.2026.00014.
- [C3] **J. Massa**, P. Dazzi, and M. Pierotti, “AI Sprawl as a Control-Plane Problem: A Rule-Based Perspective”, in *Proceedings of the 21th International Conference on Economics of Grids, Clouds, Systems, and Services (GECON)*, In press, Springer Nature Switzerland, Jul. 2026.
- [C4] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, A. Brogi, A. Clemm, and T. Eckert, “Towards Declarative Traffic Engineering for Guaranteed Latency-Based Forwarding”, in *Euro-Par 2024: Parallel Processing Workshops*, Springer Nature Switzerland, 2025, pp. 231–242.
DOI: 10.1007/978-3-031-90203-1_20.
- [C5] M. D. Bartola, **J. Massa**, P. Dazzi, and M. Torquati, “FastFlow-Python: Parallel Building Blocks in Python Through FastFlow Integration”, in *2025 IEEE International Conference on Cloud Engineering (IC2E)*, Oct. 2025, pp. 281–289.
DOI: 10.1109/IC2E65552.2025.00046.
- [C6] V. Besozzi, E. Carlini, M. Danelutto, P. Dazzi, M. Della Bartola, L. Ferrucci, **J. Massa**, and M. Mordacchini, “Decentralized Q-Learning for Workload Offloading in Urgent Edge Computing Scenarios”, in *Complex, Intelligent and Software Intensive Systems*, Cham: Springer Nature Switzerland, Jul. 2025, pp. 231–239.
DOI: 10.1007/978-3-031-96096-3_22.
- [C7] E. Carlini, P. Dazzi, L. Ferrucci, **J. Massa**, and M. Mordacchini, “Marginal Cost of Computation as a Collaborative Strategy for Resource Management at the Edge”, in *Economics of Grids, Clouds, Systems, and Services*, Springer Nature Switzerland, Feb. 2025, pp. 15–27.
DOI: 10.1007/978-3-031-81226-2_3.
- [C8] P. Dazzi, L. Ferrucci, M. Danelutto, K. Tserpes, A. Makris, T. Theodoropoulos, **J. Massa**, E. Carlini, and M. Mordacchini, “Urgent Edge Computing”, in *Proceedings of the 4th Workshop on Flexible Resource and Application Management on the Edge (FRAME)*, ACM, 2024, pp. 7–14.
DOI: 10.1145/3659994.3660315.
- [C9] **J. Massa**, “Towards a Comprehensive Approach to Resource and Conflict Management in Cloud-Edge Settings”, in *Proceedings of the 33rd International Symposium on High-Performance Parallel and Distributed Computing*, ACM, 2024, pp. 397–400.
DOI: 10.1145/3625549.3658829.
- [C10] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, and A. Brogi, “A declarative reasoning approach to conflict management in Intent-Based Networking”, in *2024 27th Conference on Innovation in Clouds, Internet and Networks*, 2024, pp. 228–233.
DOI: 10.1109/ICIN60470.2024.10494474.
- [C11] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, and A. Brogi, “Towards declarative intent processing and conflict resolution in IBN”, in *Proceedings of the IEEE/ACM 16th International Conference on Utility and Cloud Computing*, ACM, 2024.
DOI: 10.1145/3603166.3632236.
- [C12] T. Di Riccio, **J. Massa**, S. Forti, and A. Brogi, “Sustainable placement of VNF chains in Intent-based Networking”, in *Proceedings of the IEEE/ACM 16th International Conference on Utility and Cloud Computing*, ACM, Apr. 2024.
DOI: 10.1145/3603166.3632167.
- [C13] **J. Massa**, “Data-Aware Application Placement and Management in the Cloud-IoT Continuum”, in *Service-Oriented Computing – ICSOC 2022 Workshops*, Springer Nature Switzerland, 2023, pp. 301–307.
DOI: 10.1007/978-3-031-26507-5_24.
- [C14] **J. Massa**, S. Forti, P. Dazzi, and A. Brogi, “Declarative and Linear Programming Approaches to Service Placement, Reconciled”, in *2023 IEEE 16th International Conference on Cloud Computing (CLOUD)*, Sep. 2023, pp. 1–10.
DOI: 10.1109/CLOUD60044.2023.00033.
- [C15] **J. Massa**, S. Forti, F. Paganelli, P. Dazzi, and A. Brogi, “Declarative Provisioning of Virtual Network Function Chains in Intent-based Networks”, in *2023 IEEE 9th International Conference on Network Softwarization (NetSoft)*, Jul. 2023, pp. 522–527.
DOI: 10.1109/NetSoft57336.2023.10175449.

