HPC is like Formula 1 racing… but cloud is changing things

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iSGTW speaks to Michael Resch, director of the High Performance Computing Center Stuttgart (HLRS)in Germany, ahead of his keynote speech at next month's ISC Cloud '14 conference.

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What exactly is HLRS and what are its goals?

HLRS is Germany's first national supercomputing center supporting researchers and industry alike. It

"The purpose of HPC is — and has always been — to build the fastest possible systems and reach new heights of performance," says Resch.

provides both access to supercomputing systems and expertise in using them in large-scale simulations. HLRS aims to provide all the necessary services to do leading-edge simulations in all fields of science and engineering.

This work is important for Germany as it provides world-class systems and services, bridging the ever-growing gap between blue-sky research and down-to-earth solutions. At HLRS, we have a focus on real-world applications and it is vital for us to support such applications all the way through from the basic methodological research to the end product that is visible to the customer. It is HLRS that makes sure research doesn't just end up in

journal papers, but in your everyday life. I firmly believe that research needs to have a role in providing solutions to the general public. Of course, this doesn't mean that everything explored has to lead to the immediate development of a solution; rather it means that in the end we have to do research that is reasonable for our wider society.

And how is HLRS important for Europe as a whole?

Through its involvement in a number of key European projects and by being a key player in the Partnership for Advanced Computing in Europe (PRACE), HLRS plays a major role in creating and maintaining a competitive research and engineering environment in Europe.

PRACE provides an excellent opportunity to maximize the reach of our support. However, as PRACE allows only one representative per country, the Gauss Centre for Supercomputing (GCS) plays the role of the German representative in the collaboration. GCS was created in 2007 and now provides half of the systems made available through PRACE.

Why is cloud computing a source of excitement for both academia and industry?

The cloud offers a new way of providing access to computing resources. When looking at the pyramid of computational power, I believe we will see the cloud starting to eat up the bottom of that pyramid and move further upward (although I doubt it will

ever reach the highest end). This is beneficial both for academia and industry. In my talk, I will explain how even we as a large-scale center can make use of cloud technologies to support academia and industry more efficiently.

I believe you were once rather skeptical about the cloud. Why was that and what caused you to change your mind?

I was rather skeptical about 'the cloud' when it first came up. To me, it looked very much like yet another buzzword. However, over recent years I have seen industry and academia alike put some flesh on the bones and there are a variety of activities going on that deserve our support. Pressure from the commercial side, particularly from cloud providers like Amazon that can compete with large national centers, has forced the computing community to focus on what we can do to make concepts like cloud more productive for the end users.

The tagline of ISC Cloud '14 is 'Cloud Meets HPC'. To what extent do you feel we're seeing these two areas come together?

It really depends on how we define high-performance computing (HPC). In its purest form, HPC is the attempt to build the fastest system possible — at any cost. This is like Formula 1 racing: there's not too much worrying about the usability of the systems. The purpose of HPC is — and has always been — to build the fastest possible systems and reach new heights of performance.

This very much reminds me of Formula 1, where it's all about pure speed and the winner is the fastest car, rather than the best, most convenient, or most useful car.

When you talk to governments around the world, their first issue is still reaching exaflop computing. They're mainly concerned about speed and much less about the problems they could potentially solve with HPC. It may seem strange to people outside the field; it may even seem like no-one cares about the actual usage of the systems beyond scoring well on the Linpack benchmark. However, we don't start by saying 'look, here are the problems we'd like to solve'. Instead, we say 'this is the performance we want to achieve' and once this has been attained we can look for the applications that can use these systems.

That all being said, it's quite interesting to see that things are now starting to change a little bit and this is probably down to the cloud computing approach. There is a growing trend of bridging the gap between your PC and my supercomputer, with many more HPC systems falling into this space between the two extremes. In this sense, HPC and cloud are starting to come together and support one another. People are starting to understand that their HPC systems no longer just have to be very fast, but they also have to be useful. We can see this change associated with the rise of terms like 'high-productivity technical computing'.

Finally, are there any discussions or presentations that you're particularly

looking forward to attending at ISC Cloud '14?

I'm chairing a session on the industrial uses of HPC and cloud that should feature some very interesting talks. I would like to learn more about what has been achieved so far and in which ways things are likely to develop in the future. There are important lessons to learn from industry — they're very good at developing very pragmatic solutions to the challenges they face.

The key appeal for me with ISC Cloud and ISC Big Data is that they're not purely academic events. They really try to explore the state of the art, starting with basic research activities and going all the way up the chain to the final industrial uses. I think it's really important to see the whole spectrum in this way, from the very theoretical to the very practical end-user solutions.

Some of the big industry-focused HPC events out there can really be quite boring, especially when each company just presents its own solution. And equally, the very theoretical academic conferences can be quite dull if the researchers present aren't at all concerned by how their work can be put to use in the real world. I think that all of the ISC events do a great job of balancing these two extremes and are really important for today's knowledge-driven society, in which a constant flow of knowledge from academia to industry is vital.

ISC Cloud'14will take place in Heidelberg, Germany, from 29-30 September.

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