

# CONCEPT REPLY

ENGINEERING

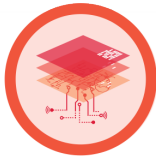


**TO EXCEL IN HELPING OUR CUSTOMERS  
EXPLOIT RELEVANT INNOVATION BROUGHT  
ABOUT BY IOT**

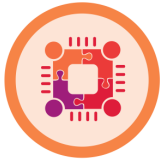
# CONCEPT REPLY

## COMPANY PROFILE

PLATFORM



SYSTEM  
INTEGRATION &  
CONSULTING



EMBEDDED

Concept Reply presents its offers towards customers that are **CONNECTING AND DIGITALIZE** their **PRODUCTS** and/or **FACTORIES**

**SENSORS INTEGRATION, EDGE COMPUTING AND IOT CLOUD PLATFORM DESIGN** are core competences at Concept Reply

R&D

Confidential and Proprietary – Concept Reply

IoT

Reply Group's **IoT**  
and **EMBEDDED** specialist



# ABOUT CONCEPT REPLY

## KEY DRIVERS

- Specialized competence in Consulting, Design, Development and System Integration for IoT Solution.
- Focus on Digital Transformation and continuous investments in Innovation and Know-How.
- Engineering solutions for hardware integration and connectivity
- Strategic Partnership with Leading Market Vendors.



## + Customers

Large Industrial groups and specialized companies. Very high customer retention.

## + More than 200 employees

Hardware and Software development competence. Electronic Design, Firmware and Software development, Backend Architecture, Mobile App development

## + State of the art R&D projects and Laboratories.

International collaboration on research projects. Audio, Radiofrequency, Imaging, Test Automation laboratories

## + Solid Track Record and Process

Consistent delivery on time and quality. Process oriented development: Waterfall, Agile, CMMI, ASPICE.

## + Founded in 2009

to achieve excellence within the Internet of Thing market with focus on Embedded system and Platform. 15+ years team's core experience in wireless communication device development



**AVAILABLE  
THESIS  
2020  
CONCEPT REPLY**



# MAIN TOPICS

Embedded programming meets IoT and AI

New approach (data driven) and technologies (Neural Networks, embedded camera, new microcontrollers & microprocessors, MEMS etc.)

Fast prototyping and structured prototype-to-engineered product pathways.

Manufacturing, healthcare devices and consumer electronics the main markets

Agile design and development is a must.



# THESIS DESCRIPTION #1

## “FOG COMPUTING FOR DIGITAL SERVICES FOR MUSEUMS”

Contribution to design and development of a fog computing platform for developing and deploying microservices to provide enhanced experience to tourists in Museum-like contexts.

PoC development in a remarkable consortium of italian partners.

In order to make visits in museums more 'smart', engaging, appealing and personalised, applications need many data (including Multimedia, AR/VR). Latency and bandwidth are still hindering services exploiting some streams. Fog computing architecture can overcome present limitations. The thesis requires to contribute to the architecture definition and to the development of microservices associated to the provisioning of an enhanced experience for tourists.

Technologies: microservices, Kafka, MQTT, Node-Red



# THESIS DESCRIPTION #2:

## ***“PERSONALISED CONTEXT-AWARE TOUR GUIDE COMPOSITION”***

*Contribution to design and development of a modular web/mobile application to offer smart and enhanced services to tourists (streaming/VR/AR) with integration with a fog computing platform delivering contents.*

*PoC development in a remarkable consortium of italian partners.*

To improve cultural tourism, the tourist should be offered proper information based on his preferences, location, available time, prior visits. The thesis requires to contribute to the definition and development of a modular web/mobile application offering smart services for tourists, based of the information provided by an external recommendation engine and enhanced contents (streaming/VR/AR) provided by a fog back-end architecture.

Technologies: web development frameworks and libraries, knowledge of VR/AR/geolocation/UX /web analytics concepts





# THESIS DESCRIPTION #3:

## ***“DISTRIBUTED LEDGER FOR CERTIFYING TRUSTED IOT DATA”***

*Contribution to design and development of an application for distributed ledger (blockchain technologies) applied to a Use Case scenario of circular economy. Specifically data to be certified by the platform should be produced by IoT devices.*

*PoC development in a remarkable consortium of italian partners.*

The thesis requires to explore and evaluate the application of distributed ledger technologies to a case study scenario related to circular economy, where such technology can improve trust. In such scenario data to be certified can be produced by IoT devices, considering high capacity requirements and the maturity of available distributed ledger frameworks/services. The thesis is about selection of the best option among a few and the development of a proof of concept.

