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Making data policies FAIR

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Many stakeholders want to monitor the OS policy landscape



SERVICES SUPPORT OPEN SCIENCE IN EUROPE ABOUT

OpenAIRE's National Open Access Desks (NOADs) are gathering and updating information on open science **POLICY-INFRASTRUCTURE-TRAINING** on a periodic basis, ensuring an up-to-date feed.

https://www.openaire.eu/os-eu-countries

EDSC Portal - A gateway to information and resources in EDSC

SIGN IN

Home » Policy » EU+ Countries

EU+ Countries



EOSC STRATEGIC AGENDA + ADVISORY GROUPS + GET INVOLVED + NEWS & EVENTS + ASSOCIATION +

Monitoring and Reporting

All Horizon Europe Partnerships must formulate a reference monitoring framework, based on the general, specific, and operational objecti strategic agendas, allowing the progress to be tracked, towards achieving the specific Partnership goals.

Such monitoring frameworks focus on Partnership-specific objectives and indicators, while being comparable, in terms of standards and metho proposed frameworks are meant to allow for a low-burden assessment of the community achievements and their impact, over time, as well as t need for corrective measures.

Progress towards EOSC-specific policy objectives and deliverables is tracked through a series of monitoring systems, including:

- the Additional Activity Plans (AAP); and:
- the Key Performance Indicators (KPIs).

https://www.eosc.eu/monitoring-and-reporting

This page collects the most up-to-date information on Open Science policies across EU Member States and Associated Countries. In particular, it provides an overview of the state of the play of the research landscape per country and highlights on the development of Open Science policies and national initiatives, including research infrastructures.

The updated information on Open Science policies across EU+ Countries is provided by OpenAIRE.



https://eosc-portal.eu/policy/EU-Countries

Currently, a manual process

- Mainly through surveys at national level
- Time consuming to collect and analyse
- Hard to compare the actual *content* and coverage of the policies across Europe

AA9 Landscape Monitoring Monitor <u>standardised</u> national Open Science and FAIR data strategies, including the description of these policies.



SRIA: https://www.eosc.eu/sites/default/files/EOSC-SRIA-V1.0_15Feb2021.pdf

FAIRsFAIR Policy Resources

FAIR-enabling data policy checklist

helps policy makers review whether their data policies are FAIR-enabling and provides practical recommendations

Policy element	Good practice recommendation	Tick the statement that best reflects your policy	
Title of the policy	To support findability, policies should have a title that makes clear whose policy it is and what the policy relates to.		 The policy has a clear and appropriate title.
			 The title of the policy would benefit from being made more explicit.
			The policy does not have a title.
Year the policy was introduced	To support both human interpretation and machine actionability, the policy should make clear the period of validity, differentiating between the date it was written and the date it was implemented where necessary.		 The policy clearly states when it came into effect and provides a scheduled review date.
			 The policy clearly states when it came into effect but does not provide a scheduled review date.
			 The policy does not make clear when it came into effect or provide a scheduled review date.
Persistent Identifier (PIDs) of the policy document	PIDs should be assigned to clearly versioned policies to ensure that the right version can be found and fed into machine actionable pipelines.		 The policy has a persistent identifier such as a DOI.
			 The policy does not have a persistent identifier such as a DOI.
Policy is registered	Policies should be registered with services such as FAIRsharing or similar to improve their findability for various end users.		 The policy is registered with one or more registry services
			The policy is not registered
Availability of the policy	Policies should be openly available and described consistently using a structured data markup schema to support both human and machine		 The policy is openly available online in a structured format.
			 The policy is openly available online (e.g., HTML, PDF).

Structured policy description template Includes policy checklist elements and enables policy makers create and share structured versions of their data policies

FAIRsFAIR Policy Characterisation Form				
Number	Section	Policy Element	Options	
1	Title of policy	Free text		
2		Availability of the policy		
3		Country/Countries	Free text	
4		Year policy was introduced	Free text	
5		Status of policy	•	
6		Policy is scheduled for review	•	
7	Policy Context	If scheduled for review, when will this take place?	Free text	
8		Persistent Identifier (PID) for policy (i.e., not a question about whether policy requires PIDs but rather is there a PID for the policy document itself)	*	
9		Policy is registered	-	
10		Subject area/discipline covered	•	
11		Sub-discipline if applicable	Free text	
12		Type of policy	-	
13		Scope of the policy	*	
14		Definition of data provided	*	
15		Sharing research software		
16		Data sharing	Suggested	
17		Alignment with FAIR principles	Required	
18		Metadata sharing	Not covered	
19		Exceptions to data sharing are allowed	la la sere	
20		Policy includes expectation on data management planning (DMP) development	Other	
21		If a DMP should be developed, please indicate the stage at which it should be produced		
22	D.I	Is there an expectation that the DMP will be updated and clearly versioned?	*	

Resources are available from https://fairsfair.eu/policy-recommendations-and-support-programme

RDA Journal Policy Features

Policy feature definitions



Feature	What	Why
Definition of research data	Define which research data the policy applies to, and the types of research data covered by the policy.	This enables the policy to define its scope and, where appropriate, provide general or discipline specific information on research data and file and format types (Hodson & Molloy, 2015). Specifying non-numeric data types (images, video, text etc) helps ensure relevance and applicability across research disciplines.
Definition of exceptions be, or should not be made publicly available, under the policy and the alternative options for describing the availability of these data.		Ensures data policy is applicable to all research publications, but acknowledges legitimate exceptions and makes clear the policy does not create new legal or ethical precedents.
Embargoes	Define if and what embargoes on data release are permitted.	Researchers' reasonable right of first use of data generated during their research is a widely accepted principle of data sharing (Anon, 2016b), but reasonable lengths of embargo may vary by discipline, data type and study.
Supplementary materials Define the journal/publisher's position on data sharing via supplementary materials, and if and when sharing data as supplementary materials is permitted under the policy.		While many policies preference sharing data in repositories (McCarthy, 2009; Santos, Blake & States, 2005; Evangelou, Trikalinos & loannidis, 2009), sharing data as supplementary materials remains very common. Some journals have strong data sharing policies and specify supplementary materials as the mechanism for data sharing. Supplementary materials are often a solution for researchers without discipline specific repositories and the definitions of supplementary material and research data often overlap.
Data repositories	State position on the use of data repositories. Data repositories	Lack of an appropriate repository or lack of awareness of repositories are common

http://doi.org/10.5334/dsj-2020-005

The **RDA Data Policy Standardisation and Implementation Interest Group** has defined and described **14 features** of journal research data policies and arranged these into a set of six standard policy types or tiers.

