

		EOSC-Nordic	EOSC-Pillar	NI4OS-Europe	ExPaNDs	EOSC Synergy
Concepts for FAIR implementation (Pillar 1)	Rec. 1: define FAIR for implementation	Implementation of FAIR follows the FAIR Evaluator (Wilkinson et al. 2019) and the EOFAIR office. D4.1 + D4.3 will detail this including FAIR recommendations and the use of hackathons and MM events to support communities to implement. Early (1st epoch) results presented 22 April at EOSC-Nordic workshop (recording available here: https://www.eosc-nordic.eu/fair-online-event-for-eosc-nordic-project-a-big-success/). The evaluation is due to D4.1 (1 Sep 2020). MMAs + hackathons will take place Aug/2022-Feb/2022.	D6.1 FAIR Research Data Management Tool set - first release 30 June 2020 D6.2 FAIR research Data Management Workbench Operation Report D6.6 FAIR Research Data Management Tool set update (Month 24)	Implementation of FAIR is according to "The FAIR Guiding Principles for scientific data management and stewardship" by Wilkinson et al. Information on the FAIR uptake strategy of NI4OS-Europe are provided in the deliverable D4.1 "EOSC service and FAIR uptake strategy" which can be found on https://www.eosc-nordic.eu/2020/07/14/ . Further information regarding FAIR implementation can be found in the deliverable D4.2 "Data repository integration and ORDMFAIR compliance guidelines". https://doi.org/10.5281/zenodo.3736149 .	D2.1/2.3 Draft/Final extended data policy framework for Photon and Neutron RIs (Aug 2020/Aug 2021); T5.1.1 Workshop to promote FAIR principles (to take place Sep/Oct 2020)	n/a
	Rec. 2: Implement a model for FAIR digital objects	Indirectly via the FAIR Evaluator and FAIR recommendations (D4.1, due Aug 2020). Follow the FAIR Digital Object framework (PIDs, explicit identifier for metadata and data) - follows the implementation by the evaluator tool by Mark Wilkinson. Training is ongoing since 2019 (but independently of the EOSC-Nordic project) and by the end of 2020 we will have trained more than a 100 data stewards via a 5-day course by EOFAIR.	WP5.1 and WP5.2 will deliver a pilot where data repositories from some of the use cases of the project are federated. It will use existing tools to proof the concept which will include the FAIR digital object concept and will deliver recommendations on integration of existing reports. The work will be discussed and shared with other call 5b projects. The training component in Pillar will pick up the experience gathered in constructing the pilot and amplify the gained knowledge in the trainings.	Task 4.3 "Open and FAIR data in practice: tools for RDM following the data lifecycle" is focussing on this recommendation. This will lead to the deliverable D4.4 "Delivery of data management and certification toolkit" (type Demo) (July 2020). IPR tool for digital objects. PID policy is being worked on (WP5). In addition we monitor FAIR Data Maturity Model and FAIRFAIR work on FAIR-aligned services in order to prepare with developing FAIR-aligned tools and services in WP4. Further information regarding FAIR implementation can be found in the deliverable D4.2 "Data repository integration and ORDMFAIR compliance guidelines". https://doi.org/10.5281/zenodo.3736149	D2.2/2.7 Draft/Final Recommendations for FAIR Photon and Neutron Data Management (Aug 2020/Feb 2022); D2.5 Advanced infrastructure for PIDs in Photon and Neutron RIs (Aug 2021) T5.1.1 Workshop to promote FAIR principles (to take place Sep/Oct 2020)	D3.3 Intermediate report on technical framework for EOSC FAIR data principles implementation. Describes the evaluation of the recommendations for assessing data FAIRness and data repository features coming from FAIRFAIR and provides details about architecture, requirements and a roadmap for implementation. (Due August 2020). D3.5 Final report on technical framework for EOSC FAIR data principles implementation. Implementation details for a technical framework to validate and monitor data FAIRness. Any change or addition to the information gathered in D3.3 will be reported. (Due Nov 2021)
