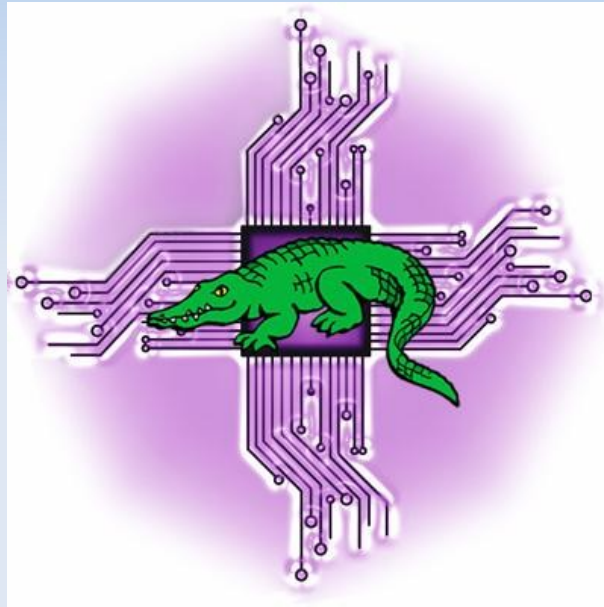


# A Tale of Two Conferences: ISC and TERATEC



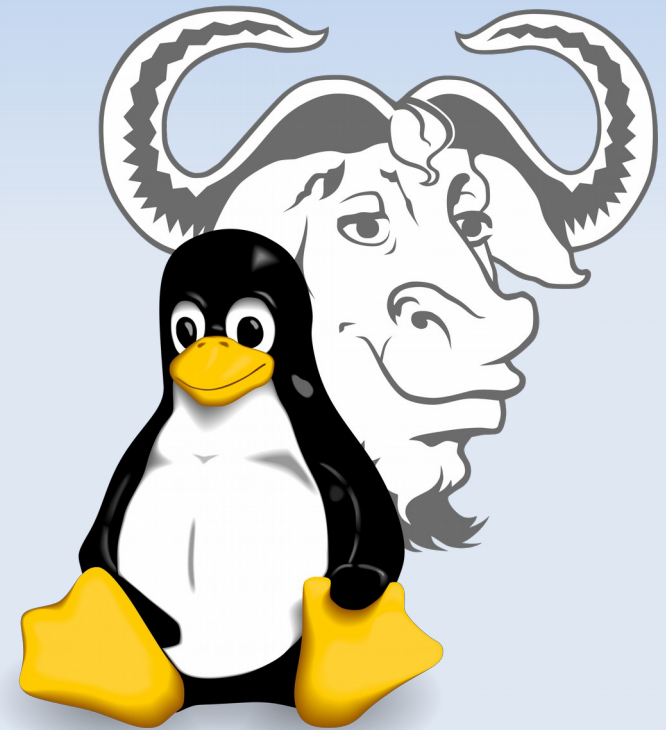
**Linux Users of Victoria, December 5,  
2017**

lev@levlafayette.com

# Introduction

This year the International Supercomputing Conference and TERATEC were held in close proximity, the former in Frankfurt from June 17-21 and the latter in Paris from June 27-28. Whilst the two conferences differ greatly in scope (one international, one national) and language (one Anglophone, the other Francophone), the dominance of Linux as the operating system of choice at both was overwhelming.

This presentation will provide an overview of the two conferences concentrating on the two items of particular focus. Firstly, the advances and use of Linux in the field of automated vehicles, which was prevalent at ISC, and secondly, health care data metrics, which was prevalent at the second. The presentation will also provide some reasons for how Linux has come to dominate in the field of research computing, and what threats and opportunities exist to its use.



# About ISC

The International Supercomputing Conference is the European equivalent of the ACM/IEEE Supercomputing Conference which has been held in the US. The precursor was the "Mannheim Supercomputer Seminar" (1986) which became the International Supercomputing Conference and Exhibition (ISC).

Managed by a fifty-plus steering committee, mainly Europeans (mainly German), some people from the USA. a few from Japan, Korea, South Africa, Taiwan etc Nobody from Australia or New Zealand! Also has a Research Papers committee, PhD Forum Programme Committee, Research Posters Committee, Project Posters Committee, Tutorials committee, BoFS committee, Workshops committee.

