ECMWF new Data Centre Industry Day, Bologna, 16 January 2019

В

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Agenda

- ECMWF current computing facilities
- Our new Data Centre
- Bologna Information System design
- Procurement, delivery and installation timeline

ECMWF current Computing Facilities





ECMWF current Computing Facilities





EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS

ECMWF's production workflow





HPC: a need for weather forecasting

- Scientists quickly realized that computing would be the key for weather prediction
 - Knowing the current weather
 - And calculating its evolution
- From dream to reality : first computer
 - And the first numerical weather prediction model
- Since, computing performance kept increasing
 - This is one of the main reason for the progress in forecast



ENIAC 1950



CRAY System



Evolution of Archive and HPC sustained performance



ECMWF EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS

The ECMWF data Archive

- Data archival and retrieval system for all ECMWF data
 - 310 PB primary data
 - This data is stored on cartridges and disks
 - If this data was printed, there would be enough books to reach the moon 8 times
- Large meteorological archive
 - Direct access from Member States
 - Available to research community worldwide
- User access via ECMWF developed applications
 - MARS Meteorological Archival and Retrieval System
 - Access via "meteorological terms", e.g. fields
 - ECFS ECMWF Common File System
 - File based access for non-meteorological data



The ECMWF data Archive

Every day the archive grows more than 250TB. This is approximately 1.75 Petabytes (PB) every week





If this data was printed, the books produced could be put in a 11,372 km long row. This is about the distance travelling from Bologna to Nova Scotia, Canada and back again!

Data acquisition and dissemination

- A total of 1163 Destinations across 79 countries:
 - Dissemination: 547 Destinations across 78 countries
 - Acquisition: 557 Destinations across 34 countries
 - Data Portal: 59 Destinations (mostly Copernicus CAMS and C3S)





Data dissemination volumes

- Monthly Volume of Data Transmitted: 857TB (~28.6TB/day)
- Exponential Increase trend for Internet





Estimated Growth in model

2015	2020
16km, 137 levels	Increase: 2 horizontal, 1 upper ai
Time critical	Time critical
 21 TB/day written 	 128 TB/day written
22 Million fields	 90 Million fields
85 Million products	 450 Million products
 11 TB/day send to customers 	 60 TB/day send to customers
Non-time critical	Non-time critical

• 100 TB/day archived

• 1 PB/day archived

• 400 research experiments

1000 research experiments

• 400,000 jobs / day

10-Year Challenge



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ECMWF new Data Centre



- The Data Centre will be located , in the Tecnopolo di Bologna
 - in the former tobacco factory, built in 1949 and closed in 1998





Data Centre Design Master Plan





Data Centre layout



How it will look





Decoupling front / backend: Mcloud Services



Bologna target functional design























Data Centre fit-out timeline





Data Centre fit-out timeline





