e-Infrastructures in Horizon 2020

Vision, approach, drivers, policy background, challenges, WP structure

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eInfrastructure

European Commission

e-infrastructure

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

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

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Vision

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

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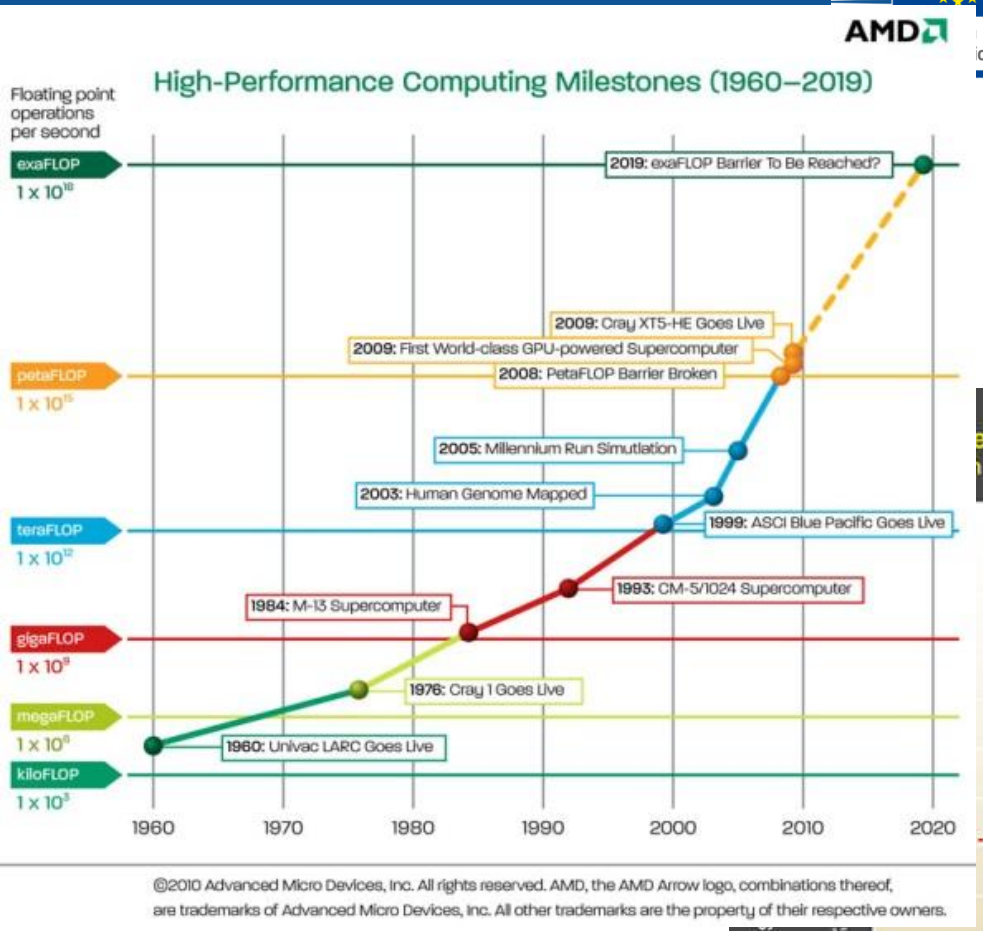
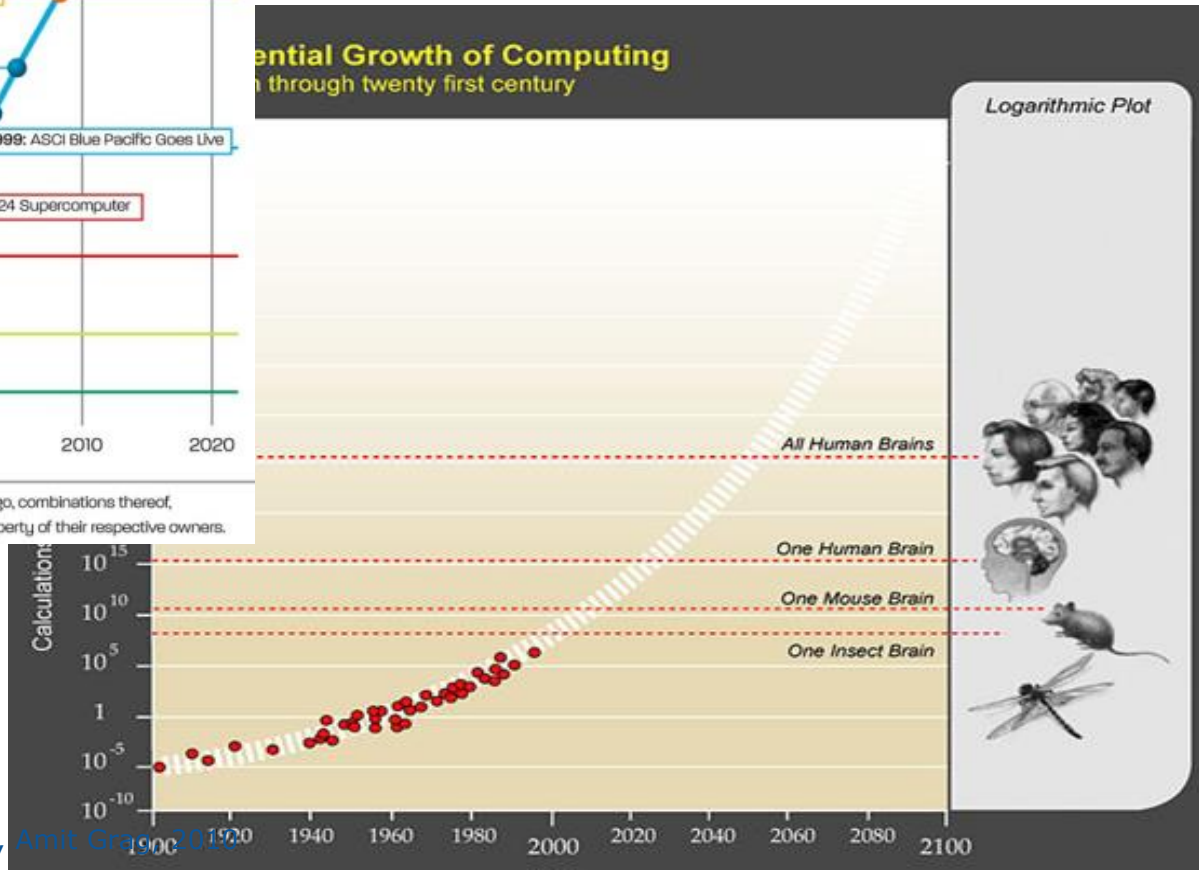
DRIVERS for change

