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Ministero
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Italiadomani
PIANO NAZIONALE
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UNIVERSITÀ
DEGLI STUDI
DELL'AQUILA

UNIVERSITÀ DEGLI STUDI DELL'AQUILA

Amministrazione centrale

Area Ricerca e Trasferimento Tecnologico

Settore Dottorati, Assegni e Borse di Ricerca

D.R. Rep. n. 505/2023 - Prot. N. 49275 Attachments 2

of 10/05/2023

Year 2023 Tit. III Cl. 6 Fasc. 8

**Public Competition, based on qualifications and examinations, for admission to
Ph.D. Courses in Information and Communication Technologies – ICT - Cycle XXXIX
Academic Year 2023/2024
N. 2 Positions with grants funded by the European Union - NextGenerationEU
National Recovery and Resilience Plan
CN00000013 National Center “National Centre for HPC, Big Data and Quantum Computing”
Mission 4 – Component 2 – Investment 1.4 - CUP E13C2200100006**

THE RECTOR OF THE UNIVERSITY OF L'AQUILA

IN FORCE OF law n. 168, May 9, 1989, concerning the establishment of the “Ministero dell'Università e della Ricerca Scientifica e Tecnologica”;

IN FORCE OF law n. 476, August 13, 1984, establishing rules on university scholarships;

IN FORCE OF law n. 398, November 30, 1989, establishing rules on university scholarships;

IN FORCE OF article n. 4 of law n. 210, July 3, 1998, which provides that the universities, with their own regulation establish their Ph.D. schools;

IN FORCE OF article 19 of law n. 240, December 30, 2010;

IN FORCE OF article 47 of Decree-Law n. 77, May 31, 2021, converted into Law n. 108, July 29, 2021, entitled "Equal opportunity and labor inclusion in public contracts, the NRRP and the PNC;

IN FORCE OF D.P.C.M. of April 9, 2001 "Disposizioni per l'uniformità del trattamento sul diritto agli studi universitari" according to article n. 4 of law n. 390, December 2, 1991;

PURSUANT TO DD. MM. 509/1999 e 270/2004 which provides rules about the didactic autonomy of Universities;

PURSUANT TO D.M. n. 226 of December 14, 2021 “Regolamento recante modalità di accreditamento delle sedi e dei corsi di dottorato e criteri per la istituzione dei corsi di dottorato da parte degli enti accreditati”;

PURSUANT TO D.M. n. 247 of February 23, 2022 which restated the gross annual amount of Ph.D. scholarships;

PURSUANT TO the rules for the admission of foreign students to the university course published on MUR website;

PURSUANT TO the Regulation of the Ph.D. Schools of the University of L'Aquila, renewed by Rectoral Decree n. 787/2022 of 2022, June 1st;

HAVING REGARD TO Ethical Code of University of L'Aquila issued by D.R. n. 1777/2022 of 2022, December 30th;

HAVING REGARD TO the note received from Prof. Massimo Tivoli, supervisor of Spoke 9 dedicated to “Digital Society & Smart Cities” of the Research Programme CN00000013 “National Centre for HPC, Big Data and Quantum Computing”, acquired as prot. n. 33854 of 15/03/2023, with which he asks to call a new public competition, for the assignment of 2 positions with scholarship for the Ph.D. Course in Information and communication technologies;



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HAVING AKNOWLEDGE that the 2 positions are entirely funded by the National Center, as established by the Directorial Decree n. 1031 of 2022, June 17th, in particular they are funded by PNRR MUR resources – M4C2 – Investment 1.4 – Advise “National Center”;

HAVING REGARD TO the minutes of the Academic Senate meeting of 27/03/2023;

HAVING REGARD TO the minutes of the Board of Administration meeting of 27/03/2023;

CONSIDERED the advisability of issuing the Announcement of Competition for admission to the Ph.D. course in Information and communication technologies - XXXIX cycle - A.A. 2023/2024 - pending the accreditation of the aforementioned course by the MUR;

HEREBY DECREES

ART. 1

Public selection

1. Public competition procedure based on qualifications and examinations for admission to the Ph.D. Courses in Information and communication technologies – XXXIX cycle – Academic Year 2023/2024 in connection with Spoke 9 dedicated to “Digital Society & Smart Cities” of the Research Programme CN00000013 “National Centre for HPC, Big Data and Quantum Computing” which provides 2 positions funded by the European Union – Next GenerationEU – National Recovery and Resilience Plan, Mission 4 – Component 2 – Investment 1.4 - CUP E13C22001000006

The courses’ duration is three years and the activities will start by 1st September 2023.

2. Winners will be expected to conduct research activities within the scope of the HPC project.

3. The form attached to this announcement and which are an integral part of it, indicate the positions and the scholarships available, the curriculum, the research topics, the methods and criteria for selecting candidates, the dates for the examinations.

