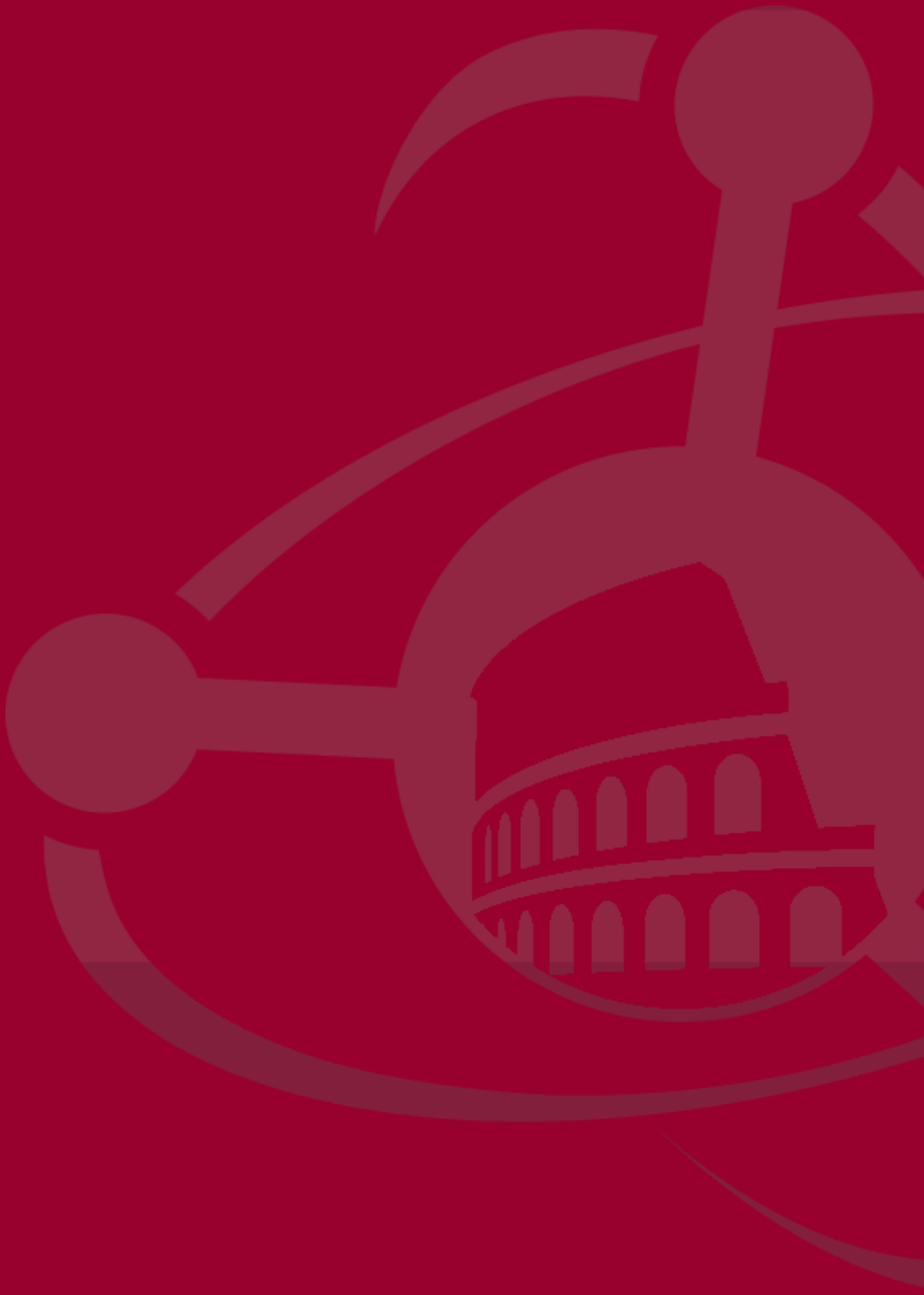
ROMARS

ROME
APPLICATIONS
RESEARCH
SYSTEMS

APPLICATIONS, RESEARCH AND SYSTEMS FOR TOMORROW'S TELECOMMUNICATIONS



SECTORS

We operate in various strategic sectors, offering tailored solutions to meet the specific needs. Our work addresses the integration of communication technologies, software and network protocol implementations to achieve solutions optimised for different contexts, ensuring efficiency, innovation, and quality.
Our technology perimeter include : 5G/6G, satellite technology, WiFi, Multi-connectivity, IoT standards and virtualised platforms, for both secure private network and public mobile network enhancements.

