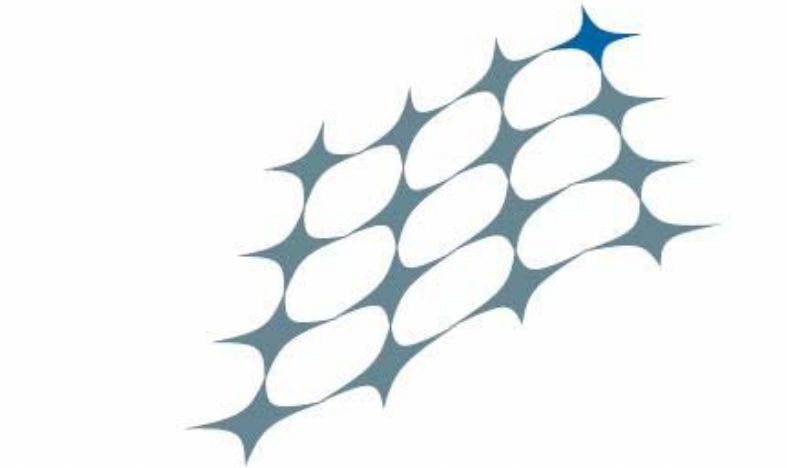

GRILO: GRId experiment on Logistic Optimisation
BE17

GRILO: GRId experiment on Logistic Optimisation

Goals

- To assess if recent advances in open GRID stacks reached a level of interest for conventional industrial applications
- To deploy an efficient graph and matrix level algebraic formalization of real industry logistic problem
- To integrate the industrial Enterprise Resource Planning systems (ERP) with efficient scheduler/planner

Target Sector

- Logistics and Transportation

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Problem

A medium – large company operating in the logistic sector (or widely interacting with it) typically has thousands of customers to service each day, each one of which must be geo-coded on a detailed road map and serviced within a specific time window. To this end, the company can make use of an heterogeneous fleet of several dozens of vehicles, which must all be routed and scheduled in an optimized way.

BE's Objective

Supporting the optimization and planning of complex real-world logistic problems. This requires a huge computational effort, both in terms of CPU and ancillary memory structures, and the geo-coding of the day customers on the road map, the computation of a huge time/distance matrix among customers and the construction of an effective routing plan.

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Technical aims

- To identify real world instances of problems by means of metaheuristics implemented using the frameworks that will be chosen as the most promising ones;
- To integrate the state-of-the-art GRID stacks with ant colony optimization (ACO) solutions
- To utilize GRID infrastructure for tasks which are out of the current application areas and have the opportunity both to verify the maturity of the infrastructure for solving complex real world problems and its suitability for use by typical mid-sized enterprises

GRILO plans to validate the functionality of current GRID technology as a foundation for advanced optimization algorithms applied to logistic and transportation optimization problem, in order to dramatically reduce elaboration/computing costs

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Technology

- UNICORE
- OGSA-DAI and SRB [the most suitable will be considered for final implementation]
- GRID infrastructure (CINECA)
- ERP: SAI tools (SOGEA 'production' SAI/PRO and 'scheduling' SAI/PRO/SCH modules)
- ACO application - Scheduling/planning module (University of Bologna)

Challenge

- Use a GRID system (infrastructure) and develop a consistent middleware that could support the dialogue between infrastructure and frontier technology models and can be applied and validated on a specific domain to configure a best fitting logistic planner for industry.