	Rec. 3: develop components of a FAIR ecosystem	Supported through the testing and development of the FAIR Maturity Evaluator on a 100+ data repository sample, highly focused on machine accessibility. During the project we will support FAIRification activities aimed towards service providers (e.g. recommendations to repositories on metadata, hackathons + MM). Results from the first epoch evaluations for FAIR Maturity will be published in D4.1 (Aug/2020) and D4.3 (Feb/2022).	WP4 will look at the status of policies in the participating countries and line them up with legal practices and procedures. This includes security, access, right of use policies.	D4.1 - Incentives for supporting ORDM and FAIR. https://doi.org/10.5281/zenodo.3736147 . This deliverable describes the incentives and rewards that can be employed to improve the uptake of ORDM and FAIR in general as well as their integration in EOSC through country-tailored systems of rewards and incentives. D4.2 "Data repository integration and ORDMFAIR compliance guidelines". https://doi.org/10.5281/zenodo.3736149 This deliverable follows the results of the analysis of guidelines for open science.	D2.4/8 (Active) DMPs for Photon and Neutron RIs (Aug 2021/Aug 2022)	D4.1 - Best Practices Elicitation including Data Management Plans (Currently in review)
	Rec. 16: Apply FAIR broadly	We aim to introduce recommendations for FAIR services (in collaboration with WP3) and for data repositories (including publishing of code).	D4.4 FAIR-oriented research data management: Support, Training and Assessment Activity Report (1 of 2), 31 Dec 2020 D4.4 FAIR-oriented research data management: Support, Training and Assessment Activity Report (2 of 2), 30 June 2022	"Training the trainers programme focuses on Open and FAIR RDM, promoting these principles at the national level by the trainers is expected"	D2.2/2.7 Draft/Final Recommendations for FAIR Photon and Neutron Data Management (Aug 2020/Feb 2022)	Working with FAIRFAIR to see where the overlap is between Software QA and Service-QA and what that means for FAIR, for an expressed task but happening as part of collaboration activities.
Rec. 17: Align and harmonise FAIR and Open data policy	Harmonising policies in the region and FAIR incentives is on the agenda of WP4 in the last year of the project (2021-22).	WP4.1 will ascertain requirements for open data, data protection and cross border data access with the FAIR and Landscaping TF, and establish boundaries for the legal interoperability of data. The result will be an legal and Policy framework and federation blueprint, December 2020 with to the region covered by Pillar (IT, DE, FR, BE, AT)	WP2 works on building national OSC initiatives aiming at stimulating discussions regarding national research settings and EOSC policies (and FAIR taking stock of OpenFAIR/ NDAOS experience and resources that facilitate policy alignment.	D2.2/2.7 Draft/Final Recommendations for FAIR Photon and Neutron RIs (Aug 2020)	Looking at the SLAs in place for service providers related to data sharing, storage and transfer - making sure DMPs are available. Looking at the AAI policies in place and defining changes which might be recommended to improve/transnational data sharing by service providers.	
FAIR culture (Pillar 2)	Rec. 4: Develop interoperability frameworks	This recommendation is supported through the use of the Wilkinson et al. 2019 evaluation indicators, which has a strong focus on interoperability via use of a number of machine actionable meta-data related to knowledge representation and FAIR vocabularies. Detailed in D4.1 (Aug/2020) and D4.3 (Feb/2022).	See Rec. 2	MM website on publishing and harvesting repository metadata is a forum that could be used to establish links to 1. Best practices for on-line and offline policies. https://eosc-nordic.eu/2020/07/14/	D2.2/2.7 Draft/Final Recommendations for FAIR Photon and Neutron Data Management: (Aug 2020/Feb 2022) D3.1 Report on status, gap analysis and roadmap towards harmonised and federated metadata catalogues for EU national Photon and Neutron RIs (Aug 2020); D3.2 Release V1.0 ExPaNDs ontology available as an EOSC-online service (Feb 2021)	n/a
	Rec. 5: Ensure data management via DMPs	Not a priority in our WP, but one use-case in WP5 on DMPs	NA	producing a FAIR DMP via Argos (machine actionable tool, applies RDA and DMPs common global standard and provides sensing, publishing and assigning DOIs to DMPs) contributing to enhancing the Argos tool with standards used in the region. D4.5 Delivery of legal, technical and procedural tools (type Demo), (November 2021).	D2.4/8 (Active) DMPs for Photon and Neutron RIs (Aug 2021/2022)	D4.1 - Best Practices Elicitation including Data Management Plans (Currently in review)
	Rec. 6: recognise & reward FAIR data & stewardship	Incentives are mapped and innovated for FAIR uptake in T4.3 (2021-2022) and will be detailed in D4.4 (Apr/2022).	NA	D4.1 Incentives for supporting ORDM and FAIR. https://zenodo.org/record/3736148/files/30c15b1a772c ; FAIR data and stewardship rewards will also be tackled by the WP2 national open science initiatives.		MS4 - Badge issuing for Software & Service Quality Assurance) - linked to but not focused on FAIRness Assessment.