These can be adopted by journals and publishers to promote data sharing in a way that encourages good practice and is appropriate for their audience's needs.

FAIRsharing registry



FAIRsharing provides **curated descriptions** and **relationship graphs** of standards, databases and policies in **all disciplines**



FAIRsharing.org standards, databases, policies

Register policy and include DOI to deposited versions and vice versa

- FAIRsharing recently updated their metadata to include most of the fields recommended by FAIRsFAIR so descriptions of content are more comprehensive
- Registering provides an openly available structured description of your data policy that is machine readable
- Very useful for monitoring the landscape with minimal effort!

Curating FAIRsharing Policy Metadata

I found that adding [the new policy] metadata was **extremely helpful** for me to understand concretely what should go in such a Policy, ideally. And found out [a] particular policy is lacking many of these important elements ... Which I can now bring to their attention!

Gabriel Pelletier, FAIRsharing Community Curator for Neuroscience

GENERAL INFORMATION	Genome Canada Data Release and Resource Sharing Policy GenomeCanada 10.25504/FAIRsharing.5h6xzg			
Туре	Funder			
Registry	Policy			
Description	Genome Canada is committed to the principle of rapid data release and sharing of unique resources to the scientific community Genome Canada-funded projects must therefore share data and resources in a timely fashion with minimal or no restrictions. By providing the scientific community with timely access to the outputs of Genome Canada-funded projects, this data and resource sharing policy is intended to accelerate the translation of research for the benefit of humankind.			
Homepage	https://genomecanada.ca/wp-content/uploads/2022/05/gcdatasharingpolicies16-09-23-1.pdf			
Year of Creation	2008			
Maintainers	This record is in need of a maintainer. If you are affiliated with this project, claim it now!			
Countries developing this resource	Canada			
Subjects	Life Science Biomedical Science			
Domains	DNA Sequence Data Genome Annotation Genome			
Taxonomic Range	AI			
User Defined Tags	None			
WEW RELATION GRA	APH			

Curating FAIRsharing Policy Metadata

I found that adding [the new policy] metadata was **extremely helpful** for me to understand concretely what should go in such a Policy, ideally. And found out [a] particular policy is lacking many of these important elements ... Which I can now bring to their attention!

Gabriel Pelletier, FAIRsharing Community Curator for Neuroscience

	Genor GenomeCanada		ease and Resource Sharing Policy
Туре	Funder	Compliance Monitoring Of Compliance	yes
Registry	Policy	Compliance	
Description	Genome Canada is Genome Canada-fu	Sharing Data Mandated Data Sharing	required
	providing the scien sharing policy is int	Exceptions To Data Sharing	yes
Homepage	https://genomecan	DMP Development Notes	The policy does not require a complete DMP, but does require a "Data Release and Resource Sharing Plan" as part of the application process
Year of Creation	2008	Fining Of Dmp	pre-award
Maintainers	This record is in nee	Mandated DMP Creation	other
Countries developing this resource	Canada	Sharing Metadata	not covered
Subjects	Life Science Bic		
Domains	DNA Sequence Data	COS TOP Guidelines	NA
Taxonomic Range	All	Ranking	NA
User Defined Tags	None	Licences For Outputs Notes	The policy links to suggested Open Source compatible licenses for Research Software/Code, but nothing for Data.
WEW RELATION GR	АРН	Value	yes
		Sharing Research Softwar	re

Benefits of this approach

- Ensures policies align with **FAIR**
- Ensures policymakers are **in control of updates**
- Utilises freely-available repositories and registries
- Policies and a structured description of their content are available to **multiple stakeholders** for a variety of uses (EOSC Association, OpenAIRE, EOSC Future, etc).

Thank you!

More information at

https://dcc.ac.uk/blog/fairsharing-and-dcc-collaborate-align-policy-metadata

https://blog.fairsharing.org/?p=451





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COST – Promoting and spreading excellence

16 November 2022, Prague











Horizon Europe =

Widening participation and strengthening the European Research Area pillar



45,000 Researchers involved in COST Actions





Role of COST in the ERA







research for breakthrough science

3



For many of these 300 COST networks, data sharing lies at the heart of their activities

- Leukaemia gene discovery by data sharing, mining and collaboration
- Performance and reliability of photovoltaic systems: evaluations of large-scale monitoring data
- Mobilising Data, Policies and Experts in Scientific Collections

Over more than 50 years, COST Actions have shown innovative ways in how to collect, manage, use and visualize data





COST Rules include a clear commitment by COST to promote Open Access to research outputs resulting from COST Actions.

Since September 2022 COST Actions have the opportunity to submit their scientific publications directly to Open Research Europe (ORE), the European Commission's Open Access publishing platform for research.





Example of COST Success Stories on data related activities



- COST Action MP1304
- Running from 16/05/2013 24/11/2017
- NewCompStar Exploring fundamental physics with compact stars
- On 10 April 2019, the world discovered the first-ever picture of a black hole in stunning detail



"Neutron stars like to become black holes," says Action Chair Prof. Luciano Rezzolla of Goethe University Frankfurt, Germany, who also played a prominent role in the collaboration that had presented the first-ever image of a black hole. "The two have a lot in common, and so the expertise that was developed and nurtured in NewCompStar also provided fertile ground for this imaging work."





How to engage with COST?





7



THANK YOU!



Contact and engage with us!





WorkflowHub FAIR Workflow Registry

Justin Clark-Casey

EOSC Programme Manager, EMBL-EBI ELIXIR Europe

On behalf of:

Professor Carole Goble The University of Manchester, UK

ELIXIR-UK

WorkflowHub Club

FAIR enabling practices, EOSC Symposium, Prague, CZ 2022-11-16

SYNIHESYS' M Synthesis of Systematic Resources a DiSSCo project

BY-COVID

WorkflowHub

Australian BioCommons

BIOD

COEOSC | EuroScienceGateway





FUROPE

Software Sustainability Institute



EOSC-*Life*

coeosc cancer

Oeosc FAIR-IMPACT

workflows

community initiation





Computational Workflows make EOSC data analysis FAIR



What is a workflow ...





Computational data pipelines and analytics, chain codes, handle data flow, manage execution on computational platforms.



