Qatar Research Community Prepares for Supercomputing

Doha, 30 April 2014: Qatar Foundation Research and Development (QF R&D) today gathered distinguished experts at the inaugural National Computing Infrastructure for Research (NCIR) User Forum in Doha, to discuss the importance of high-performance computing in research activities across Qatar.

As Qatar prepares for the development of the NCIR, the forum, attended by more than 130 experts, shed light on how computing remains an essential component of modern-day research.

Stressing the importance of high-performance computing Dr Mohammad Khaleel, Executive Director of NCIR and the Qatar Energy & Environment Institute, said: "Supercomputing is no longer a luxury technology for selective applications as the increased computation will enable researchers to apply much more sophisticated and precise techniques for the advancement of science."

Administered by QF R&D, NCIR is designed as a single entity to provide integrated national-scale computing and data capabilities for universities, industries and researchers in Qatar. As envisioned, Qatar's centralised national computational resource would surpass what any single institution could afford to deploy.

Dr Thomas Zacharia, Executive Vice President for QF R&D was one of the speakers at the NCIR forum where Qatar's research ambitions were expressed, identifying the infrastructural needs and research opportunities for high-performance computing in Qatar.

Attended by policy makers, senior researchers and computer scientists, the forum focused on how supercomputers, capable of more than 1,000 trillion calculations per second – 'petaflops' – can be used to help address some of Qatar's most important scientific challenges.

Commenting on the importance of supercomputers for academic research in Qatar Dr Khaled Machaca, Associate Dean of Research at Weill Cornell Medical College in Qatar, said: "The NCIR is important for every institution in Qatar because it is an empowering technology with great benefits. The things we otherwise would not do because of limited computational power, supercomputing would open the door for us to do them.

"As a platform especially the way the NCIR is being designed, as a service for stakeholders, it is very much an empowering technology. Therefore a supercomputer, or the availability of advanced computational power, would open doors for scientists that would otherwise be closed," he added.

In an age of complexity and big data, high-performance computing is an indispensable ingredient of scientific research. Supercomputing has become the cornerstone of the digital age, be it with regards to computer intensive tasks such as climate simulations and power grid modeling, or data-intensive computing applications such as genomic analysis, cyber network security and social media analytics.

Commenting on the benefits of high-performance computing for Qatar's academic community Dr Hassan Al Derham, Vice President of Research at Qatar University, said: "A supercomputing facility here in Qatar would serve all those working in the research field, specifically at Qatar University where we have many projects underway in the fields of engineering, environmental science, computer science and cyber security.

"Therefore, having such a facility would benefit our researchers and advance the type of research they conduct and the results they would yield, enabling them to publish their findings in world renowned publications."

The forum examined the infrastructure that Qatar plans to provide for scientific computing, will including expanded data storage, sophisticated networks to transmit information, and the human resources needed to maximise the system's capabilities.

In Qatar, researchers anticipate using the complex simulation capabilities of supercomputers to address what Qatar Foundation has identified as the nation's 'Grand Challenges' of water, energy, health and cyber security. Specifically, scientists will use computational modeling to study oil and gas exploration, the development of new materials for oil and gas exploration, climate change, the electric grid, genome sequencing devices, advanced cyber security, and data analytics.

Citing potential benefits for Qatar's oil and gas industry, forum speakers indicated that high-performance computing could provide more accurate seismic modeling of oil reservoirs that in turn might substantially increase oil recovery. Likewise, the creation of 'designer catalysts' that interact with crude oil molecules could enable oil refineries to produce more high-value products at less cost.

Commenting on the benefits of supercomputing for energy industry Ahmed Almoli, Standards Engineer of Technical Services at Qatar Petroleum, said: "The energy sector has a lot of data to store and simulations to create especially with regards to 3D modelling and onsite data gathering. With the need to have all this data digitally stored before executing live operations, which are very costly and sometimes risky, supercomputing definitely helps reduce the time and effort to speed up the entire process."

And Theis Solling, lab manager at Maersk Oil Qatar added: "The new supercomputing infrastructure is a great initiative which Maersk would be able to benefit substantially from more computing power. We have theoretical, as well as experimental, facilities in dire need of strong processes and intense data storage.

"In some sections in the oil field in which Maersk operates, the recovery is quite low due to technical restraints. Although we are there to unlock that, we need modelling and experiments in order to do so so supercomputing would present a substantial economic and scientific upside to understanding the key processes."

Looking to the future, NCIR anticipates providing computational support to other research partners in the Gulf Region.

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About Qatar Foundation Research and Development (QF R&D)

Leading Qatar's vision to become an international hub for research and development excellence and innovation, QF R&D is home to Qatar Science & Technology Park (QSTP), a world-class hub for technology innovation and commercialisation. As well as the Qatar National Research Fund (QNRF), a globally renowned scientific research funding organisation and prominent research institutes operating at the frontiers of science. Including the Qatar Biomedical Research Institute (QBRI), the Qatar Computing Research Institute (QCRI) and the Qatar Energy and Environment Research Institute (QEERI).