- **COMPUTATIONAL CAPABILITIES**

MORE COMPUTING POWER



MIT Technology Review, 2012



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DRIVERS for change

- **COMPUTATIONAL CAPABILITIES**
- **BIG DATA**

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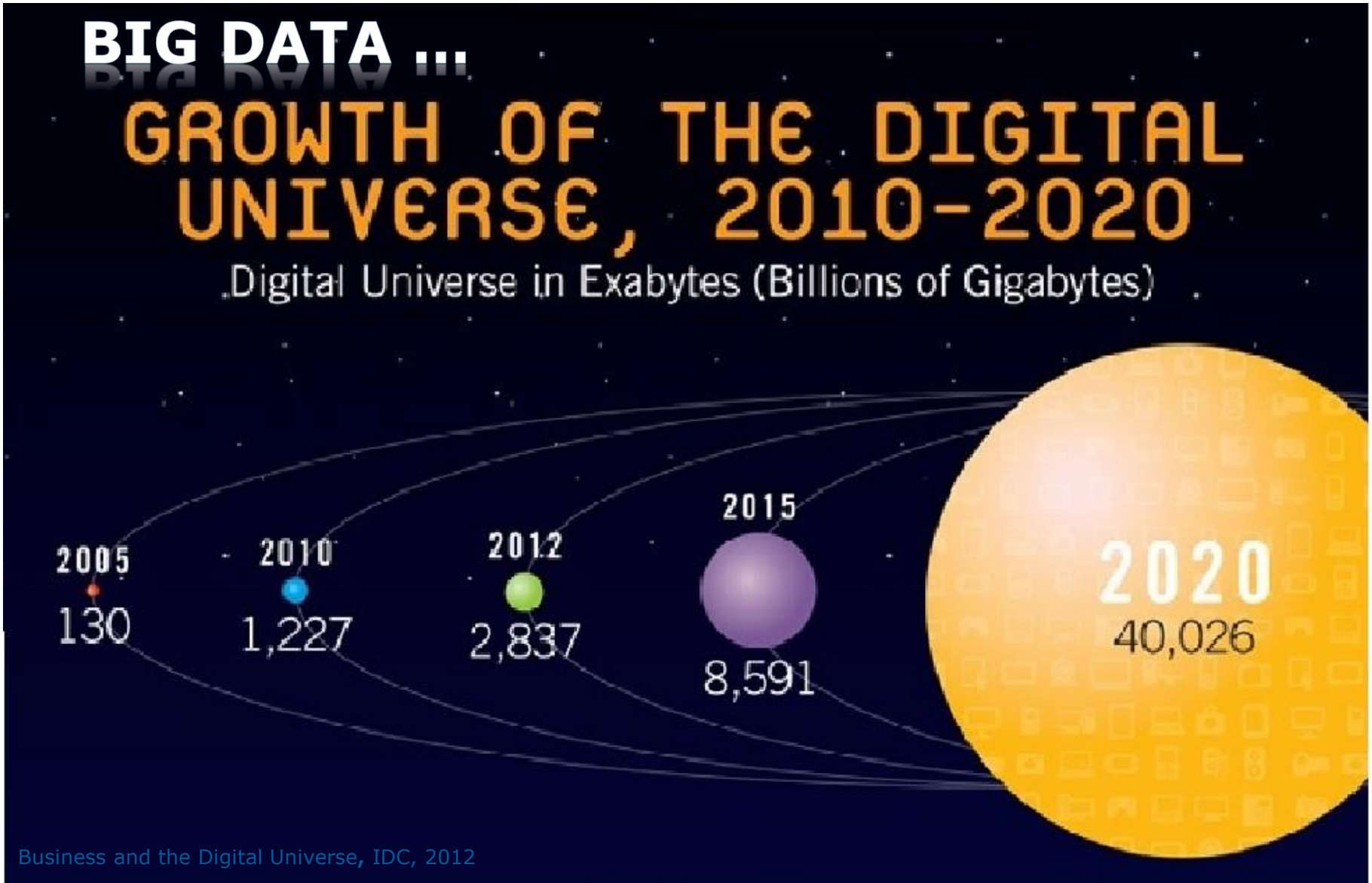
BIG DATA …



Business and the Digital Universe, IDC, 2012

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DRIVERS for change

- COMPUTATIONAL CAPABILITIES
- BIG DATA
- GLOBAL CONNECTIONS