Access EOSC computation and data infrastructure, tool interoperability, processing portability and optimisation

Software Execution on EOSC computational platforms / clouds



Increasing widespread tracking rise in data-driven reproducible analytics, data processing at scale & professionalisation of data pipelines.





Explosion of Workflow Management Systems

/ecflow+home

standard using gearma

/NGSANE-a-lightweight-pr

Kashiwabara/4c0656195b5

/2659/2475637/EuGene-PP

S7-S11



1. Arvados - CWL-based distributed computing platform for data analysis on massive data sets, https://arvados.org/ https://github.com/arvados/arvados

3. Galaxy http://galaxyproject.org/ 4. SHIWA https://www.shiwa-workflow.eu/ 5. Apache Oozie http 27 Cosmos https://cosmos.hr 6. DNANexus https:/ /2014/07/24/bioinformatic

http://cosmos.hms.harvard

Specification-v1.0. 7. BioDT http://www 28. Pinball https://github.com/ //www.biodatomic 29. bcbio https://bcbio-nextge 8. Agave http://agav 30. Chronos https://github.cor 9. DiscoveryEnvironr 10. Wings http://www 11 Knime https://www 12. make, rake, drake, compiling and par supporting paralle https://code.goo 13. Snakemake https 14. BPipe http://bpip 15. Ruffus https://git 16. NextFlow http://r 17. Luigi. Python pack https://luigi.readtl 18. SciLuigi. Helper lit /pharmbio/sciluig 19. Luigi Analysis Wor 20. GATK Queue http: 21. Yabi https://ccg.m 22, segware Workflow Zip64 files to grou that can be exchai pipeline/ 23. Ketrew https://gitl 24. Pegasus http://pe 25. Apache Airflow ht 26. Couler https://gith workflow engines,

31. Azkaban https://azkaban.g 68. sushi https://github.co Apache NiFi https://nifi.apa 69. Clinical Trial Processor 33, flowr (R-based) http://docs 70. Noodles http://nlesc.g 34. Mistral https://github.com/ 71. Swift & Swift/T http://s https://docs.openstack.org 72. Consonance (runs Seq' 35. nipype http://nipy.org/nipy 73. Dog https://github.cor 36. End of Day https://github.c 74. Produce https://github 37. BioDSL https://github.com 75. LONI Pipeline http://pi 38. BigDataScript http://pcinge 76. Cpipe https://github.cc 39. Omics Pipe: uses Ruffus ht 77. AWE https://github.cor 40. Ensembl Hive https://githu 78. (Pv)COMPSs https://wv 41. QuickNGS http://bifacility.u 79. KLIKO https://github.co 42. GenePattern http://www.br 80. SoS Workflow https:// 43. Chipster http://chipster.csc 44. The Genome Modeling Sys 45 Cuneiform A Functional W /XNAT/XNAT+Pipeline 11: 46. Anyaya http://www.ncbi.nli ANVAYA Main.html#HOW 83. OCCAM (Open Curation 47. Makeflow http://ccl.cse.nd. 84. Copernicus http://www 48. Apache Airavata http://aira 85. iRODS Rule Language 49. Pyflow https://github.com/ 86. VisTrails https://www. 50. Cluster Flow http://clusterf 87. Bionode Watermill http 51. Unipro UGENE http://ugen 88. BIOVIA Pipeline Pilot C 52. CloudSlang http://www.clo 89. Dagman A meta-schec 53. Stacks http://catchenlab.life 90. UNICORE https://www 54 Leaf http://www.francesco. 91, Toil (A scalable, efficier 55 omictools http://omictools /BD2KGenomics/toil 56. Job Description Language. classified advertisements fc 93. Autodesk Cloud Comp https://edms.cern.ch/ui/file 94. Civet https://github.co 57. YAWL yet another workflow language https://doi.org/1 58. Triquetrum https://projects.eclipse.org/projects/techno 59. Kronos https://github.com/jtaghiyar/kronos

2. Apache Taverna http://www.taverna.org.uk/ https://taverna.incubator.apache.org/ 60. qsubsec https://github.com/alastair-droop/qsubsec https://doi. 61. YesWorkflow http://yesworkflow.org 62. gwf - Grid WorkFlow https://github.com/gwforg/gwf http://gw 63. Fireworks. https://github.com/materialsproject/fireworks https:/ 131. ECFLOW (Workflow primari /10.1002/cpe.3505 64. NGLess: NGS with less work http://naless.rtfd.io 132. Ophidia ht 95. Cumulus https://github.com/Kitwa 65. pypipegraph https://g 96. High-performance integrated virtua 66. Cromwell https://githu 97. Cloudgene http://cloudgene.ujbk. 67. Dagobah - Simple DAG 98. FASTR https://bitbucket.org/bigr e 135. SCIPION http://scipion.cnb 136 Ergatis ht 99. BioMake https://github.com/evolde 100. remake https://github.com/richfitz, 137. 101. SciFloware http://www-sop.inria.fr/r 102. OpenAlea http://openalea.gforge.ir PradalCohen-Boulakia.pdf 139. Martian htt 103. COMBUSTI/O https://github.com/ja 140, BioMAJ h BioCloud https://github.com/cowan 141. Conveyo ina http://www.trianacode.org/ (Kepler https://kepler-project.org/ 142. Biopipe http:/ 143. Wildfire http 108. dash http://www.dmst.aueb.gr/dds/ 144 BioWBI EDGE bioinformatics: Empowering t 145 BioWMS http://edge.readthedocs.io/ https:// 146. BioMoby http://biomoby.og /bty405 https://doi.org 110. Pachyderm http://pachyderm.io/ ht 147. SIBIOS http://ieeexplore.iee 81. XNAT Pipeline Engine | 111. Digdag https://www.digdag.io/ 148. NGSANE https://github.cor Agua / Automated Genomics Utilitie Metapipe https://githu 113. BioDepot Workflow Builder (BwB) h 149. Pwrake https://github.com/ /099010 150. Nesoni https://github.com/ 114. IMP: a pipeline for reproducible refe 151. Skam http://skam.sourcefor http://r3lab.uni.lu/web/imp/ https:/ 152. TREVA http://bioinformatic 115. Butler https://github.com/llevar/but 153. EGene https://www.semant 116. adage / yadage https://github.com/ 117. HI-WAY: Execution of Scientific Wor enproceedings.org/2017/ 154. WEP https://bioinformatics 118. OpenMOLE https://github.com/ope fninf.2017.00021 155. Microbase http://www.micr 119. Biopet https://github.com/biopet/l 156. e-Science Central http://ww 120. Nephele https://nephele.niaid.nih.c 92. Cylc (a workflow engin 121. TOPPAS https://doi.org/10.1021/pr 157. Cyrille2 https://bmcbioinfo 158. PaPy https://code.google.c 122. SBpipe https://pdp10.github.io/sbp 159. JobCenter https://github.o 123. Drav http://dray.it/ (website seems