- [C16] **J. Massa**, S. Forti, and A. Brogi, “Data-Aware Service Placement in the Cloud-IoT Continuum”, in *Service-Oriented Computing*, Springer International Publishing, Jun. 2022, pp. 139–158.
DOI: 10.1007/978-3-031-18304-1_8.

THESES

- [T1] **J. Massa**, “Declarative application & network management in the Cloud-Edge continuum”, Ph.D. Thesis, Dept. of Computer Science, University of Pisa, Nov. 2025.
URL: <https://etd.adm.unipi.it/theses/available/etd-11022025-174209/>.
- [T2] **J. Massa**, “Data-aware application placement and routing in the Cloud-IoT continuum”, M.Sc. Thesis, Dept. of Computer Science, University of Pisa, Oct. 2021.
URL: <https://etd.adm.unipi.it/theses/available/etd-09072021-120248/>.
- [T3] **J. Massa**, “Voice and graphical user interface for a smart building application”, B.Sc. Thesis, Dept. of Computer Science, University of Pisa, Oct. 2019.

UNDER SUBMISSION

- [I1] S. Forti, **J. Massa**, and A. Brogi, “A Separation Logic for Cloud-Edge Application Management”, Submitted to *Journal of Logical and Algebraic Methods in Programming*, Jun. 2026.
- [I2] M. D. Bartola, **J. Massa**, and M. Torquati, “Stream Processing in Python: Implementation, Composition, and Performance of FastFlow-Python”, Submitted to *International Journal of Networked and Distributed Computing*, 2025.
- [I3] E. Sescu, G. Bellini, **J. Massa**, and P. Dazzi, “AquaScope: Scalable Distributed Platform for Maritime Traffic Monitoring”, Submitted to *Software: Practice and Experience*, 2025.

2.3. AWARDS AND HONORS

- 11/2024** **Best Paper Award**, GECON 2024.
 [C7] [Marginal Cost of Computation as a Collaborative Strategy for Resource Management at the Edge.](#)

2.4. EDITORSHIP

Participation in the following editorial boards for international scientific journals:

Editor

- **International Journal on Networked and Distributed Computing** (ISSN: 2211-7938) 07/2026 – NOW

Junior Editor

- **International Journal on Networked and Distributed Computing** (ISSN: 2211-7938) 10/2025 – 07/2026

2.5. CONFERENCE ORGANIZATION

Participation in the following international scientific conference committees:

Program Chair

- **AHPC³ 2026**, 3rd Workshop on Accelerated HPC in the Cloud Edge Continuum @ *PDP 2026*
- **AHPC³ 2025**, 2nd Workshop on Accelerated HPC in the Cloud Edge Continuum @ *IC2E 2025*
- **AHPC³ 2024**, 1st Workshop on Accelerated HPC in the Cloud Edge Continuum @ *PDP 2025*

