



Title: ENACT Business Model

Authors: Adrian Irala (INDRA), Rodrigo Castiñeira (INDRA), Jean-Yves Tigli (CNRS), Modris Greitans (EDI), Anne Gallon (EVIDIAN), Erkuden Rios (Tecnalia), Peter Matthews (CA), Nicolas Ferry (SINTEF), Arnor Solberg (Tellu), Andreas Metzger (UDE)

Editor: Adrian Irala (INDRA), Rodrigo Castiñeira (INDRA)

Reviewers: Hui Song (SINTEF), Nicolas Ferry (SINTEF), Anne Gallon (EVIDIAN)

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Executive Summary

This document is the enclosed document of D6.2 ENACT Business Model. The actual deliverable is the website accessible at <https://enactproject.github.io/ENACT-Business-Models/>. This document provides the framework and the model followed by ENACT partners to define the business models presented in the webpages produced, as well as an overview of this website. A preliminary summary and classification of the business models is also provided.

Members of the ENACT consortium:

SINTEF AS	Norway
CA Technologies Development Spain S.A.	Spain
EVIDIAN SA	France
INDRA Sistemas SA	Spain
FundacionTecnalia Research & Innovation	Spain
TellU AS	Norway
Centre National de la Recherche Scientifique	France
Universitaet Duisburg-Essen	Germany
Istituto per Servizi di Ricovero e Assistenza agli Anziani	Italy
Baltic Open Solution Center	Latvia
Elektronikas un Datorzinatnu Instituts	Latvia

Revision history

Date	Version	Author	Comments
10 December	Initial	Adrian Irala	First Version: integration of contributions, generation of webpage, creation of document. Version ready for internal review.
20 December	1.0	Adrián Irala	Reviewed version: Revisions according to the internal reviews

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1 Introduction

1.1 Context and objectives

This document is the accompanying document of D6.2. ENACT Business Model. The deliverable D6.2 is mainly composed of the website containing the different business models produced by ENACT partners.

Part of Task 6.3 Continuous Innovation Monitoring, the main objective of this deliverable is to define the business models and related KPIs enabled by the ENACT results. These business models have been produced as webpages and integrated into an open site hosted by GitHub. This website was produced in November 2018 and can be found at <https://enactproject.github.io/ENACT-Business-Models/>. The business models produced will evolve naturally as the project progresses and new results are obtained. This deliverable will be the foundation for the consequent work produced in Task 6.3. Having D6.2 in the form of a wiki-styled website in an open source repository allows the continuous update of the content.

1.2 Achievements

Objectives	Achievements
Definition of ENACT Business Models	The different partners involved in ENACT have identified the exploitable assets that will be produced from the ENACT results and have defined business models and related KPIs for them. Business Models have been created for the ENACT tools and for the outcomes of the application of these tools to the different domains covered.
Creation of ENACT Business Models Webpage	A webpage hosted at GitHub was created, containing the Business Models produced as “wiki pages”.

Table 1. Objectives and achievements

1.3 Structure of the document

The remainder of the document is structured as follows:

- Section 2 provides an introduction to business models and the process that has been followed by the partners to generate the webpages. A theoretical framework for the structure of business models is also provided in this section.
- Section 3 provides screenshots and text of the website generated to give an overview of the structure and content of the webpages produced.
- Section 4 provides a summary of the business models produced and a conclusion for this deliverable.

2 ENACT Business Models

The results generated in ENACT aim to provide new business models, activities and projects to the IoT, edge and cloud communities. Using ENACT's agile approach and its innovative enablers and tools, organizations can reduce their costs while improving design, operation and maintenance efficiency of smart IoT systems. The profile of the partners involved in the project ensure a great representation of IoT and DevOps stakeholders: IoT Platform Providers, Smart IoT System Providers, IoT Infrastructure Providers and DevOps Tools and Solutions Providers, and thus can show how the implementation of the innovations produced in ENACT can have a positive impact for the European market.

From these perspectives, all of the ENACT partners have carried out a wide range of activities (developments, market and technical research, etc.) that have allowed them to identify products, services and other exploitation forms to be pursued and in some cases commercialized once ENACT is concluded.

Firstly, a Business Model Template (Appendix A) was created using the Lean Canvas as a framework. This template was tested by INDRA, SINTEF and EVIDIAN, validated and shared with the rest of the partners. Using this template, they have produced different business models for the ENACT results:

- The main innovations resulting from the project are the set of enablers and tools; for each one of these tools, the partners of ENACT have produced a business model.
- Each of the use cases deployed in the project represent different business opportunities in the eHealth, Smart Buildings/Cities and Intelligent Transport Systems domains, in which these tools are tested and developed to unleash new applications and solutions. For these domains and results, the partners involved have produced business models.

The following table summarizes the business models produced for this deliverable and their main contributors:

Main Contributor	Business Model
CNRS	Actuation Conflict Management & Behavioral Drift Analysis Tool
SINTEF	Orchestration and Deployment Tool
EVIDIAN	Context-Aware Access Control Tool
TECNALIA	Security Monitoring and Control Tool
EDI	Business Model for the ITS domain
UDE	Online Learning
INDRA	Business Model for the ITS domain
CA	Root Cause Analysis Tool
TellU	Business Model for the ITS domain & ThingML Tool

Table 2. Business Models Produced and Main contributors

2.1 Business Model Structure

A business model describes the process followed by an organization to create, deliver and capture value for its customers. This process is commonly represented by a framework that organizations use as tools

to develop and define the different elements that take part in the process and the interactions between them. Among the different approaches available, one of the most popular is the framework proposed by Osterwalder and Pigneur (2009), resulting in the Business Model Canvas. The Business Model Canvas is organized around nine different elements: value proposition, customer segments, channels, customer relationships, key resources, key activities, key partnerships, cost structure and revenue streams.

The Business Model Canvas proposed by Osterwalder and Pigneur was later adapted by Ash Maurya (2010) into the Lean Canvas. This framework modifies some of the elements of the Business Model Canvas to open it to start-ups, small and large organizations. Thus, the Lean Canvas conserves some of the elements from the Business Model Canvas (customers, channels, cost structure, revenue streams), omits others (key activities and key resources, customer relationships and key partners) and introduces new ones: problem, solution, key metrics and unfair advantage:

- **Problem:** it is essential to understand in the first place what are the problems and needs that the solution you are proposing is addressing and solving for your existing/potential customers, including the existing alternatives available.
- **Customer segments:** these are the different groups of existing and potential customers that share similar problems and needs to be solved and met by the solution created by the organization.
- **Solution:** This element gives an answer to the customer segments for the problems and needs identified.
- **Unique Value Proposition:** this element explains how the solution proposed will create value to the customers.
- **Unfair Advantage:** this element describes the competitive advantage that the organization possesses that cannot be copied nor bought.
- **Channels:** this element covers the means for the delivery of value (the solution) to the customer segments (including promotion and distribution).
- **Key Metrics:** this element includes all the metrics that the organization will use to monitor and measure the performance and success.
- **Cost structure:** this element represents the financial infrastructure required to support the creation and delivery of value to the customers.
- **Revenue streams:** this element represents the mechanisms and sources for financing and capturing value as a result of the delivery of the solution.

This structure was the basis from which the business model template was created. For each one of these elements, different fields were specified in order to guide and detail the answers from the partners. This template can be found in the Appendix A of this document.

3 ENACT Business Models Webpages

The website is structured as follows:

- Home Page
 - Business Models
 - Exploitation of ENACT through Business Models

- Business model “wiki pages”

3.1 Homepage

The Homepage provides an introduction to the Business Models produced, giving information and basic knowledge about the business model Canvas and the Lean Canvas, included in section 2 of this document.



