



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 38th cycle

Research Area n. 1 - Computer Science and Engineering

**PARTENARIATO PNRR Research Field: BLOCKCHAIN-BASED DISTRIBUTED BUSINESS
PROCESS MONITORING**

Monthly net income of PhDscholarship (max 36 months)

€ 1400.0

In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity

**Motivation and objectives of the research
in this field**

This research project is in the framework of
MICS (3A-ITALY)
PARTENARIATO ESTESO MADE IN ITALY CIRCOLARE
E SOSTENIBILE
CUP D43C22003120001
Decreto di Concessione D.D. 1551 del 11/10/2022

Supply chains involve several organizations connected each other with different roles according to an agreed business process usually called choreography. In addition to the complexities related to the enactment of a choreographed business process, a particularly challenging aspect concerns the monitoring of such processes. In fact, monitoring choreographed business process implies organizational, technical, and technological challenges. From an organizational perspective, being supply chains required to be more and more adaptive, monitoring is required to be fully distributed without any super-imposed centralized element. From a technical perspective, monitoring needs to inspect process-related data of all the organizations while preserving the privacy/confidentiality of the data. From a technological perspective, yet related to the need for adaptability, monitoring systems should be easily deployable on a variety of scenarios. Goal of this research is to study and propose innovative



	choreographed business process monitoring mechanisms based on blockchain which offer interesting properties to address the aforementioned challenges.
Methods and techniques that will be developed and used to carry out the research	By following the typical constructive research method aiming to develop new solutions for solving the problem of efficient and effective monitoring of choreographed business process, the research will take advantage of case studies to better frame the challenges and to evaluate the impact of a blockchain-based solution in terms of costs and performance. Moreover, the development of a software artifact, as a proof of concept, will guide the validation of the proposed solution. Imperative vs declarative business process design and process mining will constitute the main techniques.
Educational objectives	To understand the role of business processes in complex scenarios where several actors are involved To understand the potential of a blockchain in a process-based system To apply process mining in distributed setting
Job opportunities	The candidate will acquire a solid experience on distributed business process management and blockchain which are more and more guiding the evolution of current information systems in all organizations.
Composition of the research group	1 Full Professors 2 Associated Professors 1 Assistant Professors 1 PhD Students
Name of the research directors	Pierluigi Plebani

Contacts
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--



Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information

EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student

5.707,13 Euro

TEACHING ASSISTANTSHIP: (availability of funding in recognition of supporting teaching activities by the PhD student)

There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.

COMPUTER AVAILABILITY: individual use

DESK AVAILABILITY: individual use

D.D. 341 del 15/03/2022 Avviso pubblico per la presentazione di Proposte di intervento per la creazione di "Partenariati estesi alle università, ai centri di ricerca, alle aziende per il finanziamento di progetti di ricerca di base" - nell'ambito del Piano Nazionale di Ripresa e Resilienza, Missione 4 "Istruzione e ricerca" - Componente 2 "Dalla ricerca all'impresa" - Investimento 1.3, finanziato dall'Unione europea - NextGenerationEU