Technologies: SW development, Ethereum/IOTA/Hyperledger



# THESIS DESCRIPTION #4:

## “ MACHINE VISION FOR SCRATCHES RECOGNITION ON SEMI-REFLECTIVE SURFACES”

*Contribution to design and development of machine vision techniques (applying methods of machine learning and NNs) for scratches recognition on fleets of rent cars in the context of a european project for urban mobility.*

*PoC development in a remarkable consortium of european partners.*

The thesis is about the application of machine vision techniques to the recognition of amorphous (without a clearly defined shape or form) defects such as scratches. Within the context of an ongoing project, the thesis requires to define the image processing pipeline and develop a proof of concept.

Technologies: machine learning (e.g. TensorFlow), image processing. Knowledge of lighting, filters, optics, lenses, industrial cameras is appreciated



# THESIS DESCRIPTION #5

## “INTEGRATED COLLABORATIVE SYSTEMS FOR SMART FACTORY”

*Contribution to design and development of software tool for analysing and real-time monitoring of cooperative logistic processes.*

The thesis requires to explore, evaluate and develop a software tool for real-time monitoring, analysis and forecasting of cooperative logistics processes in order to collect and process logistic data by logistic data analysis; definition of a digital twin to optimize the automatic handling of AGVs and their energy consumption; define technologies and to develop advanced HMIs to allow an efficient interaction with AGVs for logistics

Technologies: SW development, integration



# THESIS DESCRIPTION #6

## “EMBEDDED KEYWORD SPOTTING FOR MANUFACTURING ENVIRONMENT”

*. Contribution to design and development of speech recognition system based deep learning algorithms for hands-free command control in manufacturing processes.*

*PoC development in a remarkable consortium of european partners.*

Deep Learning algorithms are an extremely promising instrument in artificial intelligence, achieving very high performance in numerous recognition, identification, and classification tasks. The thesis is about the investigation, development and evaluation of an embedded speech recognition system for hands-free command control in manufacturing processes.

Technologies: SW development, integSW development, machine learning (Tensorflow, PyTorch). Knowledge of ROS (Robot Operating System) is appreciated.



# THESIS DESCRIPTION #7

**“INTEGRATION OF AN IP CAMERA WITH MULTIMEDIA SERVICES PROVIDED BY CLOUD PLATFORM, IN ORDER TO MANAGE THE FLOW OF AUTHENTICATION, VIDEO STREAM MANAGEMENT, DOWNLOAD OF VIDEO CLIPS GENERATED AND AUTOMATICALLY SAVED ON THE CLOUD.”**

The purpose is create a system that allows an IP camera, of a generic vendor, to send a video stream flow to the media streaming service of choosen cloud provider and exploit its functionality on the cloud.

Specifically, the features to implement are:

- Device authentication on the platform with the possibility to verify on the device side and on the cloud side the connection status;
- Bidirectional data exchange between the physical device and the cloud, to be able to send data to the platform and receive commands on the device;
- Send a video stream flow to the cloud with possibility to convert video encoding protocol;
- Automatic or on event recording of video clips that will be sent to the cloud for storage and to be available for download.



# THESIS DESCRIPTION #8

**“INTEGRATION OF AN IOT DEVICE WITH CLOUD PLATFORM, IN ORDER TO MANAGE AUTHENTICATION, DATA EXCHANGE, COMMANDS TO AND FROM THE CLOUD AND OTA FIRMWARE UPDATE.”**

The purpose is create a system that allows the integration of an IoT device, of a generic vendor, with Azure Cloud to exploit functionalities on cloud side.

Specifically, the features to implement are:

- Integration of SDK (of chosen cloud provider) on the device side to enable device / cloud communication;
- Device authentication on the platform with the possibility to verify on the device side and on the cloud side the connection status;
- Bidirectional data exchange between the physical device and the cloud, in order to be able to send data to the platform and receive commands on the device;
- Cloud-side management of the firmware updates (OTA) of the device, using cloud provider components or implementing a custom web component.



# THESIS DESCRIPTION #9

**“IMPLEMENTATION, USING THE SERVICES PROVIDED BY THE CLOUD PROVIDERS, OF A CHAIN OF SOFTWARE COMPONENTS FOR DATA PROCESSING, RULE ENGINE AND CUSTOM LOGICS BASED ON INCOMING DATA FLOWS.”**

The purpose is create a system that allows, based on specific input data streams, to launch data analysis and/or specific business logic; all using the services available on cloud.

- Specifically, the features to implement are:
- Recognition of input data and flow switch (rule engine) to specific business logic;
- Implementation of a custom logic based on the flow;
- Setup and configuration of a data processing component;
- Visualization of data and analytics related to incoming data in data processing component.



