e-Infrastructures in Horizon 2020
Vision, approach, drivers, policy background, challenges, WP structure

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eInfrastructure
DEVELOPMENT AND DEPLOYMENT OF E-INFRASTRUCTURES AND SERVICES FOR ON-LINE RESEARCH

Jason de Caires Taylor,
underwater statue, Cancun Mexico
http://www.underwatersculpture.com/
Vision

- Achieving Digital Era
- Bridge Digital Divides
- Every Researcher Digital
Approach

Transversal
Cutting across disciplines and sectors

Support tomorrow’s science
Open science, open access, best solutions

Enabling innovation
Developing and testing innovative solutions
Servicing industry and SMEs
Spinning out technologies
DRIVERS for change

- COMPUTATIONAL CAPABILITIES
DRIVERS for change

- COMPUTATIONAL CAPABILITIES
- BIG DATA
BIG DATA...

GROWTH OF THE DIGITAL UNIVERSE, 2010-2020

Digital Universe in Exabytes (Billions of Gigabytes)

2005: 130
2010: 1,227
2012: 2,837
2015: 8,591
2020: 40,026

DRIVERS for change

- COMPUTATIONAL CAPABILITIES
- BIG DATA
- GLOBAL CONNECTIONS
- GLOBAL PARTICIPATION
GLOBAL CONNECTIONS ...
DRIVERS for change

• COMPUTATIONAL CAPABILITIES
• BIG DATA
• GLOBAL CONNECTIONS
• GLOBAL PARTICIPATION
• OPEN IS BETTER
  • WITHIN AND BETWEEN
    SCIENTIFIC COMMUNITIES
  • BETWEEN SCIENCE AND SOCIETY
Horizon 2020: What’s new?

A single programme bringing together three separate programmes/initiatives*

More innovation, from research to retail, all forms of innovation

Focus on societal challenges facing EU society, e.g. health, clean energy and transport

Simplified access, for all companies, universities, institutes in all EU countries and beyond.

*The 7th research Framework Programme (FP7), innovation aspects of Competitiveness and Innovation Framework Programme (CIP), EU contribution to the European Institute of Innovation and Technology (EIT)
Europe 2020 priorities

European Research Area

Shared objectives and principles

Societal Challenges
- Health, demographic change & wellbeing
- Food security, sustainable agriculture and the bio-based economy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, environment, resource efficiency and raw materials
- Inclusive, innovative and reflective societies
- Secure Societies

Industrial Leadership
- Leadership in enabling and industrial technologies
  - ICT
  - Nanotech., Materials, Manuf. and Processing
  - Biotechnology
  - Space
- Access to risk finance
- Innovation in SMEs

Excellent Science
- Frontier research (ERC)
- Future and Emerging Technologies (FET)
- Skills and career development (Marie Skłodowska-Curie)
- Research infrastructures (including e-infrastructures)

Simplified access

Common rules, toolkit of funding schemes

International cooperation

Spreading excellence, widening participation
Science with and for society

Dissemination & knowledge transfer
Research Infrastructures in Horizon 2020

Developing the European research infrastructures for 2020 and beyond

- Developing new world-class RI
- Integrating and opening existing national RI of pan-European interest
- Development, deployment & operation of ICT-based e-Infrastructures

Fostering the innovation potential of Ris and their human capital

Reinforcing European RI policy and international cooperation
Policy Background (1/3):
Research Data become an infrastructure for modern science

Europe is “Riding the Wave” Report

- Data e-infrastructure that supports seamless access, use, re-use and trust of data
- Physical and technical infrastructure become invisible and the data becomes the infrastructure

Commission Communication on Scientific Information COM(2012)401

- Access, preservation and e-infrastructure (publications and data)

ERA Communication COM(2012)392

- Federation of researcher electronic identities

**Policy Background 2:**
*European HPC Strategy – integrated approach in H2020*

**Basis:** Commission Communication "High-Performance Computing: Europe's place in a Global Race" (2012)

**Vision:** to ensure European leadership in the supply and use of HPC systems and services by 2020 in a strategy combining:

(a) developing the next generation of HPC towards exascale;

(b) providing access to the best HPC infrastructure for both industry and academia;

(c) achieving excellence in computing applications - existing or new – driven by the needs of science, industry and SMEs

**Linking demand and supply** – in the spirit of Horizon 2020

**Contractual Public-Private Partnership (cPPP)** covering (a) and part of (c)
HPC - Examples of interrelations between actions

PRACE
Access to best HPC for industry and academia

PTP4HPC/cPPP
Autonomous EU development of Exascale technologies

- specifications of exascale prototypes for Tier-0
- technological options for future procurements

Centres of Excellence
Network of SME Competence Centres
Excellence in HPC application

- CoEs may be associated to PRACE Centres
- provision of HPC capabilities and expertise

- identify applications for co-design of exascale systems
Policy Background (3/3): GÉANT Expert Group Report

World Class Connectivity and Services to Knowledge Communities

- Support *Growth and Opening up*
- Help to close *digital divides*
- Europe as global *hub*
- Stimulate *innovation*

Reorganize for 2020

- *Flexibility* in Technology and Architecture
- *Experimentation* and *standardisation*
- Improve *Governance*
- Step up *Funding*
- Update the *Regulatory* Regime
CHALLENGES

• Need for long term perspective
  – Operational continuity
  – Sustainability
• Efficient and effective use of national and EU funding
• Resolving policy, legal, technical, financial and governance issues
• Innovation as a priority
  – Support SMEs
• Support to Horizon 2020
e-Infrastructure to support:
• Research under Horizon 2020
• Open Access policy
• Open Data pilot
• Data Management Planning
• …
INTEGRATED e-INFRASTRUCTURE SERVICES

VRE

E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

PROVISION OF CORE SERVICES ACROSS E-INFRASTRUCTURES

COMPUTING

NETWORK OF HPC COMPETENCE CENTRES FOR SMES

MANAGING, PRESERVING AND COMPUTING WITH BIG RESEARCH DATA

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

E-INFRASTRUCTURES FOR OPEN ACCESS

CONNECTIVITY

TOWARDS GLOBAL DATA E-INFRASTRUCTURES RESEARCH DATA ALLIANCE

RESEARCH AND EDUCATION NETWORKING – GEANT

SUPPORT

E-INFRASTRUCTURE POLICY DEVELOPMENT AND INTERNATIONAL COOPERATION

NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES
Managing, preserving and computing with big research data

- Federated pan-European infrastructure for data management
  - Access, replication, annotation, search, compute, analysis, preservation
- Services for quality and reliability
  - Including certification mechanisms and services
- Federating data management and curation tools
- Large scale virtualisation of data/compute centre resources
- Standards-based open platform for scientific computing
- Support the evolution of the European Grid Infrastructure
- Proof of concept and prototypes of enabling software
- Enabling aggregation of content for textual analysis
SUMMARY...
THANK YOU