ART. 2

Requirements for Access

1. Those who, at the expiry of the deadline for submitting the application for admission, are in possession of one of the following qualifications can participate in the selection, without age or citizenship restrictions:

a) master's or specialist degree;

b) degree from the system prior to the Ministerial Decree n. 509/1999 (old system);

c) second level academic qualification issued by institutions belonging to the AFAM (Higher Artistic and Musical Education) sector;

d) qualification obtained abroad, recognized as equivalent to the aforementioned second level academic qualifications.

The academic qualification held by the candidate must refer to a course with a duration of at least 4 years and must allow the access to a Ph.D. course in the country in which it was awarded.

Candidates holding a foreign Degree who have not yet obtained certified equivalency required for the admission to the Ph.D. course, must include the following documents in their application (necessary for the Examination Commission to evaluate the Degree as conforming to requirements):

- a copy of the Degree certifications obtained (Bachelor e Master Degree), with a transcript of records of the exams taken and an Italian or English translation provided by the applicant under his/her responsibility;

- any other documentation deemed useful for the qualification assessment by the Examination Committee (Diploma Supplement, Diploma translated and legalized by the competent Italian Diplomatic Authorities located on the Country where the Diploma has been achieved, Declaration of value, etc...).



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Eligibility of the qualification will be verified by the Examination Committee and will only be granted for the sole purpose of admission to the chosen Ph.D. course.

2. Candidates who, on the expiry date of this announcement, do not possess the requisites referred to in paragraph 1, will be admitted to the selection with reserve. The qualification required for access to PhD courses must be achieved by the completion date of the enrollment.

ART. 3

Applications, terms and conditions

1. The application form may only be submitted using the dedicated online procedure, available at:

<https://pica.cineca.it/univaq/centronazionalecottict39>

Applications must be submitted starting from 11 a.m. (CEST) of May 10, 2023 and no later than 1 p.m. (CEST) of June 15, 2023.

The application must be signed.

The absence of the signature, or of the handwritten signature, implicates the exclusion from the public competition.

There are 3 methodologies to sign it and the candidate must select one of them and read carefully they directions.

- **By digital signature using smart card, USB token or remote signature** which allow the owner to sign general documents by means of a signature software or a Remote Signature web portal made available by the Auditor. Those who have a Digital Signature smart card or USB token shall verify that they are compatible with the Digital Signature system integrated in the system server. If so, the owner may sign the application directly in the system server (e.g. ConFirma);

- **Those who do not have compatible digital signature devices and the Remote Digital Signature Owners who may access a web portal for signing general documents** shall save in their own PC the .pdf file generated by the system and, without modifying it, digitally sign it in CADES format. A .p7m file will be generated, which shall be saved and uploaded again in the system. Any editing to the file before signing with the Digital Signature shall interfere with the automatic check of correspondence between the content of such a document and the original, and this will bring to the application exclusion;

- **If none of the above-mentioned options can be used** candidates shall save in their own PC the .pdf file generated by the system and, without modifying it, print and sign it with full original signature in the last page of the printed document. A scanned .pdf copy of such a document shall be produced and the file thus obtained shall be uploaded to the system.

In case the access to the platform is via SPID, it is not necessary to sign the application with one of the aforementioned methods.

2. When filling the application, candidates must:

- select the chosen Ph.D. course;
- select the curriculum;
- select "ordinary place whit scholarships";
- select one or both the research topic for scholarships;
- attach the qualifications required and indicated in the form of the Ph.D. course and a photocopy of the identity document.

The lack of a photocopy of the identity document is cause for exclusion from the selection.

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All documentation must be attached in pdf format.

For all legal purposes, the application is to be considered as a self-certification of the data included therein, in accordance with articles 46 and 47 of Italian Presidential Decree no. 445/2000 and subsequent amendments.

3. The application is automatically sent to the University when the online procedure has finally been completed. Therefore, no paperwork needs to be delivered or sent to the University's offices.

4. Each candidate should request one or more letters of reference. The compiling advise will be sent to the referee only after final closing of application.

The referee will be automatically advised by the system and he/she must compile the reference letter and send it through the online procedure within **no later than 1 p.m. of June 22, 2023.**

Reference letters attached by the candidate will not be taken into consideration.

5. Candidates are invited to complete applications for the selection process well in advance of the closing date specified in this call.

Candidates are responsible for verifying that the procedure is completed correctly. No complaints will be accepted for any malfunctioning of the IT system due to overload experienced by candidates near the closing date.

After the deadline of the call it will no longer be possible to change the application for participation.

In force of Italian Law no. 104/1992, as amended by Italian Law no. 17/1999, disabled candidates may request an individual examination (with the use of aids, any additional time required, etc.) to complete the required entry examinations.

This request should be done by following the instructions available in the online procedure for application.

According to the art. 15 of Law 183/2011 and following the interpretation done by the Directive of the Presidency of the Council of Ministers, signed by the Minister of Public Administration and Simplification, n. 61547 of 22/12/2011, the University can't accept certifications issued by other Public Administrations.