- GLOBAL PARTICIPATION

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GLOBAL CONNECTIONS ...

Map of scientific collaborations from 2005 to 2009
Computed by Olivier H. Beauchesne @ Science-Metrix, Inc.
Data from Scopus, using books, trade journals and peer-reviewed journals

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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?

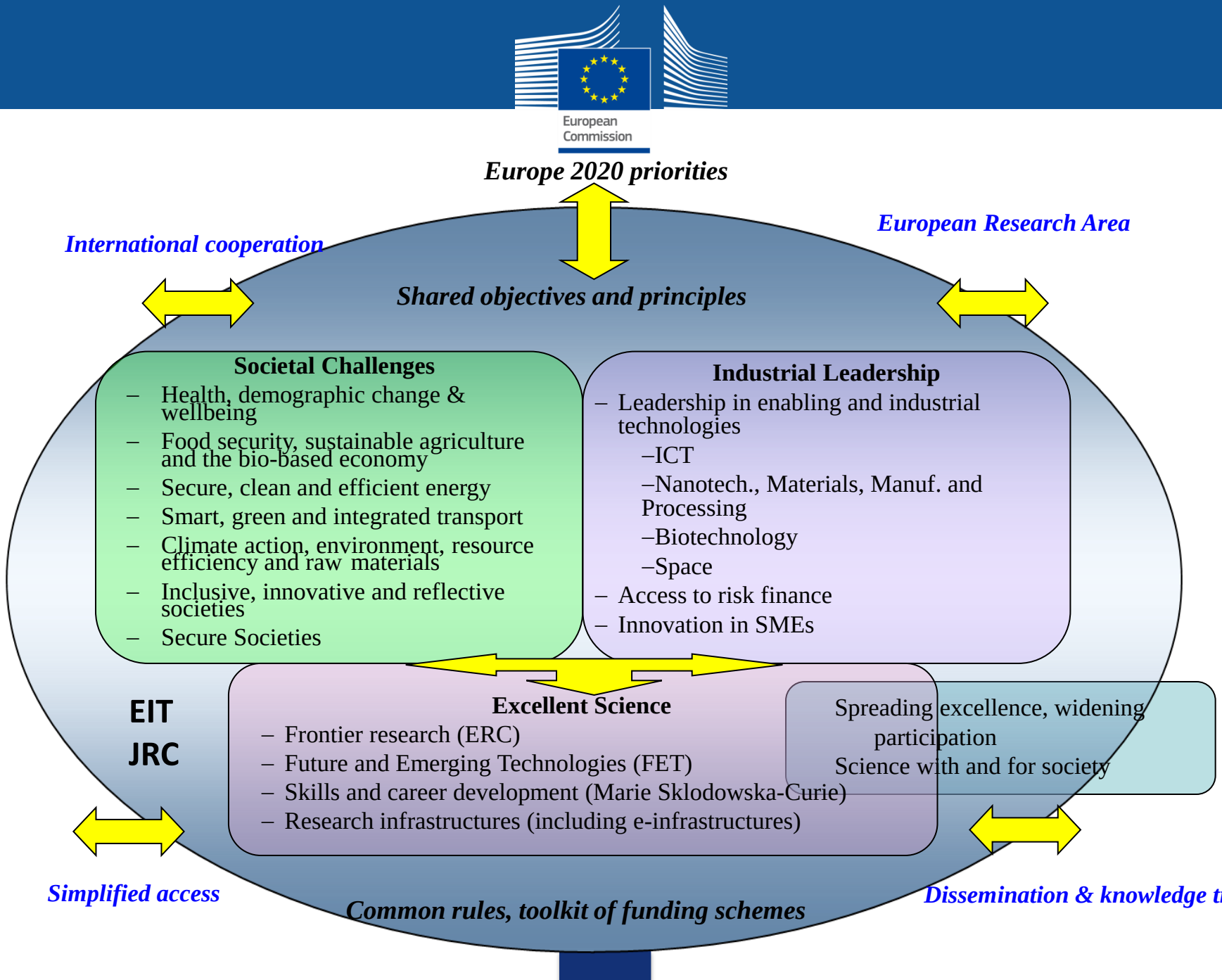
A single programme bringing together three separate programmes/initiatives*