Figure 1: Home page

- Business Models: An overview of the Business Model Canvas and the Lean Canvas can be found when scrolling down:

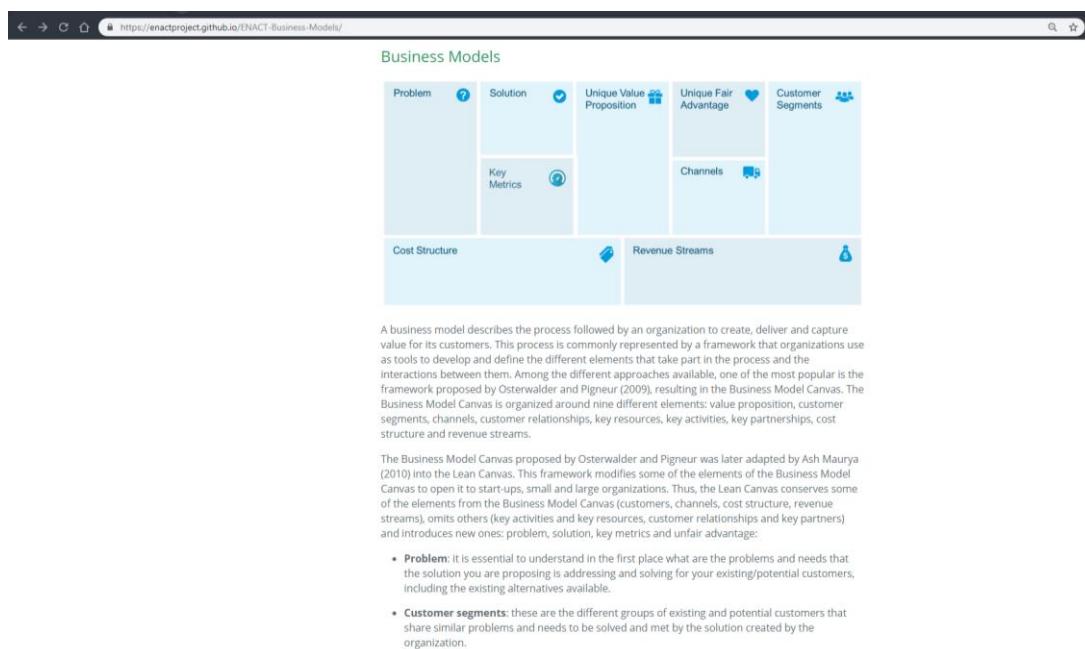


Figure 2: Home page: Business Models

- Exploitation of ENACT through Business Models: At the bottom of the page it is described how business models are applied in ENACT. This section also provides direct links to all the business models produced:

The screenshot shows a web browser displaying the ENACT Business Models page. The title is "Exploitation of ENACT results through Business Models". Below the title, there is a paragraph of text about the project's aim to provide new business models, activities and projects to the IoT, edge and cloud communities. It mentions the use of ENACT's agile approach and innovative enablers and tools to reduce costs while improving design, operation and maintenance efficiency of smart IoT systems. It highlights the profile of partners involved and the implementation of innovations produced in ENACT.

From these perspectives, all of the ENACT partners have carried out a wide range of activities (developments, market and technical research, etc.) that have allowed them to identify products, services and other exploitation forms to be pursued and in some cases commercialized once ENACT is concluded. Using the Lean Canvas as a framework, they have produced business models for the ENACT results:

- The main innovations resulting from the project are the set of enablers and tools; for each one of these tools, the partners of ENACT have produced a business model.
- Each of the use cases deployed in the project represent different business opportunities in the eHealth, Smart Buildings/Cities and Intelligent Transport Systems domains, in which these tools are tested and developed to unleash new applications and solutions. For these domains and results, the partners involved have produced business models.

The following table summarizes the business models produced and their main contributors:

Main Contributor	Business Model
CNRS	Actuation Conflict Management & Behavioral Drift Analysis Tool
SINTEF	GeneSIS Tool
EVIDIAN	Context-Aware Access Control Tool
EDI	Business Model for the ITS domain
UDE	Online Learning
INDRA	Business Model for the ITS domain
CA	Root Cause Analysis Tool
Tecnilia	Security Monitoring and Control tool
Tellu	Business Model for the Digital Health domain and the ThingML tool

Figure 3: Home page: Exploitation of ENACT Results

3.2 Business Models Pages

Nine wiki pages have been produced in total, containing the business models created by the partners. These business models will be updated during the project, and new business models may be produced and added to this website as new exploitation forms may arise when ENACT results become more mature. These pages are structured as follows:

- An introduction to the specific business model complemented by an image indicating the phase of the DevOps cycle tackled by the solution when applicable.

The screenshot shows the ENACT-Business-Models page with the title "ENACT-Business-Models" and the URL "https://enactproject.github.io/ENACT-Business-Models/". There is a "View on GitHub" button. Below the title, it says "Actuation Conflict Management & Behavioural Drift Analysis - Business Model". A sub-section title "Actuation Conflict Management & Behavioural Drift Analysis tools" is shown. The main content features a circular diagram illustrating the DevOps cycle. The diagram is divided into four quadrants: DEV (top-left), OPS (top-right), BUILD (bottom-left), and MONITOR (bottom-right). The central area contains the words "PLAN", "IMPLEMENTATION", and "OPERATE". Arrows indicate a clockwise flow between the quadrants. Labels "Actuation conflict management" point to the top-left and bottom-left segments of the circle. A label "Behavioral drift analysis" points to the bottom-right segment.

Figure 4: Business Models: Intorduction

- Main Contributor: information from the partner that has produced the Business Model, including name, category (Industrial, Academic, Research) and type (within the IoT DevOps ecosystem).
- Lean Canvas: provides the Business Model generated by the main contributor based on the structure of the Lean Canvas framework created for the project.

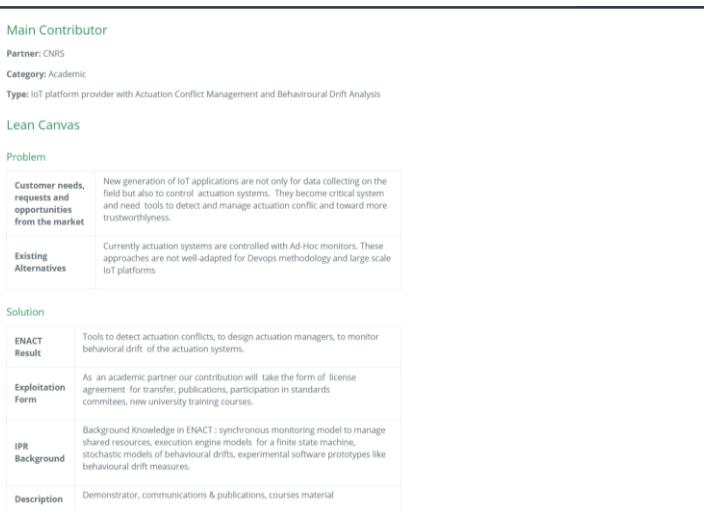


Figure 5: Business Models: Main Contributor and Lean Canvas

A text version of these pages can be found at Appendix B of this document, as they were at the time of the submission of this document. The business models are subject to evolve naturally as new insights and results from the project are obtained.

4 Conclusion

The main objective of this deliverable was to define the business motivation of the partners and generate business models for the results of ENACT, in order to provide the foundation for the future exploitation of these results. This document is the enclosed document of the ENACT Business Models website, which is the actual deliverable.