Therefore, if the titles declared by candidates and attached to the application for admission to the competition, have been issued by Italian public universities, they must only be self-certified.

Following the rules on self-certification, the University will verify the veracity of the self-certification, pursuant to the Consolidated Law on Finance. 445/2000.

ART. 4 Examinations

1. The examination procedures and the dates of the exams are indicated in the form attached to this announcement, as per art. 1, co. 2 of this call.

The date of the oral exam, indicated in the forms attached to this announcement, is to be regarded as official legally binding calls.

Candidates will therefore not receive any other sort of call or summons by the University as to the exams prescribed for the Ph.D. Course they have applied for.

The candidate does not have to be present during qualification assessment procedures.

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Any changes in dates and times will be made public on the University website.

The candidate who is not present at the time and place indicated for the examination will automatically be excluded from the competition.

2. The oral exams will be held by following the modality specified in the form attached to this announcement.

The electronically oral exam will be held by using web teleconferencing (e.g. Microsoft Teams, Skype). The candidate is required to provide contact information in their application and guarantee the use of a webcam to allow the Examination Committee to verify the candidate's identity.

The oral exam can be held in English.

For candidates who have selected both grants in their application form, furthermore, during the interview, the Commission Board will assess the suitability of the candidate in relation to both research topics of the scholarships.

ART. 5
Examination Committee and competition rules

1. The Examinations Committee are appointed by the Rector through a specific decree and are composed by a minimum of three to a maximum of five members among professors and assistant professors. At least one of the members must be full Professor or an associate Professor.

Having regard to Italian Law about "Equal Opportunities for Men and Women" and specifically to Art. 57 of the Leg. Decree n. 165, 30 March 2001, at least one third of the Examination Board must be women, except impossibility to be demonstrated when the Board proposal is made. In any case the gender balance must be respected: each gender must be represented at least by one third of components.

Having regard to Art. 35 bis of the Leg. Decree n. 165, 30 March 2001, Individuals condemned for crimes – even if not yet sentenced – in Book II of the Italian Penal Code ("crimes by civil servants against public administration") cannot be nominated as members of the Examining Board.

Teachers who have issued letters of reference to candidates cannot be part of the exam boards.

2. The Commission can carry out the preliminary meeting and the meeting relating to the evaluation of the candidates' qualifications electronically. Insofar as they are compatible, the rules of the University Regulations on the subject are guided (D.R. 319/2020 of 17/03/2020 and subsequent supplements and amendments).

3. The Examinations Committee have 100 points for the evaluation of each candidate.

The results of the assessment of the qualifications will be published on the web site of the University <https://www.univaq.it/section.php?id=2207> and on the website of the Department.

At the end of the sessions, the Examinations Committee draw up the list of the interviewed applicants with the obtained scores.

This list, signed by the President and by the secretary of the Examination Committee will be published on the web site of the Department at which the test was conducted, on the same day of the oral examination.



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ART. 6 Ranking

1. Once all the interviews have been completed the Examinations Committee draw up two final ranking lists, one for each research topic, according to the sums of the obtained scores.
In case of equality, gender balance is taken into account, for which prevails the gender that, among the candidates placed higher in the same ranking, is in the minority. In case of further equality, the Ph.D. position will be conferred to the younger candidate.

The University Administration makes this list public by publishing it on the official notice board of the University <https://www.univaq.it/section.php?id=1391> and on the University web site https://www.univaq.it/en/section.php?id=2207&lang_s=en, once the validity of the examination procedure has been checked.

The applicants will obtain a Ph.D. position according to their position on the ranking list.

ART. 7 Enrolment in Ph.D. Courses

1. Successful candidates must submit their enrolment through the University of L'Aquila official website <https://www.univaq.it/section.php?id=2207> within 15 days from online publication of selection results.
No information will be sent to the candidate's home. Candidates granted admission to the Courses are responsible for checking enrolment dates and procedures.

Failure to enroll by the deadline will be considered as drop out and the place will subsequently be assigned to the next candidate according to the ranking.

The enrolment forms, available on the University website, duly signed, must be delivered to the "Settore Dottorati, Assegni e Borse di Ricerca", within the deadline foreseen for the enrolment. The documents can be delivered in one of the following ways:

- by certified e-mail (PEC) addressed to protocollo@pec.univaq.it.
The certified e-mail account used must be the candidate's personal account. **The administration shall not accept documents from candidates using certified e-mail accounts belonging to other individuals or to institutions.** The University Administration declines all responsibility for any non-deliveries or mis deliveries of the documents sent via PEC or in case the documents attached to it are non-readable or damaged.
The date of submission will be indicated on the receipt sent automatically by the PEC system.
- by mail addressed to concorso.dottorati@univaq.it. All documentation must be attached in pdf format.