Program Committee Member

- **ACR 2027**, 5th International Conference on Advances in Computing Research
- **ASIC 2026**, 1st African Smart Cities & Innovation Congress
- **MoCS 2026**, 16th Workshop on Management of Cloud and Smart City Systems @ *IEEE ISCC 2026*
- **SSDBM 2026**, 38th International Conference on Scalable Scientific Data Management
- **PC member, web chair**, 4th Workshop on Big Data and High-Performance Computing @ *Euro-Par 2026*
- **I3E 2026**, 25th IFIP Conference on e-Business, e-Services, and e-Society
- **ESOC 2026**, 12th European Conference On Service-Oriented And Cloud Computing
- **IEEE SOSE 2026**, 20th IEEE International Conference on Service-Oriented System Engineering
- **CSC 2026**, 12th International Conference on Connected Smart Cities
- **HPDC 2026**, 35th ACM International Symposium on High-Performance Parallel and Distributed Computing
- **CLOUD COMPUTING 2026**, 17rd International Conference on Cloud Computing, GRIDs, and Virtualization
- **IEEE CCNC 2026**, 23rd IEEE Consumer Communications & Networking Conference
- **ACR 2026**, 4th International Conference on Advances in Computing Research
- **Smart-City 2025**, 23rd International Conference on Smart City
- **IEEE SOSE 2025**, 19th IEEE International Conference on Service-Oriented System Engineering
- **MoCS 2025**, 15th Workshop on Management of Cloud and Smart City Systems @ *IEEE ISCC 2025*
- **CSC 2025**, 11th International Conference on Connected Smart Cities
- **I3E 2025**, 24th IFIP Conference e-Business, e-Services, and e-Society
- **ESOC 2025**, 12th European Conference On Service-Oriented And Cloud Computing
- **ACR 2025**, 3rd International Conference on Advances in Computing Research
- **CauSE 2025**, 4th International Workshop on Causality in Software Engineering
- **CLOSER 2025**, 15th International Conference on Cloud Computing and Services Science
- **Cloud Continuum**, Cloud Continuum track @ *SAC 2025*
- **IEEE SOSE 2024**, 18th IEEE International Conference on Service-Oriented System Engineering
- **CSC 2024**, 10th International Conference on Connected Smart Cities
- **ESOC 2023**, 10th European Conference On Service-Oriented And Cloud Computing
- **Microservices 2023**, 5th International Conference on Microservices
- **ACSOS 2023**, 4th International Conference on Autonomic Computing and Self-Organizing Systems

Local Chair

- **GECON 2026**, 21st International Conference on the Economics of Grids, Clouds, Systems, and Services

Web Chair

- **GECON 2026**, 21st International Conference on the Economics of Grids, Clouds, Systems, and Services
- **HPDC 2024**, 33rd International Symposium on High-Performance Parallel and Distributed Computing

2.6. COLLABORATIONS WITH QUALIFIED FOREIGN UNIVERSITIES/RESEARCH INSTITUTES

Collaborations with researchers at foreign universities/research institutes:

Futurewei Technologies, Inc.

SANTA CLARA, CALIFORNIA, USA

01/06/2024 – 30/03/2025

- Collaboration with researchers **Alexander Clemm** and **Toerless Eckert** on declarative traffic-engineering methodologies for flows with strict latency and reliability requirements. The activity contributed to a control plane for guaranteed Latency-Based Forwarding, capable of computing paths and per-hop latency budgets to satisfy end-to-end constraints and failure-protection requirements.
- Some of the results obtained by the candidate within the collaboration are reported in: [J1, C4].

2.7. CONFERENCE ORAL PRESENTATIONS

Oral presentations at the following international scientific conferences, for the presentation of the homonymous contributions:

- 13/07/2026** [C2] A Neurosymbolic Prolog Skill for LLM-Driven Service Placement (*Online*)
19th IEEE International Conference On Cloud Computing
- 26/09/2024** [C7] Marginal Cost of Computation as a Collaborative Strategy for Resource Management at the Edge
20th International Conference on the Economics of Grids, Clouds, Systems, and Services
- 27/08/2024** [C4] Towards Declarative Traffic Engineering for Guaranteed Latency-Based Forwarding
2nd International Workshop on Scalable Compute Continuum
- 06/06/2024** [C9] Towards a Comprehensive Approach to Resource and Conflict Management in Cloud-Edge Settings
33rd International Symposium on High-Performance Parallel and Distributed Computing - Ph.D. Symposium
- 06/12/2023** [C11] Towards declarative intent processing and conflict resolution in IBN
16th IEEE/ACM International Conference on Utility and Cloud Computing
- 06/12/2023** [C12] Sustainable placement of VNF chains in Intent-based Networking
16th IEEE/ACM International Conference on Utility and Cloud Computing
- 05/07/2023** [C14] Declarative and Linear Programming Approaches to Service Placement, Reconciled (*Online*)
16th IEEE International Conference On Cloud Computing
- 19/06/2023** [C15] Declarative Provisioning of Virtual Network Function Chains in Intent-based Networks
3rd International Workshop on Intent-Based Networking
- 29/11/2022** [C13] Data-Aware Application Placement and Management in the Cloud-IoT Continuum
20th International Conference on Service-Oriented Computing
- 05/07/2022** [C16] Data-Aware Service Placement in the Cloud-IoT Continuum
16th Symposium and Summer School On Service-Oriented Computing