Since 1993 the conference has been the venue for one of the twice yearly TOP500 announcements are named. Conference also hosts multiple award ceremonies; Hans Meuer Award (outstanding research paper), Gauss Award, PhD Forum Award, ISC Research Poster Award, PRACE-ISC Research Poster Award



JUNE 18 - 22, 2017  
FRANKFURT, GERMANY

# ISC 2017 Conference

First 15 ISC conferences were in Mannheim with 81 (1986) to 257 (2000) attendees. After that it was in Heidelberg ranging from 340 (2001) to 650 (2005) attendees, then Dresden with 915 (2006) to 1375 (2008), Hamburg 1670 (2009) to 2403 (2012), Leipzig 2423 (2013) to 2405 (2014), and Frankfurt 2846 (2015) to 3253 (2017).

The 2017 ISC High Performance conference attracted 3,253 attendees from 60 countries, as well as 148 companies and research organizations. Over 40% of attendees from North and Central Europe, 23% from Western and Southern Europe, 20% from North America, 14% from Asia and Australia; 44% academic, 39% industry, 12% students.

First day consisted of ten streams of tutorials. Beginner's guide to supercomputing, I/O Performance on HPC, hybrid parallel programming, linear algebra, data compression, advanced MPI, infiniband and high speed ethernet, advanced OpenMP programming, MPI+X hybrid programming.



# ISC 2017 Conference

Next three days were keynotes, awards, conference presentations, and exhibitor presentations, with up to four streams. A great deal on machine learning, vehicle automation, materials science, life sciences, interconnect development, energy consumption, exascale computing. About 170+ non-vendor presentations and BoFs. Complete guide available here:

[http://www.isc-hpc.com/files/isc\\_events/documents/ISC2017\\_ConferenceGuide\\_FINAL\\_web.pdf](http://www.isc-hpc.com/files/isc_events/documents/ISC2017_ConferenceGuide_FINAL_web.pdf)

## Awards

Hans Mauer Award: "Designing Dynamic and Adaptive MPI Point-to-point Communication Protocols for Efficient Overlap of Computation and Communication", Dr. Hari Subromoni, Ohio University et al

[http://link.springer.com/chapter/10.1007/978-3-319-58667-0\\_18](http://link.springer.com/chapter/10.1007/978-3-319-58667-0_18)

Gauss Award: "Diagnosing Performance Variations in HPC Applications Using Machine Learning", Ozan Tuncer, Boston University et al

[http://www.bu.edu/peaclab/files/2017/04/tuncer\\_isc2017.pdf](http://www.bu.edu/peaclab/files/2017/04/tuncer_isc2017.pdf)

# About TERATEC

TERATEC is a French organisation that exists to support collaborative R&D projects, and includes over eighty technological and industrial companies, laboratories and research centers, universities and engineering schools, who combine their resources in high performance computation <http://www.teratec.eu/qui/membres.html>

Founded in 2005 as the result of a joint initiative of the Commissariat à l'énergie atomique et aux énergies alternatives (CEA) along with several industrial partners to form a French competence centre for numerical simulation. Located at Essonne department at the Bruyères le Châtel commune, almost 40km south of the Ile de la Cité, Paris.

Includes a TERATEC campus, which has several IT companies, including BULL/ATOS, CEA, ESI Group, and INTEL, along with an incubator and business centre supported by the Essonne Chamber of Commerce and Industry, with several companies including AS+ Groupe Eolen, Nvidia, Paratools, Scilab, Seagate etc, and industrial laboratories for the The Exascale Computing Research Laboratory (INTEL/CEA/GENCI/UVSQ), the Extreme Computing Laboratory (BULL/CEA), and Centre d'Expertise en Simulation des Matériaux CESIMat (CEA, Faurecia, L'Oreal, Michelin, Safran. c.f., <http://www.campus-teratec.com/en.html>

