

## KEY TARGETS



### High performance and reliability:

- Optimally deploy and manage 5G-ready applications over application-aware network slices through the definition of open APIs for interaction among service providers and telecommunication infrastructure providers.
- Dynamically create and manage application-aware network slices by the telecommunication infrastructure providers, supporting the 5G-ready application needs.

### New business opportunities and business models:

- Enable vertical industries to take advantage of 5G technologies through the provision of a development kit for 5G-ready applications and a 5G-ready applications orchestrator.
- Support separation of concerns among vertical applications and network services orchestration, enabling the various stakeholders to exploit the MATILDA framework without any prerequisite.

### Shorten time to market:

- Tackle the overall lifecycle of the design, development and orchestration of 5G-ready applications and 5G network service over programmable infrastructure.



**Project Coordinator:**

Prof. Franco Davoli (University of Genoa, Italy)



**Technical Coordinator:**

Dr. Panagiotis Gouvas (UBITECH, Athens, Greece)



[www.matilda-5g.eu](http://www.matilda-5g.eu)



@Matilda\_EU



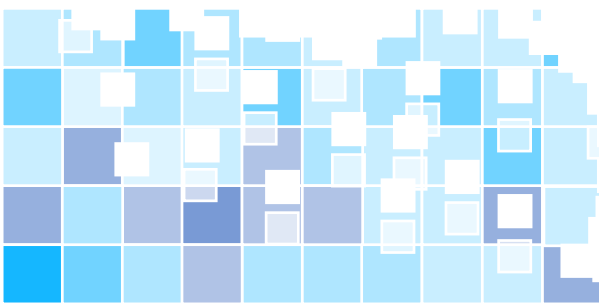
[www.linkedin.com/in/matilda-project-a43b6114a](https://www.linkedin.com/in/matilda-project-a43b6114a)



MATILDA has received funding from the European Union's Horizon2020 Research and Innovation Programme, under Grant Agreement no. 761898.



A HOLISTIC, INNOVATIVE FRAMEWORK FOR THE DESIGN, DEVELOPMENT AND ORCHESTRATION OF 5G-READY APPLICATIONS AND NETWORK SERVICES OVER SLICED PROGRAMMABLE INFRASTRUCTURE



# A HOLISTIC, INNOVATIVE FRAMEWORK FOR THE DESIGN, DEVELOPMENT AND ORCHESTRATION OF 5G-READY APPLICATIONS AND NETWORK SERVICES OVER SLICED PROGRAMMABLE

## MAIN VERTICAL DEMOS

The potential for industrial diversification and the application in different domains, which implies increased business prospects, is highlighted by different demonstrators that will be executed and validated. These include:

- **HIGH RESOLUTION MEDIA ON DEMAND & BANKING ON THE CLOUD**
- **DISTRIBUTED SYSTEM TESTING**
- **5G EMERGENCY INFRASTRUCTURE**
- **INDUSTRY 4.0 SMART FACTORY**
- **SMART CITY INTELLIGENT LIGHTING SYSTEM**

These vertical applications will be mapped over three different test beds:

- The **University of Bristol 5GUK** test bed, integrating an extensive Smart City environment of LTE radio, WiFi and mmWave devices, interconnected by fibre backhaul, and providing OpenStack on High Performance Computing nodes in Bristol, UK;
- The **CNIT-S3ITI** test bed in Genoa, Italy, based on WiFi and LTE radio devices, emulated Enhanced Packet Core, a MEC platform (OpenVolcano) and a cloud infrastructure stemming from a FIWARE Lab node, in a controlled laboratory environment;
- The **Orange Romania Smart City** test bed in Alba Iulia, Romania, integrating LTE/5G Lighting Sensors, radio access and VNFs hosted in the Orange Regional Datacentre, and a Cloud middleware IoT platform.

## KEY IMPACT ON STAKEHOLDERS

- **Application Developers:** flexibility in the design and development of 5G-ready applications by easy-to-access tools.
- **(Vertical) Application Service Providers:** policies-based highly configurable network agnostic slice requests.
- **Telco providers:** full lifecycle management of application-aware network slices over multi-site programmable infrastructure.
- **VNF/PNF developers:** direct VNF products' distribution channel towards telco providers through the MATILDA marketplace.