The documents to submit compulsory are the followings:

- a) Enrolment form;
- b) Self-Declaration in substitution of certification and Self-Declaration in substitution of attested affidavit in accordance with articles 46 and 47 of the Presidential Decree – 28th December, 2000, n.-445 (using the forms available on the University website <https://www.univaq.it/section.php?id=684>);
- c) a copy of an identity document;
- d) a photocopy of the candidate's fiscal-code number;
- e) a photocopy of the candidate's "Italian-residency permit" (permesso di soggiorno) – only for non-EU citizens;
- f) self-declaration to obtain the scholarship for the Ph.D. course they have earned admission to;
- g) scholarship accreditation form.



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Within 15 days from the start of the Ph.D. Course, candidates who have been conferred a scholarship must send by mail a photocopy of a receipt from the INPS (national social security service), certifying that they have been registered in “Posizione contributiva alla gestione separata” (for information visit the INPS web-site at www.inps.it).

Foreign citizens must declare possessing the following requisites:

1. that they benefit from civil rights and right to vote in their country;
2. that, aside from Italian citizenship, they possess all other requisites required for citizens of the Italian Republic.

Applicants holding a university Degree awarded abroad must enclose, also, the following documents, translated and certified by competent Italian Diplomatic Authorities:

- copy of their university degree indicating their final mark;
- degree transcripts indicating the exams taken during their course and marks awarded.

Alternatively, the winner may present the certificate of comparability issued by CIMEA as part of the agreement stipulated with the University of L'Aquila (<https://www.cimea.it/pagina-attestatati-di-comparabilita-e-verification-of-qualifications>).

For the registration, please enter the service *Diplome*, via the following link <https://cimea.diplome.eu/univaq/#/auth/login>.

If the above documentation is not available at the time of enrolment, the candidate's enrolment shall be deemed “subject to verification”. In this case all abovementioned compulsory documentation must be consigned by and no later than the **December 20, 2023, failure to do so will result in expulsion from the course**.

False declarations shall lead to the candidate's expulsion from the Ph.D. course and to prescribe sanctions for such offenses, vacant positions will be assigned to other candidates according to the ranking list.

2. Successful candidates who do not want to enroll in the course they have been selected for, must immediately send a signed letter of renouncement enclosing a photocopy (front-back) of their identity card.

If one winner does not accept the place, the Ph.D. Office will proceed down the ranked list and the following candidate, who has the right to be enrolled, will receive a communication to the e-mail address indicated on the application for participation in the competition. This e-mail has full notification value. Candidates selected as replacements must write a letter of acceptance within **three days** of the aforementioned e-mail. All **other necessary documents** indicated in this announcement must be consigned within, and no later than, **ten days after receiving the notification**.

Failure to enroll by the deadline indicated is equivalent to tacit renunciation.

ART. 8

Public Employee

Public employees admitted to Ph.D. course must ask the Administration to which they belong, to be placed on extraordinary leave for study purposes without paychecks for the duration of the course.

Public employees who does not obtain the aforementioned extraordinary leave without paychecks from the Administration to which they belong, will not be able to enroll or continue the PhD Course.

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Public employees who have already obtained the title of PhD, nor public employees who have been enrolled in PhD courses for at least one academic year, benefiting from this leave, are not entitled to extraordinary leave, with or without paychecks.

ART. 9

Grants – Scholarships

1. A Ph.D. gross grant consists of € 16.243,00 which includes health and social security taxes that, on 2023, amounts to 35,030%, but only 11,677% is paid by the beneficiary.

From the first year of each Ph.D. course, for each PhD student a research budget, not less than 10% of the total sum of the grant conferred, will also be available for research activity in Italy or abroad.

Grants are yearly provided and are renewed on the condition that the Ph.D. student has completed all programmed activities for the course during the previous year.

A Ph.D. scholarship cannot be cumulated with other grants except for those provided by national or foreign institutions which are aimed at integrating the Ph.D. student's research activity with periods abroad.

The payment of the scholarship is done by monthly installment.

Candidates who have already benefited from other Ph.D. study grants in Italy (even if only for one year) are not eligible to receive another grant.

If a Ph.D. student does not respect what is indicated in article 15 paragraph 6 of Ph.D. regulations, his/her scholarship will be stopped.

ART. 10

Attendance Abroad

Ph.D. students can carry out training periods abroad in qualified institutions. Such training or study periods abroad cannot be longer than 12 months and can be allowed in case they are foreseen by:

- a. The study program of the Ph.D. course;
- b. Upon advice of the course coordinator or board;
- c. Upon request made by the Ph.D. student.

The period of study abroad can be extended until 18 months at maximum only for the PhD in co-tutorship with foreign bodies.

Ph.D. students are entitled to an increase in the scholarship up to a maximum of 50% for the aforementioned training periods abroad.

Before going abroad, the following documents must be sent to the above mentioned Ph.D. office by the Coordinator:

- signed authorization by the course Coordinator for training/study periods abroad of 6 months or less
- or
- board resolution allowing a period of over 6 months.

Upon returning to Italy of the Ph.D. student or at the end of individual periods and in any case not less than one month, the Ph.D. Coordinator shall present to Ph.D. Office the certification about study periods abroad and shall request the liquidation of the amount corresponding to the scholarship increase.

