



Photo: Gabor Koszegi// Unsplash

Multi-scale and multiphysics simulation of a dam

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



Organisations Involved

CC-FR, set up within the framework of EuroHPC, is managed by the European Pole of Competence in high performance digital simulation **Teratec**, in association with the European Center for **Advanced Research and Training in Scientific Computing** **Cerfacs** and with the participation of the Big National Equipment Intensive Computing **Genci**.



CEVAA, <https://cevaa.com>, specialized in acoustics and mechanics, offers its test equipment and its expertise to Industry. Numerical simulation by finite elements is their major tool, with various specialized software and a dedicated team of engineers.



Technical Challenge

In 2021, CEVAA was asked to study the mechanical strength of a dam. With scales ranging from centimeters to several tens of meters, taking into account loads multiphysics (temperature, pressure, forces), the internal software and computing resources of CEVAA were insufficient to conduct the study.

Therefore, CEVAA requested The French NCC support to use HPC Computing resources available at the CRIANN through

GENCI as well as the latest sequential and parallel versions of Code Aster for the realization of a multi-scale simulation and multiphysics simulation of a dam.



Figure 1: dam simulation

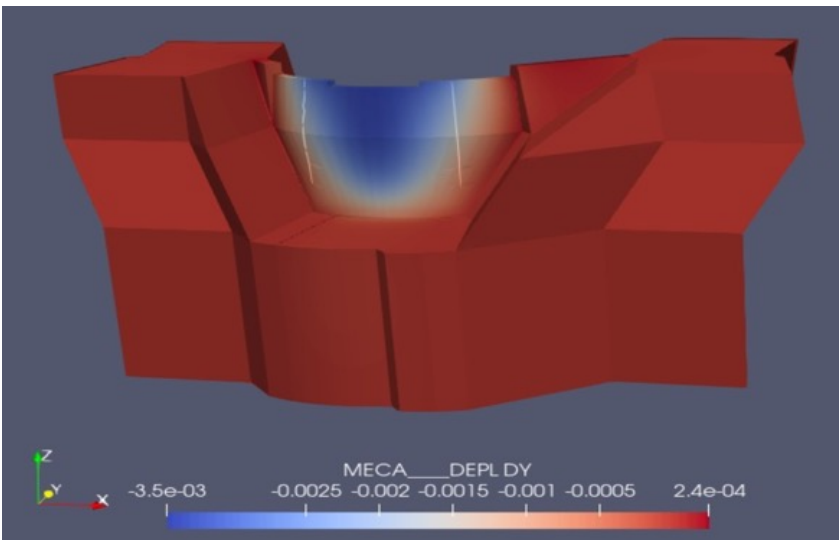


Figure 2: Results of modal deformation on a dam

Solution

The study was carried out on the CRIANN Myria calculator with Code Aster for calculations and SalomeMeca for mesh and post-processing.

The project received advanced support from the CRIANN, with the installation of the latest versions Code Aster sequential and parallel (versions 13 and 14), then help in the creation of the scripts to launch calculations. Several dozen calculations were launched on 8 CPU cores and 120 GB of memory.

Business Impact

The tailored program of CC-FR enable large client projects to be carried out with a significant productivity gain.

Benefits

- ✔ The use of the Myria calculator allowed to carry out several simulations simultaneously, and to obtain a delivery time in agreement with the customer needs.
- ✔ The remote viewing service allowed to perform pre and post-processing operations very smoothly on the calculator, without having to move the data.

- › HPC
- › Simulation
- › Multi-scale
- › Multiphysics
- › Mechanical Engineering

› Industry sector: Mechanical Engineering

› Technology: HPC, Code Aster

Download the success stories:

<https://cc-fr.eu/wp1/wp-content/mkp-starter/images/accompagniments/Fiche%20simseo%20-%20CEVAA.PDF>

More information:

<https://cc-fr.eu/accompagnement>

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