MAIN BUSINESS

R&D

Research projects funded by ESA, ASI, EC, Ministry and Industry

Design & Consultancy

TLC network and protocol design, emulators and simulators development and customisation.

Products

Three main product lines:
Multipath QUIC
WiFi Access to 5G Private Networks
Multi Access Gateway

R&D ACTIVITIES

DESIGN AND CONSULTANCY

LAB TOOLS

- Network Emulation, Simulation and Test bed for Satellite and terrestrial networks
- Satellite Performance Optimizer (PEP), TCP protocol optimization
- Multipath solution with different technologies: Satellite and Terrestrial
- CyberRange
- Networks for Research and Lab Testing: 5G toolkit, Alternative Access to 5G Core, Satellite Network Emulators

5G TECHNOLOGIES

- N3IWF (Non-3GPP Inter Working Function) to access 5G Core via Wi-Fi
- NWDAF (5G Network Data Analytics Function) for 5G Data Analytics Support
- ATSSS (Access Traffic Switching Steering Splitting) for simultaneous use of 5G and Wi-Fi
- Customised 5GC for Private Networks and specific Vertical Applications
- NTN 5GC enhancements, Multi-Path UPF and multicast support

IT/TLC SOLUTIONS

- Orchestration Platforms and Virtualization of Network Functions
- Customized TCP/IP stacks and advanced Algorithms
- Software development in Java, C/C++
- QUIC and MULTIPATH QUIC Application proxy solutions
- TCP and MULTIPATH TCP Application proxy solutions

RMA-ML PROXY
Multipath proxy

DESCRIPTION

MULTIPATH APPLICATION PROXY enabling user experience optimization thanks to a smart management of different link technologies.

TECHNICAL OVERVIEW

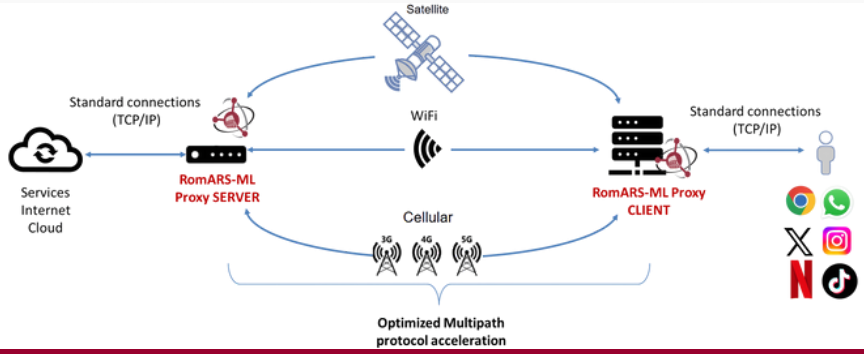
MULTIPATH

Simultaneous use of multiple link technologies, including GEO, LEO, 4G/5G, Optical, etc., with the aim to provide capacity bonding, failover/switching management, ad-hoc traffic steering, traffic duplication.

QUIC enhanced Transport

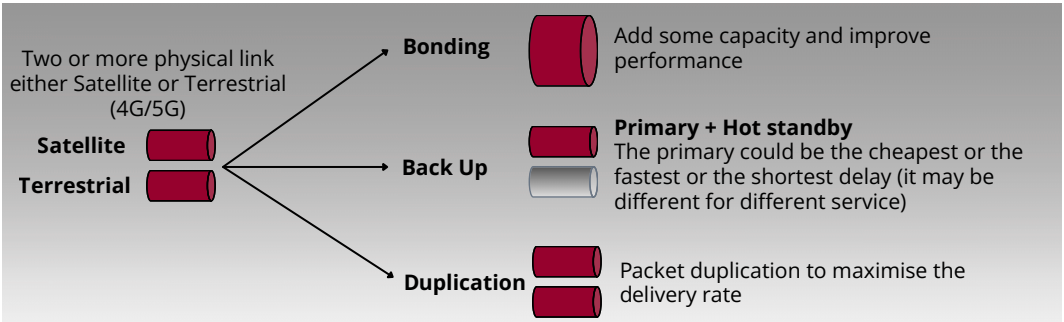
In combination with traditional MP-TCP, a QUIC-based solution guaranteeing:

- Maximize throughput and performances
- Reduced Latency/Connection Set Up (no initial signalling)
- Independent Multiple Stream with high-degree of QoS customization
- Congestion Control Algorithm (latest IETF proposals and the disruptive Wave algorithm)



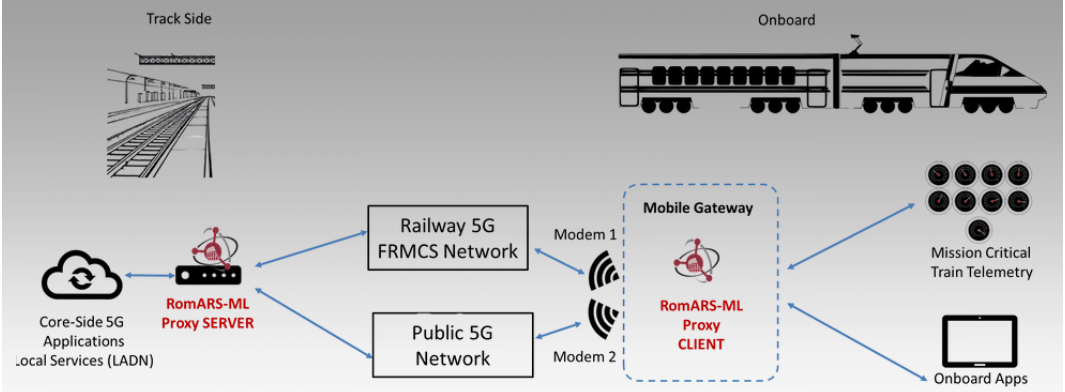
REFERENCE SCENARIO AT A GLANCE

MULTI-PATH STRATEGIES



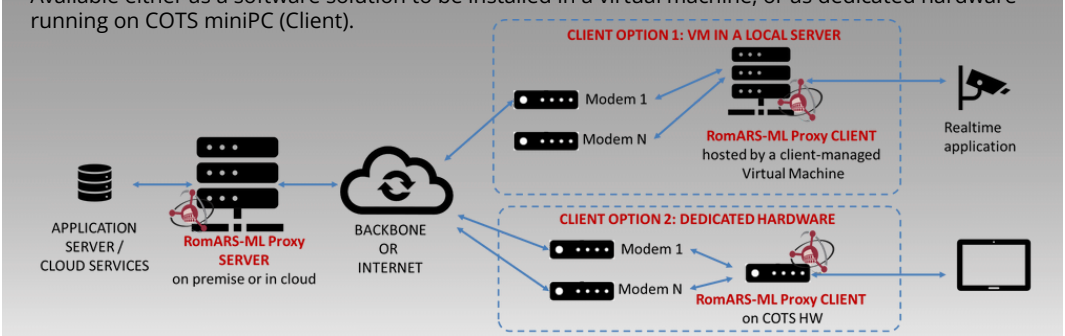
SUPPORT FOR LONG RANGE MOBILITY

MPQUIC adopted as transport protocol for FRMCS - Future Railways Mobile Communication System.
MPQUIC now in 3GPP rel.18 as standard protocol for Multipath connectivity (e.g. N3IWF/ATSSS).



DEPLOYMENT OPTIONS

Available either as a software solution to be installed in a virtual machine, or as dedicated hardware running on COTS miniPC (Client).



RMA-A^{2}C AP

Alternative access to 5G Core

DESCRIPTION

Enabling 5G services and supplementary 5G coverage extension via legacy Wi-Fi access (non-3GPP access).

