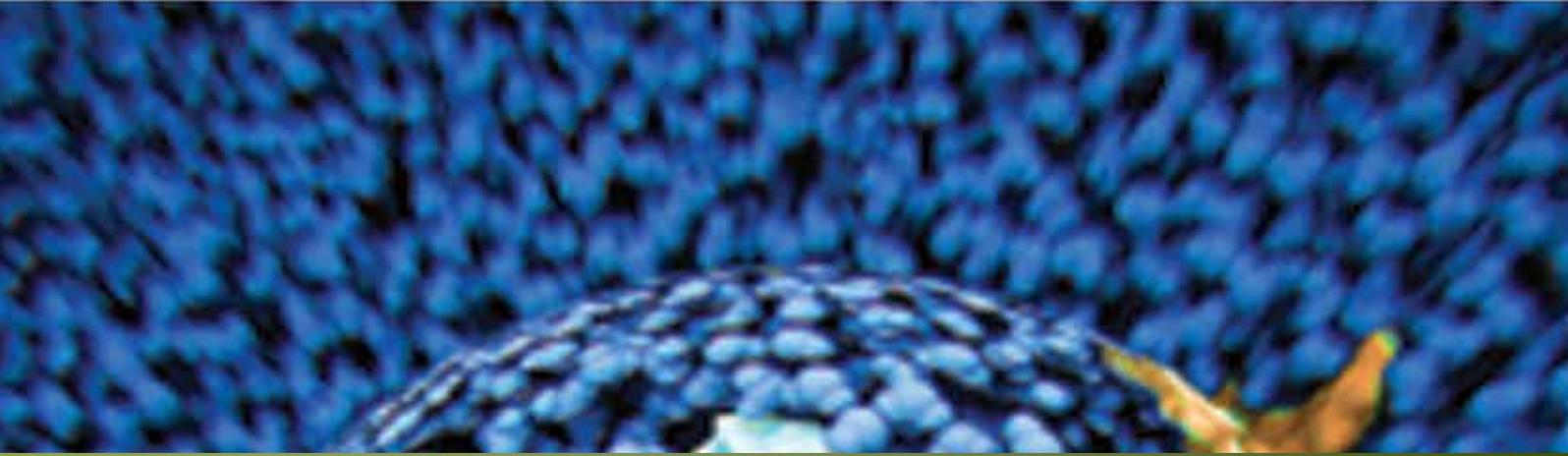




**PDC Center for
High Performance Computing**

no:1
2010

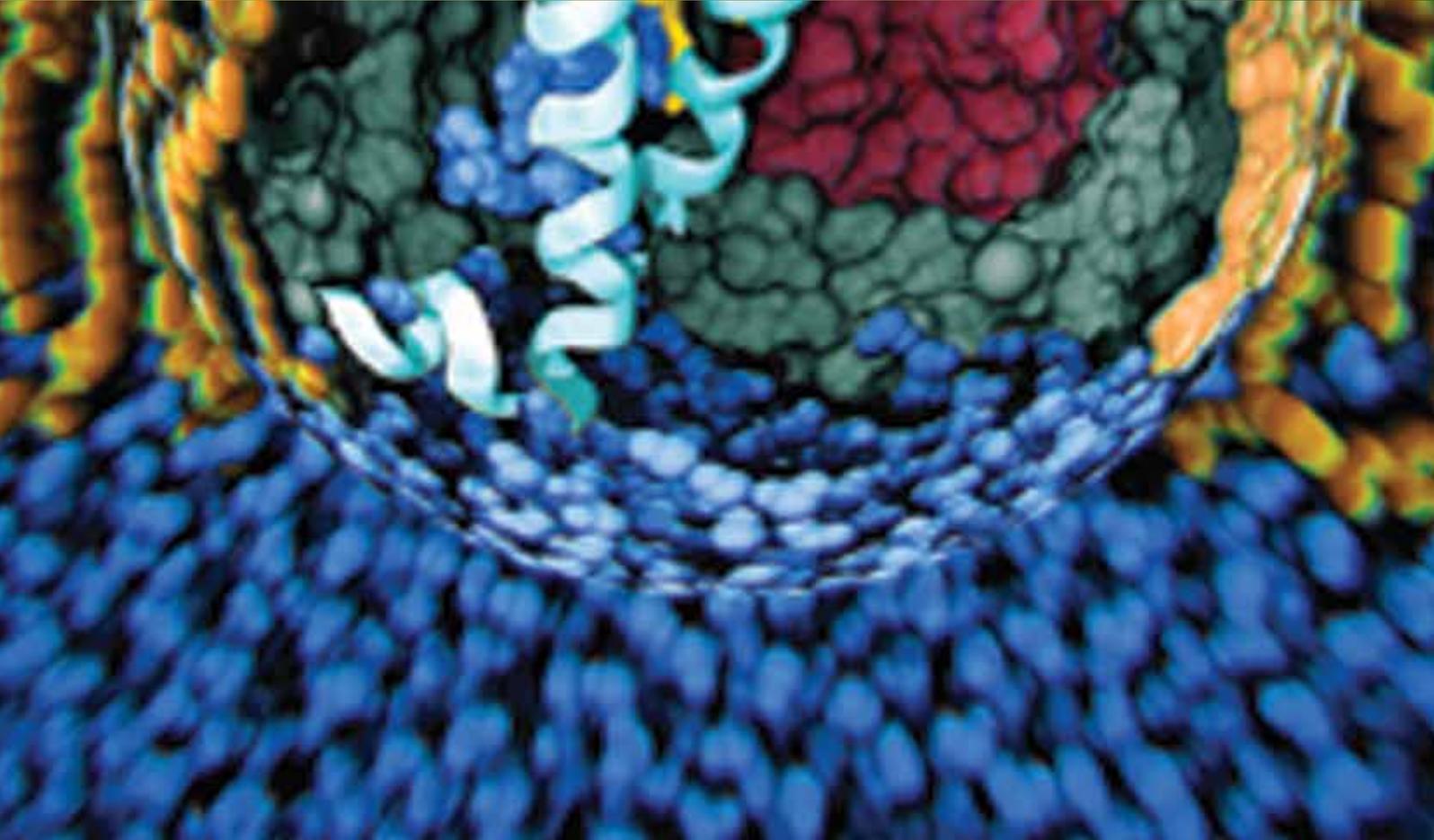


PDC Newsletter

SeRC Brings e-Science to Swedish Researchers by Dan Henningson

Swedish Scientists may apply for a HPC-Europaz Research Visit

Your X.509 certificate in five minutes by Thomas Zangerl





LENNART JOHNSSON,
DIRECTOR PDC



ERWIN LAURE,
DIRECTOR PDC-HPC

PUBLISHED BY PDC AT KTH CSC

The center operates leading-edge, high-performance computers as easily accessible national resources. These resources are primarily available for Swedish academic research and education. PDC receives funding from the Swedish Research Council (VR), and KTH.

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The year 2010 is a special year for PDC. On January 15, 1990, PDC was officially inaugurated by Janne Carlsson, then president of KTH. We will celebrate this 20th anniversary with an international symposium on August 30 and 31. Come and join us at this celebration!

Celebrating 20 years of PDC is an occasion to look back at the achievements of PDC since 1990, but even more so it is an occasion to look ahead to the years to come. And 2010 promises to be an exciting year with many new developments.

As mentioned in the previous newsletter, PDC is taking part in the Swedish eScience Research Centre (SeRC), a long-term project under the Swedish strategic research program, led by KTH with partners from Karolinska Institutet, Linköping University, and Stockholm University. SeRC's official kick off was April 22, and this newsletter features an article by Dan Henningson, the director of SeRC, on the setup and goals of SeRC. For PDC, SeRC not only provides an excellent opportunity to increase its interactions with users of computational methods in a wide range of scientific disciplines but also brings increased collaboration with its partner center NSC in Linköping. Within the framework of SeRC, PDC and NSC are striving for close collaboration; goals include coordinating their strategies, harmonizing their environments, and coordinating application support. As a first step, a Memorandum of Understanding has been developed that will be signed by the presidents of KTH and Linköping University. In the spirit of this collaboration, PDC and NSC have jointly applied for application expert positions at SNIC and were awarded four positions. Two of these positions will be installed at PDC; one will focus on fluid dynamics, and one will focus on molecular dynamics. These positions and the close collaboration with NSC will help PDC provide advanced user support.