2.8. REVIEWER ACTIVITY

Reviewing scientific contributions for the following international scientific journals and conference series:

Journals

Computing, *Empirical Software Engineering* (EMSE), *Future Generation Computer Systems* (FGCS), *Heliyon*, *IEEE Transactions on Cloud Computing* (IEEE TCC), *IEEE Transactions on Mobile Computing* (IEEE TMC), *IEEE Transactions on Services Computing* (IEEE TSC), *International Journal of Networked and Distributed Computing* (IJNDC), *Journal of Network and Computer Applications* (JNCA), *Journal of Systems & Software* (JSS), MDPI Computers, MDPI Future Internet, MDPI Sensors, MDPI Telecom, *SN Computer Science* (SNCS), *SoftwareX*, *ACM Transactions on Internet of Things* (TIOT).

Conferences

International Conference on Advances in Computing Research (ACR), *International Symposium on Cluster, Cloud and Internet Computing* (CC-GRID), *EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services* (EAI MobiQuitous), *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases* (ECML PKDD), *European Conference on Service-Oriented and Cloud Computing* (ESOCC), *IFIP Conference e-Business, e-Services, and e-Society* (I3E), *International Conference On Cloud Computing* (IEEE CLOUD), *Symposium on Computers and Communications* (IEEE ISCC), *International Conference on Service-Oriented System Engineering* (IEEE SOSE), *Conference on Science, Technology and Innovation Indicators* (IEEE STI), *Mediterranean Smart Cities Conference* (MSCC), *Euromicro International Conference on Parallel, Distributed, and Network-Based Processing* (PDP).

2.9. RESEARCH PROJECTS

Participation in the activities of the following **research projects**:

NOUS: A catalyst for European CLOUD Services

09/2024 – 11/2026

- **Grant Agreement ID:** 101135927
- NOUS is a 36-month EU-funded project, which aims to develop the architecture of a European cloud service that allows computational and data storage resources to be used from edge devices as well as supercomputers, through the HPC network, and Quantum Computers.
- The candidate has contributed to the design and development of a Python library for parallel stream processing, adopted as a shared layer and communication protocol among other project's components. The candidate has also contributed to the study and experimentation of methodologies for the automated management of applications and resources across the Cloud-Edge continuum.
- Some of the results obtained by the candidate within the project are reported in: [C2, J3, J4, I2].

OSMWARE: hOlistic Sustainable Management of distributed softWARE systems

11/2022 – 12/2024

- **ID:** PRA_2022_64
- Research project funded by the University of Pisa. The project focuses on the development of methodologies to support the management of distributed applications while considering both the quality of service delivered and the environmental sustainability of the resulting system.
- The candidate has contributed to declarative and optimisation-based methods for placing and managing Cloud-Edge applications. The candidate has also contributed to intent-based mechanisms for VNF-chain provisioning and conflict management, including sustainability objectives and traffic engineering with guaranteed latency.
- Some of the results obtained by the candidate within the project are reported in: [J3, J4, C4, C10, C12, C14, C15].

GIÒ: A Fog Computing Testbed for Research & Education

06/2019 – NOW

- The project aims at studying and experimenting with innovative methodologies and techniques for the realisation of ambient intelligence functions on a departmental Fog network and has already produced prototypes of functions for the monitoring of the Department of Computer Science of the University of Pisa.
- The candidate has designed and implemented graphical and voice interfaces for a smart-building application, contributing to the experimentation of ambient-intelligence services on the department's Fog infrastructure.
- Some of the results obtained by the candidate within the project are reported in: [T3].

