

Development of an on board battery charger

The French NCC: CC-FR, dedicated to HPC, HPDA , AI technologies, and Quantum Computing brings together the community of technology providers and users. CC-FR federates the HPC, HPDA, AI and Quantum computing ecosystem and supports SMEs on the use of intensive computing, high-performance data analysis and artificial intelligence.



Organisations Involved

The NCC CC-FR is managed by **TERATEC** the European Pole of Competence in high performance digital simulation, in partnership with **CERFACS** the European Center for Advanced Research and Training in Scientific Computing, with **Inria Academy**, a continuing education program dedicated to open source software, with **CRIANN**, the regional computer centre and digital applications of Normandy , and **ROMEIO** the Regional Computing Center of the University of Reims Champagne-Ardenne.

INFINERGIES (infinergies.fr), Part of Groupe 6Npase is a design office specialized in power electronics.

Its expertise and capacity for innovation place it at the heart of the development of innovative solutions in various industries.

Combining EMC expertise, multi-sector experience and multi-criteria optimization according, Infinergies provides its team of experts to support customers in research and development projects.



Technical Challenge

Involved in the development of an on-board battery charger for electric vehicles, Infinergies was faced with the problem of the cumulative duration of the simulations to be implemented.

The product must be able to charge the battery, but also supply electricity to the grid, or power electrical outlets in the vehicle, whatever the battery's state of charge.

This requires a large number of simulations to test these numerous operating cases.

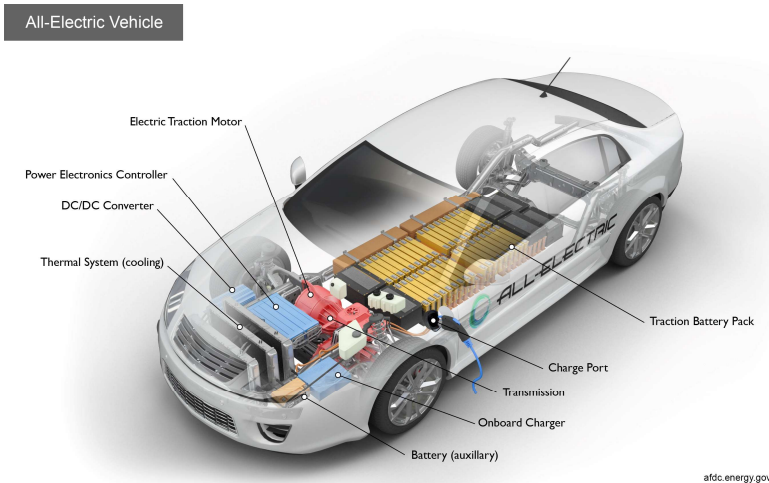


Figure 1: Components of an All-Electric Vehicle

Solution

Over a one-month period, launch 140 calculations (single-core) with an average duration of 12 hours, thanks to:

- the Available memory (60 GB of memory required for each calculation, i.e. half a Myria machine calculation node)
- consistent support from the CC for setting up calculations on the supercomputer, and for linking calculations together.

Business impact

The schedule for Infinergies was very tight. The help they received from CC-FR and CRIANN in setting up their simulations on the supercomputer was extremely effective, and then the access to the computing power enabled them to solve their industrial problem within the deadline.

Benefits

- ✔ Simulation of a large number of operating points at the same time
- ✔ Compliance with the end customer's specifications in a tight timeframe.

- HPC
- Simulation
- Multiphysics
- Battery Charger
- Electrical Vehicle

- Industry sector: Automotive
- Technology: HPC, Simulation

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