Implementing the EOSC Roadmap

Συμπόσιο: "Ανοικτή Επιστήμη στον ελληνικό ερευνητικό ιστό: ερευνητικές διαδικασίες, ερευνητικά δεδομένα, συνεργασίες"

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Unit B2 – Open Science

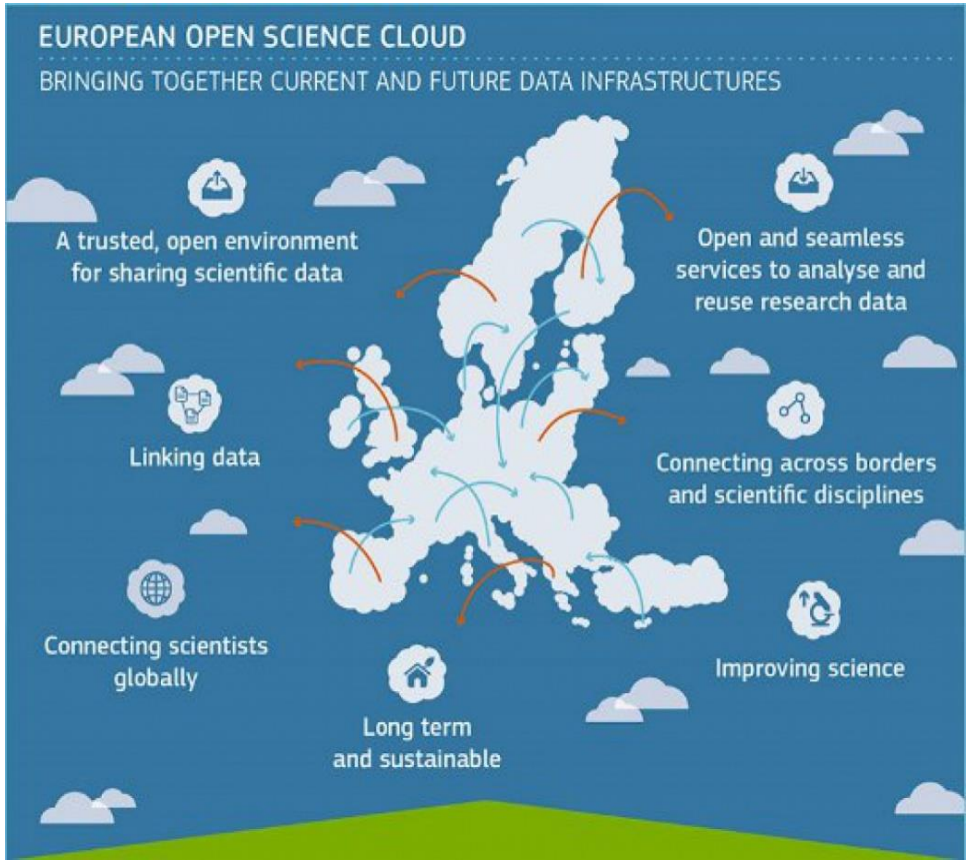
The vision

European Commission

"Europe's final transition must be one from fragmented data sets to an integrated European Open Science Cloud. By 2020, we want all European researchers to be able to deposit, access and analyse European scientific data through a European Open Science Cloud.."

Speech by Commissioner Carlos Moedas in Amsterdam, NL: "Open science: share and succeed", 4 April 2016

- EOSC will provide 1.7m EU researchers an environment with free, open services for data storage, management, analysis and re-use across disciplines
- EOSC will join existing and emerging horizontal and thematic data infrastructures, bridging todays fragmentation and ad-hoc solutions
- EOSC will add value (scale, data-driven science, inter-disciplinarity, faster innovation) and leverage past infrastructure investment (10b per year by MS, two decades EU investment)