This year is also pivotal for computational scientists in Europe and PDC's role in serving large-scale users. PRACE, the Partnership for Advanced Computing in Europe, has recently announced its first call for access to Petascale systems to be followed by regular calls and access to a rapidly growing number of Petascale resources. The Council of Research Infrastructures (RFI) of the Swedish Research Council and SNIC are very supportive of the development of a shared European Research Infrastructure for Computing and Data Intensive research. SNIC recently decided to expand PDC's role in the emerging European computing and data research infrastructure, which will add significant computer resources at PDC. This will also add, in combination with PRACE European funding, support for porting applications to Petascale systems, and training and education in the use of such systems. PDC's Director, Lennart Johnsson, has been elected by the European partners to serve on the Board of Directors of the new PRACE legal entity, initially composed of about 20 member countries. SNIC is the Swedish PRACE

partner that is expected to be represented on the PRACE Council that governs PRACE. Other SNIC centres will also provide support for beneficial use of PRACE resources by Swedish researchers.

Another major development early this year was PDC's decision to partner with Cray for its new capability system. As of July 2010, PDC will be able to offer a 93 TeraFlop/s Cray XT6m to its users. Thanks to SNIC's decision for PDC to serve an expanded role in PRACE—and their corresponding funding, along with comparable additional KTH funding—this system will, in a second phase in late 2010, be upgraded to a Cray XT6. The upgrade will include the new Cray Gemini low-latency network and extend total capacity to some 260 TeraFlop/s. With this system, PDC will be able to offer its users unprecedented capabilities that will, in combination with availability of PRACE Petascale systems, hopefully contribute to pushing Swedish science to new frontiers.