	Rec. 18: Cost data management	NA	NA	Training on Open and FAIR RDM also focusses on two aspects of RDM costs: a. from the researchers point of view and how they can calculate costs following the different steps of a data management lifecycle, and b. from the institutional providers point of view and how they can calculate the costs to build custom services.		n/a
	Rec. 19: Select and prioritise FAIR digital objects	Implicitly support FAIR Digital Objects towards data providers, but not explicitly towards researchers	Pillar is considering implementing FDO concepts for its Federated Data Space			n/a
	Rec. 20: Deposit in Trusted Digital Repositories	Activity to support the certification of repositories. Results will be published in D4.5 "Implementation of certifications and data standards"	Long term preservation of the datasets collected as part of the use cases will be done in a eDR	One of the goals of the project is to clarify specific processes of RDM. Within the work of WP4 and WP5 best practices for repositories are examined	D3.3 Demonstrate ICAT and SoCai released with APIs compatible to ExPaNDs (Feb 2022)	n/a
Rec. 21: Incentivise reuse of FAIR outputs	MM also be addressed to some extent in: D4.4 Policies and incentives, D4.3 FAIR uptake,		D4.1 Incentives for supporting ORDM and FAIR. https://zenodo.org/record/3736148/files/30c15b1a772c D2.2 - National OSC-relatives models (due August 2020).	Federated EOSC services	n/a	

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FAIR ecosystem (Pillar 3)	Rec. 7: support semantic technologies	The FAIR Maturity evaluator is actively using various harvesters to extract machine-actionable metadata (semantics). The task that addresses this theme is T4.2.2 "Support the adoption of FAIR data standards" (https://wiki.eosc.no/wiki/EOSC-Nordic/Task_of_tasks), but does not start until Sep2020 (report D4.5 deliverable due Aug2022). Supporting the adoption of semantic attributes within the various communities by MAM, hackathon events + communication. Hope to synchronize our efforts on this better with the other initiatives, in particular other 50-projects.	WP4.5 will gather types of ontologies in use which can be used as a step stone towards machine actionable metadata for FDO.	NI4OS-Europe will use existing semantic schemas	D3.2 Release V1.0 ExPaNDs ontology available as an EOSC online service (Feb 2021)	Alignment of policies to the European Interoperability Framework (EIF). Not a specific task or project focus.	