Nine business models have been identified and created. Table 2 summarizes the Business Models generated in this deliverable. Some conclusions can be drawn by comparing these business models. The first one is regarding the exploitation form and license type of the solutions identified, which are related to the type of partner exploiting them. Two main types of high-level business models have been identified regarding this aspect:

- Academic and research partners will exploit ENACT results in the form of knowledge transfer to generate new publications, training courses, participation in standardization activities and open source communities, consultancy and software/products mainly through open source and dual licenses to commercialise their research activities.
- Industrial partners have identified different exploitation forms for the ENACT results, mainly through commercial products with proprietary software and dual licenses to include in their portfolios and to sell to the customers and markets that they have identified.

All of the partners have successfully defined specific KPIs for the business models and a preliminary timeframe for their execution.

Partners have also identified the potential markets where these solutions will be deployed. Apart from the general IoT market, three other domain-specific markets have been identified: Cybersecurity and Identity Access Management, Digital Health and Transport (Rail). These markets, together with the technology involved in the solutions provided, will be analysed in next deliverables of Task 6.3.

Main Contributor	ENACT Exploitable Asset	Partner Type	Exploitation form	License Type	KPIs	Customer Segments	Market
CNRS	Actuation Conflict Management & Behavioural Drift Analysis Tool	Academic	License agreement: publications, standardizations, training courses	Dual: Open Source & Proprietary Software for prototyping	Number of License agreements for transfer, communications and publications, standard committees, training courses	App Developers	IoT Platform Providers
SINTEF	GeneSIS Tool	Research	New projects: consultancy, standardization, open source community	Open Source	Number of proposals for research projects, code delivered on public repository, involvement in standardization activities	App Developers, operators and owners	SIS providers
EVIDIAN	Context-Aware Access Control Tool	Industrial	Product: integration into existing offer	Proprietary Software	Rate of progress in the Life Cycle Management cycle, % of successful global validation tests, filed patents	End users	Cybersecurity products / Identity & Access Management
TECNALIA	Security Monitoring and Control Tool	Research	Software product and consultancy service for product customisation	Dual: Open Source & Proprietary Software	Number and type of early adopters, number and type of tool functionalities used	App operators	IoT systems in any domain.
EDI	ITS domain	Research	Publication, Technology & Knowledge Transfer	Open Source	Number of accepted publications	Researchers, industry, students,	IoT industry
UDE	Online Learning	Academic	Publications, training courses	Dual: Proprietary Software & Open Source for research demo	Increased convergence of online learning (%)	IoT DevOps Engineer	Generic
INDRA	ITS domain	Industrial	Product (integration into existing portfolio)	Proprietary Software	Reduction of costs for maintenance activities %, Reduction of time for maintenance activities %, Reduction of installation costs % and operational time%, Increase line capacity %	End users	Transport, rail domain
CA	Root Cause Analysis Tool	Industrial	Technology and knowledge transfer: product	Proprietary Software	Acceptance as a backlog entry in APM development, Inclusion in a PI plan for future development and deployment	App operators	Generic
Tellu	Digital Health domain & ThingML Tool	Industrial	Knowledge transfer: product	Dual: Open Source (tool) & Proprietary Software for evolving commercial products and services	Gain pilot of a Personal Health Gateway tested in real environments with real users, Updated security architecture for Digital Health solutions, Evolving ThingML to better support trustworthy IoT system development., Enact Digital Health use case tested out in pilot in industrial environment	System Integrators in the digital health domain, service providers (municipalities, insurance companies...)	Digital Health domain

Table 3. Summary of the Business Models Produced

5 References

Osterwalder, A., Pigneur, Y. (2009). Business model generation: A handbook for visionaries, game changers, and challengers. New Jersey: John Wiley & Sons Inc.

Maurya, A. (2012). Why Lean Canvas vs. Business Model Canvas? [Blog Post] <https://leanstack.com/why-lean-canvas/> (November 2018)

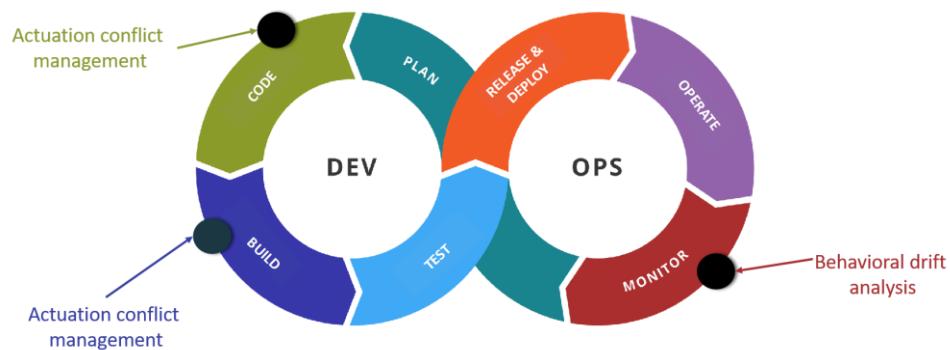
Appendix A Business Model Template

Partner	
Name	<i>Name of the partner</i>
Category	<i>Choose: Industrial, Research, Academic</i>
Type	<i>Choose: IoT Platform Provider, Smart IoT Systems provider, IoT Infrastructure provider, DevOps Solutions provider</i>
Problem	
Customer needs, requests and opportunities from the market	<i>Describe your customer needs, requests and opportunities from the market</i>
Existing Alternatives	<i>Explain the current situation</i>
Solution	
ENACT Asset	<i>ENACT result/s to be exploited (Choose: Tool, Framework, Use case).</i>
Exploitation Form	<i>Explain the objective of what you want to achieve (e.g. Technology & Knowledge Transfer) and the way to achieve this (product, service...) e.g. direct industrial use, patenting, technology transfer, license agreement, publications, standards, etc.</i>
IPR Background	<i>Technology, knowledge... that you are bringing to the solution</i>
Description	<i>Provide a short description of the artefact type you are proposing (specify what type of product/service,)</i>
Type	<i>Choose: Open Source / Proprietary Software</i>
Key Metrics	
KPI	<i>Define individual and specific KPIs for the solution (KPI to evaluate the success of the exploitation activity)</i>
Time to Market	<i>(Describe expected TRL in a 5 horizon after the end of the project)</i>
Unique Value Proposition	
Value Added by the solution	<i>Innovativeness introduced compared to already existing product/services</i>
Unfair Advantage	
Product/service positioning	<i>Unique selling point (Can't be easily copied or bought)</i>
Customer Segments	
Type of customers	<i>Choose: App Developer, App Operator, App Owner, End User</i>
Potential customers	<i>Who are the potential customers/users of your solution. Provide a description of these customers</i>
Segment (Domain/Technology)	<i>Market where this solution will be deployed. It can be global, a specific sector, or a technology line</i>
Channels	
Promotion	<i>Identify the channels that will be used to promote the solution</i>
Distribution	<i>Identify the channels that will be used to distribute the solution</i>
Cost Structure	
Cost of implementation	<i>bringing product/service to the "market" (before Exploitation)</i>
Cost sources	<i>List main sources that would produce a cost for the development and deployment of the solution proposed</i>
Revenue Streams	
Sources of financing foreseen after the end of the project	<i>List and explain</i>
Revenue Sources	<i>List the main sources of revenue and characterize them</i>

Appendix B Business Models

I. Actuation Conflict Management & Behavioral Drift Analysis - Business Model

This page contains the business model for the Actuation Conflict Management & Behavioural Drift Analysis tools. The Actuation Conflict Management tool is dedicated to the identification, analysis, and management of the potential actuation conflicts during software development of IoT systems. The Behavioural Drift Analysis tool provide metrics to evaluate to which extent the applications behaves as expected.