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)*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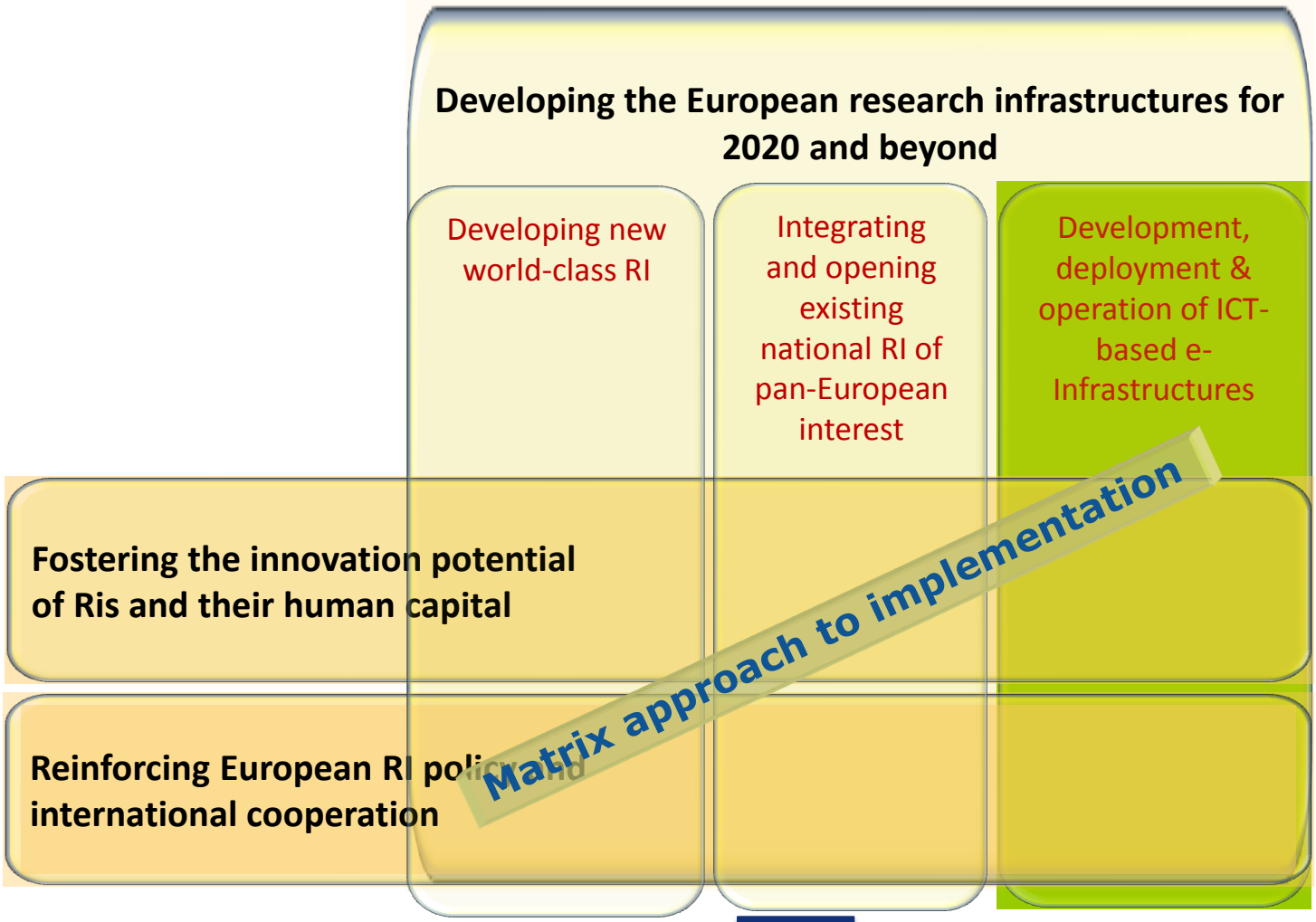
Europe 2020 priorities
International cooperation
European Research Area
Shared objectives and principles
Societal Challenges
– Health, demographic change & wellbeing
– Food security, sustainable agriculture and the bio-based economy
– Secure, clean and efficient energy
– Smart, green and integrated transport
– 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
EIT
JRC
Excellent Science
– Frontier research (ERC)
– Future and Emerging Technologies (FET)
– Skills and career development (Marie Sklodowska-Curie)
– Research infrastructures (including e-infrastructures)
Spreading excellence, widening participation
Science with and for society
Simplified access
Common rules, toolkit of funding schemes
Dissemination & knowledge tranfer

