The EOSC Environment – a system of systems approach

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Open Science – why?

The way we do science will change, because it is needed, and because we can

- The current publication system is not sustainable
  - Serials crisis in publishing; many publications have zero citations;
  - Multiple research outputs (data, software, intermediate results)
  - Lack of Reproducibility & Fraud
  - Need for faster circulation of knowledge, at increasing speed
  - Declining trust; science is a black box
- Data explosion
- Sustainable development goals
  - Solve complex scientific and societal problems
- Because we can
  - due to digitisation and internet

Open Science – how?

EC Open Science Strategy

- Changing business models for publishing
- FAIR Open Data
- European Open Science Cloud (EOSC)
- Research Integrity
- Citizen Science
- Reward System
- New Metrics
- Open Education and Skills

EOSC

"We will create a pool of interlinked information,
a 'web of research data'.
Every researcher will be able
to better use not only their own data
but also those of others"
Ursula von der Leyen
World Economic Forum, 2020

- Web of Research Data & Related Services
- EC investments
  - > 400 M€ in EOSC related projects (HPC, OpenAIRE, EOSC-HUB, Science Clusters, …)
  - One of 5 Destinations in EC Work Programme on Research Infrastructures
- Governance
  - Preparations on governance 2019-20 (EOSC Secretariat)
  - EOSC Association (AISBL) in 2021:
    EC Partnership (incl. MS/AC via a Steering Board), Membership Organisation

System of Systems

a collection of systems that pool their resources and capabilities to create a new, more complex system which offers more functionality and performance than simply the sum of the constituent systems

Characteristics

1. Each system can **operate independently** of other systems
2. Each system has its **own policies** and management
3. The SoS is not pre-specified completely but is developed in an **evolutionary** way
4. SoS characteristics (e.g., compliance, reliability) are **emergent** so that they only become understandable when the SoS is integrated
5. The SoS are not co-located but may be **widely distributed**, which may cause operational problems
6. The different systems in a SoS are likely to be built **using different hardware and software** technologies – finding ways of working together
7. Typically, the **size of the databases** in the SoS exceeds the code size by one or more orders of magnitude
   – hence it is not only a software engineering problem but also a data management problem and an engineering problem

Governance

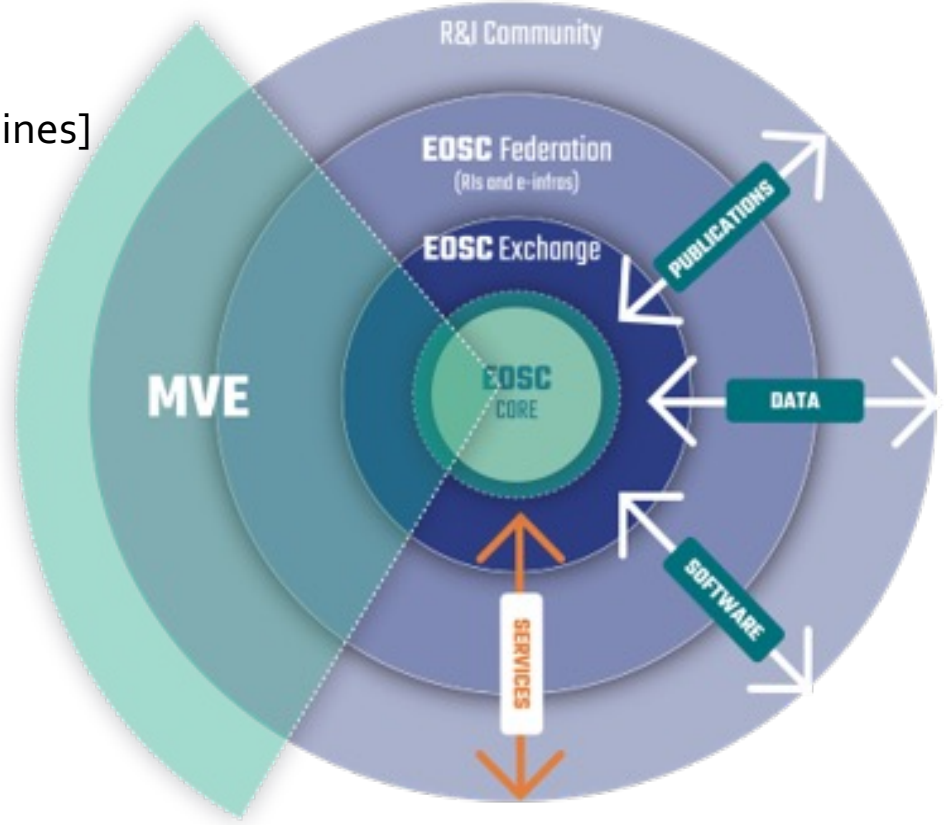
1. Directed = Organisational (governance by one organisation, multiple managers)
2. **Collaborative = Federated (governance by different organisations, but agree on overall purpose, participation in a governing body)**
3. Virtual = Coalitions (no central governance, participants may not agree on the overall purpose)