# TERATEC's Activities

Activities include initiatives in improving industrial utilisation of high performance numerical simulation. For example, TERATEC initiated the ETP4HPC (<http://www.etp4hpc.eu>), the European Technology Platform for High Performance Computing to encourage HPC uptake by industry. Currently engaged in 11 major research projects (e.g., big data solutions, HPC energy efficiency, high definition 3D medical imagery, smart agriculture, urban imagery etc [http://www.teratec.eu/activites/projetsR\\_D.html](http://www.teratec.eu/activites/projetsR_D.html))

TERATEC has initiated two postgraduate technology degrees; a Master of Science in Informatics, High Performance Computing and Simulation (MIHPS), and a Master of Modelling and Simulation. These are in coordination with École Centrale de Paris (ECP), École Normale Supérieure de Cachan (ENS-Cachan), École Nationale Supérieure de Techniques Avancées (ENSTA), Institut National des Sciences et Techniques Nucléaires (INSTN), and Université de Versailles - Saint Quentin en Yvelines (UVSQ).



# TERATEC Forum

The TERATEC Forum is an annual HPC event in Europe is held in June of each year. Initial conferences were held at the Université de Versailles Saint-Quentin-en-Yvelines, and Genocentre, Evry, but since then it has been at the Ecole Polytechnique, Palaiseau. From 2010 onwards it has attracted over 1000 attendees.

The 2017 TERATEC Forum was held on 27 and 28 June 2017 on the campus of the Ecole Polytechnique and attracted over 1300 attendees. Increasingly positioning itself as the European Conference for HPC (as opposed to ISC as the international conference). Combination of plenary sessions, workshops, exhibitors, and social events.





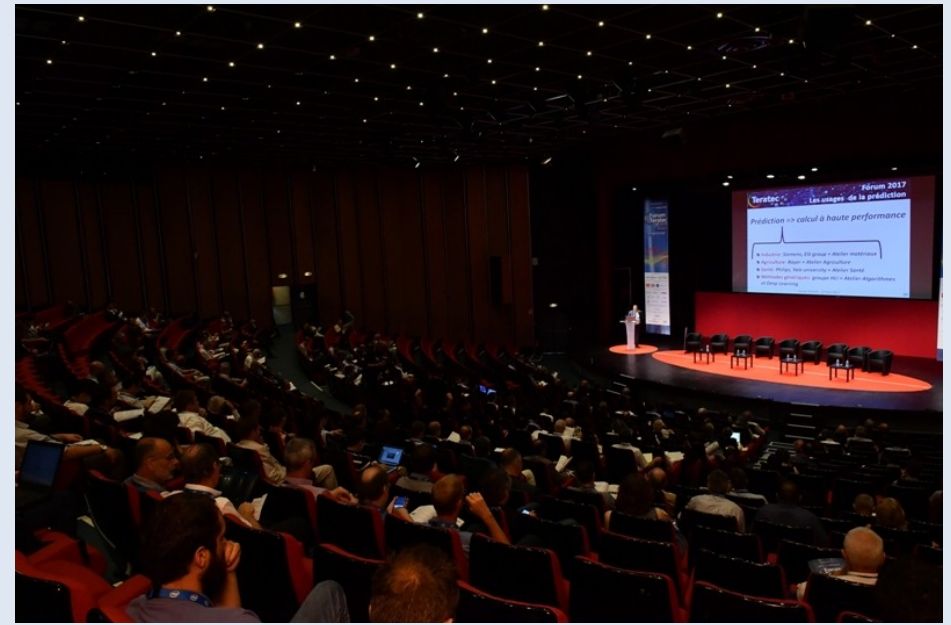
# TERATEC Forum 2017

Combination of high-level and policy-driven presentations, sponsor presentations, technical case studies which combined theoretical expositions with practical implementations. Plenary presentations available (abstract, slides, and video at [http://www.teratec.eu/forum\\_2017/colloque.html](http://www.teratec.eu/forum_2017/colloque.html)), Some particular presentations of note:

\* Dr. Norbert Luetke-Entrup, Siemens Corporate Technology, "Digitalization - a perspective from the electrical industry" (turbines, process controllers etc and especially Mindsphere OS for IoT)