2.10. RESEARCH GROUPS AND ORGANISATIONS

RESEARCH GROUPS

Participation in the activities of the following **research groups**, characterised by national and international collaborations:

NOUS: A catalyst for European CLOUD Services

PISA, ITALY

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF PISA

09/2024 – NOW

- The group includes researchers involved in the homonymous 36-month EU-funded project, whose aim is to develop the architecture of a European cloud service integrating computational and storage resources from edge devices, supercomputers, HPC infrastructures, and quantum computers.
- The candidate contributed to the design and development of a Python library for parallel stream processing, adopted as a shared layer and communication protocol among the project's components.

OSMWARE: hOlistic Sustainable Management of distributed softWARE systems

PISA, ITALY

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF PISA

11/2022 – 12/2024

- The group includes researchers involved in the homonymous OSMWARE project, whose aim is to study prototypes and technologies for the holistic and sustainable management of next-generation distributed software applications, also considering their economic impact.
- The candidate contributed to declarative and optimisation-based methods for placing and managing Cloud-Edge applications, including sustainability objectives and traffic engineering with guaranteed latency.

HPC-Lab: High Performance Computing Laboratory

PISA, ITALY

INSTITUTE OF INFORMATION SCIENCE AND TECHNOLOGIES "ALESSANDRO FAEDO", CNR-ISTI

01/2022 – NOW

- The HPC Lab focuses on scalable algorithms and systems for computational and data-intensive problems, including cloud systems, big data analytics, and machine learning. They develop efficient solutions for managing large datasets in near real-time, optimizing for resource constraints and application-specific trade-offs.
- The candidate contributes to the study of parallel and distributed solutions for stream processing and resource management in Cloud-Edge environments.

SOCC: Service-Oriented, Cloud and Fog Computing (SOCC) Research Group

PISA, ITALY

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF PISA

05/2021 – NOW

- The group brings together researchers from the Department of Computer Science of the University of Pisa, working on service-oriented computing, cloud-edge systems, declarative approaches, and the management and placement of distributed applications. It is coordinated by Prof. Antonio Brogi.
- The candidate contributes to declarative methodologies for placing and managing distributed applications, integrating requirement modelling, constraint reasoning, and optimisation in Cloud-Edge environments.

GIO: A Fog Computing Testbed for Research & Education

PISA, ITALY

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF PISA

06/2019 – NOW

- The group includes researchers involved in the homonymous GIO project, whose aim is to study and experiment with innovative methodologies and techniques for implementing ambient intelligence functions over a departmental Fog infrastructure.
- The candidate designed and implemented graphical and voice interfaces for smart-building applications, contributing to the experimentation of ambient-intelligence services on the department's Fog infrastructure.

Affiliation (as a member) of the following **international organisations**:

Organisations

- | | |
|---|-------------------|
| • ACM (Association for Computing Machinery) (Member n°: 0368812, <i>as a student member.</i>) | 01/2024 – 12/2024 |
| • IEEE Young Professionals (Member n°: 99074307) | 01/2024 – 12/2024 |
| • IEEE (Institute of Electrical and Electronics Engineers) (Member n°: 99074307) | 01/2024 – 12/2024 |

2.11. RESEARCH SOFTWARE

SL-CR

DESIGNER, MAINTAINER

06/2026 – NOW

- **License:** Apache-2.0
- **Repository:** <https://github.com/di-unipi-socc/sl-cr>
- *SL-CR* is a declarative prototype for continuous reasoning over application placement in Cloud-Edge environments. It separates a deployment into valid and invalid fragments, preserves valid assignments, and repairs only affected components through Prolog-based reasoning, reducing unnecessary recomputation and migrations after application or infrastructure changes.