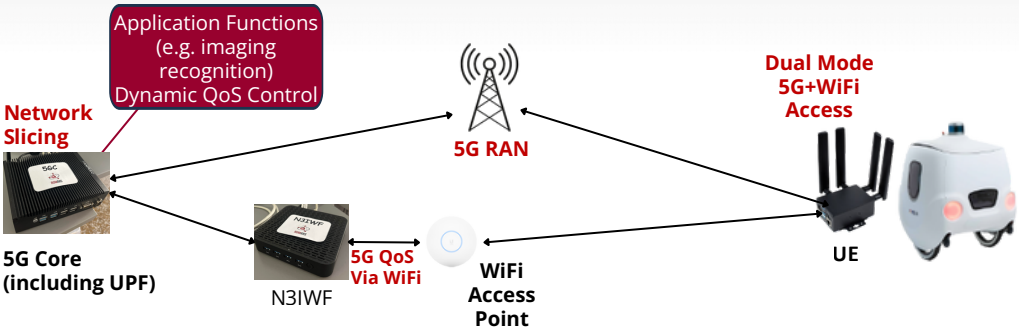
TECHNICAL OVERVIEW

Non-3GPP Access

RMA-A^{2}C represents the enhancement of the WiFi access with a Non-3GPP Inter-Working Function (N3IWF) component, in charge of adapting access and authentication protocols of User Equipment (UE) towards the 5G Core (5GC) via Wi-Fi.

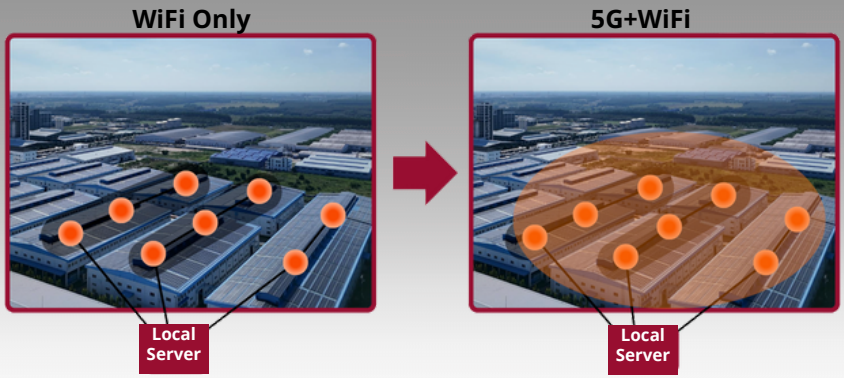
Access Traffic Steering, Splitting and Switching

Combined use of 5G and Wifi to extend coverage and implement tailored multi-access strategies in compliancy to 3GPP specifications. Customized private-5GC with UPF supporting multi-path management. Possible extensions to other access technologies (i.e. satellite megaconstellations) and support for “5G trusted” advanced methods.



REFERENCE SCENARIO AT A GLANCE

RMA-A²C ENHANCED PRIVATE 5G COVERAGE IN BIG FACTORIES



WI-FI + 5G MOBILE APPLICATIONS WITH LOCAL PROCESSING

Applications:
- Self driving
- Error free logistic
  - Autonomous picking
  - Automatic Inventory and connection with ERP
- Quality control of goods
- Safety (man down, safety-dress compliancy)

ROMARS-A²-C USER EQUIPMENT EXAMPLES

Characteristics

Modem 5G + WiFi compliant N3IWF

MODEM (CPE)

TABLET

RMA-MS GATEWAY

Multi access gateway for sensor networks

DESCRIPTION

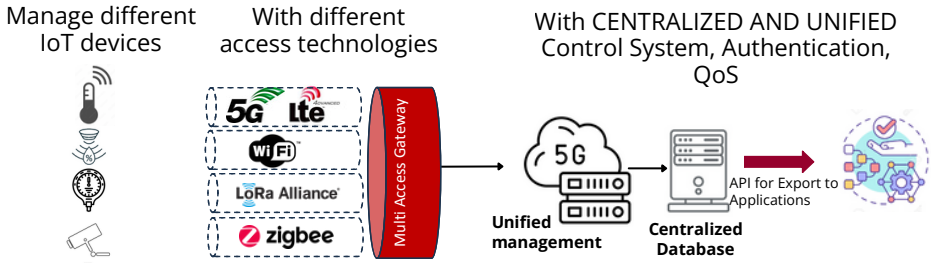
RMA-MS introduces legacy sensors' "Digital Twins" in 5G, for a unified orchestration and control of QoS, Core-side applications, monitoring, provision, and authentication.