> 124. GenomeVIP https://github.com/ding-lab/GenomeVIP https://doi.org/10 125. GridSAM https://sourceforge.net/projects/gridsam 126. Roddy https://github.com/eilslabs/Roddy

127. SciFlo (historical: doesn't seem to be maintained anymore) https://web //sciflo.jpl.nasa.gov/SciFloWiki/FrontPage

195. JTracker https://itracker.io/ https://github.com/itracker-io 128. GNU Guix Workflow Language https://git.roelj.com/guix/gwl.git#gnu 196. PipelineDog http://pipeline.dog/ https://github.com/UMCUGenetics/guix-workflows/blob/master/um 129. Porcupine https://timvanm 130. Parsl (a Parallel Scripting Lil

161. dynamic-pipeline https://cod 162 XiP http://vip hac ip/wiki/en/L_200_GC3Pie https://github.com/uzh/g

th b. 07/R

/10 1016/i commatsci 2015 05

178. Reflow: a language and runtir

179. Resolwe: an open source data

180. Yahoo! Pipes (historical) http:

181. Walrus https://github.com/fit

182. Apache Beam https://beam.a

183. CLOSHA https://closha.kobic

184. WopMars https://github.com

185. flowing-clj https://github.com

186. Plumbing and Graph https://

187. LabView http://www.ni.com/e

188. MyOpenLab http://myopenla

189. Max/MSP https://cycling74.co

191. Flowstone http://www.dsprok

190. NoFlo https://noflojs.org/

manual-ver1-1-kobic-korean

management-system-in-bio

160. CoreFlow https://www.ncbi.nl 198. Overseer https://github.com/fram 199. Squonk https://squonk.it/

Tavaxy Pattern based workflow sy

215. Ginflow: Decentralised adaptive w

216. SciApps: A cloud-based platform

218. Collective Knowledge (CK) framev

219. QosCosGrid (QCG) http://www.go

220. High-Throughput Binding Affinity

cybertools/htbac https://arxiv

221, BioWorkbench (Swift-based) http:

222. ENVI Task Engine https://gbdxdg

226. Piper (based upon GATK Queue)

227, Apache Object Oriented Data Tec

192 HyperLoom https://code.it4i.cz/ADAS/loom https://code.it4i.cz/ADA

193. Dask http://dask.pydata.org/en/latest/ https://github.com/dask/dasl

194. Stimela https://github.com/SpheMakh/Stimela https://github.com/S

/~cosmosafari2017/wp-content/uploads/2017/02/makhathini.pdf

195. JTracker https://jtracker.io/ https://github.com/jtracker-io

/Whitepapers/Tabld/2359/ArtMII

https://www.sciapps.org/

JE 207 Jobber

197. DALiuGE https://arxiv.org/abs/170

217. Stoa: Script Tracking for Observat 246. Luna https://luna-lang.org/

engine.readthedocs.io/en/latest/i 253. DataFlows https://github.com

mpipe http://ymlaker.github.io/m 255. DataJoint https://datajoint.io,

idseg-dag https://github.com/chr 256, DIRAC3 (LHCb grid software)

223. Pypeline https://github.com/cgan 254. Volcano https://github.com/v

228. JX Workflow (DSL for Makeflo /papers/jx-escience-2018.pdf 229. The Adaptable IO System (AD

34 Niass mps

236. Tiny Cloud Engine http://ka.c

247. Passerelle https://code.googl

248. Kurator-Akka https://github.c

249. Jug https://doi.org/10.5334/i

250 Node-RED https://podered.o

252. Frictionless Data Package Pip

257. Orange https://orange.biolab

258. Ensemble Toolkit (EnTK) http:

259. BioQueue http://www.bioque

260. mlr3pipelines https://mlr3pipelines.mlr-org.com/

261. Kedro - Production-Ready Data & ML Pipelines ht

/btx403

227. Apache Object Oriented Data

264. Giraffe Tools ht 297. TriggerFlow: Event-based Orchestration of Serverless Workflows https://github.com/triggerflow/tr

265. CERAMICCA https://ceramio 266. uap - Universal 299. PanDA Workflow Management System: https://doi.org/10.1051/epjconf/201921403050 https://d

263. SecDATAVIEW

287. SimStack http://

288. Maestro Workf

289. HyWare https:/

290. HyperFlow http

291, BRANE Framew

292. ApolloWF http

293, IS-EPOS Platfo

heterogeneous

eractive Erectron Condition Research

http://www.pvinvoke.org/

295. targets R package https://cran.r-project.org/package=targets

workflows. https://cloud.google.com/workflows/docs

269. CWLEXEC - CW 302. redun (yet another redundant workflow engine) https://github.com/insitro/redun 270. drmr https://gi 303. pyiron (The materials science IDE) https://pyiron.org/ 304. looper (pipeline submitting engine) https://github.com/pepkit/looper 305. dagster (Python based data orchestration platform) https://dagster.io/ https://autosul 306. StackStorm (Devops automation engine) https://stackstorm.com stack deep learning workflows) https://esipfed.github.jo/G 309. Cloud Build: Build, test, and deploy on our serverless CI/CD platform https://cloud.google.com/bu Data Management http: 274. Netflix Conduct 310. Task/Taskfile: A task runner / simpler Make alternative written in Go https://github.com/go-task/ta 311. pypyr: task runner for automation pipelines script sequential task workflow steps in yaml conditio 243. Apache SCXML engine https: 277. Drake R packa error handling & retries https://pypyr.io/ https://commons.apache.org 278, MaDaTS https:// 312. SimTool/Sim2Ls: Jupyter notebook-based pipelines of Simulation Tools for the HUBzero platform https://github.com/hubzero/simtool https://simtool.readthedocs.io/ https://doi.org/10.1371/journ 244. IceProd https://github.com/V 279. Cadence https: 245. AnADAMA2 http://huttenhov 280. Merlin https://i 313. SidelO: A Side I/O system framework for hybrid scientific workflow (no project/source code availab /10.1016/j.jpdc.2016.07.00 281. Janis https://ja 282, AlphaSQL http: 314, Flyte https://flyte.org/