Main Contributor

Partner: CNRS

Category: Academic

Type: IoT platform provider with Actuation Conflict Management and Behavioural Drift Analysis

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	New generation of IoT applications are not only for collecting data on the field but also to control actuation systems. They become critical systems and need tools to detect and manage actuation conflicts and toward more trustworthiness.
Existing Alternatives	Currently actuation systems are controlled with Ad-Hoc monitors. These approaches are not generic and thus not well-adapted to Devops methodology and frameworks and large scale IoT platforms

Solution

ENACT Result	Tools to detect actuation conflicts, to design actuation managers, to monitor behavioral drift of the actuation systems.
Exploitation Form	As an academic partner our contribution will take the form of license agreement for transfer, publications, participation in standards committees, new university training courses.
IPR Background	Background Knowledge in ENACT : synchronous monitoring model to manage shared resources, execution engine models for a finite state machine, stochastic models of behavioral drifts, experimental software prototypes like behavioral drift measures.

Description	Demonstrator, communications & publications, courses material
Type	New algorithms and models for knowledge contribution, Open Source (Lesser General Public License) and legacy proprietary software for prototyping

Key Metrics

KPIs	<p>Each KPI evaluate the impact on the targets identified above:</p> <ul style="list-style-type: none"> • License agreements for transfer (key metric = sum of %) <ul style="list-style-type: none"> ◦ 50 % licenses on actuation conflict manager tools ◦ 50 % licenses on Behavioral Drift Analysis tools • Communications & publications (key metric = sum of %) <ul style="list-style-type: none"> ◦ 20% = 2 communications in major conferences (on both CNRS contributions) ◦ 50% = 1 journal publication on Actuation Conflict in IoT Survey and contribution ◦ 30 % = 4 communications with the other partners (eg. with UDE on reinforcement learning with behavioral drift measure ...) • Standard committees: (key metric = sum of %) <ul style="list-style-type: none"> ◦ 40% = participation to a Specification Groups on IoT plateforms, (ex. ETSI / SmartM2M ...) ◦ 60% = standard draft on guidelines for IoT plateforms and Actuation • Training (key metric = sum of %) <ul style="list-style-type: none"> ◦ 50% = Online New Course on Devops for IoT (Master degree level) ◦ 40% = Hackaton on ENACT solutions
Time to Market/ TRL at the end of the project	1 year after licensing with an industrial partner

Unique Value proposition

Value added by the solution	Tools for actuation conflict detection and management in IoT Systems
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Customer Segments

Type	App Developer , App Operators, App Owners
Potential customers	Software company that wants to provide a new software IoT Platform with new tools for more trustworthiness at design and while monitoring.
Segment	All IoT platform providers

Channels

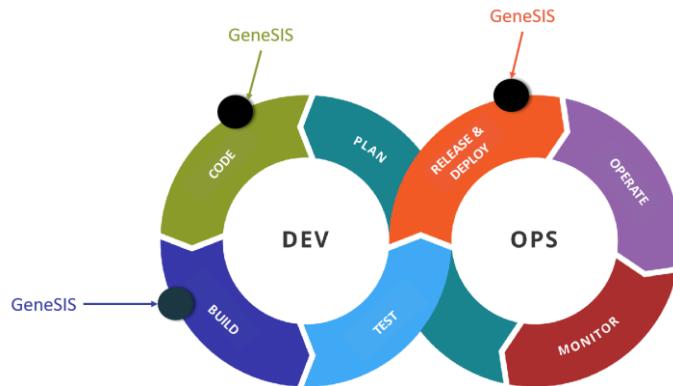
Promotion	conferences, journals, demonstrations, workshops
Distribution	publications, courses, hackatons

Revenue Streams

Sources of financing foreseen after the end of the project	licences fees, training, consulting
Revenue Sources	companies, training organizations

II. Orchestration and Deployment – Business Model

This page contains the business model for the GeneSIS (Orchestration and deployment) tool. GeneSIS facilitates the development and continuous deployment of smart IoT systems, allowing decentralized processing across heterogeneous IoT, edge and cloud infrastructures. GeneSIS includes: (i) a domain-specific modelling language to model the orchestration and deployment of smart IoT systems; and (ii) an execution engine that support the orchestration of IoT, edge and cloud services as well as their automatic deployment across IoT, edge and cloud infrastructure resources.



Main Contributor

Partner: SINTEF

Category: Research

Type: DevOps Solutions provider

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	Needs continuous deployment over IoT, Edge and Cloud. Need support for trustworthy deployment (i.e., support for deploying trustworthiness mechanisms and Mechanisms to properly monitor what has been deployed)
Existing Alternatives	Current solutions: (i) No deployment solution tailored for IoT, Edge, and Cloud infrastructure, (ii) No monitoring of the execution flow of the application. This is particularly relevant for debugging on IoT devices (as this is typically a complicated task), (iii) deployment tool do not integrate with security and privacy tools.

Solution

ENACT Result	GeneSIS (Orchestration and deployment enabler)
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Exploitation Form	<ul style="list-style-type: none"> Technology and knowledge transfer: Acquire new projects with industry and government to transfer the knowledge and technology gained during former projects. Way: Consultancy and new projects Technology and knowledge transfer: Acquire new projects with industry and government to transfer the knowledge and technology gained during former projects. Way: standardization Technology and knowledge transfer: Acquire new projects with industry and government to transfer the knowledge and technology gained during former projects. Way: reaching or building open source community
IPR Background	ThingML for the design and implementation of distributed reactive systems. CloudML for the deployment of multi-cloud applications
Description	Software tool and expertise in continuous development, orchestration and deployment of software across IoT, Edge, and cloud infrastructure.
Type	Open Source

Key Metrics

KPIs	<ul style="list-style-type: none"> 2 proposals for research projects or bi-lateral project with industry are submitted Code delivered on a public repository (e.g., github, gitlab) together with documentation and tutorials. Open source communities have been contacted. Involved in the OASIS TOSCA standardization activity
Time To Market / TRL at the end of the project	TRL6-8

Unique Value proposition

Value added by the solution	Solution has been designed with specific support for all the infrastructure continuum. It is technology agnostic as well as cloud and platform independent. Faster time-to-market, better agility Same language includes runtime information, and in particular execution flow can be monitored when ThingML is used. Faster time-to-market, better agility. It seamlessly integrates with security and privacy mechanisms for better trustworthiness.
Unfair Advantage	Tailored for IoT, Edge, Cloud and support for Security/privacy

Customer Segments

Type	App Developers, App Operators, App Owners
Potential customers	Industry partner willing to improve his software delivery process.
Segment	SIS provider
Channels	
Promotion	Publications, seminar, open source repositories and communities, meetings TOSCA standardization process
Distribution	Research project, open source repositories

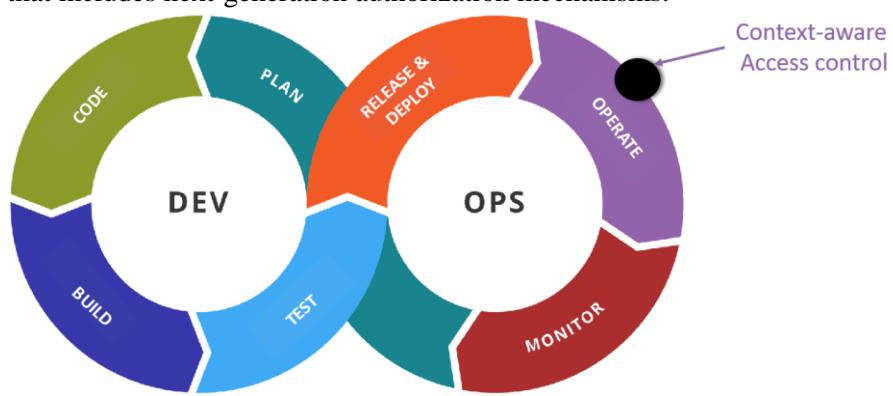
Cost Structure

Cost of implementation	<ul style="list-style-type: none"> Administration team Standardization contributor Development and research team
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Cost Sources	<ul style="list-style-type: none"> • Software development • Dissemination • Software distribution and administration • Participate in meeting • Contribute to standard definition
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III. Context-Aware Access Control - Business Model

This page contains the business model for the Context-Aware Access Control tool. This tool will provide Context-aware risk & trust-based dynamic authorization mechanisms, through an IAM gateway for IoT that includes next-generation authorization mechanisms.