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History of the EOSC file

European Commission

2016

European Cloud initiative

Vision for European Open Science Cloud

2017

H2020 – WP 2018-20

INFRAEOSC-05-2018-2019 Call

Implementation Roadmap

Federated model with 6 action lines

2018

Council conclusions

Set up of EOSC governance framework by end 2018

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Actions	Timeline
The Commission will work with global policy and research partners to foster cooperation and to create a level playing field in scientific data sharing and data-driven science.	As of 2016
The Commission will use the Horizon 2020 Work Programmes to provide funding to integrate and consolidate e-infrastructure platforms, to federate existing research infrastructures and scientific clouds and to support the development of cloud-based services for Open Science.	As of 2016
The Commission will make open research data the default option, while ensuring opt-outs, for all new projects of the Horizon 2020 programme.	As of 2017
The Commission will review the 2012 Commission Recommendation on access to and preservation of scientific information[41] to encourage scientific data sharing and the creation of incentive schemes, rewards systems and education and training programmes for researchers and businesses to share data, in close relation with the DSM 'Free flow of data' initiative.	As of 2017
The Commission will work with Member States to connect the priority European research infrastructures[42] to the European Open Science Cloud.	As of 2017
Together with stakeholders and relevant global initiatives, the Commission will work towards an Action Plan for scientific data interoperability, including 'meta-data', specifications and certification.	By end 2017

OECD, RDA, G7

WP2018-20

1 JAN 2017

Data package April 2018

WP2018-20

FAIR Action Plan

- **a. Architecture** — Architecture of the federated infrastructures as the solution to the current fragmentation in research data infrastructures which are insufficiently interoperable.
- **b. Data** — FAIR data management and tools. A common data language to ensure data stewardship across borders/disciplines based on FAIR principles.
- **c. Services** — Available services from a user perspective. A rich environment offering a wide range of services covering the needs of the users.
- **d. Access & Interface** — Mechanisms/interfaces for accessing EOSC. A simple way for dealing with open data obligations or accessing research data across different disciplines.
- **e. Rules** — Rules of participation for different EOSC actors. An opportunity to comply with existing legal and technical frameworks and increase legal certainty & trust.
- **f. Governance** — Governance of the EOSC, aiming at ensuring EU leadership in data-driven science but requiring new governance frameworks.

Not a cloud made in Brussels

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EOSC Summit 2017 & 2018

- **180** key participants, representing all categories and scientific fields
- **15** research funders and **30** officials from Member States and Associated Countries
- **1000+** viewers via web stream
- Extensive coverage via Twitter in the EU, USA and Canada (tweets and retweets reached **350k+** people)

EOSC Declaration

- 33 high level statements meant to capture our common understanding on the required & underpin the EOSC implementation
  - ✓ Data culture & FAIR data,
  - ✓ Research data services & architecture,
  - ✓ Governance and funding
- The EOSC Declaration set in motion decision-making processes at various stakeholders.
- The list of signatories of the EOSC Declaration have been maintained by the EC and will be handed over to the EOSC governance.
- **Currently signed by up to 100 scientific stakeholders*** (so called 'Coalition of the Doers').

* *EOSC Signatories available here*: https://ec.europa.eu/research/openscience/pdf/list_of_institutions_endorsing_the_eosc_declaration.pdf

EOSC Declaration

Commitments to action

- Types of stakeholders who committed to one or more implementing actions to support EOSC:
  - ✓ Research funders
  - ✓ Scientific organisations
  - ✓ Research infrastructures and e-Infrastructure providers
  - ✓ Other (e.g. project consortia)
- Types of commitments:
  - ✓ To gear several of their core and strategic activities towards implementation of the EOSC Research funders
  - ✓ To the practical application of FAIR data principles, including certification
  - ✓ To provide input touching upon EOSC strategy and governance
  - ✓ To wide-ranging actions involving large scientific communities
- The full list of commitments will be handed over to the EOSC governance.