294. pyinvoke: Pythonic task management & command execution, uses python as workflow language

296. Compi https://doi.org/10.7717/peerj-cs.593 https://github.com/sing-group/compi https://www.sin

. Google Cloud Workflows: Orchestrate and automate Google Cloud and HTTP-based API services

283. zeebe https://g 315. StreamFlow https://streamflow.di.unito.it/

284, durabletask htt 16. Jupyter Workflow https://jupyter-workflow.di.unito.it/

285. Illumina State I Nnodes: a simple workflow manager for Python functions and command line tools https://github. 251. Databolt Flow https://github. 286. Moteur http://

318. Orchest: A GUI for developing, running and managing container workflows https://github.com/o /654974/attach

319. Wasmflow: platform for building applications out of WebAssembly code containers https://github /wasmflow https://wasmflow.com/

320. HyperShell: cross-platform, high-performance computing utility for processing shell commands of asynchronous queue, https://doi.org/10.1145/3491418.3535138 https://github.com/glentner/hype

321. Covalent: Pythonic distributed workflow tool used to prototype and run high performance classica https://github.com/AgnostiqHQ/covalent

322. Icolos: workflow manager for structure-based workflows in computational chemistry https://githu /lcolos https://doi.org/10.26434/chemrxiv-2022-vqbxg

323, dwork Task graph scheduler with a minimalistic API, https://github.com/frobnitzem/dwork

324. pmake parallel make developed for use within batch jobs https://docs.olcf.ornl.gov/software/work /pmake.html#workflows-pmake

262. DATAVIEW - DATAVIEW is a big data workflow management system, https://github.com/shivonglu/DATAVIEW

This project has received funding from the European Union's Horizon Peter Amstutz, Maxim Mikheev, Michael R. Grusoe, Nebojša Tijanić, Samuel Lampa, et al. (2022): Existing Workflow systems. Common Workflow Language wiki, GitHub. https://s.apache.org/existing-workflow-systems updated 2022-08-30. accessed 2022-08-30



Are workflows

Findable, Accessible, Interoperable, Reusable?

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824087



https://workflowhub.eu





Launched Sept 2020 EOSC service provided by ELIXIR, EOSC-Life, The University of Manchester **Open Development**

Click here to see The registry supports any workflow in its native repository COVID-19 related workflows WorkflowHub aims to facilitate discovery and re-use of workflows in an accessible and interoperable way. This is achieved through extensive use of open standards and tools, including Common Workflow Language (CWL), RO-Crate, BioSchemas and TRS, in accordance with the FAIR principles. A Contribute Discover About Latest additions Find content X-omics ACTIONdemonstrator analysis workflow Workflow - added 8 days ago Browse Spaces xReferenceFasta-n 7 CroMaSt: A workflow for domain family curation through crossmapping of structural instances between protein domain databases Archive ouwerte HAL Document - added about 1 month and Alignment Assembly Bioinformatics covid-19 CWL Galaxy GATK4 Genomics INDELs Machine Emp CroMaSt: A workflow for domain family curation through crossmapping of structural instances between protein domain databases Learning Metagenomics Nextflow Python rna rna-seq Workflow - added about 1 month ago RNASEQ SNPs Transcriptomics workflow Workflows (Show all) A DRC biochemical toECBD Workflow - added about 1 month ago Integrations Authentication Ontologies Assign DOIs OH**N** LS LOGIN (DataCite doi Publish Programmatic access Markup json api Bioschemas zenodo

Search Ø

WorkflowHub
 Q Browse •

Search here.

WorkflowHub is a registry for describing, sharing and publishing scientific computational workflows



FAIR Workflow registry for EOSC



Workflow-system agnostic Search for and **discover** workflows Metadata standardization (CWL, schema.org, custom tags, RO-Crate) DOI publication, citation & credit Collections, Teams, Organizations and Communities Programmatic access: GA4GH TRS API, RO-Crate **Registry**, not repository Workflows can live elsewhere, e.g. GitHub Integration with EOSC execution platforms





Low barrier to entry for publishing workflows

- ⊘ Workflow-system agnostic
- ✓ Import from native repositories
- ─ Git integration
- Versions, any stage of development
- Or Automated metadata extraction
- 🕑 Include documents, test data

tl;dr: Workflows can remain in existing repositories





WorkflowHub







Helping EOSC communities make FAIR workflows

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824087

Supporting workflow communities in EOSC





https://workflowhub.eu/projects



WorkflowHub integrates with EOSC services

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824087

WorkflowHub in the EOSC ecosystem



Services in the

Workflow Collaboratory exchange workflows as

FAIR Digital Objects using RO-Crate

Packaging workflow files & companion objects

Exchange between services & systems

Reproducibility & Testing

Citation

Workflows in the EOSC PID graph

Standards-based exchange

https://doi.org/10.5281/zenodo.4605654

Acknowledgements

WorkflowHub Club **COEOSC** EuroScienceGateway

https://about.workflowhub.eu/ **Open Development Bi-weekly community calls**

Workflow Community Initiative https://workflows.community/about EOSC-Life https://www.eosc-life.eu/ ELIXIR http://elixir-europe.org RO-Crate https://www.researchobject.org/ro-crate/ WorkflowHub https://workflowhub.eu/ Galaxy Europe https://galaxyproject.eu/ Bioschemas https://bioschemas.org Common Workflow Language https://www.commonwl.org/ Life Monitor https://crs4.github.io/life_monitor/

Finn Bacall, The University of Manchester Stuart Owen, The University of Manchester Stian Soiland-Reyes, The University of Manchester

FAIR Computational Workflows at WCI





EOSC-*Life*

IBISBA

meosc cancer

COEOSC FAIR-IMPACT





BY-COVID

Australian BioCommons





Synthesis of Systematic Resources a DiSSCo project



National Initiatives for Open Science in Europe

RoLECT: a self-assessment tool against EOSC RoP Legal & Ethics Compliance

FAIR Enabling Practices EOSC Symposium 2022, Prague, 14-17 November 2022

Eleni Toli ATHENA RC NI4OS-Europe Project Director



- Self-assessment tool against EOSC RoP focusing on Legal & Ethics aspects.
- Designed to promote compliance and identify non-compliance with EOSC RoP.
- Prospective resource providers have a hands-on opportunity to verify if the resources meet the legal & ethics standards of EOSC Rules of Participation.
- Targeted audience: any resource providers familiar / concerned with legal & ethics conditions related to EOSC RoP.
- Version released: June 2022


Ethics & Legal compliance as part of FAIR



- Legal and ethics conditions are important elements of FAIR
 - have a great impact on how we grant access to resource, use it and allow its reuse
 - o are important parts in policies of publishing platforms and funding bodies → and EOSC!