Main Contributor

Partner: EVIDIAN

Category: Industrial

Type: Cybersecurity products / Identity & Access Management

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	<ul style="list-style-type: none"> • Apply access control mechanisms and identity governance mechanisms that today address people accessing IT applications, to people accessing industrial IoT, and to relationships between industrial objects • Improve global cybersecurity of the middleware and application IoT layers • Consider privacy risks as an integral part of the dynamic access control process
Existing Alternatives	<ul style="list-style-type: none"> • Today, no protocol can deliver dynamic authorization based on context for both IT and OT (operational technologies) domains. • Cloud computing infrastructures do not use dynamic access control, but static traditional mechanisms, despite the highly dynamic nature of cloud computing capabilities. • As the number of connected devices increases more and more, the related security risks are more and more important.

Solution

ENACT Result	Context-Aware Access Control tool
Exploitation Form	Product (integration into existing offer)
IPR Background	Evidian provides strong authentication management, enterprise single sign-on, web access management, identity management, role life cycle management, self-service portal, user provisioning, audit and reporting. Its solutions govern the accesses of more than 5 millions end-users every day, in the healthcare, finance, telco, government and industry sectors. Evidian dedicates a significant part of its revenue to research and development, and as such has led or participated in several collaborative European R&D projects.
Description	Software tool: Context-aware access control and authorization mechanisms for smart IoT systems. The context-aware risk-based authorization server will be integrated in the Evidian standard offer as “an IAM gateway for Industrial IoT”.
Type	Proprietary Software

Key Metrics

KPIs	Individual and specific KPIs for the solution (KPI to evaluate the success of the exploitation activity): <ul style="list-style-type: none"> • Rate of progress in the Life Cycle Management cycle: <ul style="list-style-type: none"> ◦ 100% = GO for General Shipment max 6 months after the end of the project ◦ 50% = GO for General Shipment between 6 and 12 months after the end of the project ◦ 0% = 12 months after the end of the project there is still no GO for General Shipment • % of successful global validation tests • Filed patents: <ul style="list-style-type: none"> ◦ 100% = 2 patents ◦ 50% = 1 patent ◦ 0% = 0 patent
Time To Market / TRL at the end of the project	<ul style="list-style-type: none"> • MS 1 - Middle of ENACT's lifetime: Testing new technology is under progress and TRL 3 reached. Partial results promoted towards Product Line Management. Step 1 in the company Product Life Cycle Management process: formal decision to include in the official roadmap. • MS 2 - End of ENACT: Step 2 of the Product Life Cycle Management: GO for industrialization and announcement. TRL 6/7 reached for some parts TRL8/9. Product management team prepares sales and training material, Delivery team prepares software distribution, Support team prepares helpdesk processes. Revenue increase. • MS 3 - After end of ENACT (2 years): Step 3 of the Life Cycle Management (max 6 months after the end of the project): GO for General Shipment. Press release and communications about the new product offer, now on sale. • MS 4 - 5 years later: Deployment of the solution at key customers in the manufacturing sector, acquisition of new customers in other sectors of Industry. Praised by analysts as a major European vendor for IoT security.

Unique Value proposition

Value added by the solution	<ul style="list-style-type: none"> The resulting IAM offer will deliver new access control mechanisms for authorizing access to industrial objects, with ad-hoc protocols, while still being able to address traditional access to IT applications. The resulting IAM offer will in addition secure the access to applications and APIs. The authorization decisions will take privacy risk values into account. Consent management will be enforced by the resulting IAM offer.
Unfair Advantage	Evidian, now a member of the ATOS Group, is a French Independent Software Vendor with a worldwide presence based on subsidiaries and a network of 70 partners. It is the European leader in identity and access management software, with 16 years experience. Evidian identity and access management solutions help over 800 organizations in the world improve their agility, enhance security and comply with laws and regulations, while reducing costs.

Customer Segments

Type	End Users
Potential customers	<ul style="list-style-type: none"> Manufacturing (equipements for smart buildings, car manufacturers, aeronautics) Healthcare domain (hospitals, telemedecine environments) Transport Utilities
Segment	Cybersecurity products / Identity & Access Management

Channels

Promotion	<p>Channels that will be used to promote the solution:</p> <ul style="list-style-type: none"> Mailing and web advertising Twitter (@evidian) and LinkedIn. YouTube channel (EvidianIAM). Major events and exhibitions such as Infosecurity (UK and Belgium), Gartner IAM Summit (UK), European Identity Conference (Germany), Les Assises (France), and Japan IT Week / Information Security Expo Publications in specialized magazines (e.g. DSIH or MySIH in France for the healthcare market). <p>Most marketing communication is channelled through the Evidian web site. Sales and training material. Press release and communications about the new product offer.</p>
Distribution	<p>Channels that will be used to distribute the solution:</p> <ul style="list-style-type: none"> Direct sales via the Evidian dedicated sales forces. Sales via the Evidian mother company Atos. Indirect sales via Evidian network or resellers and integrators.

Cost Structure

Cost implementation of	<p>Cost du bring product/service to the “market” (before Exploitation):</p> <ul style="list-style-type: none"> Cost of 1 P.Y. for Product Management: define product pricing, train presales and support personnel Cost of 1 P.Y. for Product Marketing and Communication: build collaterals, deliver marketing materials, organize communication events
Cost Sources	<p>Main sources that would produce a cost for the development and deployment of the solution proposed:</p> <ul style="list-style-type: none"> R&D Team: Development of the product Support & Maintenance team: Provides the customer with Support and Maintenance on the installed product. Two levels of support:

	<ul style="list-style-type: none"> ○ Standard support with remote assistance during business hours and SLA limited on reaction time. ○ Premium support, a personalized support with nomination of a Technical Support Account Manager, and specific SLA. ● sales & Marketing team ● Professional Services team: The Evidian Expertise Centre (ECC) makes their experts available for end users & partners. ECC can provide the following type of services: <ul style="list-style-type: none"> ○ Turnkey projects for end customer including: installation, configuration, customisation, training and rollout support, ○ Expertise for partners to securise their project or to customers that implement themselves the product. The level of ECC implication depends on the maturity of the partner or customer. ○ Post implementation services; training the system operators, usage, maintenance in operational condition, etc.
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Revenue Streams

Sources of financing foreseen after the end of the project	<p>Funding after the end of the project: product extensions will be funded by standard R&D budget, since the outcome of ENACT for Evidian will be a standard product in the offer.</p>
Revenue Sources	<p>Main sources of revenue:</p> <ul style="list-style-type: none"> ● Licences: Perpetual Licenses on a One-Time Fee basis. The price is based on the number of users and then OPTIONS can be ordered. Minimal order is 100 users, with degressive pricing points at 500, 1000, 3000, 5000, 7500, 10000, 15000, 25000, 50000, 100000, 200000, 500000 and 1000000 users. Pricing for larger deployments and site licences are directly negotiated on a case by case basis. Special Pricing is proposed for external users, CUSTOMERS mitigating the price with a 0,25 ratio. Special Pricing is proposed for external users, BUSINESS PARTNERS mitigating the price with a 0,50 ratio. <p>In addition, two criteria can significantly change the price:</p> <ul style="list-style-type: none"> ● A global purchase order for the total number of users, rather than an incremental purchase; ● The fact that more than one product is ordered. <p>OBVIOUSLY taking into account the competition we are facing can also significantly change the pricing offered as well as knowledge of customer budget</p> <ul style="list-style-type: none"> ● Support & Maintenance: To benefit from updates, in the case of Perpetual Licenses, a customer must subscribe to a Standard Support & Maintenance contract which also gives access to a number of other Support & Maintenance services. List Price of the Standard Support & Maintenance contract is calculated at a yearly rate of 20% of the License Fee list price. ● POC: Proof of Concept in customer environment ● Professional Services: Evidian delivers a specific catalog of professional services for all these operations.