Public consultations

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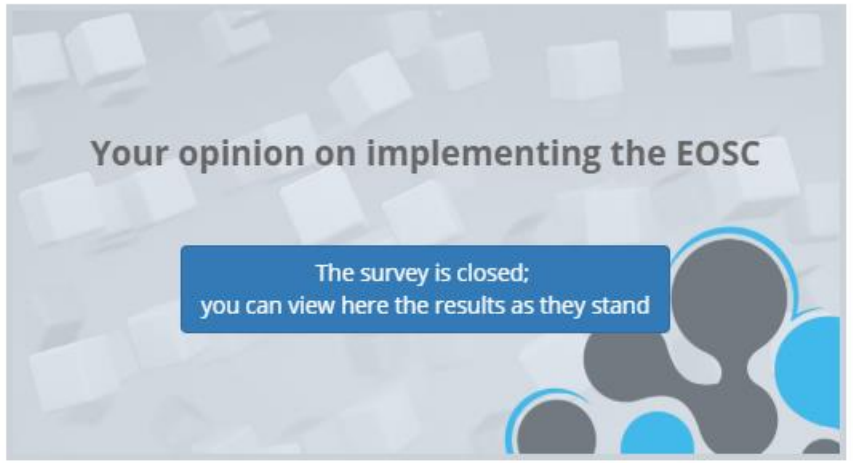
- **EOSC Rules of Participation**

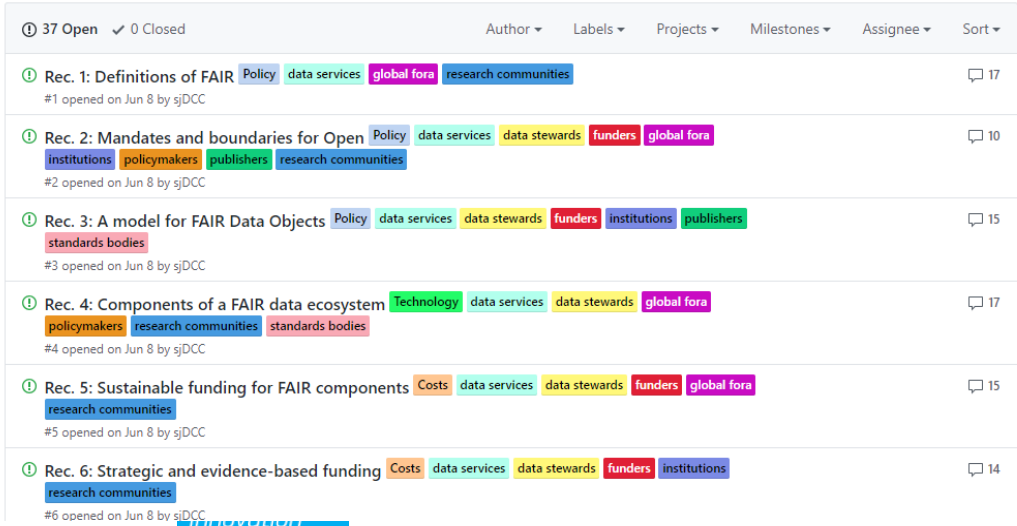
  Input on the recommendations:
  https://eoscpilot.eu/open-consultation

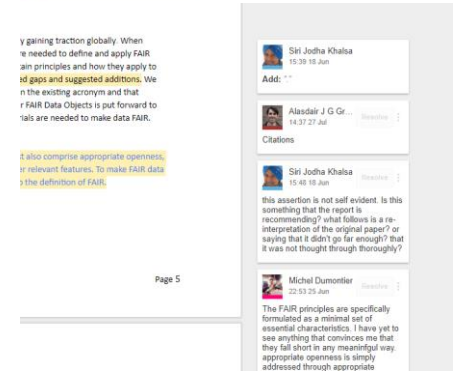


- **Turning FAIR into reality**

  Input on the report:
  http://bit.ly/interim_FAIR_report

  Input on the proposed "FAIR Data Action Plan":
  https://github.com/FAIR-Data-EG/Action-Plan

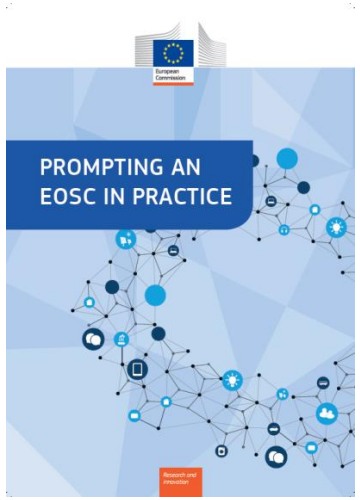




Prompting an EOSC in practice

European Commission

EOSC 2nd High Level Expert Group



Available at the EU Bookstore:

EOSC 2nd High Level Expert Group (Jun 17 – Dec 19)

- **Aim**: To mark a transition towards the practical implementation of the EOSC and to set the scene to the practical launch the EOSC
- **Focus**: Governance Structure, Rules of Participation and Business model options
- **32 recommendations** are provided, clustered in Implementation, Engagement and Steering

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Prompting an EOSC in practice

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Key elements in the report

- ✓ **Vision – The EOSC as interlinking people, data, services & trainings, publications, projects, and organisations across borders and scientific disciplines**
- ✓ **MVE – Discussion on how to make EOSC a Minimum Viable Ecosystem**
- ✓ **Business models – 3 valid alternatives for funding the EOSC have been outlined**
- ✓ **The stimulating set of practical recommendations – including on EOSC portal**
- ✓ **Preliminary list of possible WGs**

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Prompting an EOSC in practice

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IMPLEMENTATION RECOMMENDATIONS

1. **Serve all researchers** & all research support units
2. Have new projects define KPIs or metrics in work plans to respond how EOSC benefits them
3. Increase **availability & volume of quality** & user-friendly scientific information online
4. Select **standards & community-endorsed** best practices
5. Use **international fora as vehicles to support**

FOR THE EOSC PORTAL

7. Define 2 sets of **rules of participation for MVE** 1) data, service & infrastructure providers; 2) users;
8. Marketplace of **efficient and effective** services,
9. Involve **industry in EOSC**, utilising data & services marketplace
10. Services are **independent**, **interoperable** and **exchangeable** building blocks
11. Developopen,**sustainable**,**versioned**,**documented**, & energy-consumption-aware software
12. Meet **user needs**
13. **Simplify early (beta) participation by all**
14. **Access management** to services/resources
15. Provide environment for **co-development, testing & innovation.**

FOR SKILLS, MONITORING, BUSINESS MODELS & POLICY

16. **Build a workforce** who are trained & supported adequately.
17. **Monitor data access & reuse**
18. Effective combination of **different types of business models**
19. Introduce funding instruments in Horizon Europe & **capacity building programmes.**
20. Define & enforce **data management policies**
21. Define an **EOSC Helpdesk**

ENGAGEMENT RECOMMENDATIONS

EOSC FOR MS, NATIONAL & INTERNATIONAL

1. Create **career-enhancing incentives**
2. Develop, both at Member State & EU level, **appropriate engagement schemes**
3. Take **national and international developments** into account

SUPPLY & DEMAND SIDE

4. Stimulate the **supply** side
5. Stimulate the **demand** side

STEERING RECOMMENDATIONS

TRUST, NOVEL IDEAS & ADVANCED PARTNERSHIPS

1. Base research support around the **concept of trust**
2. Ensure WG cover the latest **scientific and organisational trends & novel ideas**
3. Harness **inputs**
4. Pursue **advanced partnerships**, support to lagging countries

GUIDELINES, LIVING DOCUMENTS & SYNERGIES

5. Guidelines and rules separated into **stability and trust**. All guidelines & rules accounted for
6. Synergise with **cybersecurity competence centres** & WISE trust community support **shared security model**

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Turning FAIR into reality

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FAIR Data Expert Group

Available at the EU Bookstore

FAIR Data Expert Group

- **Report and Action Plan**: Take a holistic approach to lay out what needs to be done to make FAIR a reality, **in general and for EOSC**
- Addresses the following key areas: **Concepts for FAIR, the FAIR data culture, the FAIR data ecosystem, skills, incentives and metrics, investment and sustainability.**
- **Recommendations and Actions**: 27 clear recommendations, structured by these topics, are supported by precise actions for stakeholders.

