

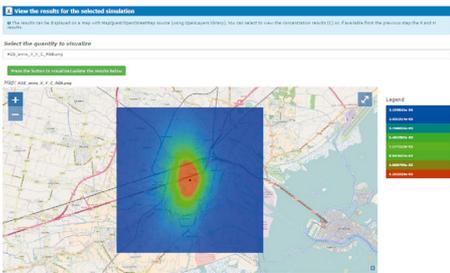
## Cloud-based environmental modelling

### Fortissimo Experiment Facts:

- Segment: Environmental Assessment
- Application Domain: Atmospheric Modeling
- Application: Aermod

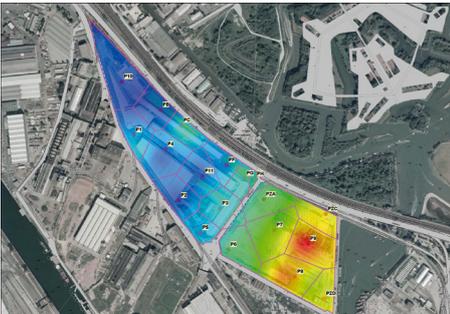
### The Company

eAmbiente is an SME operating in the area of environmental consulting. It provides its services to architects and designers involved in the design of large factories and industrial plants, characterized by significant environmental impacts. eAmbiente's mission is to reduce these impacts to acceptable levels. Since 2002, eAmbiente has used computer simulation to model emissions and water flow to predict the risk to soil and groundwater. During this period, environmental modelling has become an important tool during the planning phase of buildings, factories and public infrastructures. Although the required simulations are well understood, their performance and ease of use are limited. In particular, models may take prohibitively long run-times on conventional computing resources. This Case Study aims to overcome the limitations of existing environmental modelling tools such as processing time, cost and lack of user friendliness. eAmbiente will deploy and test a new Cloud-based-HPC service as a pay-per-use one-stop shop targeting the environmental modelling domain for both public and private organisations.



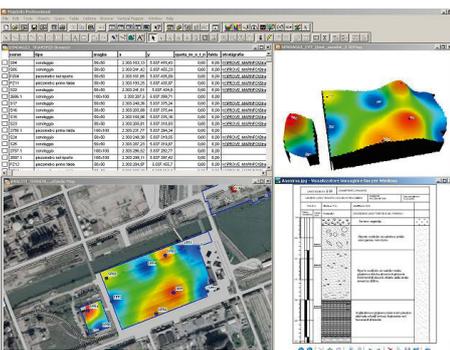
### The Challenge

The challenge of this Case Study is to overcome the current limitations of environmental modelling tools. The main aim is to set up and test an innovative service for SMEs, public sector (i.e. environmental agencies) and private stakeholders (i.e. consultancy companies, research centres and engineering facilities) through a single access-point/platform. The clear goal is to offer a service through the Fortissimo Marketplace structured in two ways: a Cloud-based 'on-line' service that will launch and aggregate the results of different models in parallel; and an 'off-line' service where augmented and virtual-reality facilities will be used to evaluate and interact with the results of the simulations. This challenge targets environmental issues such as noise, atmospheric fallout and soil pollution.



### The Solution

This challenge of this Case Study has been addressed through the development of a customized platform to integrate environmental software including a single easy-to-use GUI available to potential end-users. This GUI gives access to cloud-based HPC resources providing a one-stop-shop for the end-user. The use of this solution enables an 80% reduction in both simulation time and time to result with consequent cost benefits. Furthermore, the use of open-source software for the simulations has resulted in a significant reduction in the costs of using the platform.



### The Benefits

The total cost of running a single traditional Environmental Impact Assessment (EIA) on a powerful in-house system is ~€30.5K, including staff effort, computing resources and software licences. The same assessment, using open-source software, Cloud-based HPC resources and reduced staff effort is ~€6.5K resulting in a saving of ~€24K per EIA. eAmbiente will share 1/3 of this saving with customers with a consequent saving to eAmbiente of ~€16K per EIA. eAmbiente expects to carry out an additional 4 EIAs yearly over each of the next five years resulting in an overall cost saving of ~€64K per year. Similar gains apply to other consultancies active in this area.

### Fortissimo Experiment Partners:

- eAmbiente (End-user)
- Progesi (HPC Expert)
- T2i (Domain Expert)
- CINECA (HPC Provider)

### More Information:

[www.fortissimo-project.eu](http://www.fortissimo-project.eu)

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Furthermore, eAmbiente expects to increase its revenue with around €374 K of additional business over the next five years, corresponding to about €75K per year. eAmbiente has a revenue of about €270K per year for the EIA sector. The experiment can generate an increase of +28% in that yearly revenue. As a result of the experiment, two new employees over the next five years is expected. Finally an increase in competitiveness at the European level is anticipated since the workflow is easily customizable to European environmental legislation.

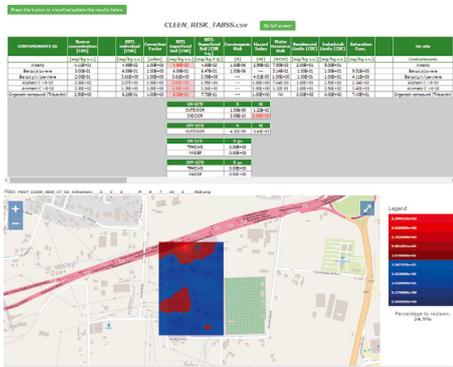
T2i will develop a brand new EIA-related service starting from scratch. There is no such (digital) service in T2i's portfolio and compared to the overall 'environment lab services' such as product tests, energy performance evaluations and CE labelling. T2i estimates a 5% increase in commercial revenues in the next two years corresponding to an expected increase in sales of €5K to €10K euros per annum.

Finally, this experiment offers a success story for CINECA, in the application field of environmental services. It is estimated that this will bring at least one new customer per year, with an approximate 5% increase in revenues from commercial services. This is in addition to an increase in cycle sales resulting from the use of CINECA resources in EIAs undertaken by eAmbiente.



### The Fortissimo Project

Fortissimo is a collaborative project that enables European SMEs to be more competitive globally through the use of simulation services running on a High Performance Computing cloud infrastructure. The project is coordinated by the University of Edinburgh and involves 123 partners including Manufacturing Companies, Application Developers, Domain Experts, IT Solution Providers and HPC Cloud Service Providers from 14 countries. These partners are engaged in 53 experiments (case studies) where business relevant simulations of industrial processes are implemented and evaluated. The project is funded by the European Commission within the 7th Framework Programme and is part of the I4MS Initiative.



**I4MS** Fortissimo is part of I4MS ICT Innovation for Manufacturing SMEs: [www.i4ms.eu](http://www.i4ms.eu)

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