Identifying erosion threats to property developments

Hartree Centre
Science & Technology Facilities Council

Working on behalf of a client in the coastal reclamation and development sector, HR Wallingford has harnessed the intense computing capabilities at the STFC Hartree Centre to generate super-fast insights into the potential erosion threats to a proposed coastal residential and recreational development in the Middle East.

Challenge

Any investment in a new residential or recreational development demands an accurate and thorough up-front assessment of the potential risks involved. Developments on or close to the coastline come with the added risk of potential land erosion caused by the local wave regime. Civil engineering and environmental hydraulics specialist HR Wallingford were contracted to clarify the severity of threat to a proposed development in the Middle East The limitations in HR Wallingford's in-house computing resources placed substantial constraints on the time allowed to complete the necessary computer modelling exercise. The data generated by this exercise would be crucial to establishing whether the development would be practicable and affordable to insure. In view of the commercial pressures involved, the client needed to resolve this issue as fast as possible.

Solution

HR Wallingford harnessed the computing capabilities of 'Blue Wonder' at the Hartree Centre, an IBM iDataPlex cluster with a total of nearly 8,200 data-processing cores. This cluster offers strong performance in parallel processing, enabling large numbers of modelling runs to be undertaken concurrently, rather than one after another. This reduced the amount of time needed to run 20 years worth of wave and wind data using TOMAWAC, a 3rd generation wave transformation solver developed by a consortium including energy company EDF (France), government agency BAW (Germany) and HR Wallingford with the Hartree Centre (UK). Scripts specially developed for HR Wallingford were loaded onto the Hartree infrastructure, enabling this software to perform parallel simulations on high-end computing resources.

Benefits

The outcome was a better understanding of local wave behaviour in terms of key physical phenomena such as wave propagation, refraction, shoaling and their implications for coastline erosion. The required data was also produced significantly faster than would have been possible using conventional computing resources. As a result, HR Wallingford were able to deliver their findings and interpretations to their client much more quickly. This equipped the client to reach appropriate decisions in a timely and cost-effective manner – a critical benefit in the highly competitive coastal residential and recreational development sector in all parts of the world.

Work with us

We collaborate with industrial clients and research partners on projects that create insights and value using high performance computing, big data analytics, simulation and modelling.

By combining our world-class facilities with access to our specialists and computational scientists, we can enable your organisation to produce better outcomes, products and services more quickly and cost-effectively than through conventional R&D workflows.

With our partners we are developing the next generation of supercomputing architectures and software, combining existing best practice with innovation to deliver faster, cooler and more sustainable solutions capable of meeting the challenges of data intensive computing.

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