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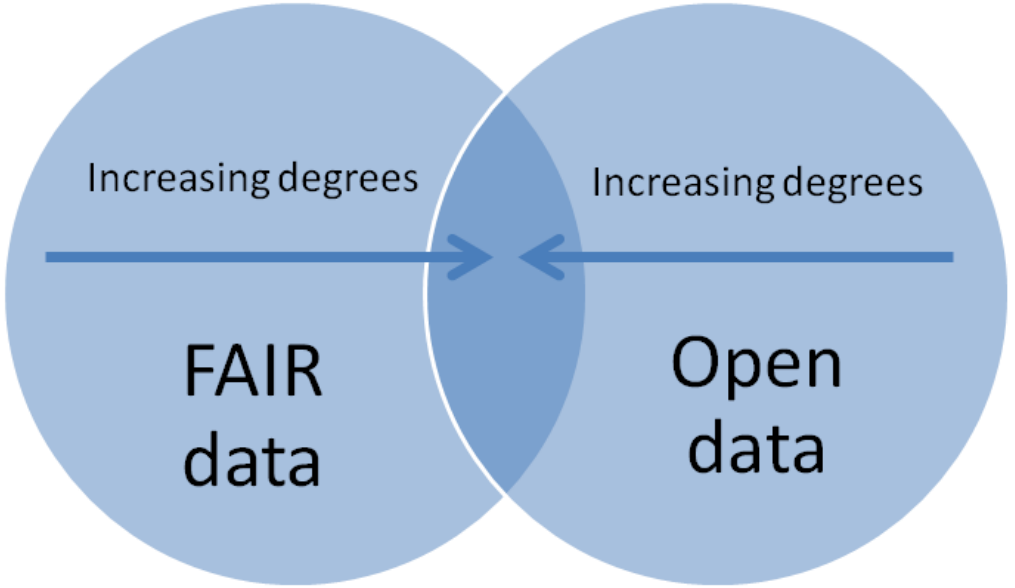
Turning FAIR into Reality

European Commission

Key Elements of the Report

- **Extensive consultation:** Over 500 comments and suggestions from c.50 stakeholder groups.
- **To gain the greatest benefit and support EOSC**, turning FAIR into reality must be supported by additional concepts and policies:
  - as Open as possible
  - prompt publication
  - good practices for selection, stewardship and sustainability.
- FAIR must **apply to all digital outputs** (including data, code, metadata etc).
- Need to address **enabling practices and technologies**.



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Turning FAIR into Reality

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- **FAIR Digital Objects:** FAIR requires a model for FAIR digital objects: outputs (data, software and other research resources) have appropriate PIDs, use standard formats, rich metadata, licenses.

- **FAIR ecosystem:** FAIR requires an ecosystem of components, including policies, DMPs, PIDs, specifications and standards, repositories and registries of these components.

- **Interoperability frameworks:** Essential to support research communities to develop interoperability frameworks (for traditional disciplines and for new interdisciplinary research areas).

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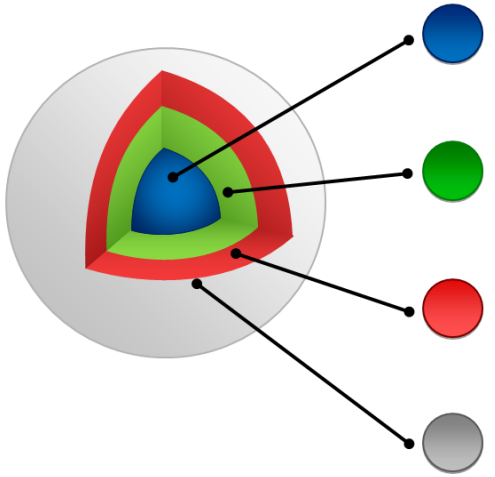
Key Concepts

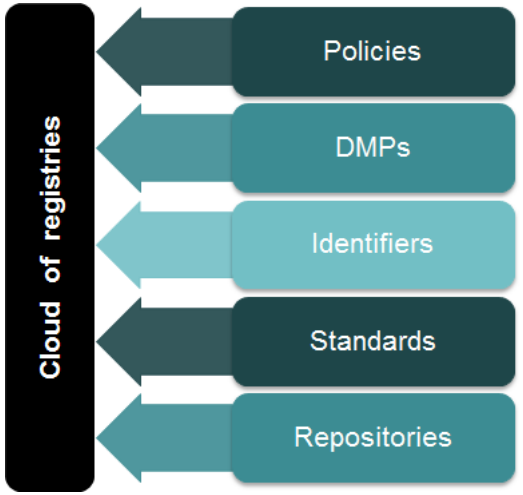


DIGITAL OBJECT
Data, code and other research resources
At its most basic level, data or code is a bitstream or binary sequence. For this to have meaning and to be FAIR, it needs to be represented in standard formats and be accompanied by Persistent Identifiers (PIDs), metadata and documentation. These layers of meaning enrich the object and enable reuse.