IV. Intelligent Transport Systems - EDI Business Model

This page contains the business model generated by EDI for the solutions and applications identified as a result of the implementation of the use case in the Intelligent Transport Systems domain.

Main Contributor

Partner: Institute of electronics and computer science (EDI)

Category: Research

Type: IoT Platform Provider

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	<p>The current solutions:</p> <ul style="list-style-type: none"> • Lack automatization of control of rolling stock • Need large and expensive (wired) communication infrastructure • Offer limited access to information • Do not offer tracking information of rolling stock • Inauguration of composition is done manually, change also is manual and time consuming
Existing Alternatives	<p>Train detection systems (TDS) - axle counter and track circuit - , manual (wired) On Board Train Integrity Devices, GSM-R communications...</p>

Solution

ENACT Result	ITS Use Case
Exploitation Form	Publication, Technology & Knowledge Transfer
IPR Background	EDI has extensive know-how in IoT system development and has also participated in EU FP7 project "DEWI" rail domain.
Description	Demonstrator, publications. We would like to use our existing knowledge to get new knowledge, exploit it and gain our publicity.
Type	Open source

Key Metrics

KPIs	Accepted publication, (2 SCOPUS-indexed)
Time To Market / TRL at the end of the project	expected TRL is 5

Unique Value Proposition

Value added by the solution	IoT system compatible with DevOps enablers for integrity, logistics and maintenance control of systems
Unfair Advantage	more than 5 year experience in IoT development field

Customer Segments

Type	researchers, industry, students
Segment	IoT industry

Channels

Promotion	Radio, conferences, TV, journals
Distribution	journals, conferences

Revenue Streams

Revenue Sources	licensees, future projects, contract research
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V. Online Learning - Business Model

This page contains the business model for the Online Learning tool. Online learning enabler supports the adaptation logic of a system by updating and improving the adaptation rules.

Main Contributor

Partner: UDE

Category: Academic

Type: DevOps Solutions provider

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	Adaptive IoT systems in an open world setting (unknown unknowns) cannot be completely defined and realized during design-time, online learning to learn and improve the way that a system adapts during runtime is essential.
Existing Alternatives	Current online learning solutions were devised for systems (such as cloud and web) that can tolerate slow convergence and thus require sufficient time to learn. This is no longer sufficient for the highly dynamic IoT systems setting, where each actuation and action may have an effect (even negative) in the environment. Thus, novel online learning mechanisms are required.

Solution

ENACT Result	Online Learning enabler (enhanced reinforcement learning module taking into account the structure of the IoT systems' adaptation space)
Exploitation Form	As an academic partner exploitation will include publications, offering training courses, as well as using the ENACT outcomes as part of graduate teaching.
Description	Demonstrator, communications & publications, courses material
Type	Prototype software (available as open source research demo)

Key Metrics

KPIs	Increased convergence of online learning
Time To Market / TRL at the end of the project	TRL4

Unique Value proposition

Value added by the solution	The online learning enabler will empower IoT systems to self-adapt at runtime, even if the developers are not able to fully capture all potential future situations during design time.
Unfair Advantage	Incorporating knowledge about the structure of the software system's adaptation space makes the reinforcement learning algorithms capable of exploiting knowledge that standard RL algorithms are not aware of.

Customer Segments

Type	IoT DevOps Engineer
Segment	Generic

VI. Intelligent Transport Systems - INDRA Business Model

This page contains the business model generated by INDRA for the solutions and applications identified as a result of the implementation of the use case in the Intelligent Transport Systems domain. INDRA will exploit ENACT results by integrating the ENACT tools and developments achieved during the execution of the project (Use case) into an existing rail traffic control and safety platform.

Main Contributor

Partner: INDRA

Category: Industrial

Type: IoT Platform and Infrastructure Provider

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	<p>The current solutions:</p> <ul style="list-style-type: none"> • Lack automatization of control of rolling stock • Need large and expensive (wired) communication infrastructure • Offer limited access to information • Do not offer tracking information of rolling stock • Inauguraiton of composition is done manually, change also is manual and time consuming
Existing Alternatives	Train detection systems (TDS) - axle counter and track circuit - , manual (wired) On Board Train Integrity Devices, GSM-R communications...

Solution

ENACT Result	ITS Use Case
Exploitation Form	Product (integration into existing portfolio)
IPR Background	Indra's rail traffic control and safety platform allows rail infrastructure operators and managers to performe signaling (autorouting, enhanced safety, PIS, etc), maintenance and logistics activities providing functionalities of data monitoring, orchestrated development, learning operations security threats, actuation conflicts and error source analysis.
Description	INDRA will exploit ENACT results by integrating the ENACT tools and developments achieved during the execution of the project (Use case) into an existing rail traffic control and safety platform. The ENACT results will create new value, adding wireless safety and trustable IoT capabilities, V2X and I2I communicaitons. This product will provide safety solutions based on IoT infrastructures for enhanced capabilities of Lines, Monitoring, Tracking, Maintenance and Logistic of both Freight, Rolling Stock and track equipment.
Type	Proprietary Software

Key Metrics

KPIs	<ul style="list-style-type: none"> • Reduction of costs for maintenance activities %
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	<ul style="list-style-type: none"> • Reduction of time for maintenance activities % • Reduction of installation costs % and operational time% • Increase line capacity %
Time To Market / TRL at the end of the project	<ul style="list-style-type: none"> • MS 1 - Middle of ENACT's lifetime: Define the IoT Services and testing new technology under development. Up to TRL3. • MS 2 - End of ENACT: End of the project we expect relevant results validated on a Real Rail Environment • MS 3 - After end of ENACT (2 years): The solution has been validated and evaluated for inclusion in the Indra InvitalRail product roadmap. If included, technology certificated and ready for commercialization. (inc. Portfolio) • MS 4 - 5 years later: First commercial results, new markets and customers. Standards, interoperability.

