

ESCAPE DIOS: towards the prototype

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ESCAPE WP2/DIOS Workshop, 10 December 2020





Work Package Deliverables



Deliverables Nr	Description (type)	Task Lead Month participant		
D2.1	Implementation plan and design of pilot; R&D questions/metrics that will be addressed in the pilot and prototype. (R)	2.1, 2.2, 2.3, 2.4, 2.5, 2.6	CERN	8
D2.2	Assessment and analysis of the performance of the first pilot data lake (R)	2.1, 2.2, 2.6	SKAO	24
D2.3	Final assessment and analysis of the full prototype, outlook for further development and deployment towards full production services within EOSC (R)	2.1, 2.2, 2.4, 2.6	CERN	40



Project Title European Science Cluster of Astronomy & Particle physics ESFRI research Infrastructure

Project Acronym ESCAPE
Grant Agreement No 824064

Instrument Research and Innovation Action (RIA)

Topic Connecting ESFRI infrastructures through Cluster projects (INFRA-EOSC-4-

2018)

Start Date of Project 01.02.2019

Duration of Project 42 Months

Project Website www.projectescape.eu

D2.1 - IMPLEMENTATION PLAN AND DESIGN OF PILOT









Already Partially achieved

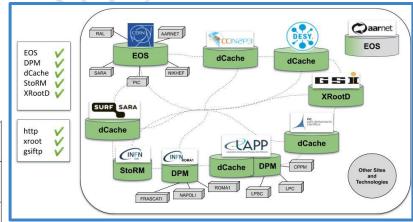
Work Package Milestones



Successful Transfers Percentage (days)

 Well ahead of M2.2, functional pilot data lake with 10 storage endpoints

First WP2 workshop on the initial design and goals of the first pilot data lake, prepare D2.1	WP2	М6	Workshop summary report
Initial pilot data lake with at least 3 core data centres	WP2	M18	Progress report; Active monitoring of activity (web site)
Second WP2 workshop to analyse the performance of the pilot, prepare D2.2	WP2	M22	Workshop summary report
Expanded prototype – more data centres including 3rd party centres, demonstrate integrated data management tools, verify RI data accessibility from compute platforms including commercial clouds	WP2	M24	Review of D2.2; Monitoring web site
Extension of the data lake to efficiently serve data to external compute resources providers	WP2	M30	Progress report; Monitoring web site
ISO 16363 certification process underway in core data centres	WP2	M32	Progress report; core data centres finished self-certification audit and ready to submit to external audit.
Third WP2 workshop to review performance of the full prototypes, and to explore future directions, prepare D2.3	WP2	M38	Workshop summary report
	and goals of the first pilot data lake, prepare D2.1 Initial pilot data lake with at least 3 core data centres Second WP2 workshop to analyse the performance of the pilot, prepare D2.2 Expanded prototype – more data centres including 3rd party centres, demonstrate integrated data management tools, verify RI data accessibility from compute platforms including commercial clouds Extension of the data lake to efficiently serve data to external compute resources providers ISO 16363 certification process underway in core data centres Third WP2 workshop to review performance of the full prototypes, and to	and goals of the first pilot data lake, prepare D2.1 Initial pilot data lake with at least 3 core data centres Second WP2 workshop to analyse the performance of the pilot, prepare D2.2 Expanded prototype – more data centres including 3rd party centres, demonstrate integrated data management tools, verify RI data accessibility from compute platforms including commercial clouds Extension of the data lake to efficiently serve data to external compute resources providers ISO 16363 certification process underway in core data centres Third WP2 workshop to review performance of the full prototypes, and to WP2	and goals of the first pilot data lake, prepare D2.1 Initial pilot data lake with at least 3 core data centres Second WP2 workshop to analyse the performance of the pilot, prepare D2.2 Expanded prototype – more data centres including 3rd party centres, demonstrate integrated data management tools, verify RI data accessibility from compute platforms including commercial clouds Extension of the data lake to efficiently serve data to external compute resources providers ISO 16363 certification process underway in core data centres Third WP2 workshop to review performance of the full prototypes, and to WP2 M38