EdgeWiseCR

DESIGNER, MAINTAINER

07/2025 – NOW

- **License:** MIT
- **Repository:** <https://github.com/di-unipi-socc/edgewise/tree/cr>
- *EdgeWiseCR* is a data-aware framework for placing multi-service applications in Cloud-Edge environments, combining declarative reasoning and MILP optimisation to minimise operational costs and data transfers. It extends *EdgeWise* with continuous reasoning, reusing existing placements to reduce recomputation and service migrations while preserving placement stability under dynamic infrastructure conditions.
- The software is described and/or used in: [J3]

ECLYPSE

DESIGNER, MAINTAINER

11/2024 – NOW

- **License:** MIT
- **Repository:** <https://github.com/eclipse-org/eclipse>
- *ECLYPSE* (Edge-Cloud pYthon Platform for Simulated runtime Environments) is a simulation library entirely written in Python for experimenting with deployment strategies under varying infrastructure conditions. It provides an interface to simulate deployments of service-based applications onto realistic infrastructures, both with and without an actual application implementation. It was also used in the European FREEDA project.
- The software is described and/or used in: [J4]

dgLBF

DESIGNER, MAINTAINER

06/2024 – NOW

- **License:** MIT
- **Repository:** <https://github.com/di-unipi-socc/dgLBF>
- The guaranteed Latency Based Forwarding (gLBF) approach features per-hop bounded delays to meet end-to-end latency requirements of data flows based on application needs. *dgLBF* introduces a Prolog-based specification of gLBF for path selection and delay configuration. The prototype determines paths and delays to meet latency targets, offering a concise and extensible solution.
- The software is described and/or used in: [J1, C4]

MultiDIPS

DESIGNER, MAINTAINER

10/2023 – NOW

- **License:** Apache-2.0
- **Repository:** <https://github.com/di-unipi-socc/MultiDIPS>
- *MultiDIPS* is a Prolog tool that extends DIPS to model and process multiple VNF-based service provisioning intents. It enables providers to specify high-level requirements such as service type, location constraints (e.g., edge deployment), Quality of Service (latency, bandwidth), and non-functional properties like privacy or logging. *MultiDIPS* leverages Prolog inference to translate multiple intents into consistent provisioning specifications.
- The software is described and/or used in: [C12]

EdgeWise

DESIGNER, MAINTAINER

09/2023 – NOW

- **License:** MIT
- **Repository:** <https://github.com/di-unipi-socc/edgewise>
- *EdgeWise* shows a declarative programming approach combined with a Mixed-Integer Linear Programming (MILP) formulation to identify eligible placements that minimise operational costs and reduce the number of nodes involved, limiting data transfers. After evaluating both approaches, *EdgeWise* reconciles them through a hybrid methodology that leverages declarative pre-processing to accelerate the MILP solver while computing optimal solutions.
- The software is described and/or used in: [C14]

DIPS

DESIGNER, MAINTAINER

07/2023 – NOW

- **License:** Apache-2.0
- **Repository:** <https://github.com/di-unipi-socc/dips>
- *DIPS* (Declarative Intent Provisioning System) is a Prolog tool that uses a declarative methodology for modelling and processing VNF-based service provisioning intents. It enables providers to specify high-level requirements such as service type, edge placement constraints, Quality of Service (latency, bandwidth), and non-functional properties like privacy or logging. *DIPS* leverages Prolog inference to translate intents into provisioning specifications.
- The software is described and/or used in: [C10, C15]

DA-Placer

DESIGNER, MAINTAINER

12/2022 – NOW

- **License:** MIT
- **Repository:** <https://github.com/di-unipi-socc/daplayer>
- *DA-Placer* proposes a declarative solution that accounts for both functional and non-functional aspects to determine service placements and SDN data routings that satisfy application requirements. The solution leverages a Prolog reasoner and continuous reasoning to speed up placement and routing decisions at runtime.
- The software is described and/or used in: [C16]

GiòSkill

DESIGNER, MAINTAINER

06/2019 – 12/2025

- **License:** MIT
- **Repository:** <https://github.com/di-unipi-socc/gio-ui>
- *GiòSkill* is a set of conversational interfaces for the Giò project's ambient-intelligence services, implemented as Alexa skills. It enables users to access information and navigation services through natural-language requests and to manage building functions, such as lighting and plant care.
- The software is described and/or used in: [T3]