\* Jay D. Humphrey, Yale University, USA, Comprendre la progression des maladies vasculaires grâce à la simulation numérique, Understanding vascular disease progression via advanced computational modeling (leading cause of death in the world, blood clots, heart disease and strokes)

\* Adeline Loison, Alassane Cisse, Déléguée Analytique et Délégué IT, Le Machine Learning dans l'industrie; De la prédiction à la prescription (bank fraud, customer retention in telecommunications, urban maintenance)



# Linux and the Big Iron

The June 2017 Top500 was announced at ISC. Linux systems made up 498/500 (99.6%), UNIX systems made up 2/500 (0.4%). For Linux this is an increase from the same time from 497 (June 2016), 489 (June 2015), 485 (June 2014), 476 (June 2013), 462 (June 2012), 457 (June 2011), 456 (June 2010), 442 (June 2009), 427 (June 2008), 367 (June 2007). In November 2017 it was announced that Linux made up 500/500 of the Top500.

Reasons for this dominance are well established: (a) The commandline interface provides a great deal more power and is very resource efficient. The GNU/Linux operating system and utility suite scales and does so with stability and efficiency. (b) Critical software such as the Message Parsing Interface (MPI) and nearly all scientific programs are designed to work with GNU/Linux. Linux is based on UNIX which is based on Multics means more than fifty years of software development. (c) The operating system, utilities, and many applications are provided with "free and open source" licenses which are better placed to improve, optimize and maintain, especially in a high performance computing environment.

# Two Examples: Vehicular Automation and Health Data

One example stream from ISC was Deep Learning, and one particular set of presentations was "PC & Big Data for Autonomous Driving & Connected Vehicles". Presentations from BMW, Intel, Bosch. Emphasis on transition from fully human control to fully automated system. Use of machine learning to identify objects. Use of data connectivity to provide mapping, road rules etc.

Multiple sessions from TERATEC on health and bioinformatics. Presentations from Yale and Bayer. Simulation and modelling of vascular disease progression with hemodynamic simulations, personalised health informatics with massive improvements in bioanalytical data processing (e.g., protein characterisation, DNA sequencing) - and with related improvements in agriculture.

## Driverless cars: Kangaroos throwing off animal detection software

By Jake Evans

Posted 24 Jun 2017, 8:28am



VIDEO: [Driverless cars test detection software on kangaroos](#) (ABC News)

**Driverless car makers are discovering a unique problem as they begin to test the vehicles in Australia.**

MAP: [Canberra 2600](#)

It turns out the unusual way that kangaroos move completely throws off the car's animal detection system.

"We've noticed with the kangaroo being in mid-flight ... when it's in the air it actually looks like it's further away, then it lands and it looks closer," Volvo Australia's technical manager David Pickett said.

Because the cars use the ground as a reference point, they become confused by a hopping kangaroo, unable to determine how far away it is.

# Free Riders and Artificial Scarcity

Industry is very fond of making use of GNU/Linux as an operating system for computation. If an equivalent contribution is not provided equal to use then that they are acting as *free riders*.

Industry is typically less keen in opening its data to further development. This is a form of *artificial scarcity*. Nevertheless European approaches that use dirigisme (France) and Ordoliberalism (Germany) as public indicative planning and infrastructure mechanisms can avoid some of these negative effects.

Also, satisfies Turing-Church hypothesis in terms of economic productivity.

Collaborative data projects also further these technological development - these are presentations in their own right !

c.f., Automotive Grade Linux (<https://www.automotivelinux.org/>), OS Vehicle (<https://www.osvehicle.com/>), OpenSource Car Control (<http://oscc.io/>); OpenMRS (<http://openmrs.org/>) and OpenEMR (<http://www.open-emr.org/>), Health Data (<https://www.healthdata.gov/>), Protein Data Bank (<https://www.rcsb.org>, <https://www.pdbe.org>).

I see a beautiful city and a brilliant people rising  
from this abyss

-- Charles Dickens, *A Tale of Two Cities*

Thanks to the University of Melbourne in their  
support of my attendance to these conferences.

**THANKS FOR WATCHING**



**& LISTENING PATIENTLY**