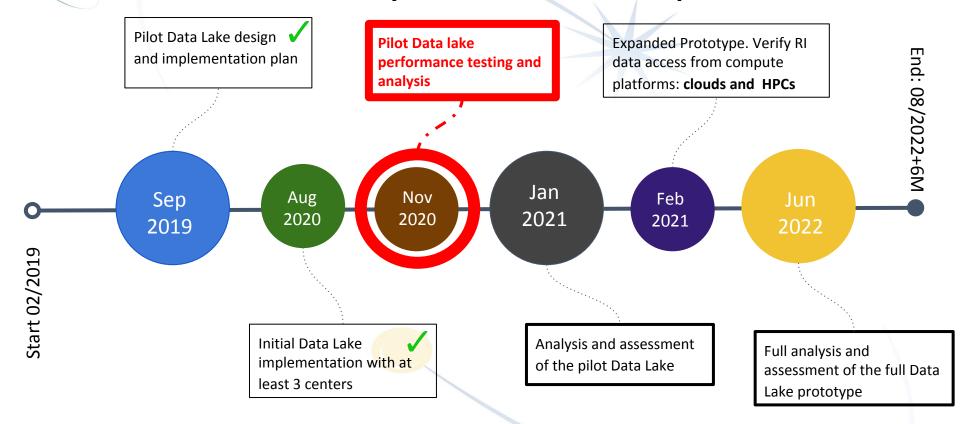


				Successful fransiers Percentage (davs)			
Source \ Destination	ccdcalitest10.in2p3.fr	dcache-door- doma01.desy.de	dclxwp2dlds1.gsi.de	door05.pic.es	eoseulake.cem.ch	lapp- dcache01.in2p3.fr	
ccdcalitest10.in2p3.fr	a a	100.00%	99.76%	100.00%	100.00%	99.95%	
dcache-door- doma01.desy.de	100.00%	2	99.69%	99.99%	100.00%	99.48%	
dclxwp2dlds1.gsi.de	99.24%	99.55%	(5)	99.19%	73.65%	98.94%	
door05.pic.es	99.97%	100.00%	99.69%	100.00%	100.00%	99.90%	
eoseulake.cern.ch	100.00%	100.00%	98.97%	100.00%		99.87%	
lapp- dcache01.in2p3.fr	99.69%	99.63%	98.89%	99.53%	99.94%	-	
lapp-esc02.in2p3.fr	100.00%	99.82%	99.81%	100.00%	100.00%	100.00%	
lapp- testse01.in2p3.fr	96.16%	96.17%	94.39%	96.35%	94.88%	95.16%	
t2-dpm- dome.na.infn.it	97.44%	100.00%	91.01%	98.18%	92.86%	96.67%	
webdav.grid.sara.nl	100.00%	100.00%	99.85%	100.00%	100.00%	99.79%	
xfer.cr.cnaf.infn.it	100.00%	100.00%	78.27%	100.00%	95.31%	99.96%	



Summary WP2 Roadmap











Risk review - from the GA



Performant and scalable data lake not being able to serve multiple RIs simultaneously. (Low)	WP2	Build on many years' experience in WLCG in data and storage federations, with existing and demonstrated solutions, integrating these with a coordination and service layer.
Lack of maturity and uptake of underlying technologies required; such as European- wide AAI services. (Low)	WP2	Collaborate with and set requirements for ongoing actions and projects: for example, AARC, EOSC-hub, EOSCpilot, GEANT etc.
Difficulty in integrating adhoc storage solutions at data centres into a coherent federated service. (Medium)	WP2	The core data centres selected bring several different and widely used storage solutions to the project; previous expertise of the partners (CERN, DESY, INFN) in building large-scale storage will address this.
Access to external HPC and cloud resources to support and validate data-heavy workflows is essential, missing HPC and cloud environments to support exascale data processing capabilities. (Low)	WP2	Collaborate strongly with PRACE for HPC, HNSciCloud partners for cloud, and GEANT for data access.