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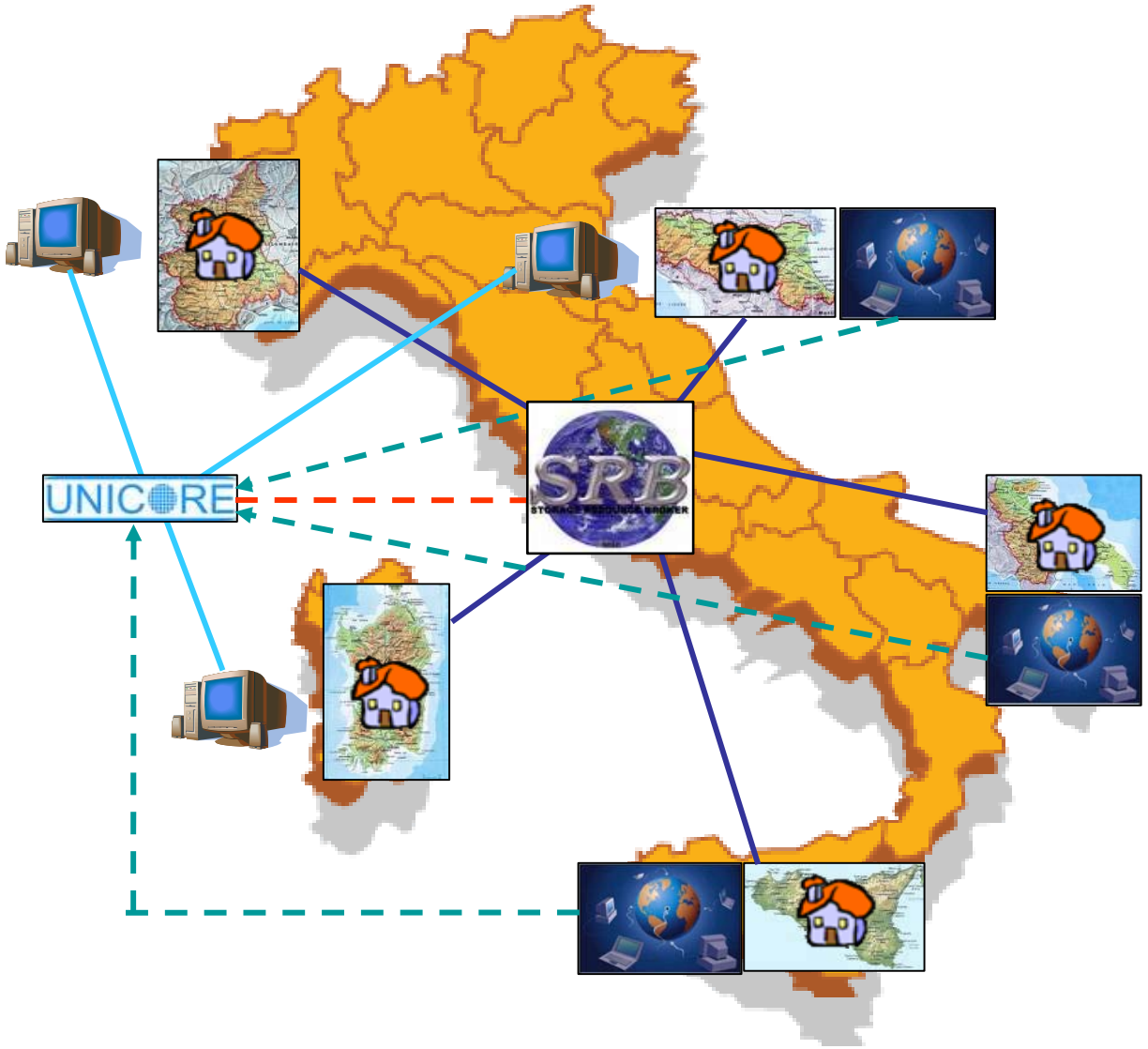