Source: Ian Sommerville, www.slideshare.net/sommerville-videos

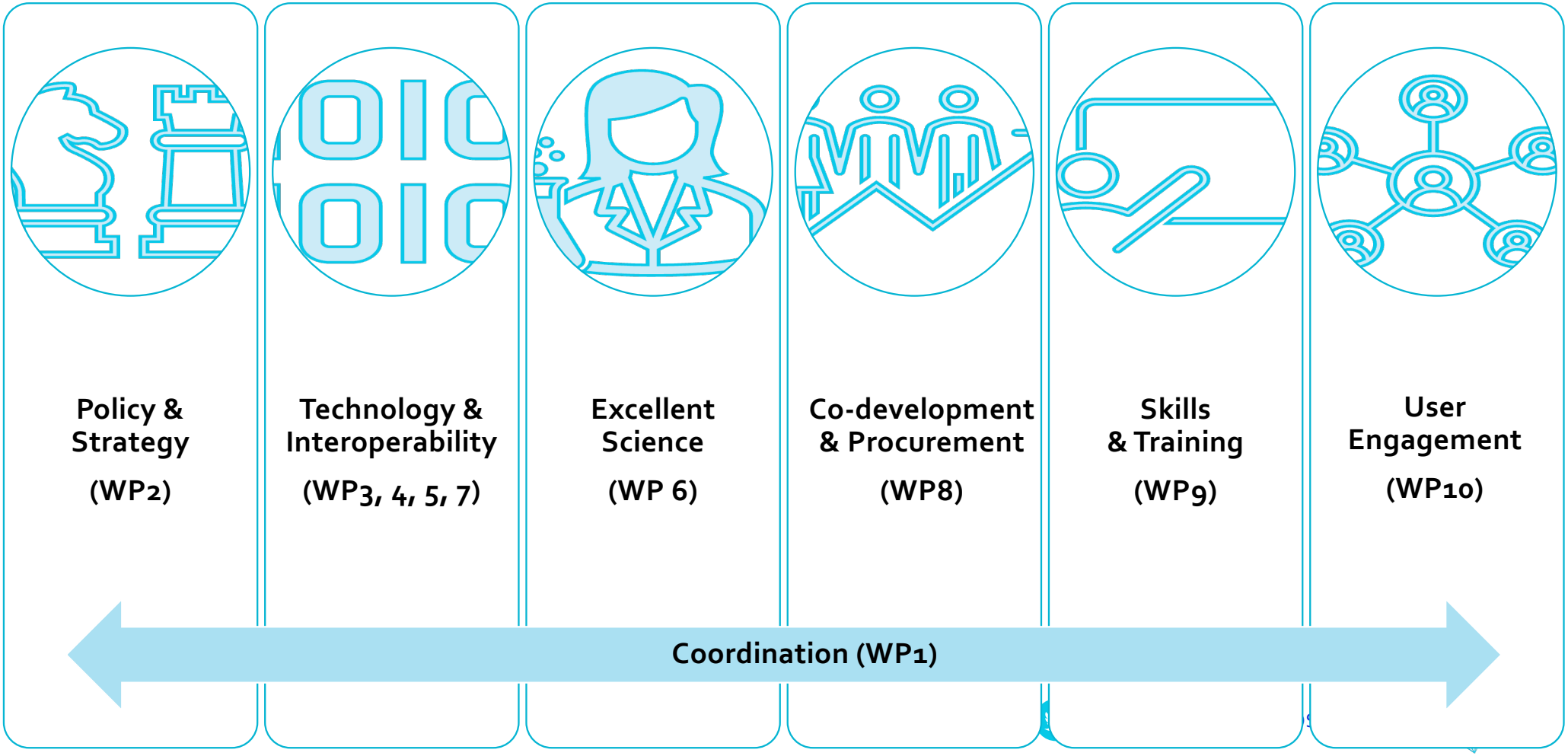
EOSC Support Activities
Training and education
Engagement and promotion
Business collaboration & the Digital Innovation Hub
EOSC Exchange
Community A
Thematic resources
Thematic execution layer
Thematic portal
Thematic service
Thematic research products
Cluster B
Thematic resources
Thematic execution layer
Thematic portal
Thematic service
Thematic research products
Community C
Thematic resources
Thematic execution layer
Thematic portal
Thematic service
Thematic research products
Regional D
Regional resources
Regional execution layer
Regional portal
Regional service
Regional research products
Horizontal execution layer
Horizontal services from wider community
Expanded horizontal services from clusters
07 horizontal services
e-Infra horizontal services
EOSC Core
Core coordination
Rules of Participation
Security Coordination
PID Policy
Onboarding
Knowledge base
Procurement
Core platform
Helpdesk
SMS
Monitoring & accounting
AAI
Configuration Management
Portal
Marketplace/Order Management
Validation/usage stats of sources
Service PIDs
Service Catalogue
Resources/Res. Prods Catalogue
Open Science Monitor
EOSC Interoperability Framework
AAI framework
Operational Support Framework
Open Metrics Framework
Security Framework
Metadata Framework
Open Science Policy Framework
PID
Data access Framework
Resource Description Framework
Service Management Framework
Procurement Framework