Unique Value Proposition

Value added by time	Cloud system that will allow the automation of control of rolling stock, access to data, wireless communications (which decrease cost of installation, deployment, maintenance, the solution distribution, transportation) - Network Service (access, distribution, transportation) - Easy to install, configure and deploy - Decentralized, safe and trustable - Interoperable and compatible with existing infrastructures
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Customer Segments

Type	End User
Potential Customers	Railway infrastructure managers and train operators: Public/private owned companies in charge of the administration of rail infrastructures (incl. Tracks, stations, trains...), managing the traffic, distributing capacity and operation of trains for transport of freight and people.
Segment	Transport, Rail

Channels

Promotion	Relevant sector fairs, exhibitions and congresses; press release; social media and web page; sales and offers department Membership at Shift2rail (first European Initiative for the Rail Market) Indra expects to introduce the solution developed in ENACT in its existing portfolio;
Distribution	Existing channels: it can be included in the current platforms being commercialized; existing exploitation channels can be used for distribution, including international markets where Indra is present; Existing exploitation channels can be used for distribution

Cost Structure

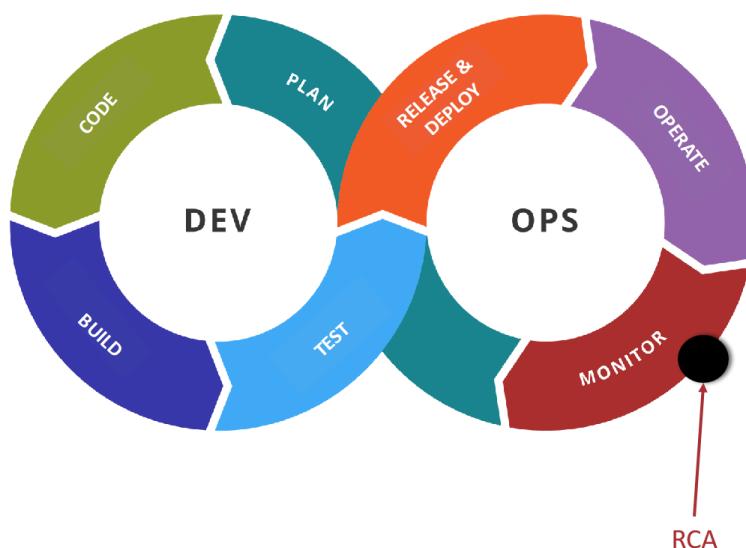
Cost Sources	<ul style="list-style-type: none"> • Rail, RAMS, Architecture, Communications, Management Developers and Managers (Personnel costs) • Equipment and SW • Background services • Commercialization • Installation
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Revenue Streams

Revenue Sources	<ul style="list-style-type: none"> • Direct sell to new customers (new opportunities and better market positioning) • Improvement in the margin of operations (existing customers, new customers) • Additional income (greater scope of recruitment, higher added value, projects in other ways)
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VII. Root Cause Analysis - Business Model

This page contains the business model for the Root Cause Analysis tool. This tool will allow performing root-cause analysis on a complex system by finding failure patterns that are similar to previously found problems.



Main Contributor

Partner: CA Technologies

Category: Industrial

Type: DevOps Solutions and Infrastructure Management provider

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	Monitoring has always been a critical feature for IT management. However, large deployments suffer from the "christmas tree" effect: lots of alarms triggering at the same time requires lots of expertise for administrators to identify the correct culprits and ignore false alarms. There are systems that can perform root cause analysis of an infrastructure, but they require deep domain knowledge, which is impractical to elicit and maintain in large and fast changing deployments. Customers are continually looking to automate the identification of critical errors within enterprise scale deployments enabling faster and more accurate root cause analysis
Existing Alternatives	Limited alternatives in this area. CA is a leader in the domain.

Solution

ENACT Result	RCA enabler
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Exploitation Form	Technology and Knowledge transfer from the research project to the Application Performance Management (APM) group in CA Technologies will put the research outcome into a product team and possibly become an integral part of the APM product for general sale worldwide. It is not anticipated that this will be licenced to third parties
IPR Background	Root Cause analysis has been one of the main research threads with CA Technologies Strategic research and part of other research projects. The team has considerable expertise in AI extensions to RCA prior to engaging in the ENACT project
Description	There have been no plans for development of this technology as a separate product. It will either become fully integrated in the APM product or become a paid for extension
Type	Proprietary Software

Key Metrics

KPIs	KPI1: Acceptance as a backlog entry in APM development, KPI2: Inclusion in a PI plan for future development and deployment
Time To Market / TRL at the end of the project	At the end of the project it is anticipated as TRL4 - proven in Lab. After potential transfer to CA development the initial plan will be TRL5 moving up the levels once validated in customer sites

Unique Value proposition

Value added by the solution	APM already has a triage capability however this needs further automation to include improved RCA, including recognition of the source of a fault beyond the existing stories
Unfair Advantage	Difficult to evaluate since it will potentially become part of a larger product and will not be sold as standalone

Customer Segments

Type	App Operator
Potential customers	The customers will be users of the APM product and will be buying more functionality than just the RCA capability
Segment	The target market is for enterprise APM users who need to monitor and manage applications running in a wide number of domains

Channels

Promotion	CA's Direct high value customer sales teams CA's extensive partner network and CA marketing/PR teams
Distribution	CA's Direct high value customer sales teams CA's extensive partner network

Cost Structure

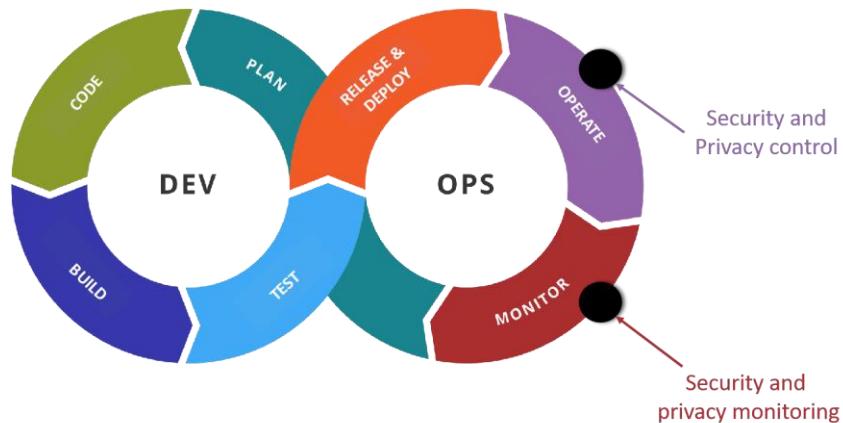
Cost of implementation	Unable to evaluate costs of a PI plan until the plan is formed
Cost Sources	Unable to evaluate costs of a PI plan until the plan is formed

Revenue Streams

Sources of financing foreseen after the end of the project	Unbale to evaluate. CA does not breakdown the costs of an individual component
Revenue Sources	Revenue is likely to be from subscription or purchase of product licencing and SaaS implementations. Other sources will likely be from CA Partnership agreements with partner network

VIII. Security Monitoring and Control - Business Model

This page contains the business model for the Security Monitoring and Control tool. This tool will offer IoT system operators with the possibility of controlling the security of their system with a minimal intervention and full integration with security-by-design (risk analysis) mechanisms used, following the DevOps approach.



Main Contributor

Partner: TECNALIA

Category: Research

Type: IoT Platform Provider, Smart IoT Systems provider, DevOps Solutions provider

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	The lack of holistic security assurance for IoT systems, companies cannot guarantee high security and privacy levels. It is difficult to monitor IoT environments, and lack of automatic remediation in case of SLA violation. Compliance with GDPR requires systematisation of security and privacy assurance mechanisms and evidences be collected.
Existing Alternatives	Most clients only use traffic monitoring tools. Limited control capabilities. Not integrated with design, no DevOps nor risk-driven security controls.

Solution

ENACT Result	ENACT Security Monitoring and Control Enabler
Exploitation Form	The Enabler prototype will be a software product and consultancy service for product customisation will be offered together.
IPR Background	MUSA Security Assurance Platform and MUSA Security Controls Metrics catalogue.
Description	A security monitoring and control tool that offers IoT system operators the possibility of controlling the security of their system with a minimal intervention and full integration with security-by-design (risk analysis) mechanisms used, following the DevOps approach. The prototype includes heterogeneous monitoring and enforcement agents to capture and analyse security metrics to detect SLA violations, as well as assessing the security controls deployed in different layers.
Type	Dual License

Key Metrics

KPIs	Number and type of early adopters besides ENACT end-users. Number and types of tool functionalities used.
Time To Market / TRL at the end of the project	TRL5 in the project and TRL7 1 year after.