More than half of respondents say that the policies of funding bodies and publishers are the most influential when it comes to their RDM and data sharing European Research Data Landscape Study, Executive Summary – Draft

The EOSC context



- \Xi EOSC Rules of Participation
- Ownership and evolution of the RoP from 2021 onwards

Implementation of EOSC

meosc

Task Force

Advisory

Group

Rules of Participation Compliance Monitoring

Aims

Provide criteria based on the principles expressed in the high-level EOSC RoP.

Define monitoring process of the different RoPs by setting up a dedicated framework

EOSC Symposium 2022, Prague, 14-17 November 2022





EOSCROP

Executive Board Working Group



- EOSC is based on the principle of openness
- EOSC data align with FAIR principles
- EOSC services align with EOSC architecture & interoperability guidelines
- EOSC is based on principles of ethical behaviour and integrity
- EOSC users are expected to contribute to a successful EOSC and active EOSC community
- EOSC users adhere to the terms of use of the resources they use
- EOSC users reference the resources they use in their work
- Participation in EOSC is subject to the policy and legislation of the EU



- Personal Data: minimum level of compliance with GDPR → lawfulness of processing (Art 6§4 GDPR), information obligation (Art. 13, 14 GDPR), and data subjects' rights (Art. 15-22 GDPR).
- Definitions of PSI and trade secrets according to Directives (EU) 2019/1024 and 2016/943 respectively.



Development approach



Guidelines of EOSC Executive Board RoP Working Group Deconstruct EOSC RoP into general categories (transparency, legal aspects, ethics)

Reconstruct units of rules & classification according to priorities of EOSC RoP

Structured flow of questions categorized into three levels of importance



How does it work? The process







EOSC RoP Legal & Ethics Compliance



Explore the tool as a guest user

EOSC Symposium 2022, Prague, 14-17 November 2022





High Importance: Critical information that reflects the basic principles of RoP

Medium Importance: Information that is consistent with the EOSC RoP

Low Importance: Information with a relatively low impact on the assessment result

J help resource providers to assess what information or omission of information is most important

EOSC Symposium 2022, Prague, 14-17 November 2022

Assessment IPR: Basic Information General Information General Information of the Resource Service Transparency Provisions Questions about service's ToS **IPR: Basic Information** Yes IPR: Basic Information No IPR: Restrictions IPR information about resource's restrictions Is the IP owner identified? Yes IPR: Licensing Out IPR information about resource's NO licenses

"As open as possible, as closed as necessary"

IPR: Open Licenses Information IPR information about resource's open licenses compatibility

Personal Data Personal Data Information

Ethics Information Ethics Information

Dashboard

Public Sector Information (PSI) Public Sector Information (PSI)

Intellectual Property Rights (IPR) is a type of condition that the resource may contain with respect to the scope of its use. This section requires information about any types of Intellectual Property (IP) that may subsist in the resource. IP may subsist as copyright, patents, trademarks or trade secrets.

Are the types of Intellectual Property (IP) subsisting in a resource identified?

Is provenance or other type of IP acquisition related information provided? (Yes No Is the identity of the author / inventor or other IP originator provided?

Yes No

- **Intellectual Property Rights**
- Licensing conditions
- License compatibility assessment
- Public domain
- Cultural heritage law
- Code of Conduct
- Public Sector Information
- Trade secrets, confidential information



FAIR, legal & ethics aspects, boundaries and restrictions

Assessment report



ΩТ

Submitted on 12 Jan 2022 17:03 EOSC RoP Legal and Ethics Compliance

GUEST USER







Eleni Toli, elto@athenarc.gr





NI4OS_eu



NI4OS.eu



Join NI4OS-Europe Community: https://ni4os.eu/contact-us





EOSC RoP Legal & Ethics Compliance







CHGGS DMPs, FAIR principles & the European Landscape

Elli Papadopoulou ATHENA RC / OpenAIRE





DATA MANAGEMENT PLANS - TODAY

2

Policy

- Public DMPs
- Rich content
- Support

Technical

- Search & retrieve
- Interoperability
- Semantics

• Not Open Access

- Granularity of content
- Unclear about the process, e.g. where to start, how to get input

- Resource_type
- Reused datasets
- Qualified references

Adoption • FAIR practices • Disciplines / Communities • Data sharing • Reproducibility

- Domain Data Protocols
 - Input & Output Data

³ ARGOS – A GLIMPSE

ARGOS is an open source, configurable and extensible **tool** for **planning Research Data Management** (RDM) activities according to **Open Access & FAIR data policies.**



ARGOS – OUTPUTS & PROCESSES



- Findable: OpenAIRE EXPLORE
- Accessible: PIDs (ORCIDs & DOIs)
- Interoperable: RDA DMP Common Standard
- Reusable: Licenses
- Versioned (history/provenance)
- Published and preserved in Zenodo

Automated

- Writing: inferred content and allocation in Templates as answers
- Searching: Published Dataset / Software metadata
- Publication: DMP metadata and files in Zenodo





5

Collaborations

- Funders and Institutions
 - Deployments and Integrations with local research services
 - Migrating mechanism to move DMPs from other software to ARGOs

• Templates

• Features

- Extend publishing mechanism
- Extend semantics
- Machine actionable table for input
- Feedback from the community





Reliance

ARGOS - COMMUNITY

Argos Community Calls

Are you a researcher or administrator of Argos? Got questions on how to write your Data Management Plan (DMP) or how to create your Template and connect DMPs with other data services and outputs? Join us and learn more!



OpenAIRE is running a series of **community calls for Argos** to **support all researchers** in meeting their **Horizon Europe requirements** by creating **FAIR** (Findable, **Accessible, Interoperable, Reusable) DMPs.** Similarly, it supports **all research performing and funding organisations** to orchestrate their data services around Argos and **connect data workflows** contributing to **interconnected Research Data Management ecosystems**.