GiòMap

DESIGNER, MAINTAINER

06/2019 – 12/2025

- **License:** MIT
- **Repository:** <https://github.com/di-unipi-socc/gio-ui>
- *GiòMap* is a web application with a REST API for interactive navigation within the Department of Computer Science. It models spaces and walkable paths, provides information about people and rooms, and computes indoor routes, also supporting the related conversational interfaces.
- The software is described and/or used in: [T3]

3. Teaching activities

3.1. JOINT TEACHING

Joint teaching for the following **university courses**:

A.Y. 25/26 (2 CFU, 20h) **Laboratorio 1**
B.Sc. in Informatica, Department of Computer Science, University of Pisa

3.2. TEACHING ASSISTANCE

Teaching assistance for the following **university courses**:

A.Y. 25/26 (20h) **Laboratorio 1**
B.Sc. in Computer Science, Department of Computer Science, University of Pisa

A.Y. 24/25 (20h) **Laboratorio 1**
B.Sc. in Computer Science, Department of Computer Science, University of Pisa

A.Y. 23/24 (20h) **Laboratorio 1**
B.Sc. in Computer Science, Department of Computer Science, University of Pisa

A.Y. 22/23 (20h) **Advanced Software Engineering**
M.Sc. in Computer Science, Department of Computer Science, University of Pisa

A.Y. 21/22 (20h) **Cloud & Green Computing**
B.Sc. in Computer Science, Department of Computer Science, University of Pisa

A.Y. 21/22 (20h) **Laboratorio 1**
B.Sc. in Computer Science, Department of Computer Science, University of Pisa

3.3. SUPERVISED THESES

B.Sc. THESES

Co-supervision of the following **bachelor's theses**:

03/2026 **Continuous Routing Repair in Software-Defined Networks** (*ongoing*)
Leonardo Signore, B.Sc. theses in Computer Science, University of Pisa

Supervisors: Stefano Forti, Jacopo Massa, Giulia Punzi

03/2026 **LLM per la traduzione neuro-simbolica di intenti in Prolog** (*ongoing*)
Niccolò Baicchi, B.Sc. theses in Computer Science, University of Pisa

Supervisors: Stefano Forti, Jacopo Massa, Federica Paganelli

02/2026 **Studio e valutazione di un sistema Mixture-of-Agents distribuito** (*ongoing*)
Giuseppe Acocella, B.Sc. theses in Computer Science, University of Pisa

Supervisors: Saul Urso, Jacopo Massa, Patrizio Dazzi

12/2025 **Traffico di rete a latenza garantita: un approccio dichiarativo e sostenibile**
Alessandro Mariani, B.Sc. theses in Computer Science, University of Pisa

Supervisors: Antonio Brogi, Patrizio Dazzi, Stefano Forti, Jacopo Massa, Federica Paganelli

10/2025 **Valutazione sperimentale di un approccio per il leasing di infrastrutture Cloud-Edge**
Andrea Caggiani, B.Sc. theses in Computer Science, University of Pisa

Supervisors: Stefano Forti, Antonio Brogi, Jacopo Massa

10/2023 **Intent-based networking e piazzamento sostenibile di catene VNF**
Tommasso Di Riccio, B.Sc. theses in Computer Science, University of Pisa

Supervisors: Antonio Brogi, Stefano Forti, Jacopo Massa

M.Sc. THESES

Co-supervision of the following **master's theses**:

- 12/2025** **ECLYPSE-NET: estensione di un simulatore Cloud-Edge con un modello di rete avanzato** (*ongoing*)
Davide Orsucci, M.Sc. theses in Computer Science, University of Pisa
Supervisors: Jacopo Massa, Stefano Forti, Patrizio Dazzi, Antonio Brogi

3.4. SEMINARS

Organisation and coordination of the following **series of seminars**:

How to exploit Intent-based Networking to manage your distributed networks

PISA, ITALY

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF PISA

06/12/2025 – 09/12/2025

- (12h) The candidate presented the Intent-Based Networking paradigm and methodologies for applying it to the management of distributed networks, from objective specification to network provisioning and control.