On the international scene, we are moving ahead on several fronts. In the context of DEISA/PRACE, we will, for the first time, provide Swedish resources to the DEISA infrastructure and welcome European users in autumn this year. In turn, we have mentored three Swedish applications for the use of other European HPC resources in the context of the DEISA Extreme Computing Initiative (DECI).

Along with continuing its contributions to the European Grid Infrastructure (EGI), PDC was awarded two other major European projects this spring. The Venus-C project, which is led by Engineering Spa, Italy, and brings together a consortium of 14 European partners, will establish an industrial strength Cloud infrastructure with Microsoft's Azure platform as one of the major building blocks. The ScalaLife project, led by PDC, aims at providing scalable software services for life sciences much in the SeRC spirit. PDC is partnering with major European software, technology, and resource providers in this project, namely the Department of Theoretical Chemistry at KTH, Stockholm University, Oxford eResearch Centre, Leibniz Rechenzentrum, Barcelona Supercomputing Center, the Institute for Research in Biomedicine, and Synective Labs.

With all these developments, 2010 promises to be an exciting year for all of us, and we look forward to welcoming you to the PDC 20th anniversary celebration!

Lennart Johnsson, Director PDC

Erwin Laure, Director PDC-HPC

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SeRC Brings e-Science to Swedish Researchers

By: Dan Henningson

SeRC – the Swedish e-Science Research Centre – is formed by the universities in Stockholm and Linköping (KTH, KI, SU and LiU) around the two largest high-performance computing centres in Sweden (NSC at LiU and PDC at KTH). This project will bring together a core of nationally leading IT research teams (tool makers) and leading scientists in selected strategic application areas (tool users) and will focus on three main objectives:

- 1) Formation of e-Science communities that connect application groups with relevant core e-Science groups and computer experts at PDC and NSC.
- 2) Research in core e-Science methods such as distributed resources, database technology, numerical analysis, visualization and interaction, mathematical modeling, and parallel algorithms—all focusing on problems critical for several e-Science communities.

3) Much closer collaboration between PDC and NSC, and a substantial increase in advanced support staff, which will turn the centers into comprehensive e-Science enablers.

SeRC will take a national responsibility in the e-Science area in terms of hosting a majority of the Swedish e-Science infrastructure through PDC and NSC (e.g., almost 80% of the total cores and capacity, i.e., 300 Tflap/s, currently available for academic research in Sweden). To ensure commercialization and non-academic use are dealt with at the highest decision making level, SeRC will have an advisory board that includes experts from the private and public sectors alongside international science and e-Science experts. SeRC will also feature industry representatives taking an active role in the e-Science communities. Thus SeRC, as a Swedish e-Science Research Center, will constitute a leading visionary

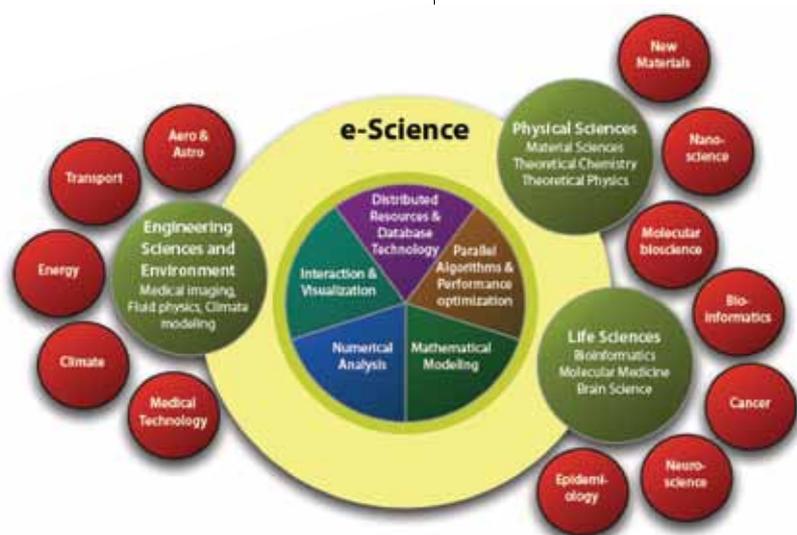
e-Science node with a national scope and strong international ties. The four partner universities are together committed to strengthening and shaping the emerging e-Science landscape in Sweden and to give research in this field clear priority in their strategic plans.

During 2010, SeRC will start seven e-Science communities in the areas of bioinformatics, complex diseases, electron structure, flow, particle simulation, visualization and numerical analysis. In 2011 additional communities within the areas of climate, databases, distributed resources, parallel algorithms will be set up.

The SeRC management group consists of Dan Henningson (director), Olof Runborg, and Anna Delin from KTH, in addition to Erwin Laure, PDC director, as adjunct member. From Linköping University Anders Ynnerman (co-director) and Bengt Persson are involved. Stockholms University is represented by Juni Palmgren and Erik Lindahl. Karolinska Institutet is represented by Bengt Persson and Juni Palmgren.