TECHNICAL OVERVIEW

RMA-MS enables an existing 5G network to register, handle and exchange data with sensors with different access technology. Already available LTE, LoRa, Zigbee, etc. sensors are virtually integrated via the RMA-MS gateway, together with native 5G IoT devices, for a unified 5G-only handling.

Re-use of legacy IoT technology and 5G Inter-working

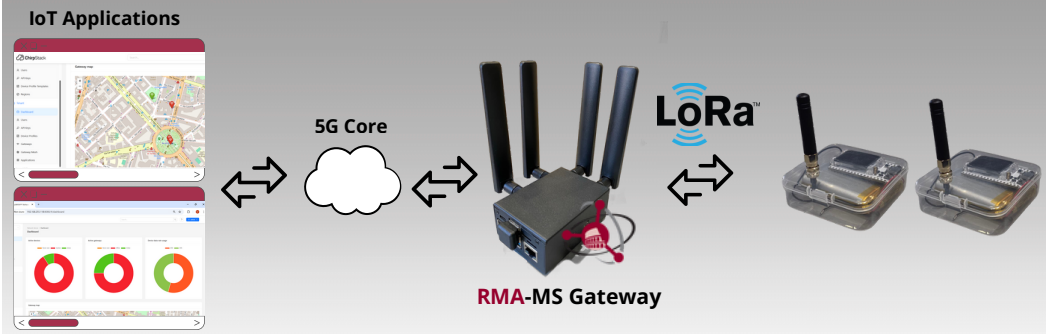
Easy integration and control of legacy sensors within a 5GC, enabling customized 5G-only sensor applications.
IoT service definition leveraging 5G slicing paradigm with standard interfaces.
Integration of different sensor technologies optimizing operational costs, preserve investments and reduce time-to-market of 5G compliant IoT networks.
Deployment of proprietary application at the edge exploiting 5G local break-out.



REFERENCE SCENARIO AT A GLANCE

LEGACY SENSOR NETWORKS IN 5G

RMA-MS creates a LoRa digital twin managed at the 5G core side.



AGRITECH APPLICATIONS, ENVIRONMENTAL MONITORING AND SENSING

Integration of existing sensors networks, actuator and narrowband communication:

Different sensors for humidity, pH, salinity, etc.
Possibility of creating a "digital twin" of crops and preventing problems or predicting quantity and quality of the harvest.

Terrestrial or aerial drones for soil and crop monitoring

Remote 5G IoT using legacy sensors and satellite connectivity.

A PROVEN HISTORY OF PASSION AND KNOW HOW

TRACK RECORD

2003
Founders start to cooperate in PhD research at University of Rome Tor Vergata

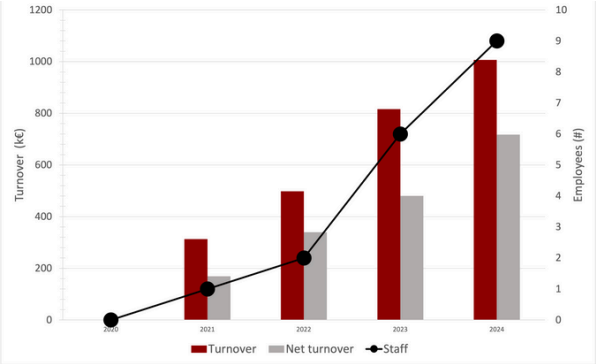
2006
Founders join Nitel Consortium for expansion of their R&D activities