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The financial coverage of the training periods abroad, for a maximum of 50% of the monthly scholarship, is entirely up to the Research program CN00000013 "National Centre for HPC, Big Data and Quantum Computing", under the PNRR – M4C2 – Investment 1.4 – Advise “National Centers”.

ART. 11

Tuition Fees

All Ph.D. students are exempted from tuition payments. All Ph.D. students must only pay € 156,00; the Regional tax (€ 140,00) and a duty stamp “marca da bollo” (€ 16,00).

Late payment will result in a € 52.00 fine.

ART. 12

Rights and Duties

1. Ph.D. students are obliged to attend lessons and carry out all prescribed activities regularly in accordance with the programs and schedules set by the Board of Professors.
2. The University provides insurance coverage for the entire duration of the Ph.D. course and for activities pertaining to the course.
3. Compatible employment activities shall be allowed for brief periods, following authorization from the Board of Professors, after hearing the favorable opinion of the supervisor, as long as such commitments do not pose any sort of conflict with the activities required within the Ph.D. course.
4. Interruptions in attendance shall be allowed for:
 - Illness or injury for periods of 30 days or more;
 - Military or civil service;
 - Training courses for teacher certification.

Interruption may also be agreed for substantiated serious personal reasons after having received a positive opinion of the Board of Professors. Discontinuation does not last longer than six months one year according to the total course length. Ph.D. students benefitting of interruption period must recover the entire time with consequent test delay for the move to following year and for the awarding of title.

5. Maternity/paternity leave and leave for adoption or foster care may also be authorized. Maternity-leave laws and regulations as indicated in Gazzetta Ufficiale n. 247 of 23rd October, 2007 shall be applied.

6. A Ph.D. student's unexcused absence or non-fulfillment of obligations shall result in his/her exclusion from the course by the Board of Professors. In this case the expelled Ph.D. student shall be liable for the sum of the scholarship conferred or for tuition fees.

7. Ph.D. students enrolled at the University of L'Aquila may carry out limited teaching or tutoring activities within the University's Bachelor and Master-level degree courses if so established and programmed by the Board of Professors in agreement with the University Department.

8. Ph.D. students must preserve the confidentiality in information, knowing and materials. They must not disclose beyond subject different by the ones that gave to them.

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ART. 13 Graduation

Students can write their Ph.D. thesis in Italian or in English, an abstract in English must also be provided. Students wishing to write their thesis in a language different from Italian or English must receive authorization from the Board of Professors.

The evaluation committee for Ph.D. thesis discussion will be appointed according to the Ph.D. Regulations of the University.

A Doctoral Degree title (Dott. Ric. or Ph.D.) will be awarded following a positive assessment of the Ph.D. thesis, taking into account the achieved results.

ART. 14 Head of the Competition Procedure

According to art. 5 of law 07/08/1990, n. 241, the Head of the Settore Dottorati, Assegni e Borse di ricerca of the University of L'Aquila (Piazza Santa Margherita, 2 – Palazzo Camponeschi - L'Aquila) shall be responsible for the competition procedure.

ART. 15 Legal Reference

For all other matters not foreseen or included in this announcement we shall refer to Law n. 210 of 03/07/98, Law n. 240 of 30/12/2010, Ministerial Decree 226/2021 and to the “Regolamento dei corsi di Dottorato di Ricerca” (Ph.D. regulations) of this University.

This announcement is available at: https://www.univaq.it/section.php?id=2207&lang_s=en

Further information may be requested through HELP POINT ONLINE, accessible from the website <https://help.univaq.it/>.