Research Infrastructures in Horizon 2020



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Policy Background (1/3): Research Data become an infrastructure for modern science

Europe is "Riding the Wave" Report

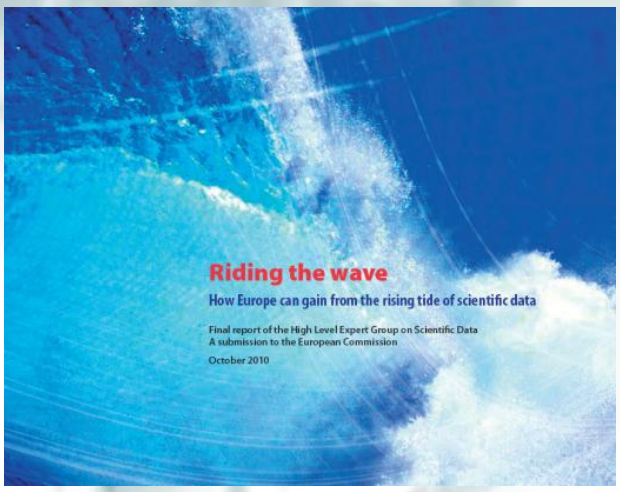
- Data e-infrastructure that supports seamless access, use, re-use and trust of data
- Physical and technical infrastructure become invisible and the **data becomes the infrastructure**

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



Riding the Wave
High Level Expert Group on Scientific Data, October 2010

http://cordis.europa.eu/fp7/ict/e-infrastructure/docs/hlg-sdi-report.pdf

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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)

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HPC - Examples of interrelations between actions

PRACE

Access to best HPC for industry and academia

- **specifications of exascale prototypes forTier-0**
- **technological options for future procurements**