Unique Value proposition

Value added by the solution	Monitoring for controlling the security of the multi-cloud applications, considering heterogeneous information (container, application, network, etc.). This technique can continuously check compliance with the agreed security SLA, and implement several reaction mechanisms that take into consideration the severity of the detected security deviation, with the possibility of repelling or mitigating negative effects.
Unfair Advantage	Combines network and IoT platform level monitoring and control, and it is based on a comprehensive catalogue of formal metrics.

Customer Segments

Type	App Operators
Potential customers	The targeted customers are SMEs or large software companies planning to offer secure and GDPR compliant IoT systems, preferably those adopting the DevOps paradigm. The early adopters are the end-users of ENACT.
Segment	IoT systems in any domain. Full functionality will be exploited in SOFIA (SMOOL) based IoT systems.

Channels

Promotion	Tecnalia customer channels, Tecnalia marketing as well as internal and external exhibitions/industrial events.
Distribution	Tecnalia marketing and Tecnalia business development forces

Cost Structure

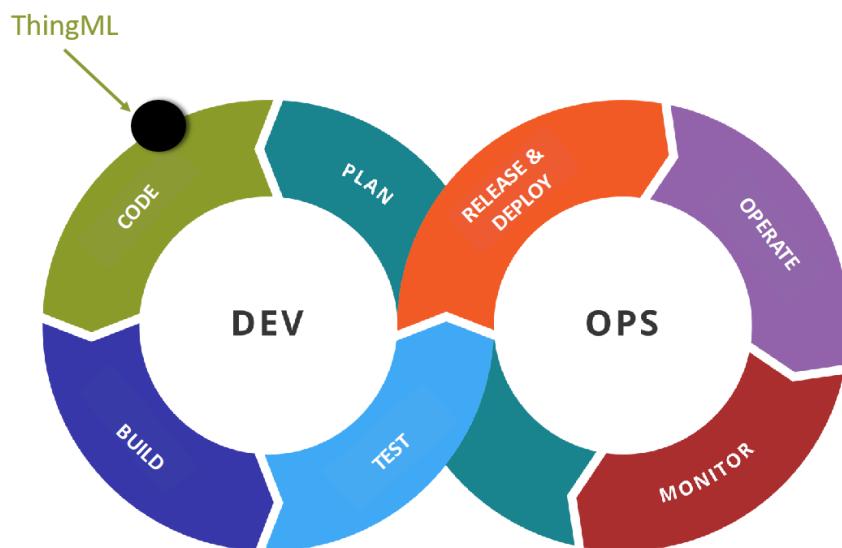
Cost of implementation	Personnel costs to bringing prototype to the “market”.
Cost Sources	Hosting costs. Staff required: 1 senior developer (12 months) + 1 administrator.

Revenue Streams

Sources of financing foreseen after the end of the project	Depending on the result of Tecnalia Elevator pitch event.
Revenue Sources	The Enabler will be provided with a 30-day free trial. The business model could be pay-per-use (each month or year) or per license, and will be part of the ENACT Framework license.

IX. Digital Health & ThingML Business Model

This page contains the business model generated by TellU for the solutions and applications identified as a result of the implementation of the use case in the Digital Health domain, as well as the ThingML enabler.



Main Contributor

Partner: Tellu IoT AS

Category: Industrial

Type: IoT Platform Provider, Smart IoT Systems provider

Lean Canvas

Problem

Customer needs, requests and opportunities from the market	Tellu delivers IoT platform and services within the digital health domain. The customer needs are digitalisation and automation within the health and welfare services to be more efficient and to deliver better services. Examples are Remote Patient Monitoring, allowing patients to stay longer at home, reduce travels to/from hospitals etc. for both care providers and care consumers. Another example is digitality and supervision (e.g., to supervise elderly living at home (e.g., applying sensors, video-based etc). An important component in these kind of digitalisation scenarios is the Personal Health
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	Gateway ensuring trustworthy flexible and controlled management of the IoT-based system.
Existing Alternatives	The current situation is a set of isolated services coming with the complete stack of hardware and software across the IoT, edge and cloud space. This alternative is not sustainable, as the scaling of these services need to be build on flexible platforms and infrastructures that enable interoperation and integration of a set of eHealth services as well as provisioning of data to various stakeholders, electronic patient journals etc

Solution

ENACT Result	eHealth Use Case & ThingML
Exploitation Form	To achieve the new generation of trustworthy services for the digital health domain, there are several ENACT tools and enablers that we plan to exploit in industrial use. In particular, the continuous deployment and delivery of the Personal Health Gateway, is planned to be exploited to improve the delivery process. The Security and Privacy monitoring and control enabler will be exploited both in terms of knowledge transfer to upgrade the security architecture of our digital health solutions and in terms of technologies to better handle authentication and authorisation across the IoT, edge and cloud space. The risk driven decision support enabler will be exploited in terms of knowledge transfer to improve our risk analysis processes related to our products. Finally it is planned to exploit results from the Robustness and Resilience enabler to improve robustness and resilience of our products, mainly through knowledge transfer.
IPR Background	Tellu is bringing both the IoT platform and ThingML as IPR background
Description	In particular Tellu want to bring to the market the Personal Health Gateway in which ENACT results will be exploited. Moreover, existing digital health services such as Remote Patient Monitoring and Digital Supervision will be evolved and improved applying gained knowledge as well as results from the ENACT project
Type	In terms of what Tellu will contribute to ENACT it will mainly be open source basically evolving the ThingML open source framework. In terms of exploitation of ENACT results (in terms of knowledge and technology) it will mainly be to build and evolve commercial products and services

Key Metrics

KPIs	<ul style="list-style-type: none"> Gain pilot of a Personal Health Gateway tested in real environments with real users Updated security architecture for our Digital Health solutions Evolving ThingML to better support trustworthy IoT system development. ENACT Digital Health use case tested out in pilot in industrial environment (e.g., at the ISRAA site)
Time To Market / TRL at the end of the project	Expected TRL is 6-8 at the end of the project, leading to commercial products within 2 years after the project end

Unique Value Proposition

Value added by the solution	Personal Health Gateway with unique flexibility and in general management of software based services across IoT, edge and Cloud space. Leading to unique offering of open and integrated digital health services.
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Unfair Advantage	Our digital health services will both be flexible and open, and trustworthy. For the Trustworthiness, the plan is to be able to certify according to Medical Device (ISO13485) of software based services that executes across IoT, edge and cloud space. This is currently not available for the market, as mainly closed embedded systems are until now been reaching the certification standard requirements
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Customer Segments

Type	System Integrators in the digital health domain such as Telenor, Tieto, Siemens Healthineer, Open Tele Health etc as well as service providers such as municipalities, insurance companies etc
Segment	Digital Health domain

Channels

Promotion	Web, mass media, commercials, Digital Health venues, Social Media, YouTube, conferences, publications - Engaging Policy Makers and Social/Health decision makers at regional level that could decide to invest in innovation at broad level for a territory. Thanks to the organization of National/Regional Road Show and events policy makers could improve the awareness about the IoT potential in seniors home care and in prevention with a consistent cost saving result coming from the adoption of a proactive care approach.
Distribution	Internet, System Integrators, Partners, National dedicated event on seniors care and ICT

Cost Structure

Cost of Implementation	Main cost is labour, doing requirements, analysis, design and implementation
Cost Sources	Main cost sources is labour, in addition comes cloud providers as well as marketing and sales

Revenue Streams

Sources of financing foreseen after the end of the project	Sales, Innovation projects, Investors
Revenue Sources	Main sources of revenue are the provided services. Tellu has a recurring revenue model based on volume (e.g., number of devices, users etc), features (motion detection, fall detection, integration with electronic patient journal etc), and use.