L'Aquila 09/05/2023

The Rector of the University of L'Aquila
Signed Prof. Edoardo Alesse



Ph.D. Course in INFORMATION AND COMMUNICATION TECHNOLOGIES – ICT	
Ordinary places full grant	2
Start of activity	1 st september 2023
Grant/Fellowship Funding source	2 grants financed by the research program CN00000013 National Center "National Centre for HPC, Big Data and Quantum Computing", in the framework of PNRR – M4C2 – Investment 1.4 - CUP E13C22001000006.
Grants subject	<ol style="list-style-type: none"> 1. Automated composition and coordination of (micro)services in smart scenarios; 2. On the use of Machine Learning for the discovery and rapid execution of QoS-aware microservices.
Description of the research	<p>1. Service-oriented Architectures (SOA) established since years as the main approach for building large-scale distributed systems by composing software services in a loosely coupled fashion. In SOA, services can be reused and composed as black-box entities that interact over the network through a standardized interaction protocol. In recent years, a further advancement of SOA consisted of microservice architectures. By leveraging on the main principles of SOA, microservices are built through the composition of fine-grained, loosely coupled, and autonomous services that are organized around a specific business capability, can be independently deployed, and communicate through lightweight protocols.</p> <p>Microservices are beneficial in terms of scalability, flexibility, and resilience, allowing for more efficient use of resources and infrastructure and better support for continuous integration and delivery. These benefits are particularly desired for complex smart scenarios, notably Smart Cities, requiring flexible architectures to satisfy new functional and non-functional situational requirements that come into being and constantly evolve according to the many different surrounding contexts and environments. There is also the necessity of scaling up the offered services to handle the increasingly number of connected devices and users. In order to take advantage of the distinctive attributes and characteristics of microservices, companies are migrating their legacy monolithic services to microservices. Although, in principle, the microservices resulting from the migration are independent from each other and can be independently deployed on physically distributed machines, they must work together to offer the desired functional behavior. Specifically, an extremely challenging and complex problem is to ensure that the behavior emerging from the distributed interaction of the microservices is equivalent to that of original monolith system by avoiding not only deadlocking behavior, but also extra behavior, which is undesired with respect to the original monolith.</p> <p>To this end, the purpose of this research will be to devise novel techniques to automatically (i) detect both deadlocking interactions and extra behavior, and (ii) synthesize the distributed and correct logic to avoid deadlocks and force desired interactions only.</p> <p>2. Microservice architectures have gained enormous popularity over the last decade due to their ability to distribute application logic into independent services, which can be dynamically added/removed, replicated, and updated according to specific run-time needs. In this context, service discovery plays a pivotal role as it allows services to dynamically discover and communicate with each other. However, the dynamic nature of microservices introduces uncertainty, which in turn can affect the provided Quality of Service (QoS). This calls for novel service discovery mechanisms able to self-adapt to the variability of the QoS attributes and further perform effective service discovery and selection.</p> <p>To this end, the purpose of this research will be to combine self-adaptive and machine-learning techniques to perform service discovery and selection by trading off different QoS attributes.</p>
Project Manager	Prof. Massimo Tivoli <i>massimo.tivoli@univaq.it</i>
Duration	3 years
Curricula	<ol style="list-style-type: none"> a) System Engineering, Telecommunications and HW/SW platforms b) Emerging computing models: algorithms, software architectures and intelligent systems



University Department Responsible for the Ph.D. Course	Department of Information Engineering, Computer Science and Mathematics
Ph.D. Course Website	http://phdict.disim.univaq.it/
Ph.D. Course Coordinator	Prof. Vittorio Cortellessa vittorio.cortellessa@univaq.it
Admission Pre-requisites	All Master-level Degrees or foreign degrees with certified equivalency or recognized as equivalent to the aforementioned qualifications. Within the deadline indicated in this call for applications, candidates who are expected to obtain the abovementioned Degrees by no later than the enrollment may also apply.
Admission Procedure	Qualification assessment and Oral exam. The electronically oral exams will be held by using web teleconferencing (e.g. Microsoft Teams, Skype). For this purpose, each candidate has to enter his/her own electronic contact while filling in the application format. The testing commission will certify the identity of the candidate, to this end the candidate shall be required to show a valid identification document with recent photo, during the oral exam. Foreign applicants may sit the oral exam in English.
Examination topics	During the oral exam, the commission will focus on the following aspects: candidates' qualifications and his/her knowledge ICT basic topics, especially the topics characterizing the curricula of the abovementioned Ph.D. course, personal motivation, scientific interests and attitude to research activity; candidates' qualifications and his/her knowledge regarding the specifics topics of the call as stated in the research description.
How to apply	The application must be submitted only via the online procedure available at: https://pica.cineca.it/univaq/centronazionaledotict39 . The documents must be attached in pdf format. The application and the attached documents are submitted automatically by closing the online procedure. So, no hard copy of the application and of the documents must be sent to the office.
Documents to be annexed to the Application	<ol style="list-style-type: none"> 1. CV 2. Candidates holding a degree from an Italian university must provide: <ul style="list-style-type: none"> - Self-certification concerning their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; - Self-certification concerning their Master-level Degree course indicating final mark and list of exams taken and marks obtained. 3. Candidates enrolled in an Italian Degree Course must include: <ul style="list-style-type: none"> - Self-certification of their Bachelor-level Degree indicating final mark and list of exams taken and marks obtained; - Self-certification of the exams so far taken in their Master-level Degree course indicating marks obtained. 4. Applicants with foreign Degrees and those who still have to award the Degree, must follow the directions explained in article n. 2 of this call. 5. Each candidate must enter the name and the e-mail address of one or two referee. The referee will be automatically advised by the system and he/she must compile the reference letter following the received instructions. 6. Summary, max. 2 pages (font size minimum 10), of the candidate's Degree thesis. 7. Summary, max 2 pages (font size minimum 10), of the candidate research project that he/she wants to develop during the Ph.D. Course. 8. Any publications and research projects in which the candidate has participated that are deemed useful for evaluation purposes. 9. Any additional qualifications deemed useful for the assessment.
Language(s)	Assessment of foreign language skills English language skills and competence shall be assessed during the oral exam. Admission The candidate may sit exams in ITALIAN or ENGLISH
Exam Schedule	Qualification assessment: July 3, 2023 at 10:00 a.m.