To fulfill its mission, SeRC is critically dependent on the resources provided by PDC and NSC and requires continued support by SNIC and VR to these centers to ensure the availability of suitable national hardware resources, which is also a precondition for gaining access to international systems.

The strategic research initiative, SeRC, has now been formally running for a couple of weeks, and is in full action with regards to activity planning and recruitment. The first annual SeRC research conference took place April 22-23, 2010.



The structure SeRC envisions is captured in five primary core e-Science technology areas that interface with three e-Science application areas, representing (i) Engineering Sciences and Environment, (ii) Physical Sciences, and (iii) Life Sciences. The glue holding these together is the network of e-Infrastructure, in terms of services from the PDC/NSC high-performance computing centers, application experts, software engineers, frequent meetings between scientists, and—not least—resources, so that leading researchers can spend time for building and actively managing these new communities.

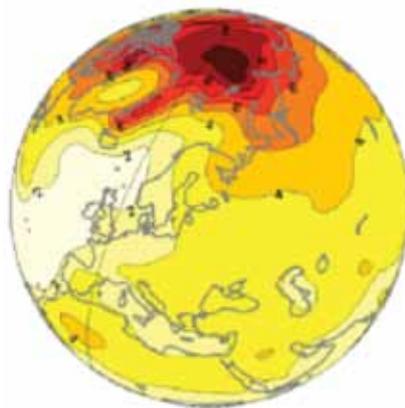
SeRC will support existing communities and the catalyzation of new communities that connect application-oriented groups with relevant core e-Science groups in the SeRC research platform and the SeRC services and infrastructure platform. Each of the supported communities will thus comprise computer experts, e-Science method developers and scientists from application areas who jointly run e-Science projects. There will not be a fixed set of communities, but they will be created dynamically as the research environments evolve. It is crucially important that communities do not become isolated subcenters, but that they are effectively linked together. A non-exhaustive list of e-Science communities is given below:

FLUIDS.

The Fluids community will include application groups from fluid mechanics, geophysical flow, aeronautics, and astrophysics, some of which already collaborate in the FLOW and BBCC centers. There is also a strong connection to the strategic areas of transport (laminar wings) and energy (wind energy). The development of efficient and accurate methods for the simulation of turbulent flow is a core activity. Major breakthroughs are expected via numerical simulations of turbulence, which is at present often only attainable in experimental studies.

CLIMATE AND THE ENVIRONMENT.

The climate modeling community will involve scientists from BBCC, SMHI, and FLOW. BBCC and SMHI are partners in MISTRA-SWECIA and use climate models as the research tool. On the international scene they are associated with the EC Earth project, aimed at the development of an earth system model for climate prediction. The e-Science components in climate modeling include the development of efficient coupling techniques between climate model components and numerical techniques for space-time discretization.



BIOINFORMATICS AND SEQUENCE DATABASES.

This community will build on the constellation of SBC (SU+KTH), CBR (SU), the possible new high-throughput genomics core facility in SciLifeLab (KTH+SU+KI), and additional participants from LiU. Bioinformatics is a strong strategic field in Sweden, with world-leading research on membrane protein structure prediction (von Heijne), maintenance of high-profile sequence databases (Pfam, InParanoid), and the Stockholm-Linköping groups have been driving the formation of the Swedish BILS node of the ELIXIR infrastructure for bioinformatics in Europe.

COMPLEX DISEASES.

For the first time in medical history, the technical prerequisites exist for merging cascades of molecular data from biological samples, with images of the brain or other body parts, with longitudinal information on lifestyle and health, and with clinical data from hospital databases and from disease registers. High-throughput molecular technology allows mining a large number of genes, transcripts, metabolites or proteins in order to detect association with clinical outcomes. Adding the interplay with environmental and lifestyle factors allows new insight into the complex multi-factorial mechanisms underlying human health.

Staff Focus



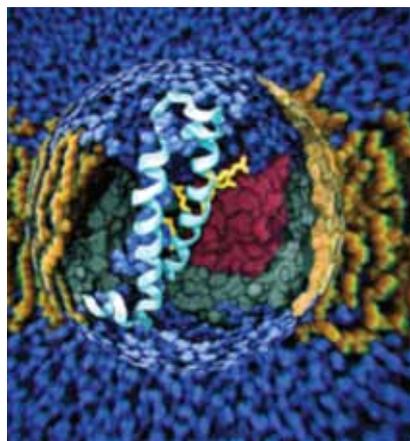
LILIT AXNER

Lilit Axner studied and obtained her M.Sc. in Mathematics at NADA (currently CSC), here at KTH. Afterwards she obtained her Ph.D. in computer science--with emphasis on Computational Fluid dynamics--at the University of Amsterdam <<http://uva.computationalscience.nl/>>, the Netherlands. To continue her passion in computer science, she immediately started to work as a consultant at SARA Computing and Networking Services <<http://www.sara.nl>>, Amsterdam, the Netherlands. During her two years of employment there, together with her colleagues at SARA, she was actively involved in the DEISA <<http://www.deisa.eu/>> and HPC-Europa2 <<http://www.hpc-europa.eu/>> European Union projects as well as other Dutch national HPC projects. She was also involved in application support for users. While working at SARA in the Netherlands, she has studied and obtained her M.B.A. at Blekinge Institute of Technology <<http://www.bth.se/>>, Sweden.