UNICORE

COMPUTING NODE

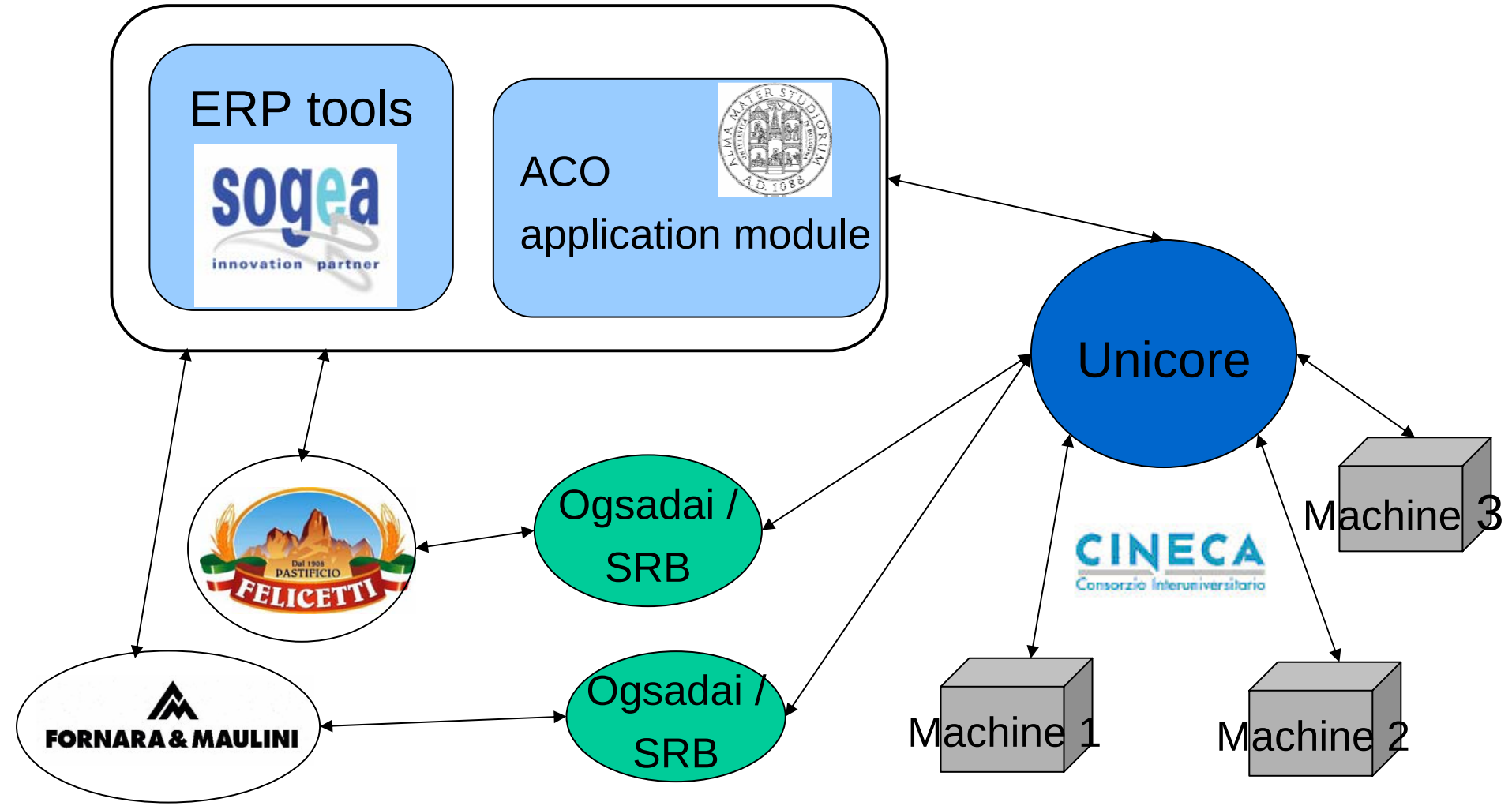
SRB

ERP

Company branch

Georeferential data

GRILO: GRId experiment on Logistic Optimisation



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Experiment output aims to

- A significant reduction in distribution costs;
- Increase central control on distribution activities and relative costs
- Formalization and replicability of planning skills;
- Analyze cost structure and support to distribution scenario definition;
- Geomarketing and price policies for new customers and customer areas;
- Balancing of working load among different drivers;
- Balancing of working load among different depots;
- Company vehicle fleet optimization.

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- **References :**
  - http://www.ogsadai.org.uk
  - http://www.sdsc.edu/srb/index.php/Main_Page
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Thank you!