IDENTIFIERS
Persistent and unique identifiers (PIDs)
Digital Objects should be assigned a unique and persistent identifier such as a DOI or URN. This enables stable links to the object and supports citation and reuse to be tracked. Identifiers should also be applied to other related concepts such as the data authors (ORCIDs), projects (RAIDs), funders and associated research resources (RRIDs).

STANDARDS & CODE
Open, documented formats
Digital Objects should be represented in common and ideally open file formats. This enables others to reuse them as the format is in widespread use and software is available to read the files. Open and well-documented formats are easier to preserve. Data also need to be accompanied by the code use to process and analyse the data.

METADATA
Contextual documentation
In order for Digital Objects to be assessable and reusable, they should be accompanied by sufficient metadata and documentation. Basic metadata will enable data discovery, but much richer information and provenance is required to understand how, why, when and by whom the objects were created. To enable the broadest reuse, they should be accompanied by a plurality of relevant attributes and a clear and accessible usage license.



Turning FAIR into Reality

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Key Messages

- **Skills:** two skill sets / cohorts of professionals needed to support FAIR, data scientists and data stewards.
- **Metrics and incentives:**
  - Metrics needed for FAIR Digital Objects.
  - Metrics for FAIR services should build on existing certification such as CoreTrustSeal for trusted digital repositories.
  - Metrics must align to provide incentives for FAIR
- **Investment and sustainability:**
  - ROI for FAIR and Open data is considerable
  - Strategic and coordinated funding needed to maintain **all** the components of the FAIR ecosystem.

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Turning FAIR into Reality

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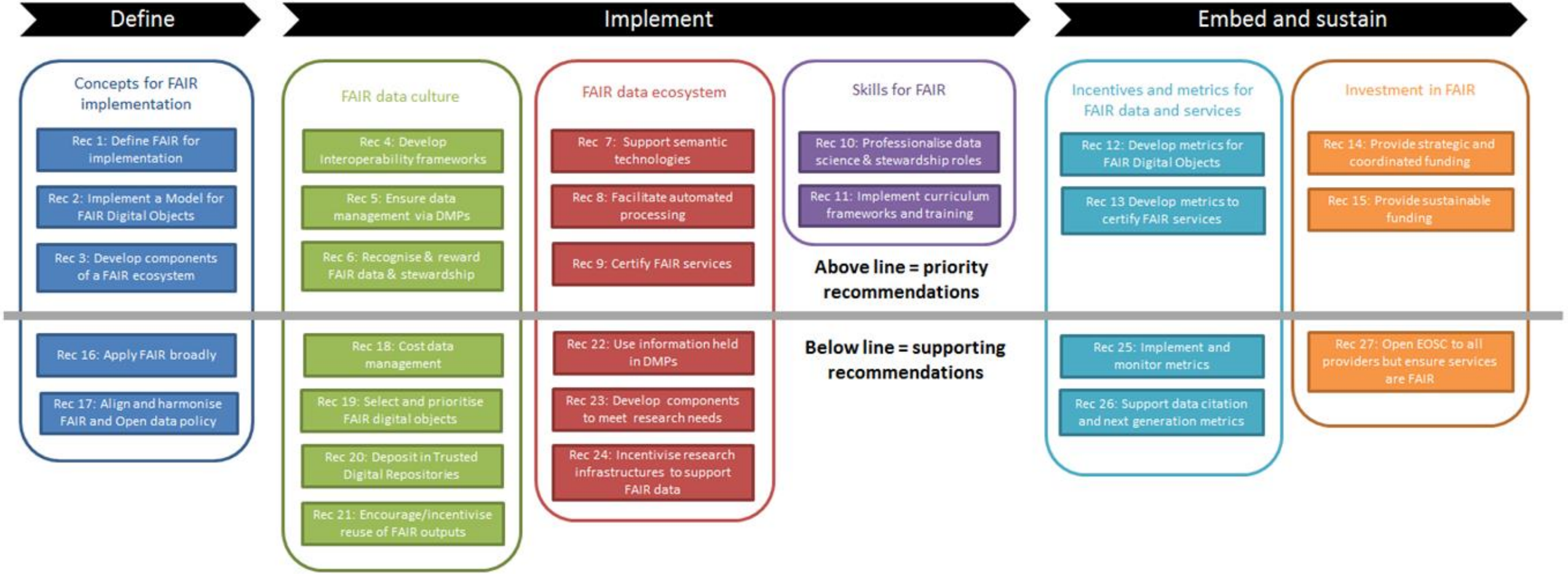
Recommendations and Actions