Simulation and Emulation frameworks for the Cloud-Edge continuum

PISA, ITALY

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF PISA

29/09/2025 – 30/09/2025

- (12h) The candidate presented approaches and tools for simulating and emulating the Cloud-Edge continuum, illustrating their use in the reproducible evaluation of management strategies.

Declarative management of distributed applications in Cloud-Edge scenarios

PISA, ITALY

DEPARTMENT OF COMPUTER SCIENCE, UNIVERSITY OF PISA

29/07/2025 – 30/07/2025

- (12h) The candidate presented declarative methods for managing distributed applications in Cloud-Edge scenarios, illustrating their use for resource placement and orchestration.

4. Other activities

4.1. SCIENTIFIC DISSEMINATION

DAYstributed

ORGANISER, SPEAKER

29/05/2025

- **Homepage:** <https://jacopo-massa.github.io/DAYstributed/>
- The candidate organised and participated as a speaker in DAYstributed, a half-day event on distributed/decentralized systems and related research topics. During the day there was a series of pitch talks, where each speaker had 5 minutes to present and start a discussion on their research topic.

Ph.D. Spotlight - From Study to Research

ORGANISER, SPEAKER

11/11/2024

- **Homepage:** <https://phdspotlight.di.unipi.it>
- The candidate organized and participated as a speaker in a poster session presenting doctoral research activities to Master's students, with the aim of providing new ideas for potential thesis topics and encouraging them to pursue an academic career through a PhD.

Robotica Educativa - Laboratorio di programmazione Python

TEACHER

25/05/2024

- **Homepage:** <https://roboticafestival.it/2024/laboratori-di-robotica-educativa-2024/>
- The candidate participated as a teacher in an educational robotics workshop using Python to program the e.Do robotic arm, strengthening technical skills, computational thinking, leadership, teamwork, and time management.

4.2. EDUCATIONAL GUIDANCE ACTIVITIES

Chi ha ucciso il Dr. Black? - Introduzione al linguaggio Prolog

GROSSETO, ITALY

EDUCATIONAL GUIDANCE EVENT "Informatica in Tour" – POLO MANETTI-PORCIATTI

15/04/2025

Presentation for high school students to introduce the logic programming language Prolog through an investigative case study.

L'Informatica dopo la Laurea: industria, accademia e ricerca

PISA, ITALY

EDUCATIONAL GUIDANCE EVENT "Incontra Informatica"

08/04/2025

Talk for secondary-school students presenting the paths available after completing a degree in Computer Science.

Declarative Cloud-IoT continuum: Gestire applicazioni, dati e reti con la programmazione logica

PISA, ITALY

EDUCATIONAL GUIDANCE EVENT "UniPi Orienta"

14/10/2023

Presentation for students interested in the University of Pisa Computer Science programmes. It describes declarative methodologies for managing applications, data, and networks in the Cloud-IoT continuum as an example of a research line pursued after graduation.

Assistenti Personali e Smart Building Applications

PISA, ITALY

EDUCATIONAL GUIDANCE EVENT "Incontra Informatica"

16/04/2021

Seminar on personal assistants and smart-building applications, with examples integrating user interfaces, sensors, and distributed services.

4.3. ACTIVITIES FOR THE DEPARTMENT OF COMPUTER SCIENCE

Representative of research fellows and contract researchers

PISA, ITALY

UNIVERSITY OF PISA

11/2025 – 10/2027

Representative of research fellows and contract researchers on the Department of Computer Science Council.

*The undersigned **Jacopo Massa**, born in San Giovanni Rotondo (FG) 71013, true 03/09/1997, residing in Pisa (PI) 56127 Via Ugo Foscolo 2E, aware that, pursuant to Article 76 of Italian Presidential Decree 445/2000, false declarations, falsification of documents, and use of false documents are punishable under the Italian Criminal Code and applicable special laws, declares under his own responsibility that the information reported in this curriculum vitae et studiorum, including information on scientific production, is true. I authorise the processing of the personal data contained in this curriculum pursuant to Article 13 of the GDPR 679/2016.*

Pisa , 31/08/2026

Jacopo Massa