	Rec. 8: Facilitate automated processing	Indirectly supported via the FAIR Maturity evaluator that is fully automated itself and promotes machine-actionability, which ultimately enables automated processing. Ongoing activity throughout the project.	WP7 will implement workflows using VRE	WP4 will facilitate automation processes through the development of the tools. D4.3 Delivery of legal, technical and procedural tools (type Demo) (November 2020), potentially D4.7 D4.7 Second set legal, technical and procedural toolset (type Demo) (November 2021). A categorization of contemporary tools supporting FAIR and ODM, applicable at the strategic, operational or technical level is provided in the deliverable D4.3 "Mapping of legal, technical and procedural tools" (https://doi.org/10.5281/zenodo.350088)	D4.5 Deployment of Analysis Services for EOSC (Jun 2022)	M3.6 - Software QA-as-a-Service allows to plug-in generic software for CC0. Automated pipelines for adding Software and Services to the EOSC; this should respect FAIR and ROP. (To be possible for generic software & services by the end of 2021)	
	Rec. 9: Certify FAIR services	Support for self-assessments and certification of data repositories according to CTS is a central activity (T4.2.3) in the project and process and results will be detailed in D4.5 (Aug2022). Candidate repositories will be selected in T4.2.1 (May-Jun2020) according to "maturity" repositories that are not yet certified (using results from the FAIR evaluation) and other. Aiming to support 3-5 repositories in the way during the period.	Services delivered as part of the project will stick to the FAIR recommendations. However, the certification of FAIR services is not mature enough to be in scope.	Training for Open and FAIR RDM (WP4) and for onboarding (WP5) includes presentation and walk through the specifics of the CoreTrustSeal certification. Repositories to be onboarded in the NI4OS-Europe countries will have the opportunity to learn about the process and prepare for obtaining a certification if they decide to do so. Also, tools/services to be produced in WP4 already take into consideration FAIR/FAIR reports and deliverables about FAIR-aligned repositories and services. Potentially D3.2 First report on pre-production environment, D3.5 Final report on pre-production environment	D2.6 Self-evaluation Photon and Neutron Ris for FAIR data certification (Feb 2022)	Whitepaper: State of the art regarding digital badge issuing technologies: https://digital-csc.escholar12061206348	M3.4 - Badge issuing for Software & Service Quality Assurance - linked to but not focused on FAIR/Reass Assessment.
	Rec. 22: Use information held in DMPs	NA	NA	NI4OS-Europe DMP has been produced in deliverable D1.14 "Data Management Plan"	D2.8 Active DMPs for Photon and Neutron Ris (Aug 2022)	Driving some process guidance for developing DMPs for services joining the EOSC. D4.1 - Best Practices Elicitation including Data Management Plans -> Deliverable focusing on work with thematic services to empty data management plans as part of the project.	
	Rec. 23: Develop components to meet research needs	NA	See Rec. 1		D3.3 Demonstrate ICAT and SciCat released with APIs compatible to ExPaNDs (Feb 2022)	See Rec. 9.	
Rec. 24: Incentivise research infrastructures to support FAIR data	T4.3 "Incentives for the uptake of FAIR practices" will map and identify effective incentives for various stakeholders. Activity ends 2021 (and continues in D4.6 (Apr2022)).	A federated data space incentivise the uptake of additional data spaces and will connect data islands.		Federated EOSC services	See Rec. 9 - Badging provides recognition.		
Skills for FAIR (Pillar 4)	Rec. 10: Professionalise data science & stewardship roles	NeIC (project coordinator) has initiated a regional series of data stewardship courses (held by GO-FAIR trainers) to build homogeneous data stewardship competences throughout the region (by end of 2020 expect more than 100 trained stewards). Beyond dissemination of the importance of training and self-development through the project (T4.1), there are no explicit actions to contribute to training among data scientists or research support staff. Train-the-trainer event planned for 2020-21, to develop a training series with hands-on exercises using tools and use-cases.		Through training activities and dissemination events of the project with a total of 600 persons targeted. All the relevant information can be found on our training plan published on the deliverable D2.3 Training plan (https://zenodo.org/records/3736165#file=Qj7T25uLKWJ). In addition, WP2 that consults NI4OS-Europe partners and builds a blueprint for creating national open science initiatives, includes provisions for implementing education and training frameworks in the countries. However, how/when which extent they will be implemented at the national level depends on the diversity of national settings and on the priorities set in national roadmaps.	D2.1 Annual report on training activities (Aug 2020, 2021, 2022)	Development of a train-the-trainer guide for the associated platforms being developed on the project.	