EOSC model / Governance

6 lines of action

a. Architecture	Architecture of the federated infrastructures as the solution to the current fragmentation in research data infrastructures which are insufficiently interoperable.
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Governance framework

- **SCOPE**

  All actions needed for steering and overseeing the initial development of the EOSC (until end 2020) towards the EOSC federated model described in the EOSC Implementation Roadmap

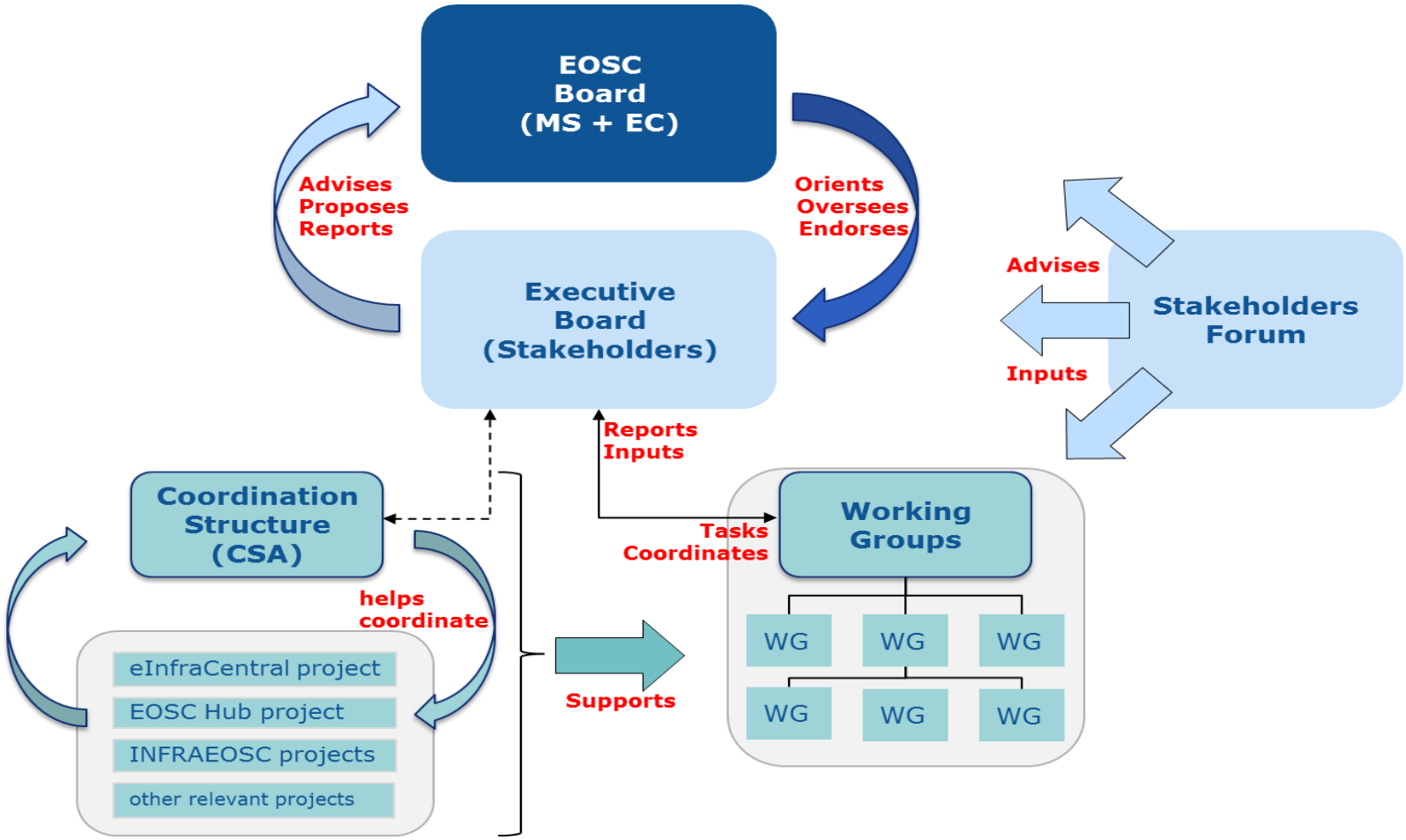
- **EXPECTED DELIVERABLES**

  Strategic plan, Annual work plans, FAIR action plan, Rules of participation, mechanism for post-2020 governance, approach to extend user base to industry and public authorities

- **ACTORS**

  The governance should rely on the interplay between three components:
  - EOSC Board
  - EOSC Executive Board
  - Stakeholders Forum

Governance framework



Three layer structure

- *EOSC Board* of MS/AC and EC representatives to ensure effective supervision of EOSC implementation
  - **Working Group of the strategic configuration of the Programme Committee**
- *Executive Board* of stakeholder representatives to help ensure proper EOSC implementation and accountability
  - **Commission expert group**
- *Stakeholder Forum* to provide input from a wide range of actors
  - **Self-organised with EC support**

EOSC Executive Board

Chair Karel LUYBEN – Representative of CESAER

Vice Chair Cathrin STÖVER – Representative of GEANT

Organisations and their representatives

1. CESAER represented by Karel LUYBEN
2. CESSDA ERIC represented by Ronald DEKKER
3. EMBL represented by Rupert LÜCK
4. European Spallation Source ERIC represented by John WOMERSLEY
5. GÉANT represented by Cathrin STÖVER
6. OPENAIRE represented by Natalia MANOLA
7. Research Data Alliance (RDA) represented by Juan BICARREGUI
8. Science Europe represented by Stephan KUSTER

Individual experts

1. Sarah JONES
2. Jean-Francois ABRAMATIC
3. Jan HRUSAK

Financing of EOSC

European Commission