Lilit recently joined PDC as an application expert. Her main objectives will continue to be the DEISA and PRACE <<http://www.prace-project.eu/>> European Union projects as well as Swedish e-Science projects such as ScalaLife and SeRC.

PARTICLE SIMULATION.

The core of this e-Science community is particle-based modeling, using e.g., time-dependent molecular dynamics or Monte Carlo simulation to study extremely complex systems with methods based in statistical mechanics.



Some of the currently most important areas are the field of simulations of biological macromolecules and materials modeling (with strong groups both at SU and KI), for instance to design new drug molecules to interact with specific proteins or understand complex dynamics on the molecular level. Advancing the state of the art of these modeling methods will also be crucial for several other areas such as condensed matter and nanophysics.

ELECTRON STRUCTURE.

This community will focus on first-principle calculations based on, for example, density functional theory and Hartree–Fock methods, but also on multiscale simulation techniques. Groups involved in the community will be, for example, theoretical physics, theoretical chemistry, and materials science. More powerful models will have strong impact on applications such as materials science, nanoscience, molecular biosciences, energy, security, and cancer (e.g., two-photon sensitizers for photodynamic therapy), etc.

MEDICAL VISUALIZATION.

The human visual sense is superior to today's computers in terms of perceiving content in images. Using vision, high bandwidth can be created between digital data representations and the user. It is this human capability that visualization builds upon by generating images representing the content of large and complex data sets. In image science the goal is to translate complex



spatio-temporal patterns into forms that can be understood by humans, through a series of processing steps to extract descriptions of the objects embedded in the image or volume dataset. To achieve this goal there is a need to develop a language describing derived image content, understandable by visualization pipelines allowing them to act upon the metadata in the data stream. This will turn the visualization and Image processing system into an increasingly autonomous companion to the e-Scientist.

NUMERICAL ANALYSIS.

Development of numerical algorithms is critical in successful e-Science based research, often matching or outperforming improvements of hardware in terms of speed gains, in particular in areas at the forefront of research which only recently have become amenable to computer simulations. The numerical analysis group will work together with several other e-Science communities in their projects and also lead its own projects. The work will focus on general software and theory for first principle computational mathematical modeling; multiscale, multiphysics and stochastic problems, as well as application fields like turbulent and multiphase flow and high frequency wave propagation.

CONCLUSION:

SeRC will encompass many strong research environments in the Stockholm and Linköping regions, including ten strategic centers of excellence in areas where e-Science methods are of paramount importance. Almost 14 000 cores of computer capacity (approximately a third of all academic capacity in Sweden) have been obtained by SeRC groups from external funding (outside the national system), with another large system about to be procured. World leading scientific software with thousands of licensed users have been developed or developed in part within the consortium. One of the defining characteristics of leading e-Science is the vertical integration of cutting edge e-Infrastructure, advanced algorithms, and important scientific applications. The Stockholm–Linköping region has been highly successful in a number of such cases.

Through SeRC, the already existing close collaboration between PDC and NSC will be further developed and deepened ensuring the development of complementary competences and well-aligned hardware procurements. Transforming NSC and PDC from HPC hardware supporters to e-Science enablers is another important mission. Extending and merging NSC and PDC efforts will have a large impact on the Swedish development in e-Science and on the dissemination of computational infrastructure to large new groups of researchers in general, and on SeRC in particular.

KTH, Stockholm University, Karolinska Institutet, and Linköping University are committed to shaping the emerging e-Science landscape in Sweden and giving research in this field clear priority in their strategic plans. Each of the universities has a distinctive research profile that will support research depth in this field; the breath created across these profiles establishes a unique environment, which will permit SeRC to be developed with reference to the needs of several distinct research fields.

As e-Science is an emerging discipline there is a great need for competence building in both academia and society; this will be a major focus for SeRC that will be addressed at a national level. The comprehensive training and education programmes that SeRC is committed to delivering will underpin success in the long term by establishing e-Science infrastructures in broad scientific areas.

...from page 6, Staff Focus: Lilit Axner

She will also provide overall application support by working closely with users. If you have further questions don't hesitate to write an email to <lilit@pdc.kth.se> directly.

Staff Focus



ANDREAS DAVOUR

Andreas Davour has been working in the computer business since the 1990's, after studying a wide variety of subjects at Uppsala university <<http://www.uu.se/>> that looked like fun.

He has been working as a consultant at a few different companies, among them Sun Microsystems <http://en.wikipedia.org/wiki/Sun_Microsystems>. Most recently, he worked in Kingston, Ontario, where he was a Systems Engineer at HPCVL/Queens University <<http://www.hpcvl.org>> with special responsibility for storage and tape backup/HSM.