Working pilot data lake in place, strong indications it can serve multiple RIs

Successful interactions and experience: common AAI in production (indigo IAM)

Different storage technologies with a variety of storage backends have been successfully integrated

Ongoing collaboration with the GEANT, PRACE, CERN, SKA collaboration agreement on HPC. Participated in the kick-off workshop Sep-2020







Risk review - new possible risks



- **Risk**: Difficulty to endeavour partner data centers into the certification as trustworthy digital repositories. ISO16363: long term data preservation (low risk)
- **Mitigation**: Collaboration ongoing with ARCHIVER project, join efforts, some common stakeholders in both projects (CERN, DESY and PIC). This does not compromise the project as it is a data center specific certification
- **Risk**: Difficulty to procure and commission external compute resources for a meaningful data lake access demonstrator (low risk)
- **Mitigation**: Joint proposal with an ICT call was rejected, keep an eye on possible cooperation with current/new EU projects, otherwise start a dedicated task during the next period







Next steps



- Pilot datalake assessment exercise (November/December)
 - Very successful Full Dress Rehearsal on the 17th Nov M2.3 (M22)
 - Second WP2/DIOS Workshop 8th and 9th December
- Deliverable D2.2 (M24): Performance assessment and analysis of the pilot datalake
- From M24: Pilot datalake evolution towards the prototype phase
 - Increase storage size, allowing to scale-up data ingestion and throughput challenges
 - Demonstrate data access from compute platforms (including commercial clouds), evaluating the possibility to include HPCs
 - Trustworthy digital repositories for long term archive (ISO16363 certification)
 - WP5/ESAP intensify collaboration focusing to prepare full workflows (planing a mini-workshop)
- A very rich work program for 2021:
 - Collaborating with European Projects: ARCHIVER, CS2MESH4EOSC, (EOSC-Future)
 - Engagement with Fellow Cluster Projects: PANOSC /EXPAND
 - And technical challenges: Tokens, Embargo data, FTS/network throttling multi-VO, RUCIO event notification mechanism, Downtime/ ticketing, TSP, Immediate use-cases (EGO)...







Summary



- For the first time flagship ESFRIs are collaborating together since the real beginning to implement the standards of data FAIRness and Open Access in a common scientific data management infrastructure
- Breaking historic sociological barriers among different scientific communities in the search for commonalities in their computing models and potential synergies
- A very encouraging scientific atmosphere. The engagement from from ALL OF YOU have been overwhelming. We should be proud of what we achieved so far and use this momentum for the 2nd phase of the project. I am convinced we will deliver value that will persist after the end of the project.

	Marka	AAI	Storage Orchestration	Networks and asynchronous data transfer	Content delivery and caching	Configuration, Monitoring and Accounting		
	Month 8		Proje	ect planning and hiring stage co	iipiete			
Pilot Phase	Month 12	X509 authentication enabled on all partner sites	Enable ESCAPE VO on partner storage sites Test RUCIO instance federating storage	perfSONAR deployed at three partner storage sites	Installation and configuration of Cache at one site	CRIC information system deployed in ESCAPE datalake		
	Month 18	Enable IAM on ESCAPE rucio instance	3 partner institutes with different technologies ESCAPE Rucio instance deployed. Ability to define simple file QoS rules	Network health dashboard developed for ESCAPE	Instrumentation of XCache monitoring	Adoption of FTS monitoring dashboard for ESCAPE datalake		
	Month 24	storage access	FTS instance ready for bulk data transfers among the pilot partner sites	Data Transfer and access commissioning	Installable SW suite measuring the impact of a cache	Prototype of ESCAPE datalake dashboard		
		<u></u>	Pilot	Pilot phase testing complete, report delivered				
Full ESCAPE prototype phase	Month 30	Token-based data management	Quality of Service parameter development and tuning for Reliability, Performance and Cost Event-driven data management tested	Third party transfers enabled	Interactions with science analysis	Instrument workload testing on the ESCAPE datalake (Hammercloud)		
	Month 36	deployed ob ESCAPE datalake		Network route optimisation for intelligent transfers	methods within ESCAPE WP5	Final ESCAPE data lake dashboard		
FIII	Month 40	Final deliverable assessing data lake performance in all themes.						