Phase 1, until 2020:

- the Commission will invest EUR 300 million to support the core functions of the EOSC as per milestones
- Member States would flag the national initiatives that they want to federate into the EOSC (e.g. the work of the Helmholz Data Alliance); and the resources they are willing to provide in kind
- Research funders would start making costs eligible for FAIR data only

Phase 2, after 2020:

- To explore a mix of funding including possibly deposit fees from national funders
- Based on a full cost estimate for the running of the EOSC, conducted by the EOSC governance framework in Phase 1

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EOSC model / Data

European Commission

6 lines of action

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EC proposal for FAIR components

European Commission

Policy context

EOSC Council Conclusions

- Foster FAIR data
- Make optimal use of existing initiatives

Implementation Roadmap

- FAIR related actions, milestones and resources

EOSC Declaration

- Commitments to change towards FAIR
- Data culture and skills
- Rewards & incentives
- Data tools and services

European Cloud Initiative

- Make open research data the default option
- FAIR DMPs

2018

Policy implementation

Demonstrate the financial case

- Cost of not having FAIR data
- Cost-benefit analysis
- Recommendations for sustainability

Support implementation

- Turning FAIR data into reality
- FAIR data action plan

2019

Provide guidance

- European Research Interoperability Framework

Maximize efficiencies

- Annual FAIR data Work Plan

Ensure governance

- FAIR data Working Group

2020

Measure readiness

- Core assessment criteria
- FAIR data maturity model

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Promote certification

- Accreditation / certification scheme

Target groups

- Policy makers
- Funders
- Researchers
- Infrastructures
- Coordination Fora

Thank you for your attention

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