At PDC, he has joined the grid group and will also work with general storage-related system administration.

He is married with two children, lives in Uppsala with his family and quite a few bookcases. His computers at home mostly run FreeBSD.

Staff Focus



MICHAEL SCHLIEPHAKE

Michael Schliephake started working at PDC in January 2010. As a system administrator, he will concentrate on the operation of PDC's HPC computer systems.

After spending several years as a software developer creating engineering software, he began working in the area of HPC at the High Performance Computing Center Stuttgart <<http://www.hlrs.de/>>. There, Michael gained experience in the installation and operation of cluster systems as well as in several projects which were associated with the design and implementation of supercomputing and grid infrastructures. These projects were the German D-Grid Initiative <<http://www.d-grid.de/>> and the European projects DEISA <<http://www.deisa.eu/>> and PRACE <<http://www.prace-project.eu/>>. Furthermore, he brings with him his past experience educating students in HPC. Michael obtained his qualified engineer degree at the Technical University Leipzig.

Your X.509 certificate in five minutes

Thomas Zangerl, Nordic Data Grid Facility / PDC

Ever since the dawn of Grid computing, X.509 certificates <<http://en.wikipedia.org/wiki/X.509>> have served as the building blocks of Grid-user authentication. While X.509 certificates are a well-established technology for authentication (and used, for instance, whenever you open a secure browser connection on the web), it is both complicated and time-consuming for an end-user to get such a certificate. Usually it involves creating a certificate signing request on the command-line and sending it via e-mail to a registration authority (RA), which subsequently checks the identity of the requester. But more often than not, both the person requesting the certificate and the RA are located in the same institution, where the identity of the requester has already been checked when she enrolled. Hence, the described process can be viewed as little more than a costly waste of time for all participants.

Novel Grid authentication approaches often focus on consuming identity-information that institutions store about end-users with the help of identity-exchange standards like SAML2 <http://en.wikipedia.org/wiki/SAML_2.0>. But, since Grid authentication builds on X.509 certificates, that requires changes in the Grid middleware. Such a situation often leads to a chicken-hen problem, because site administrators are often (with good reason) conservative and don't want to adopt new technology, unless it is widely used already.

The approach of the Confusa development team (Henrik Austad, NDGF/UNINETT and Thomas Zangerl, NDGF <<http://www.uninett.no/> <http://www.ndgf.org/>>) on the other hand, is to map the identity information sent by the institutions as SAML2 attributes to a X.509 certificate. Thusly, the end-user can get a X.509 certificate directly within her browser, by logging in to her home institution and accepting information exchange with the certificate portal. There are no manual checks, leading to a processing time of just 2 minutes. The issued certificate has a validity of 13 months, so it does not have to be requested more often than with the traditional approach. And it can be used for authenticating the user on the Grid. This approach has the advantage that it does not require any changes in existing Grid middleware.

However, will Grid sites trust the certificates issued by a software called Confusa? Yes, they will, because the central Confusa-based portal operated at the University of Tilburg <<https://tcs-escience-portal.terena.org/>> has received accreditation by the EUGridPMA <<http://www.eugridpma.org/>>. Such an accreditation involves a review process, in which members of national CAs decide whether new CAs are considered to be "trustworthy." Thus, Confusa's CA is going to become included in the IGTF <<http://www.igtf.net/>> distribution of CA certificates, which is usually installed at Grid sites. Hence certificates issued by Confusa will be trusted automatically at most Grid sites.

But we are not planning to stop with Grid certificates. The software can also issue personal certificates that can be used for signing and encrypting e-mails. Confusa's CA is signed by a commercial root-CA, which is trusted by most popular browsers and mail clients. Therefore, certificates issued by the TCS-personal-portal <<https://tcs-personal-portal.terena.org/>> will work out of the box as trusted e-mail signing certificates.

Both the Grid, as well as the personal certificate-portals, are considered to be productive. Sweden, Norway, Finland, Denmark, the Netherlands, Austria, Belgium, Italy, and France, have agreed to connect to the central portals; see map. Institutions within these countries are free to use the service. So, once the contractual details have been cleared, PDC users can expect fast and easy access to X,509 certificates!