## GOALS

**MATILDA** aims to devise and realize a radical shift in 5G-ready vertical applications, intrinsically **bridging cloud-native applications and network service domains**.

In a stronger integration of cloud and Mobile Edge Computing (MEC) environments, while recognising and conforming to the ongoing developments, MATILDA will **provide clear interfaces toward the multi-site management of cloud/edge computing and Internet of Things (IoT) resources**. It will support:

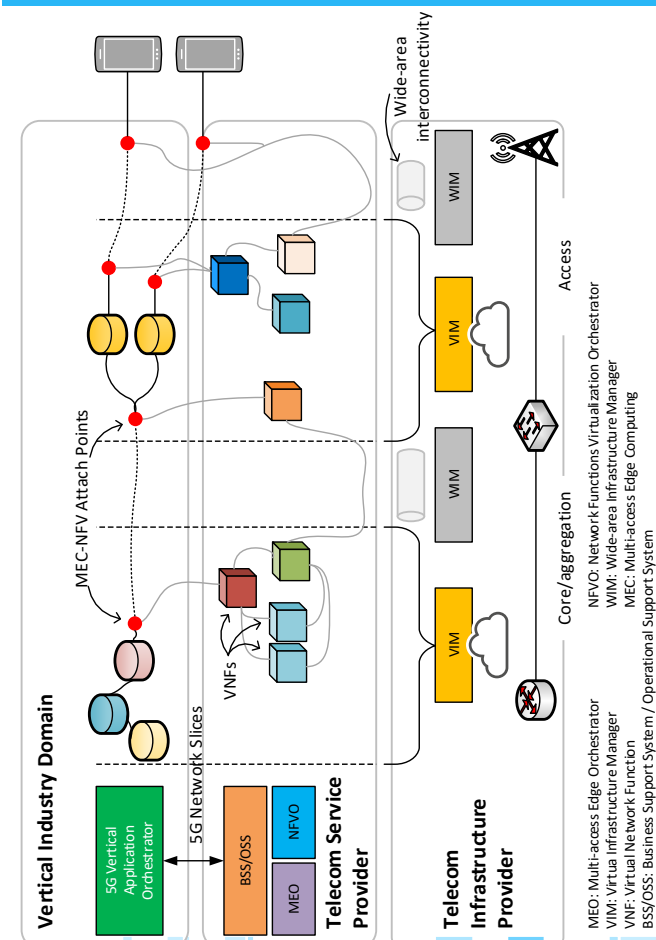
- The creation and maintenance of **5G-ready applications** through the **selection of their service components and the generation of their own Forwarding Graphs**;
- The lifecycle management of the required **network slices**;
- The **interaction with** the multi-site Network Functions Virtualisation Orchestrator (**NFVO**) residing in the Network Providers' domain.
- Network- and application-oriented analytics and profiling mechanisms;
- A **5G-ready Application Orchestrator** layer based on **component-proxying** (performing dynamic service discovery, load balancing, TLS termination, circuit breaking, health checking, L7 traffic shaping, publication of metrics, etc.) to materialize a **service mesh (SM)**.
- Tools for constantly monitoring, analysing and optimising the SM's installed components and the allocated infrastructure, in order to guarantee the optimal usage of resources and enforce that network slice specifications are met.

The concept of **slice intention** will allow the application-level orchestrator to request, negotiate, deploy, maintain and discontinue the proper application-aware slice instantiation, tailored to the specific application's needs, by also providing a set of mechanisms for runtime adaptation of the application components and/or network functions, based on policies defined on behalf of the services' provider.

The MATILDA architecture is divided into three distinct layers; namely:

- **Development Environment and Marketplace**
- **5G-ready Application Orchestrator**
- **Programmable 5G Infrastructure Slicing and Management**

## ARCHITECTURAL FRAMEWORK



## AT A GLANCE

**Programme:** H2020-ICT-2016-2  
**Duration:** 30 months  
**Starting Date:** 1 June 2017  
**Total Cost:** €8,378,945.36  
**EC Funding:** €6,664,458.75