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	<u>Oral exam:</u> July 10, 2023 at 10:00 a.m. - electronically.
Assessment Criteria	<p>The examination procedure consists in two phases: qualification assessment and oral exam. Final score shall be indicated out of a total of 100 points attributed as follows:</p> <ol style="list-style-type: none">1. Qualification assessment: Max. 50 points attributed through the evaluation of CV, presentation letters, publications and additional qualifications. Minimum score is 30/100.2. Oral exam: max. 50 points. During the oral exam, each candidate has to present and defense the thesis and the research project. The oral exam aims to assess the applicant's motivation and aptitude for scientific research, his/her experience within the research sector and general knowledge. The oral exam will also include assessment of the candidate's English language skills in the scientific field.
Title evaluation results publication	Title evaluation results shall be published on the University website https://www.univaq.it/en/section.php?id=2207&lang_s=en and on Department website: http://www.disim.univaq.it .



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Technical guidelines for the submission of the application form for Ph.D. Course in Information and Communication Technologies – ICT

XXXIX cycle

**Online application opens from May 10, 2023 at 11 a.m.
until June 15, 2023 at 1.00 p.m. CEST**

Online form available at: <https://pica.cineca.it/univaq/centronazionalecottict39>

1. The application form must only be submitted online. No hard copy of the application must be sent by post.
2. Before filling in the application form, please read carefully the selection announcement, in particular the chosen PhD course table in order to verify the eligibility criteria and the documents to be submitted.
3. WATCH OUT: ALL DOCUMENTS MUST BE UPLOADED IN PDF FORMAT AND, IN SOME CASES, THEY MUST BE PRINTED, SIGNED AND UPLOADED. WE ADVISE APPLICANTS TO USE A PC CONNECTED WITH A PRINTER AND A SCANNER.
4. It is possible to fill in the application form by logging in at different times and saving the data. In order to access the application form that has been partly completed you must click on Modify to complete it.
5. Further information may be requested through HELP POINT ONLINE, accessible from the website <https://help.univaq.it/>.
6. For technical problems contact support via the link at the bottom of the page <https://pica.cineca.it/univaq>.
7. Applicants with foreign qualifications that have not been legally recognized as equivalent to Italian degrees must read art. 2 of the selection announcement and upload the required documents in the relevant section of the online application.
8. After the application has been correctly filled in and submitted, applicants will receive an email with the confirmation of the submission.

1. DATA REGISTRATION

To start the registration go to the website <https://pica.cineca.it/login>

Access can be done via SPID. In the absence of SPID, at the first access applicants need to register by clicking on 'Register' and fill in the required data. If applicants already have LOGINMIUR credentials, they don't need to register again. They must access with their LOGINMIUR username and password in the relevant field LOGINMIUR.

In case you forgot username and password, click on 'Forgot your credentials?'

After completing the data, click on 'New Registration'. Applicants will receive an email with the data to confirm their registration. In case you don't receive or cannot read the email, contact support via the link at the bottom of the page <https://pica.cineca.it/univaq>.

2. APPLICATION FORM ACCESS

Once registered it is possible to access the website <https://pica.cineca.it/univaq/centronazionalecottict39> and login with username and password to fill in the application form by clicking on 'New Submission'. Before filling in the application form, applicants can modify their personal data by clicking on the top right button (User Profile) and select what to modify.

The first section to be filled in is "PHD COURSE", the applicant must select:

- the PhD course;
- the curriculum;
- the "ordinary place with scholarship"
- one or both the themed scholarships.

WATCH OUT: after completing each section of the form, the applicant must click on the button "SAVE AND PROCEED". Only if the data have been correctly filled in, the applicant can go to the next section. Otherwise error messages will display and will be compulsory to correct the data.

The section named "DECLARATIONS" display a list of declarations concerning the veracity of data inserted and the treatment of the personal data inserted in the application form.

The third section to be filled is "PERSONAL DATA". This section is partially filled by transferring data from the registration procedure thus the candidate must complete the missing items. In case of mistakes in personal data, applicants can modify them by clicking on the top right button (User Profile).

In the following section "Admission requirements" applicants must select one out of the four options proposed. After that applicants must specify the qualification awarded or to be awarded by the completion date of the enrollment.

In the following section "FURTHER DECLARATIONS" the applicants must compulsory declare the level of knowledge of English language and if they are in situations preventing the receiving of the scholarship and/or of special needs.

In the section named "ATTACHMENTS" the applicant can upload the identity card (or passport) and all the qualifications and certifications required in order to participate to the selection of the chosen Ph.D. course. The applicant can write a self-declaration about the degree obtained and about all the exams passed. The self-declaration concerning the degrees obtained, can be written in a simple paper according to the scheme available below, or downloading the concerned form if it is available on the website of the home University. The applicant must read carefully the list of documents required for the Ph.D. course chosen, in order to speed up the procedure.