For further reading:

* <http://wiki.ndgf.org/download/attachments/7831924/TerenaAbstract.pdf>

* <http://www.assembla.com/wiki/show/bJPkAOuyCr3ykWab7jnrAJ>



PDC at EGEE User Forum

PDC, along with SNIC and UPPMAX, hosted the EGEE User Forum

<<http://egee-uf5.eu-egee.org/>>

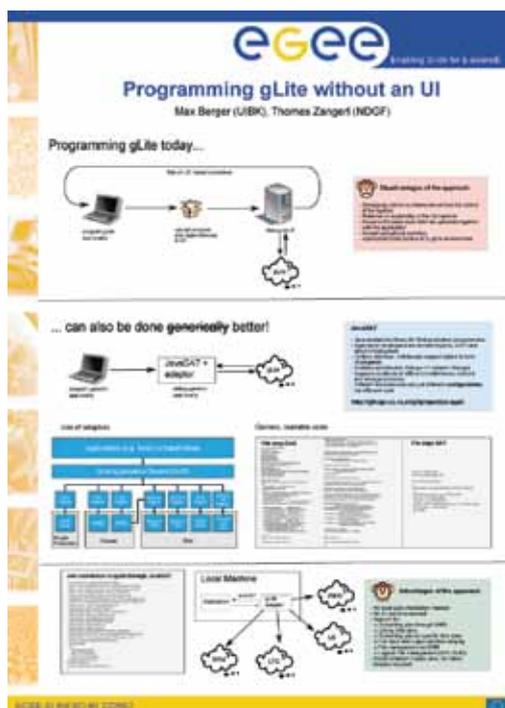
on April 12-16, 2010 in Uppsala.

Erwin Laure was the chair of the local organizing committee and a number of other notable people, including Carl von Linné, were involved. Pictured are some of the PDC staff members taking part in the conference. The event was an ideal place for European e-Infrastructure users to meet, share experiences, and shape the future of European e-Infrastructures.



Best Poster Award

Maximilian Berger and Thomas Zangerl won the best poster award at the EGEE User Forum in Uppsala, 12-15 April 2010 with their poster titled "Programming gLite without an UI".



Staff Focus



MIKAEL DJURFELDT

Mikael Djurfeldt wants to know how the brain processes information. After a degree in engineering physics at KTH he studied computational neuroscience at the department of computational biology (CB/CSC) <<http://www.csc.kth.se/forskning/cb/>> at KTH where he got his Ph.D. on large-scale models of the cerebral cortex. He is especially interested in the role of the basal ganglia and has worked with modeling, data analysis, and electrophysiology in the laboratory of Ann Graybiel at MIT <<http://mcgovern.mit.edu/about-the-institute>>. He has also taught computer science, been a free-software developer, and has developed software tools for computational neuroscience, some in the domain of parallel computing.

Mikael now has a position shared between PDC and INCF (International Neuroinformatics Coordinating Facility <<http://www.incf.org/>>). At INCF he has the role of a researcher in neuroinformatics. At PDC he is an application expert, responsible for the support of INCF infrastructure and services at PDC, such as servers for digital brain atlasing. He is currently involved in a number of research activities aimed towards better understanding of the basal ganglia and the cerebral cortex, and aiding tool development in the field of computational neuroscience.

Swedish Scientists may apply for a HPC-Europa2 Research Visit



Would you like to spend up to three months abroad doing research in a group working in a similar field? If your answer is yes, HPC-Europa2 programme might be your chance to carry out an exchange visit.

HPC-Europa2 (Pan-European Research Infrastructure on High Performance Computing) enables researchers to visit a participating research institute to carry out a collaborative visit of up to 3 months' duration, and to gain access to some of the most powerful High Performance Computing (HPC) facilities in Europe. Applicants can be working in any discipline, but must require the use of High Performance Computing facilities.

The following HPC centers are included in the programme: CINECA (Bologna, Italy), BSC (Barcelona, Spain), EPCC (Edinburgh, UK), HLRS (Stuttgart, Germany), GENCI-CINES (Paris, France), SARA (Amsterdam, the Netherlands) and CSC (Espoo, Finland). Researcher may visit any institute associated with these centers.

Visitors work closely with a "host" research group working in a similar field of research – over 200 research groups in 7 countries are currently associated with the programme as host research groups (see HPC-

Europa2 webpage for more details). New potential hosts can be suggested directly when applying for the funding.

Visits can last between 2 weeks and 3 months. HPC-Europa2 pays travel and living costs and provides accommodation. The programme is open to researchers of all levels, from postgraduate students to the most senior professors.

Closing dates for HPC-Europa2 applications are held every three months, next being 15th of September. For the rest of 2010 the closing dates are: 15th of September and 15th of November.

Acceptance rate of visit applications has so far been approximately 70%. The programme started in 2009 and continues until December 2012.

More information:

Further information and the online application form can be found at www.hpc-europa.org/ta.html. Any questions not answered by the information on the webpage can be addressed to the HPC-Europa helpdesk at access@hpc-europa.org, or to HPC-Europa2 project representative at CSC, Antti Pursula (antti.pursula@csc.fi), since CSC is serving as the center responsible for outreach to Sweden.

Introduction to High-Performance Computing PDC Summer School

STOCKHOLM, SWEDEN, AUGUST 16-27, 2010



<http://www.pdc.kth.se/education/summer-school>

You are invited to register for the class "Introduction to High-Performance Computing" being held at PDC on the KTH main campus. To register, and find out more about the class, visit the course Web page at <http://www.pdc.kth.se/education/summer-school/>. Registration opened March 15 and closes June 1.