	Rec. 11: Implement curriculum frameworks and training	NA	D3.3 Training Plan (Dec 2019)	The project supports Training of Partners and creation of training material to be translated to the partners' languages for FAIRness. The material will be based on existing training material/guidelines transformed to meet stakeholders' needs according to the project's stakeholder survey findings.	D5.4 Report on lessons learned and future prospects for adopting best practices on data FAIR principles, data management and data stewardship at the ExPaNDs Ris (Aug 2022)	WP6 is finalizing a report about MOOC solutions available as a preliminary step for the development of a tool that will help data producers, stewards, services and infrastructures run their own training events about Open Science in general	
Incentives and metrics for FAIR data and services (Pillar 5)	Rec. 12: Develop metrics for FAIR digital output	Evaluation of repository FAIRness is achieved by averaging 10-15 datasets from the respective repository. More than 100 repositories are evaluated. Project has contributed to the extensive testing and multiple improvements of the FAIR Maturity evaluator tool, including harvester and many of the indicators. Details to be provided in D4.1 (Aug2020) and D4.3 (Feb2022).	Together with the calls& an initiative to define metrics (indicators) which include indicators on implementation of FAIR for continuous monitoring has been started.	D4.3 has identified studies, frameworks and tools that propose and/or make use of FAIR metrics. FAIR Maturity Model is also guiding practice in that area and service providers will be informed about all possible solutions for assessing FAIRness and will be provided with support within WP4, 4 and 5 should they be willing to implement them.	D2.1 Draft data policy framework for Photon and Neutron Ris (Aug 2020) -> evaluation using FAIR Data Maturity Model - write up as possible use case?		
	Rec. 13: Develop metrics to certify FAIR services	WP3 is developing a Service Maturity framework, but the FAIR aspect of that is less clear.	NA	D4.3 has identified studies, frameworks and tools that propose and/or make use of FAIR metrics, including for repositories. Moreover, for the needs of new tools to be developed in WP4, FAIR/FAIR report is taken into consideration so that they are designed from scratch as FAIR-enabled tools/services.	D2.6 Self-evaluation Photon and Neutron Ris for FAIR data certification (Feb 2022)		
	Rec. 25: Implement and monitor metrics	FAIR Maturity evaluator is the implementation of metrics and the project is monitoring the evolution of those metrics among 100+ repositories in the region and will monitor those over 2 years using a fixed version of the evaluator.	Pillar together with 50 projects work on metrics to be rolled out in National initiatives - this includes metrics related to FAIR	Metric derived from onboarded services and repositories will be monitored at the pre-production platform before fed to EOSC.			
	Rec. 26: Support data citation and next generation metrics	NA	NA				
Investment in FAIR (Pillar 6)	Rec. 14: Provide strategic and coordinated funding	NA	The project has funds to support applicable use cases of new services with integration into EOSC. The applicants will be selected through an open call. At the time the selection criteria for the applicants are not yet defined but will contain requirements regarding FAIRness of the proposed service candidate.	Strategic and coordinated funding will be covered in business plan as well as sustainability plan. Regarding Business Plan, there is a particular task focusing on such aspects, namely T2.4 "Business Models" which is expected to deliver D2.5 "Business model for recommendations" by October 2021. In addition, task 7.4 "Innovation management and sustainability" with final results presented in the deliverable D7.7 "Sustainability Report" which is expected to be delivered by August 2022.	D1.7 Sustainability policy report (https://doi.org/10.5281/zenodo.3715279)	n/a	
	Rec. 15: provide sustainable funding	NA	WP4.5 investigates models for funding in the different participating countries and will deliver lessons learnt.	T7.4 Innovation management and sustainability. This leads to two deliverables, D7.2 "Marketing, dissemination and sustainability plan" (https://zenodo.org/records/3736165#file=XH7NkgX2x (November 2019)) as well as D7.7 "Sustainability Report" (MS)	D1.7 Sustainability policy report (https://doi.org/10.5281/zenodo.3715279)	n/a	
	Rec. 27: Open EOSC to all providers but ensure services are FAIR	What is expected to "ensure that services are FAIR-compliant" is not very clear to us yet. What we have discussed is to include machine-actionable metadata to declare what type of service and supported APIs a given service provides (but have not yet clearly established what vocabulary/standard to use if available at all). Open APIs are used as a rule (when possible) to enable interoperability.	Assessment of FAIRness of services is the next step - currently main objective is inclusion to EOSC catalogue.	Gradual migration of regional services and repositories towards EOSC with focus on FAIRness. Deliverable D3.2 "First report on pre-production environment" (June 2020), Deliverable D3.5 "Final report on pre-production environment" (April 2020)	D4.5 Deployment of Analysis Services for EOSC (Jun 2022)	D2.3 Intermediate report on integration efforts. This report will provide information on the implementation status of Integration Plan. (Q4, 2020)	