# THESIS DESCRIPTION #10

## **“IMPLEMENTATION, USING SERVICES PROVIDED BY CLOUD PROVIDERS, OF A SOFTWARE COMPONENT TO MANAGE "DIGITAL TWIN" OF AN IOT DEVICE.”**

The purpose is create a system that allows, for any type of device, to create, store and manage the digital twin of a physical device using the services available on cloud.

Specifically, the features to implement are:

- Definition of the data to use for digital twin (among all data received in ingestion);
- Definition, setup and configuration of the Azure service to use for data storage;
- Creation and insert of the "digital twin" object in the storage;
- Definition of the flows to update and remove "digital copy" from the storage;
- Creation of a component for visualization, on web side, of the data relating to the digital twin of devices.





# **THESIS DESCRIPTION #11**

## **CLAY TARGET SHOOTING DATA ANALYSIS**

Big Data Analytics is a hot research area under big data. It is a strategy to analyze large volumes of data collected from a number of resources. The main aim of data analytics is to identify different data patterns from large datasets. Data analytics helps in getting useful insights for the business and will help in making better business decisions.

Big data analytics help companies to achieve financial efficiency.

It speeds up the decision-making process.

Provides new business opportunities to the companies.

Data can be visualized in a better way using charts, graphs, and slide decks.

The thesis is about the Big Data Analytics on data collected from the clay target shooting application we have developed. The aim of this thesis will be to provide data analytics in order to organize big data using graphs to provide information on the user experience.



# **THESIS DESCRIPTION #12**

## **CLAY TARGET SHOOTING WEARABLE APPLICATION**

Wearable devices like smart band and smart watch are able to collect biometric and environment data.

Aim of the thesis will be to study, analyze and develop a solution to integrate data from wearables into our clay target shooting platform in order to correlate data from the field with environment and biometric data.



# WHAT WE OFFER

- Thesis duration: 6 months
- Site: mostly in Torino, Via Cardinal Massaia where teams and labs are located.
- Time spent: flexibly but constant work expected.
- Workplace: open space with collaborative environment & free coffee/tea ! 😊
- Language: Italian and English are required.
- Expense reimbursement: Eur 500,00 / month + Lunch Ticket (6 €) every day spent in REPLY.
- Chance to get hired when graduated (we are searching even now!).
- Thesis is a project that will take shape with the supervising professor, you and us..



# WE'LL TOTALLY LIKE YOU IF:

- You're a fast learner, with interest in new digital technologies
- You have skills in programming
- You have knowledge of AI methodology and concepts
- We appreciate proficiency in English and interest in design of software architectures
- Average exam vote of 27/30 required.



# SOME FREE SELF LEARNING ..

## .. TO CLOSE THE GAP ON MACHINE LEARNING

1. Corso introduttivo su Deep Learning: <https://www.udacity.com/course/intro-to-tensorflow-for-deep-learning--ud187>
2. Corso di approfondimento su Deep Learning: <https://www.coursera.org/learn/neural-networks-deep-learning?specialization=deep-learning>

Advanced : <https://www.coursera.org/learn/machine-learning>

Un po' più di materiale:

- Corso di Stanford: <http://cs231n.github.io/>
- Libro online su reti neurali: <http://neuralnetworksanddeeplearning.com/>

Provare la piattaforma <https://notebooks.azure.com/> con open datasets da: <http://archive.ics.uci.edu/ml/datasets.php>



# SOME FREE SELF LEARNING ..

## .. TO CLOSE THE GAP ON AGILE SOFTWARE PROCESS (SCRUM)

My suggestion is to self study and take the online PSM I Exam (so you don't need to attend a classroom training) PSM stands for Professional Scrum Master :

### 1) Books:

- Download the Scrum Guide from <http://scrum.org> (Free)
- Download our Agile Scrum Manual <http://xavierkoma.com/wp-content/uploads/2017/04/The-Scrum-Master-Training-Manual-Vr1.61.pdf> (this is FREE)

### 2) Online Course / Classroom Training

- This is an online video course : [Agile and Scrum eLearning Course | MP](#)
- Classroom Training: See this page for Scrum .Org Trainers: [Scrum](#)

### 3) PSM I Assessment (Exam) Simulator : <https://mplaza.training/exam-simulators/psm/>

- You need to get > 85% in the PSM I exam - - This is high and many people fail the first exam. You can find 30 sample assessment questions on Scrum.org :



# CONTACTS

[m.griva@reply.it](mailto:m.griva@reply.it)

[s.giaconia@reply.it](mailto:s.giaconia@reply.it)