ETP4HPC/cPPP

Autonomous EU development of Exascale technologies

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

- **identify applications for co-design of exascale systems**

Centres of Excellence

Network of SME Competence Centres

Excellence in HPC application

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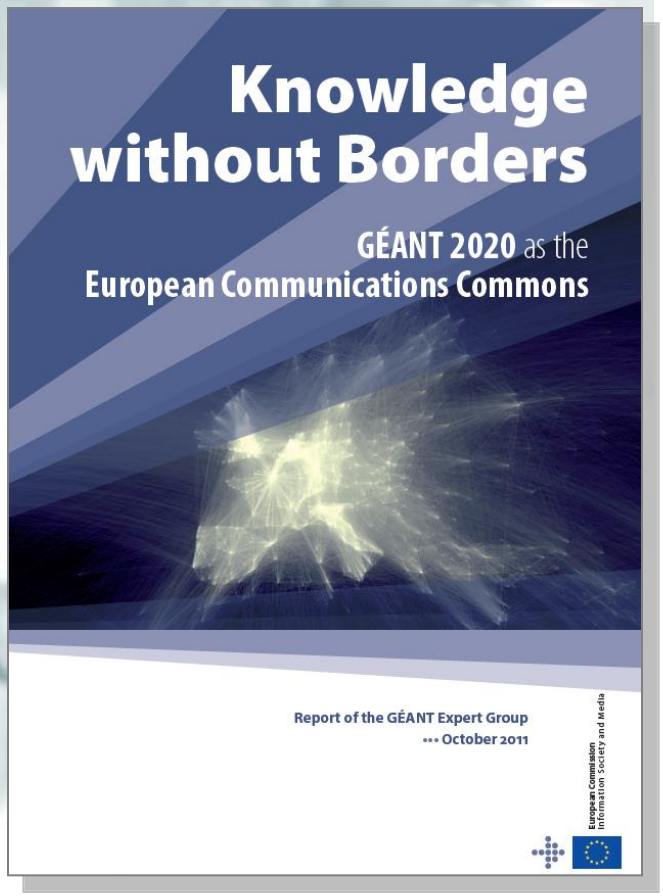
Policy Background (3/3): GÉANT Expert Group Report

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**

FET
Human Brain Project,...

LEIT
Big Data in ICT
Manufacturing PPP
Internet of Things...

Societal Challenges

SC1
Research on Alzheimer

SC2...

SC3
Earth observation

SC4, SC5, ...

e-Infrastructure to support:

- **Research under Horizon 2020**
- **Open Access policy**
- **Open Data pilot**
- **Data Management Planning**
- **...**

e-Infrastructure integrates resources and services...

- Networking
- Computing
- Data
- Software
- User interfaces

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INTEGRATED e-INFRASTRUCTURE SERVICES

VRE

E-INFRASTRUCTURES FOR VIRTUAL RESEARCH ENVIRONMENTS (VRE)

PROVISION OF CORE SERVICES ACROSS E-INFRASTRUCTURES

DATA

COMPUTING

NETWORK OF HPC COMPETENCE CENTRES FOR SMES

MANAGING, PRESERVING AND COMPUTING WITH BIG RESERACH DATA

RESEARCH AND EDUCATION NETWORKING – GEANT

CENTRES OF EXCELLENCE FOR COMPUTING APPLICATIONS

E-INFRASTRUCTURES FOR OPEN ACCESS

CONNECTIVITY

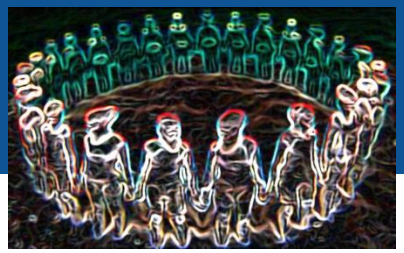
PAN-EUROPEAN HIGH PERFORMANCE COMPUTING INFRASTRUCTURE AND SERVICES

TOWARDS GLOBAL DATA E-INFRASTRUCTURES RESEARCH DATA ALLIANCE

SUPPORT

E-INFRASTRUCTURE POLICY DEVELOPMENT AND INTERNATIONAL COOPERATION

NEW PROFESSIONS AND SKILLS FOR E-INFRASTRUCTURES



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INTEGRATED
e-INFRASTRUCTURE
SERVICES
across...

Industry sectors

disciplines

societal chalenges

Automotive

Oil and gas

Pharmaceuticals

Smart cities

Health

Climate change

Physics

Social sciences

... ...

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SUMMARY …

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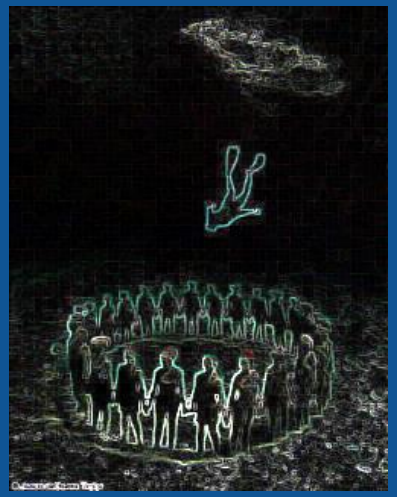
THANK YOU



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