These calls offer the opportunity to discover Argos novelties and learn how to benefit from them in your practice, share feedback and discuss the future of DMPs as FAIR and machine actionable outputs, i.e. as complete outputs that bring validated information, qualified references and automations to the table to assist the processes of collecting, documenting, and publishing your data

The Argos Community Calls will run every last Wednesday of the month at 14.00 CEST, starting from June 29th!



https://www.openaire.eu/argos-community-calls



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Twitter @elli_lib

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Research data support at Recherche Data Gouv









What is Recherche Data Gouv?

An ecosystem providing...

A sovereign solution for publishing and reporting data

- A federated national research data platform...
- ... complementary to the thematic repositories...
- Implanned to integrate EOSC services, offering access to shared and open research data

Research Data Management Support

 Train, support and raise the awareness of research teams throughout the data life cycle



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An ecosystem of five types of stakeholders



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Data management clusters



Generalist expertise, close to the research teams

Shared services and skills for organisations from a given territory *These clusters are progressively developed*

- As they are designed by the universities involved
- Following successive calls for expressions of interest (three a year as of the end of 2023)







Thematic reference centres



Expertise in a given scientific field

Definition and dissemination of **best practices and international standards for data management, processing and dissemination** by scientific field

The first landscape put forward: Research infrastructures that structure data management and dissemination for their scientific community

















Resource centres





Training and e-training resource centre B Recherche Data Gouv

Sharing and certification of **teaching tools** along with the development and provision of **generalist e-training**



Shared tools for the clusters resource centre Recherche Data Gouv

Development and maintenance of **shared tools** for the data management clusters



Skills resource centre E Recherche Data Gouv

A system aimed at increasing the skills of the data management clusters



Repository-registry resource centre B Recherche Data Gouv

Development and maintenance of the repository-registory along with user support





https://recherche.data.gouv.fr/en





EOSC – Recherche Data Gouv: several points of convergence









RÉPUBLIQUE FRANÇAISE recherche.data.gouv.fr

Thank you!

https://recherche.data.gouv.fr/en

@RechercheDataGv



https://www.linkedin.com/company/recherche-data-gouv/









Making EOSC Research Objects FAIR with RO-Crate

Justin Clark-Casey RO-Crate Community EMBL-EBI ELIXIR Europe Stian Soiland-Reyes RO-Crate Community The University of Manchester ELIXIR Europe

> EOSC Symposium Prague, CZ, 2022-11-16



CC

Is it FAIR to use these repositories? Ar sharing.org



分 → Resources → Sharing & Discovery EOSC Services CATEGORIES

372

Access physical & eInfrastructures	95
Aggregators & Integrators	25
Processing & Analysis	158
Security & Operations	39
Sharing & Discovery	94
Applications	24
Data	42
Development Resources	5
Samples	1
Scholarly Communication	21
Software	22
Training & Support	28
Other	9

neosc

	Filter
	Reset all
Subjects 🕀	
Content Types ⊟	
Archived data (504) Audiovisual data (335) Configuration data (45) Databases (473) Images (1090) Networkbased data (111 Plain text (926) Raw data (979) Scientific and statistical Software applications (3 Source code (126) Standard office docume Structured graphics (79) Structured text (735) other (769)	data formats (1429) 368) ents (1262)

<mark>iD</mark> ش			3
1620 Standard	S	1944 Databas	ses
Terminology Artifact	825	Repositories	100
Iodel/Format	524	Knowledgebases	80
eporting Guideline	229	Knowledgebase/Repositories	13
dentifier Schema	28		
VIEW ALL		VIEW ALL	

Researchers are asked to make their research outputs FAIR – where to publish?

Thousands of public, institutional and domainspecific repositories

Help from guidance and **catalogues** (FAIRsharing, re3data, EOSC Catalogue)

...but how to gather and reference outputs across multiple repositories?

What about **contextual** information?

Aims of FAIR Research Objects

Describe and package data collections, datasets, software etc. with their metadata
Platform-independent object exchange between repositories and services
Support reproducibility and analysis: link data with codes and workflows
Transfer of secure/large distributed datasets with persistent identifiers
Aggregate citations and persistent identifiers
Propagate provenance and existing metadata
Publish and archive mixed objects and references
Reuse existing standards, but hide their complexity

Findable Reusable Accessible Interoperable



Practical and general purpose packaging of Research Objects



Infrastructure independent – avoiding repository/service silos Practical, lightweight, robust



Familiar, developer friendly, web native, machine- and humanreadable, search-engine accessible Adoptable Linked Data JSON and PIDs



Embrace diversity, legacy, unknowns, open-ended, multi-

interpretation, self-describing, interlingua Adaptable Metadata Profiles



https://www.researchobject.org/ro-crate/

Realizing FAIR Digital Objects with RO-Crate

Reference existing repositories Re-use Web standards (JSON-LD, schema.org) Persistent identifiers w/FAIR Signposting Add context: people, projects, etc.



RO-Crate is used by multiple international projects

Applied across research domains – from **life sciences** to **cultural heritage**

RO-Crate in practice

https://www.researchobject.org/ro-crate/in-use/

Data Cubes – earth observation data

The EOSC project **RELIANCE** use RO-Crate to package data cubes of **earth observation data**, along with documentation, images and workflows

Connects to related **infrastructures** for execution/analysis.

Metadata includes **temporal** coverage, **spatial** coverage and **vertical** coverage.

ROHub publishes the archived RO-Crates to general-purpose repositories (Zenodo, B2Share) for longevity and PIDs.







Fouilloux et al (2022): International conference on FAIR Digital Objects https://doi.org/10.24424/nz65-v565

https://doi.org/10.3897/rio.8.e93940



HMC Hub Energy: FAIR Time Series of energy consumption measurements





Capturing & describing Time series:

- Electricity
- Gas
- Heat
- Drinking Water
- ≈ Compressed air

Günther et al (2022): Use Cases in HMC – from Generation to Reuse of Data Helmholtz Metadata Collaboration https://doi.org/10.5281/zenodo.7157694 https://helmholtz-metadaten.de/en/fair-data-commons/overview



https://nfdi4plants.de/content/learn-more/annotated-research-context.html
Building an EOSC ecosystem of FAIR Workflows

