Future computing (for NWP and EO)

Martin Palkovic

ECMWF

My background and experience

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Imec Belgium

- Data Transfer and Storage Exploration Methodology
- ADRES processor (VLIW+CGA architecture)

IT4Innovations Czech National Supercomputing Center

- Establishing national supercomputing centre (DC+HPC)
- One of the largest Xeon Phi clusters in EU

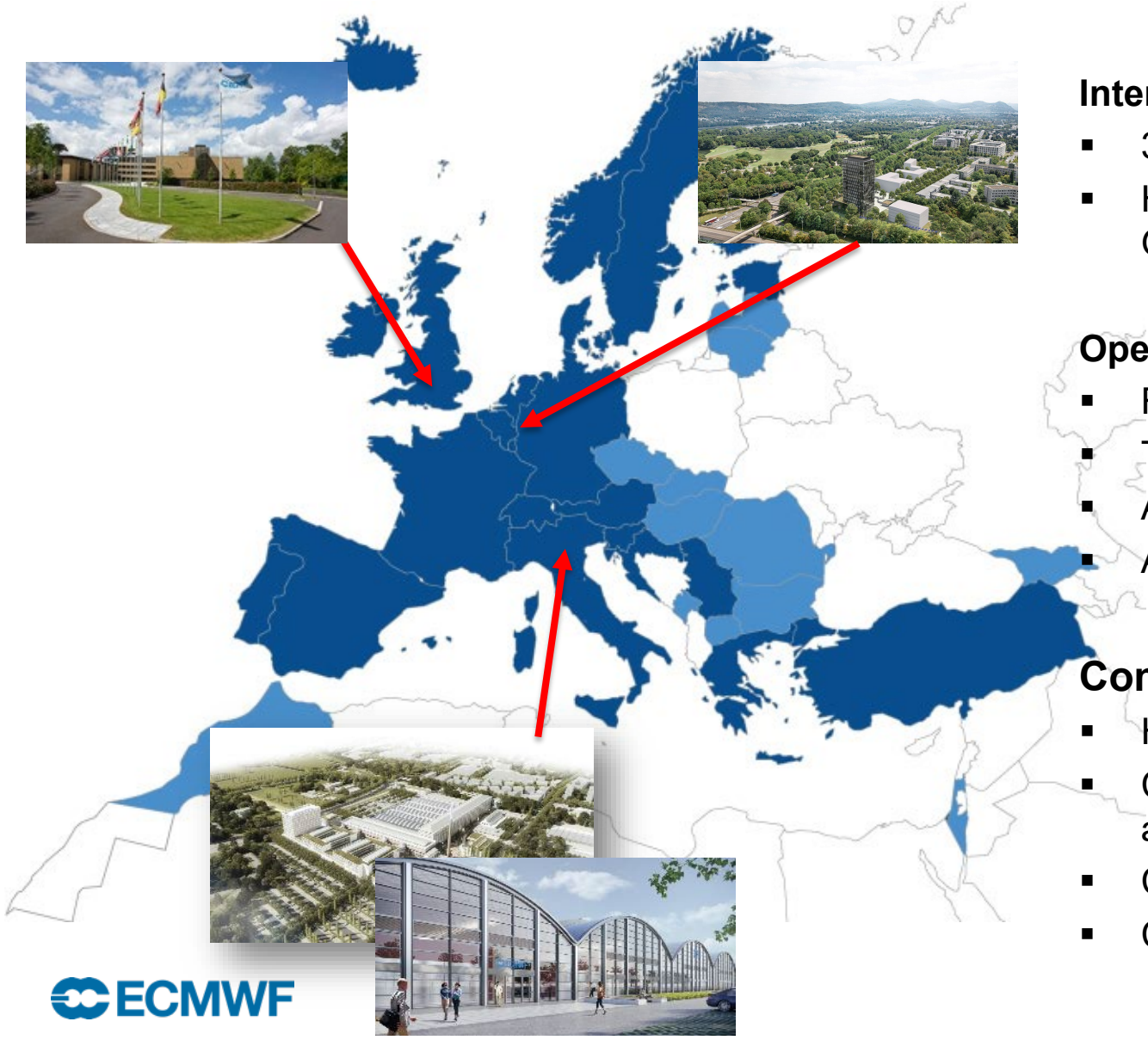
Codasip

- RISC-V with customised ISA extensions + LLVM

ECMWF

- ECMWF new DC project in Italy + new HPCF

European Centre for Medium-Range Weather Forecasts (ECMWF)



Inter-governmental Organisation, Established in 1975

- 35 States (23 Member &12 Co-operating States)
- Headquarter in Reading, UK + DC in Bologna, Italy + Bonn, Germany (EU funded activities)