ATTENTION: in this section you must upload the documents requested for the recognition of the foreign academic degree (art. 2 of the selection announcement - Admission of applicants with foreign (non-Italian) qualifications).

The files must be in pdf format and readable. For each file a brief description is needed.

After completing this section applicants will be redirected to the dashboard where they can see the draft of their application form. By pressing the bottom "Sign and submit" the process is finalised. If the application has been filled in correctly the system displays the PDF file of the application. In case of mistakes applicants receive an error message and the application must be corrected. Once all the mistakes are corrected the applicant can go to the next section for the submission. By clicking on "Sign" bottom the process is finalise and the PDF file of application is generated.

The application must be signed. The absence of the signature, or of the handwritten signature, implicates the exclusion from the public competition.



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There are 3 methodologies to sign it and the candidate must select one of them and read carefully they directions.

According to article 3 of the call the possible methodologies are the following:

- By digital signature using smart card, USB token or remote signature which allow the owner to sign general documents by means of a signature software or a Remote Signature web portal made available by the Auditor. Those who have a Digital Signature smart card or USB token shall verify that they are compatible with the Digital Signature system integrated in the system server. If so, the owner may sign the application directly in the system server (e.g. ConFirma);
- Those who do not have compatible digital signature devices and the Remote Digital Signature Owners who may access a web portal for signing general documents shall save in their own PC the .pdf file generated by the system and, without modifying it, digitally sign it in CADES format. A .p7m file will be generated, which shall be saved and uploaded again in the system. Any editing to the file before signing with the Digital Signature shall interfere with the automatic check of correspondence between the content of such a document and the original, and this will bring to the application exclusion;
- If none of the above-mentioned options can be used candidates shall save in their own PC the .pdf file generated by the system and, without modifying it, print and sign it with full original signature in the last page of the printed document. A scanned .pdf copy of such a document shall be produced and the file thus obtained shall be uploaded to the system.

In case the access to the platform is via SPID, it is not necessary to sign the application with one of the aforementioned methods.

In case the applicant decides to sign the PDF file he/she must verify that the file that is going to be upload is complete because the system accept only one PDF file.

After the submission applicants will receive an email with the confirmation of the submission. Applicants will always be able to login to their account, personal data and application form.

3. REFERENCE LETTERS

After submitting the application, the applicant must indicate the names and addresses of a maximum of two referees. The applicant must write in the form the official email address of the referee. A private email address is not allowed.

The referee will be informed of the candidates requirement and receive a reference letter form that he/she must submit **by June 22, 2023 at 1 o'clock p.m. CEST.**

We advise applicants to inform referees that they will receive the request. When the referee fills in the letter and submits it, the applicant will receive an email specifying that the letter has been upload. Applicants, however, can always check the status of the request. Reference letters uploaded by applicants or sent by the referent directly to the university, will not be taken into consideration.

If applicants wish to change the referee they must contact support via the link at the bottom of the page <https://pica.cineca.it/univaq>.

4. APPLICATION FORM MODIFICATION OR WITHDRAWAL

Modifications of the application form after the pdf has been created are possible:



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- If they have submitted the application form and received the email of confirmation applicants cannot modify the application form but they will be able to withdraw it following the relevant procedure available on the dashboard and submit a new application form.
- If they have created the pdf file but they have not completed the submission (the pdf file has not been uploaded yet and so they haven't received the email of confirmation) then they must contact support via the link at the bottom of the page <https://pica.cineca.it/univag> and ask to have the application re-opened. In the email they must specify the reason of their request, the ID of their application form and attach copy of their identity document.



**Self-Declaration in substitution of certification
(art. 46 D.P.R – 28th December 2000, n.445)**

and/or

**Self-Declaration in substitution of attested affidavit
(art. 47 D.P.R 28th December, 2000 n.445)**

The undersigned _____ born in (place of birth) _____ on (date of birth) _____

residing in (city/State/Country) _____ Postal code _____
at (address) _____

DECLARES:

1) in compliance to art(s). 46,47 and 38, D.P.R 28/12/2000, n.445 that he/she has been conferred the following Degree:

Bachelor-level Degree in (title) _____ at (name of University or College issuing the Degree) _____ on (date issued) _____, mark _____

and that he/she passed the following exams:

EXAM (title of the exam/course)	MARK	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

2) in compliance to art(s). 46,47 and 38, D.P.R 28/12/2000, n.445 that he/she will be confer the following Degree:

Master-level Degree in (title) _____ at (name of University or College issuing the Degree) _____ on (date issued) _____,

and that he/she passed at today the following exams:

EXAM (title of the exam/course)	MARK	DATE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____



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The undersigned declares that he/she is aware of the sanctions applied in case of false statements established in art.76 D.P.R. 28/12/2014, n.445 and of the consequent loss of any benefits obtained by making false statements as established in art. 75 D.P.R. 28/12/2014, n.445.

The undersigned, under penalty of nullity of the application, shall enclose a photocopy of a valid ID.

Date, _____

(Applicant's signature)