- EOSC projects **BY-COVID**, **EOSC-Life**, **EuroScienceGateway** exchange rich Workflow RO-Crate within an emerging EOSC ecosystem
- Workflow Crates capture
 - executable workflows in their **native format** (e.g. Galaxy)
 - interoperable CWL description of the workflow
 - software citations (e.g. tools used)
 - required data sources
 - **test** suites
 - workflow execution provenance



https://workflowhub.eu/ https://www.researchobject.org/workflow-run-crate/

https://www.researchobject.org/ro-crate/community.html

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Engaging stakeholder communities in Skills4EOSC and FAIR-IMPACT

> Loek Brinkman, DANS / TUDelft Joy Davidson, DCC

Skiis 4 eosc

COEOSC FAIR-IMPACT Expanding FAIR solutions across EOSC





Call HORIZON-INFRA-2021-EOSC-01-05

Enabling discovery and interoperability of federated research objects across scientific communities

Expanding FAIR solutions in Europe

Partly following up on FAIRsFAIR

EU funded project

Coordination and Support Action

10 million euro

36 months, starting 1 June 2022 28 partners and affiliate entities

From 10 EU member states: NL, FI, FR, DK, IT, DE, ES, NO, BE, RO

and the UK



Goal: Supporting the implementation of FAIR-enabling practices



Engaging stakeholder communities



Persistent Identifiers validated and suitable for use in data production workflows; in complex data citation; with sensitive data in multiple domains.



Metrics, guidelines and assessment tools validated and suitable for use in multiple domains and for various different of digital objects.





Expanding FAIR solutions across EOSC

Greater and more harmonised use of semantic artefacts throughout the EOSC ecosystem, leading to semantic interoperability within and between disciplines.

COCOSC FAIR-IMPACT



A range of core building blocks for interoperability in the EOSC. validated and suitable for use in multiple domains.

Engaging stakeholder communities



FAIR-IMPACT

Expanding FAIR solutions across EOSC

meosc

Skils 4 eosc



44 Participants, 18 Countries

"Key doers" in Open Science in their Country/Region/Domain

- 2 ESFRI Research Infrastructures
- 7 millions €



Skiis Goal: Supporting an EOSC-ready digitally skilled workforce

Institutions

Professional networks and communities

Science for Policy







Skiils Engaging stakeholder communities 4 eosc

Network of Competence Centres

- Institutional
- Regional
- Thematic





Next run: March 2023 Register at <u>www.osc-international.com</u> International Network of Open Science & Scholarship Communities

Ways you can engage with us

- Apply to take part in one of the support programmes
 - FAIR-IMPACT open calls (March 2023)
 - Skill4EOSC Open Science Incubator Programme (March 2023)
- Review and comment on our draft deliverables
 - <u>Skills4EOSC Zenodo Community</u>
 - FAIR-IMPACT Zenodo Community
- Sign up to the project newsletters to be kept informed about our outputs and open calls

Related EOSC Symposium sessions

- Talkers, Thinkers, Doers: Stakeholder Engagement and EOSC synergies through Skills4EOSC
- Towards a shared value proposition for Persistent Identifiers in EOSC
- Semantic Interoperability in EOSC
- EOSC PID Policy and FAIRCORE4EOSC: Measuring compliance

FAIR enabling practices

Engaging stakeholder communities in Skills4EOSC and FAIR-IMPACT

Training & Skills for EOSC: Lightning talks

- The Skills4EOSC project contribution
 The Open Science Communities Incubator Program

Thank you!



/company/fair-impact-eu-project

IPACT



ALMA MATER STUDIORUM Università di Bologna

Tackling Research Data Management challenges with FAIRness

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Research Services Coordination Unit Research Services Division (ARIC) University of Bologna

RDM Challanges with FAIRness

- Data need to be Findable, Accessible, Interoperable and Reusable (FAIR): need acknowledged by RDM communities
- FAIR principles can guide and be beneficial to researchers: it is not trivial to make them understand how
- RDM take place in a context of specific and restrictive ethical and legal requirements
- FAIR principles and DMP are mandatory in many funded programmes, including Horizon Europe



(2018). Open Science Training Handbook (1.0) [Computer software]. Zenodo. <u>https://doi.org/10.5281/zenodo.1212496</u> (CC0)

Researchers should be aware of how all these topics intersect the different phases of data lifecycle, and support for researchers should be tailored on this need for a global and integrated overview



Support @ FAIRness

In our experience across different research domains, researchers often face the same stumbling blocks. To support them, we have developed a **RDM Decisional Tree** starting from the fundamental bricks of the data lifecycle and posing a series of questions to help researchers navigate:

- 1) the domain specific nature and origin of the data they are handling;
- 2) Privacy/Ethics requirements (e.g. GDPR);
- 3) Intellectual Property Rights;
- 4) active data storage;
- 5) long-term deposit and preservation.

With all these questions in mind, we support researchers in finding answers by supplying a **Data Lifecycle Model**, including a series of possible actions and resources to protect/organize/preserve their data.



Data Life-cycle





Source: https://zenodo.org/record/7249051#.Y1pAi3ZBxPY

This diagram proposes a data lifecycle model inspired by the University of Virginia Library's model (https://guides.lib.virginia.edu/c.php?g=515290&p=3522215)



EOSC Symposium, November 2022, Prague

Research Data Management Decision Tree

Source: https://zenodo.org/record/7190005#.Y1ptGXZBxPY

Decisional tree to help researchers ask, and answer, questions they did not know they had. Starting from the fundamental bricks of the data lifecycle, integrates a series of questions aiming to encourage the researchers address some major attention points, encompassing privacy/ethics issues that range from requirements to IPR legislation and FAIR principles.







Legend:





Depositing

RDM Decision Tree - Planning

Legend:

DATA MANAGEMENT



EOSC Symposium, November 2022, Prague

ALMA MATER STUDIORUM Università di Bologna

RDM Decision Tree - Handling





ALMA MATER STUDIORUM Università di Bologna





Take Home Messages:

- RDM Decision Tree is useful also as a self-standing tool to support researchers. It improves researchers' awareness on the importance and value of research data
- It helps the researcher to think about both their inbound (IPR, privacy, ethics) and outbound data, and to make upstream decisions with a view to long-term preservation.
- It highlights that FAIR RDM implies a plurality of supporting expertise and a multitude of services, resources, tools
- RDM DT is a tool that can be used in any context, it might also need to be integrated depending on the situation (e.g. funded project, different funders requirements, etc.)
- We are collecting feedback from researchers to identify further critical points and integrate the Tree
- The feedback gathered so far from researchers has shown considerable appreciation for the tool provided



Thank you!



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