EOSC-Future: 3 Tenets

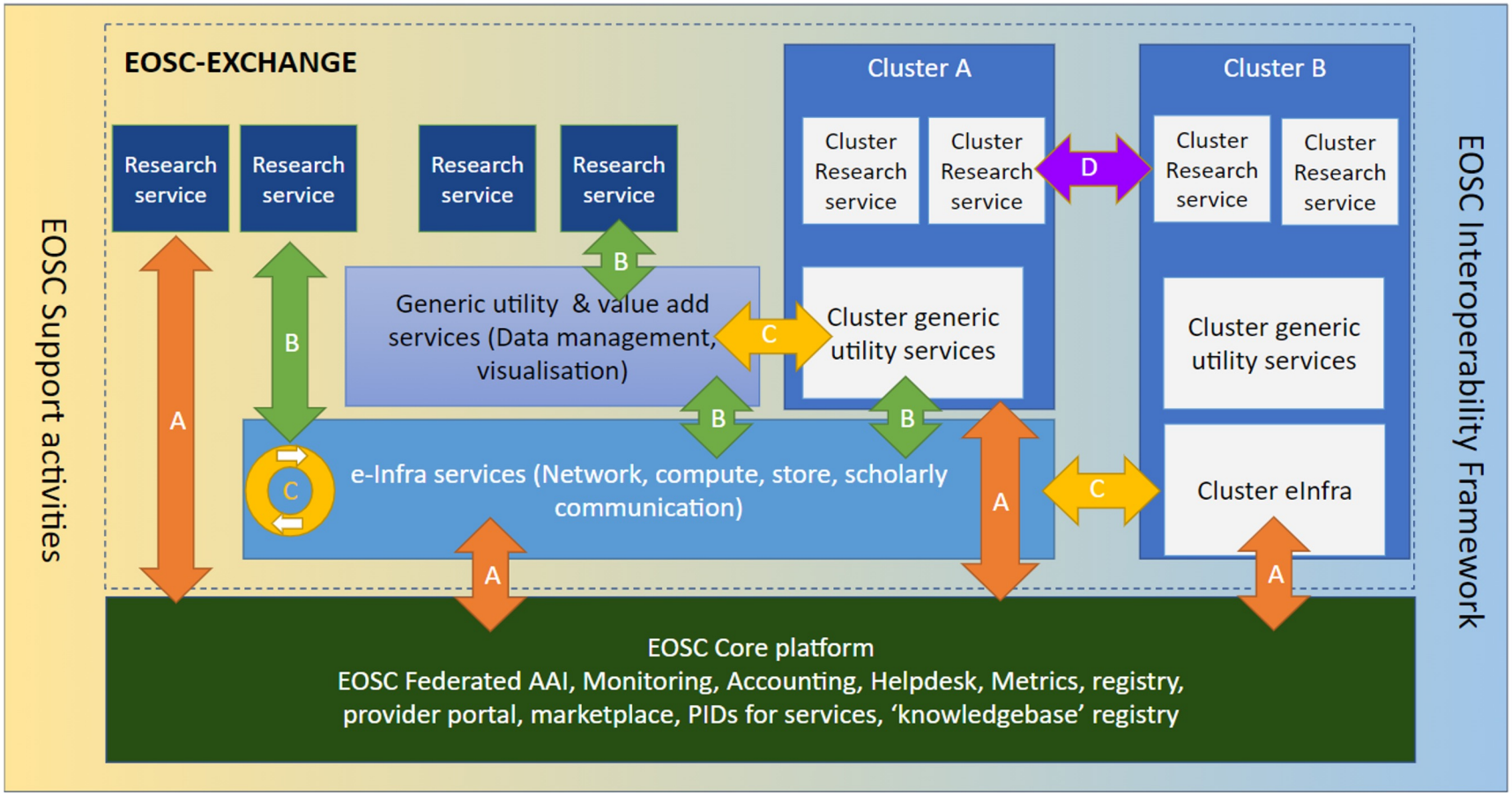
- EOSC Platform
  - EOSC Core & EOSC Exchange
  - Interoperability Framework [standards & guidelines]
- Data Content & Services
  - Science Clusters
  - e-Infra Services [computing, storage, networks]
  - 3rd party services
- Communities
  - Engagement
  - Training & Skills



EOSC-Future project



EOSC Core, Exchange and Interoperability Framework



RI Landscape