2015
Development of Products and Applications for 3rd Party Customers

2020
Foundation of RomARS Innovative Start Up

2024
1 M€ turnover and 9 employers. > 2 M€ of project grants. New Business Unit

ROMARS IN NUMBERS



THE TEAM

FOUNDER

Michele Luglio
President

FOUNDER

Francesco Zampognaro
Vice President, CTO

FOUNDER

Cesare Roseti
Chief R&D Officer

Mattia Quadrini
Internet Engineer

Lorenzo Serranti
R&D Software engineer

Domenico Verde
R&D Software engineer

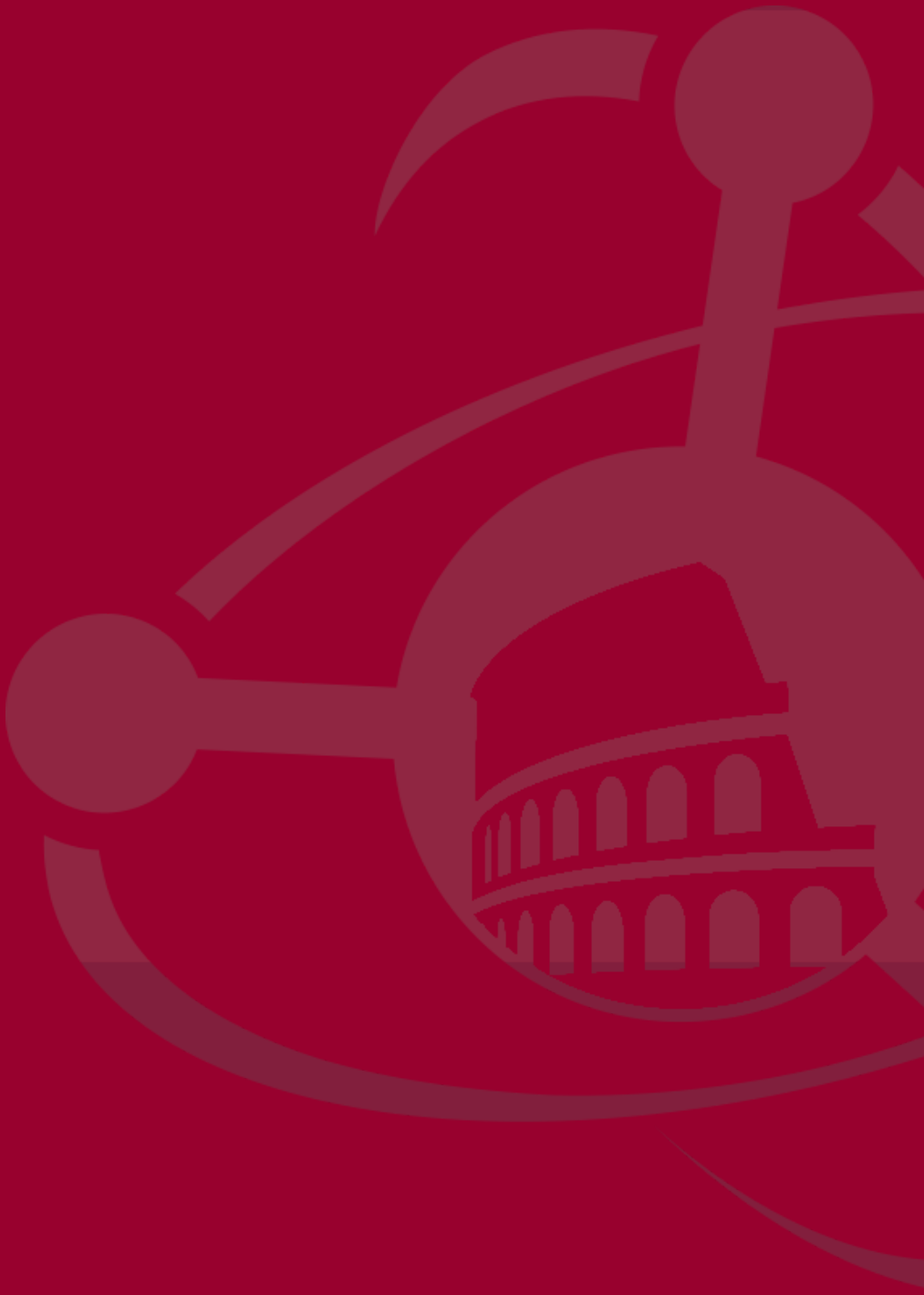
Luca Fiscariello
R&D Software engineer

Sara De Prai
Communication manager

Walter Munarini
Commercial director

Federica Malavasi
Administrative secretary

Maddalena Notarmasi
Accounter



Phone: +39 0645475521
Website: www.romars.tech
Email: info@romars.tech