Operational Numerical Weather Predication (NWP) centre

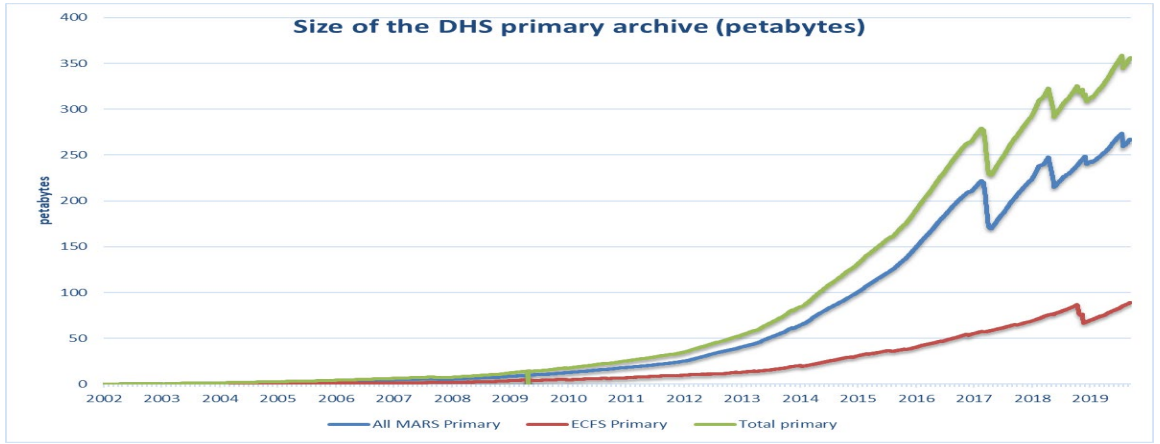
- Research institute and a 24/7 operational service
- Twice daily generation of operational weather forecasts
- Assimilation of 60-80 million observations/day
- Archive of Petabytes of observations and forecast data

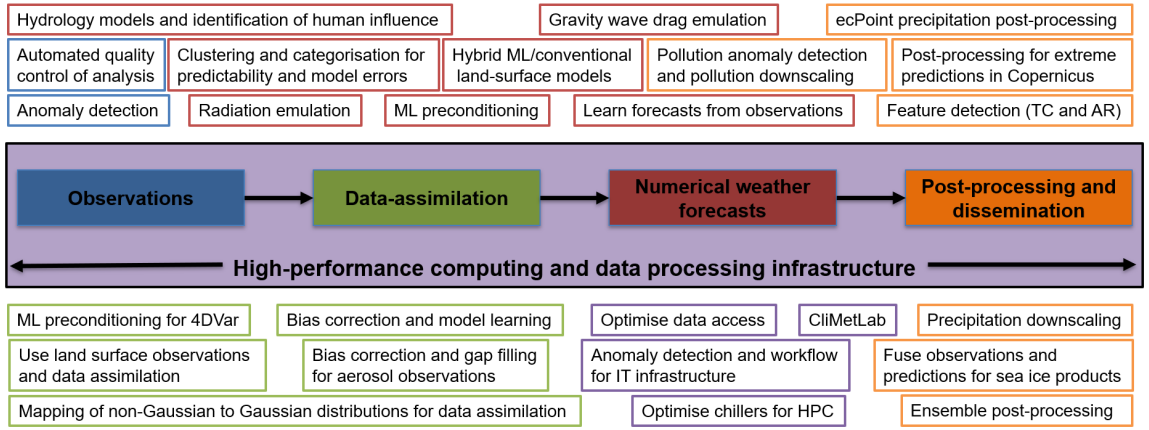
Computing services

- HPC facility globally one of the largest for NWP
- Cloud infrastructure for C3S, CAMS and WEkEO (DIAS) and the **European Weather Cloud**
- Climatological data : ~350 PB (daily growth of 250TB)
- Computational science and ML/AI

Challenges for computing in NWP and EO

- Heterogenous architectures and novel technologies
- Exponential increase of data
- Use of the cloud
- Use of AI/ML
- Remote working
- Federation of the resources





Challenges for computing in NWP and EO

- Backwards compatibility/familiarity with ISA

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CAES Gaisler Signs Contract with the European Space Agency for New Advanced Space Processor

- New GR765 Microprocessor features octa-core system-on-chip; offers best-in-class integration and performance for reduced weight and power consumption.

April 20, 2021 10:00 AM Eastern Daylight Time

GOTHENBURG, Sweden--(BUSINESS WIRE)--CAES Gaisler announced today that it has received a contract from the European Space Agency (ESA) to fund the first phase to develop a new advanced processor for space applications. Developed in Sweden and based on the popular LEON5FT Fault Tolerant Processor Core, the GR765 Microprocessor meets market demand for high-performing processors, offering a higher level of integration with more functionality on the chip to reduce weight and keep power consumption low.

"The software compatibility and a common development environment makes it easy for a design team, already familiar with the LEON, to quickly come up to speed."

CAES Gaisler's products include world-leading embedded computer systems for harsh environments, with footprints throughout the solar system. The portfolio includes a suite of trusted fault-tolerant computing offerings for reliable system-on-a-chip solutions, based on the SPARC and RISC-V processor architectures. The product offering comprises IP core building blocks, radiation hardened components, flight software & development tools, development hardware, test equipment and services.