The PDC Summer School in High-Performance Computing is an annual offering to researchers to improve on their skills in scientific computing. The course is held for its fourteenth consecutive year at KTH, Stockholm, Sweden.

During two intensive summer weeks at the KTH campus students will be able to learn and improve their skills in writing efficient programs for serial and parallel scientific applications.

The course carries 7,5 ECTS (European Credit Transfer and Accumulation System), where 1.5 ECTS credits are equivalent to one week's workload of 40 hours. The student receives these credits on successful completion of the post-course project. Participants are strongly encouraged to bring their own problems or programs for discussion and to possibly use as the basis of the post-course project. Participants are provided with remote access to the PDC Linux clusters such as Ferlin (Dell Harpertown), Hebb (IBM Blue Gene), and Key (HP Itanium SMP). Industrial participation is welcome. The number of seats for all participants is limited.

Roughly half of the class time will be spent hands-on in the lab. The lecturers and the PDC staff will assist in the computer labs. Students who do not already have an account at PDC will receive one. These accounts will stay active after the course so students may work on the post-course project.

TOPICS AND TEACHERS

A number of topics will be covered in overview lectures given by international experts and in-depth technical lectures followed by hands-on computer lab sessions. The course will consist of about 35 hours of lectures and 35 hours of computer lab sessions. Among the topics:

- Programming Environments at PDC
- Parallel Programming
- Modern Computer Architectures
- Parallel Algorithms
- Efficient Programming
- Case Studies

These topics will be covered both in lectures and labs by the following teachers:

- Lilit Axner (PDC)
- David Black-Schaffer (Uppsala University)
- Iris Christadler (LRZ - Leibniz-Rechenzentrum)
- Björn Engquist (KTH and the University of Austin)
- Thomas Ericsson (Chalmers)
- Erik Hagersten (Uppsala University)
- Michael Hammill (PDC)
- Sverker Holmgren (Uppsala University and SNIC)
- Niclas Jansson (CSC - KTH School of Computer Science and Communication)
- Lennart Johnsson (PDC and University of Houston)
- Erwin Laure (PDC)
- Michaela Lechner (PDC)
- Dag Lindbo (CSC - KTH School of Computer Science and Communication)
- Elisabet Molin (PDC)
- Jesper Ooppelstrup (CSC - KTH School of Computer Science and Communication)
- Michael Schliephake (PDC)
- Olav Vahtras (PDC)
- Anders Ynnerman (Linköpings Universitet)

PDC Related Events (Sponsored/Associated)

PDC SUMMER SCHOOL 2010: INTRODUCTION TO HIGH-PERFORMANCE COMPUTING

KTH main Campus
August 16-27, 2010

This course will give an introduction to the skills needed to utilize high-performance computing resources. The course is intended for Ph.D. and Masters students with interest in the application of High-Performance Computing.

<http://www.pdc.kth.se/education/summer-school>
See invitation elsewhere in this newsletter.

PDC 20TH ANNIVERSARY AND SNIC INTERACTION

Tammsvik Konferens och Herrgård, 197 91 Bromma
August 30-31, 2010

A two-day symposium will be held to celebrate the occasion. Included in the symposium will be talks by world-leading scientists on PDC, high-performance computing in Europe and Sweden, and science done using such high-end computing power. At this symposium we will also inaugurate our new Cray XT6m system. A poster session highlighting accomplishments by users of high-performance computing in Sweden, as part of SNIC Interaction, will complement the event.

<http://www.pdc.kth.se/events/event-repository/pdc-20th-anniversary>

12TH IEEE INTERNATIONAL CONFERENCE ON HIGH PERFORMANCE COMPUTING AND COMMUNICATIONS (HPCC 2010)

Melbourne, Australia
September 1-3, 2010

<http://www.anss.org.au/hpcc2010/>
Erwin Laure is the general chair.

6TH IEEE INTERNATIONAL CONFERENCE ON E-SCIENCE

Brisbane, Australia
December 7-10, 2010

<http://www.escience2010.org/>
PDC will, together with SeRC, organize the 2011 edition of this conference.

Sources

We can recommend the following sources for other interesting HPC opportunities and events:

CERN

<http://cerncourier.com/cws/events>
<http://cdsweb.cern.ch/collection/Conferences?ln=en>

DEISA

<http://www.deisa.eu/science/decisions>
http://www.deisa.eu/news_press/deisa-latest-news

EGI

<http://www.egi.eu/about/events/>

HPC UNIVERSITY

<http://www.hpcuniv.org/events/current/>

HPCWIRE

<http://www.hpcwire.com/events/>

LINUX JOURNAL

<http://www.linuxjournal.com/events>

NETLIB

<http://www.netlib.org/confdb/>

PRACE

<http://www.prace-project.eu/prototype-access>
<http://www.prace-project.eu/hpc-training-events>
<http://www.prace-project.eu/news>

SNIC

<http://www.snic.vr.se/news-events>

TERAGRID

<https://www.teragrid.org/web/events/tg10>

US DEPARTMENT OF ENERGY

<http://hpc.science.doe.gov/>